# AN EXPLORATORY STUDY OF PSYCHOLOGICAL CORRELATES OF TYPE 2 DIABETES

*Thesis*

*Submitted in partial fulfillment
of the requirements for the Degree of*

DOCTOR OF PHILOSOPHY

IN

PSYCHOLOGY

**Submitted By**

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**2016**

# DECLARATION

I, Sarika K. K, do hereby declare that this thesis, **"AN EXPLORATORY STUDY OF PSYCHOLOGICAL CORRELATES OF TYPE 2 DIABETES"** is a bonafide record of the research work done by me under the guidance of Dr. Baby Shari P.A, Associate Professor, Department of Psychology, University of Calicut. I further declare that this thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title of recognition.

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# CERTIFICATE

This is to certify that this thesis entitled "AN EXPLORATORY STUDY OF PSYCHOLOGICAL CORRELATES OF TYPE 2 DIABETES", is a bonafide record of research work carried out by Mrs. Sarika . K.K, under my supervision and guidance, and that no part of this has been presented before for the award of any degree, diploma, associateship or fellowship or other similar title or recognition.

Calicut

Supervising Teacher
**(Dr. Baby Shari P.A.)**

# DEDICATION


*This thesis is dedicated to my dear parents and my loving husband Jubin Rajeev*


By

The Author

**Sarika. K.K**

# ACKNOWLEDGEMENTS

# ABSTRACT

Diabetes Mellitus is considered as the second largest lifestyle disease, based on the mortality rate of this in every year. In the present scenario the disease and health behaviour has been given more importance by the researchers. Like all other illness, type 2 diabetes also has a bio-psycho-social interaction in its causal factors, but more importance was given to the biological part and the treatment also limited to the biological factors. Many researchers have speculated numerous psychosocial factors were related to diabetes, and its proper identification and management will help to limit the long term complication caused by the disease. That means psychosocial factors not only become causal factors but also the consequences of type 2 diabetes. Several studies were conducted regarding psychological factors of type 2 diabetes. Compared to Western countries such studies were less in India. In this context the researcher conducted the present study to identify the psychological factors related to type 2 diabetes, in Kerala population and designed a psychological intervention package to modify those factors. To get a general idea of the common psychological difficulties experienced by the type 2 diabetic patients, a pilot study had been conducted. Based on the pilot study and the scientific evidences obtained, the researcher selected certain variables for the study namely Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related Depression and Type D personality. Later the researcher aimed to explore the common psychological factors associated with type 2 diabetes. Participants of the study were 256 diabetic patients with the age range 30-70 years and all were the natives of Kerala. Among these a small subsample were collected from the migrated population of Kerala for a culture based comparison. The participants completed the measures such as Quality of Life Instrument for Indian Diabetic patients, Perceived Stress Scale, The Self- Care Inventory, The subjective Well –Being Inventory, DS-14 Questionnaire of type D personality, Multidimensional Scale of Perceived Social Support and Patient Health Questionnaire. The collected data was analyzed using Statistical Package for Social

Sciences (SPSS). One of the major findings was the identification of the two types of psychological factors, namely positive factors and negative factors based on their nature of influence on blood sugar level. And also the results indicated that those positive and negative factors were related to each other in a contradictory fashion. It was very interesting to find that the variables have the capacity to predict certain other related variables especially; Negative Affectivity predicts decrease in Subjective Well being and Diabetes Related Quality of Life predicts decrease in Health Related Depression. Enhanced positive factors like Diabetes Related Quality of life, Perceived Social Support and Diabetes Self Care significantly reduce the Health Related Depression (a negative factor). Increased negative factors of Perceived Stress, Negative Affectivity and Social Inhibition significantly decrease Subjective Well Being (a positive factor). Locality based comparison showed that those who were living in their own home town have improved Subjective Well Being compared to those who were migrated. In this study the researcher identified the common psychological factors associated with type 2 diabetes in Kerala and also to modify those psychological factors an intervention strategy has been designed. The techniques used in this intervention strategy have been divided into four major clusters namely, Self Care Management, Social Skills Training, Cognitive Behaviour Therapy and Relaxation Training. Those intervention techniques were used either single or in combination based on the need of the patient.

**Key words**: Type 2 Diabetes Mellitus, Psychological Correlates, Management.

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# ABBREVIATIONS

| | | |
|---|---|---|
| DRQOL | = | Diabetes Related Quality of Life |
| DSC | = | Diabetes Self Care |
| FBS | = | Fasting Blood Sugar |
| NA | = | Negative Affectivity |
| SI | = | Social Inhibition |
| PSS | = | Perceived Stress |
| SS | = | Perceived Social Support |
| SWB | = | Subjective Well Being |
| HRDPN | = | Health Related Depression |

# Chapter I

# INTRODUCTION

❖ Diabetes

❖ Role of Psychological factors in Diabetes

❖ Significance of the study

❖ Statement of the Problem

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An adolescent boy, named Karthik was brought to a psychologist for having inattention in classroom, not interested to play with peers, drinking water to express irreverence with teachers. He was reported to be lethargic, interrupted sleep, sleepy very early and not concentrating in classroom discussion or parental advices. In relation to his age his problem can be attributed to love affairs, substance abuse, physical abuse, effect of growth spurt, identity crisis, and peer rejection, parental over expectation or even lack of acceptance of changes in his physique. But before attributing to psychosocial factors, the problem's root cause could have been immediately identified, if his blood analysis was done, that he is diabetic. But how many psychologists are ready to go for a blood test, for the list of psychological symptoms presented before them.

Teena was citing her mother's case to my guide, where her mother Daisy was always blamed by Teena and her father as a lazy wife. When the husband and daughter will be busy preparing to go to the office and school in the morning, the mother, Diasy couldn't wake up early and engage in the household works. She somehow prepares some easy breakfast and compels her husband and daughter to pack same for lunch. As soon as they leave, Daisy will lie down, being very tired. By evening she will wake up and cook something for the husband and daughter. They had a lot of complaints about the 'mother', but all ended up when she had difficulty to urinate. Only then they identified that she was diabetic and both her kidneys were badly damaged. Daisy couldn't be saved, but she was many years showing her behavioural symptoms of diabetes which were thoroughly ignored.

In UK, police received an urgent call from a factory that Mr. Andrew was becoming violent and he had already attacked two of his colleagues. Somehow he was under control till the police come. As per their rule, by suspecting a behavioural disorder a social worker also was present there, during the arrest. By suspecting a behavioural symptom, (especially in discussion with a Diabetician in the previous day), the social worker suggested for a blood test, where as the results had brought a total change of path for the case. Sudden increase in blood sugar also can lead to this

kind of symptoms? Do we also have to do an endocrinological analysis during different behavioural extremes?

Dinesh was about to file a case for divorce. Because his wife Lishma was not found to be compatible by him. When the case was analyzed it was found that theirs was a love marriage. The relation went on smoothly only for 2 months, but when Lishma was living with her in laws, and Dinesh reach home during weekends. His mother complained that his wife was not at all interested in household works. Unlike with the expectations of traditional family, Lishma was not cleaning the house, washing clothes, or preparing food, but always reading, sleeping, taking rest and doing something for herself only. She eats well and asks for water from the homemaid, who also complained that she can't climb steps always up to her bed room. While going to meet relatives, Lishma compelled to go by taxi, as she can't sit long in bus. By ignoring all the complaints, Dinesh brought Lishma to his official quarters but things were no different. The real complaints of his mother were really experienced by Dinesh where his wife was not all interested in sex also. Dinesh, who is aspiring for a promotion, was also interested to settle somewhere he is going to be posted soon, but was same that his life will be an utter failure, if he is going to continue with Lishma.

Every event will be leading to its own effects on the environment, just like a butterfly effect i.e., it says, if a butterfly is flapping its wing, even that creates an effect in the environment around. In terms of medical disorders and illnesses, this effect can be like symptoms of different sorts. But the sensitivity toward the identification of the significance becomes very crucial, when it leads to the matter of life. The above mentioned persons could or couldn't be identified as diabetic, in terms of the sensitivity of an immediate environment (a person nearby), to identify it as a symptom and intervene accordingly. The importance is tried to be highlighted here, as the symptoms also will be expressed in terms of bio-psycho-social events of the person. In diabetics the role of psychological factors and the kinds of symptoms are tried to be portrayed here, especially in terms of its importance in studying as causal effect or regulated symptom. Many a time, even directed to a psychologist

they may not attribute directly to a biological cause. Similarly, there will be behavioural symptoms, which may not be identified and intervened in time, but will be ignored up to the expression of complex biological symptoms.

Health can be defined in different ways. It can be defined, as the absence of illness; functionally, as the ability to cope with everyday activities, or positively, as fitness and well-being (Blaxter, 1990). In any living being, health operates in the form of homeostasis or a state of balance, with inputs and outputs of energy and matter in equilibrium (allowing for growth). And in human beings health is a broader concept invoking a dynamic state ranging from chronic illness or disability to optimum levels of functioning across all domains of life. Though the interplay between Psyche and Health has got a long history, psychosomatic medicine and behavioural medicine had developed out of it very recently, in 1930's and 1970's. A third field also emerged in the late 1970's within the discipline of psychology; it is 'Health Psychology'. Mechanisms like neuroendocrine and immunological may mediate the effects of psychological factors on physical process (Dogar, 20007). This perspective has later emerged into 'biopsychosocial model' (Engel, 1977, 1980; Schwartz, 1982).

Biological psychological and social factors influence the prevention, causes, presentation, management and outcome of the disease. Each of these factors continuously interacts with the others and together they constitute the unique state we call illness. Psychological and social variables are unquestionably important in medicine; their proportional importance varies depending on the person and his or her medical circumstances. Chronic conditions such as hypertension and diabetes are affected by multiple aspects of the personality and the social environment. The effects of bio-psycho-social factors are significant in the occurrence of type 2 diabetes.

Diabetes is expected to increase further with the International Diabetes Federation's prediction of an increase in the number of individuals with diabetes from 240 million in 2007 to 380 million in 2025, with 80% of this disease burden in lower-and middle-income countries (Diabetes Atlas, 5th ed 2011). More alarming in

this region is the expectation that more than 60% of this population with Diabetes Mellitus will come from Asia, implying substantial increases in prevalence in each country in the coming decades, especially so in developing countries with the most rapid economic growth (Diabetes Atlas,3rd ed 2006).

Diabetes is growing alarmingly in India, home to more than 65.1 million people with the disease, compared to 50.8 million in 2010 ( International Diabetes Federation, Diabetes Atlas, 6th ed 2013). A potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease (Diabetes Atlas, 5th ed 2011, Diabetes Atlas, 3rd ed 2006). In 2000, India (31.7 million) topped the world with the highest number of people with diabetes mellitus. The prevalence of diabetes is predicted to double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India. It is predicted that by 2030 diabetes mellitus may afflict up to 79.4 million individuals in India. (Roglic & Unwin, 2010, Hirsch, 2003). India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. Many influences affect the prevalence of disease throughout the country, and identification of those factors is necessary to facilitate change when facing health challenges. The etiology of diabetes in India is multifactorial and includes genetic factors coupled with environmental influences such as obesity associated with rising living standards, steady urban migration and lifestyle changes.

There are however, patterns of diabetes incidence that are related to the geographical distribution of diabetes in India. Rough estimates show that the prevalence of diabetes in rural populations is one quarter that of urban population for India and other Indian subcontinent countries such as Bangladesh, Nepal, Bhutan, Sri Lanka (Roglic & Unwin, 2010, Claudi, Ingskog, Cooper, Jenum & Hausken, 2008). Preliminary results from a large community study conducted by the Indian Council of Medical Research (ICMR) revealed that a lower proportion of the population is affected in states of Northern India (Chandigarh 0.12 million, Jharkhand 0.96 million) as compared to Maharashtra (9.2 million) and Tamil Nadu (4.8 million) (Claudi, Ingskog, Cooper, Jenum & Hausken, 2008). The National

Urban survey conducted across the metropolitan cities of India reported similar trend: 11.7 percent in Kolkata (Eastern India), 6.1 percent in Kashmir Valley (Northern India) (Saydah, Fradkin & Cowie, 2004), 11.6 percent in New Delhi (Northern India), and 9.3 percent in West India (Mumbai) compared with 13.5 percent in Chennai (south India), 16.6 percent in Hyderabad (South India) and 12.4 percent in Bangalore (South India). A suggested explanation for this difference is that the north Indians are migrant Asian populations and South Indians are the host populations, however this possible cause-and-effect has not been corroborated through further research.

**Diabetes**

Diabetes is a chronic condition of impaired carbohydrate, protein, and fat metabolism that results from insufficient secretion of insulin or from insulin resistance. The cells of the body need energy to function, and the primary source of energy is glucose, a simple sugar that results from the digestion of foods containing carbohydrates. Glucose circulates in the blood as a potential source of energy for cells that need it.

Insulin is a hormone, produced by the beta cells of the pancreas that bonds to the receptor sites on the outside of a cell and acts essentially as a key to permit glucose to enter the cells. When there is not enough insulin produced or when insulin resistance develops (that is, the glucose can no longer be used by the cells), glucose stays in the blood instead of entering the cells, resulting in a condition called hyperglycemia. The body attempts to rid itself of this excess glucose, yet the cells are not receiving the glucose they need and so send signals to the hypothalamus that more food is needed.

**Types of Diabetes**

There are two major types of diabetes: Insulin dependent (or Type 1) diabetes and non-insulin dependent (or Type 2) diabetes. They differ in origin, pathology, role of genetics in their development, age of onset and treatment.

Type 1 diabetes is an autoimmune disorder characterized by the abrupt onset of symptoms, which result from lack of insulin production by the beta cells of the pancreas. The disorder may appear following viral infection and probably has a genetic contribution as well. In type 1 diabetes, the immune system falsely identifies cells in the pancreas as invaders and, accordingly, destroys these cells, compromising or eliminating their ability to produce insulin. Type 1 diabetes usually develops relatively early in life, earlier for girls than for boys. There are two common time periods when the disorder arises: between the ages 5 and 6 or, later between 10 and 13.

The most common early symptoms are frequent urination, unusual thirst, excessive fluid consumption, weight loss, fatigue, weakness, irritability, nausea, uncontrollable craving for food(especially sweets), and fainting. These symptoms are due to the body's attempt to find sources of energy, which prompts it to feed off its own fats and proteins. By-products of these fats then build up in the body, producing further symptoms; if the condition is untreated, even a coma can be the result.

Type 1 diabetes is a serious, life-threatening illness accounting for about 10% of all diabetes. It is managed primarily through direct injections of insulin-hence the name insulin-dependent diabetes (American Diabetes Association, 1999).

Type 2 (or non-insulin-dependent) diabetes is milder than the insulin-dependent type and has different underlying causes. A good deal is known about the mechanisms that trigger Type 2 diabetes (Kiberstis, 2005). Glucose metabolism involves a delicate balance between insulin production and insulin responsiveness. As food is digested, carbohydrates are broken down in to glucose. Glucose is absorbed from the intestines in to the blood, where it travels to the liver and other organs. Rising levels of glucose in the blood trigger the pancreas to secrete insulin in to the blood stream. When this balance goes away, it sets the stage for type 2 diabetes. First, cells in muscle, fat and the liver lose some of their ability to respond fully to insulin, a condition known as insulin resistance. In response to insulin resistance, the pancreas temporarily increases its production of insulin. At this point,

insulin-producing cells may give out, with the result that insulin production falls, and the balance between insulin action and insulin secretion becomes deregulated, resulting in Type 2 diabetes (Alper, 2000). The symptoms include frequent urination; fatigue; dryness of mouth; impotence; irregular menstruation; loss of sensation; frequent infection of the skin, gums, or urinary system; pain or cramps in legs, feet, or fingers; slow healing of cuts and bruises; and intense itching and drowsiness are occurs in type 2 diabetics .

**Type 2- life style disorder**

Type 2 diabetes is a relatively modern disease, occurring in the past few thousand years with increasing obesity and reduced physical activity occurring in populations with genetic tendency toward diabetes, type 2 diabetes has become almost epidemic in some corners of the world (Reddy, 2009). A combination of genetic susceptibility plus adoption of a high- calorie, low-activity lifestyle is the main reason behind India's growing diabetes. The main etiological risk factors for type 2 diabetes are age, obesity, family history, and physical inactivity. Dietary factors such as a high proportion of energy consumed as saturated fat and low intake of fruits and vegetables are likely to be important. Type 2 diabetes is a lifestyle disease, and several lifestyle factors are known to cause type 2 diabetes. In addition, heredity also plays a major role in type 2 diabetes. Most important lifestyle risk-factors for type 2 diabetes include; obesity, sedentary lifestyle, and unhealthy eating habits. Health behaviors of Diabetic patients are not widely explored in eastern countries. Nowadays westernization, industrialization and modernization are making Indian life also similar to that of western. So that sedentary lifestyle related diseases are also reported from our country too.

**Role of psychological factors in Diabetes**

More researches in diabetes conducted in non-psychological risk factors, compared to this the psychosocial risk factors were less studied.  Even so there are some research studies suggesting the significant independent effect of psychosocial variables in the onset of diabetes. A research conducted by Eaton and colleagues suggested that major depressive disorder may increase the risk for onset of type 2

diabetes, even when age, race, sex, socio economic status, education, use of health services, other psychiatric disorders, and body weight are controlled for (Eaton, 1996). In a study conducted in 2000 in Japanese men with moderate to severe symptoms of depression had 2, 3 times higher risk for having type 2 diabetes at 8 years follow up (Kawakami, 1999).

The psychological factors of stressful life experience influence the onset of type 2 diabetes. The research conducted by Mooy, (2000), had found that the number of major stressful life experiences in the previous 5 years might be associated with the new diagnosis of diabetes.

Psychosocial factors that directly and indirectly associated with glycemic control in type 2 diabetic patients including, diabetes self-care, health related quality of life, social support, subjective well being, perceived stress, health related depression, and type D personality. On the basis of the impact of on the patients' mental health and glucose level these variables can be classified as positive and negative

The positive impact of diabetes was represented by overall well being, harmonious relationships, a rewarding life, and spiritual satisfaction, while the negative impact was represented by depression, fear, lack of support and psychological stress (Cited by Sarika & Baby Shari, 2015). Descriptions of both positive and negative impacts were limited. The studies indicated the existence of positive impacts of chronic illness among people with diabetes. Choe et al., (2001 a)

Health has been defined as a human condition with physical, social, and psychological dimensions, each characterized along a continuum with positive and negative poles (1988 International Consensus Conference on Exercise, Fitness, and Health). Within this definition, positive health is associated with life enjoyment and not merely the absence of disease. Negative health is associated with morbidity and at the extreme, premature death. The WHO views health as a state of complete physical, mental, spiritual, social well-being and not merely the absence of disease.

Present study aimed to explore positive and negative psychological variables related to type 2 diabetes mellitus, their inter relationship with each other, and combined effect which influences the  changes in individual's perspectives of life after diagnosed with type 2 diabetes. And the present research also intended to design a psychological intervention package which consists of the different psychological techniques what will be effective to influence the psychological factors related to type 2 diabetes. The psychological variables identified as related to type 2 diabetes have been classified as positive and negative variables. The presence of positive variables enhances the person's satisfaction and happiness in life, which will help the person to view their life in positive perspective. Positive variables identified in the study that related to type 2 diabetes includes; Subjective Well Being, Health Related Quality of Life / Diabetes Related Quality Of life, Perceived Social Support, and Diabetes Self Care.  The experience of negative variables decreases the person's life satisfaction and they become unhappy in their life, which in turn leads to negative outlook of life. Negative variables identified in the study related to type 2 diabetes are; Perceived Stress, Health Related Depression, and Type D personality.

**Subjective Well Being**

Subjective Well Being or person's subjective perception of life satisfaction is most important among the positive psychological variables related chronic illnesses. The person who is enjoying high level of Subjective Well Being is based on his or her satisfaction of their own life, and frequently experiences positive emotions (such as joy, affection) and they will never feels negative emotions (such as distress and anxiety).  Psychological health is the embodiment of social, emotional, and spiritual well being (as a resource and state). It is a potential pre requisite for providing the life necessities for the active lifestyle, achievement of one's own goals, adequate and optimum interaction with people, social environment and other (Haletska, 2006).

Thus, in Subjective well being, a person's subjective perception about his/her own well-being is of supreme importance, many cultural factors are affecting the subjective well being and which is formed it multifaceted. It is good to feel

(Subjectively) happy in order to keep one's subjective well-being and avoid the negative affect but it cannot be looked at in isolation.

Well being is planned to be studied in an Indian Perspective in the present study. Mind and spirit both have found important place in Indian perspective on 'health' and well-being. It explains well being as an interactive process having several dimensions. Based on Indian perspective well being of an individual or society is multi dimensional in its nature, thus if an individual is physically strong, economically rich, and socially active, it does not ensure his overall 'well-being' or happiness.

Indian perspectives for subjective well being also states that, the above mentioned dimensions defining well-being constantly interact with each other. These are dynamic in nature and therefore the healthy interactions between these factors become part of the process of development of an individual.

Ormel, Lindenberg, Steverink, & Vonkorff (1997) equate Quality Of Life with an overall state of psychological well-being maintained by using resources. Psychological well-being is a cumulative appraisal of one's physical and social well-being. Peoples' resources are put to use so they can engage in activities that produce physical and social well-being. For example, close others and volunteer agencies bring a sense of intimacy and confirmation that enhance social well-being. When resources are scare or lost, people turn to substitute resources to maintain well-being over the long term. When resource losses are severe, peoples' options are restricted.

**Diabetes Related Quality of Life / Health Related Quality of Life**

Subjective well being and Quality of Life are interrelated. Quality of Life is also a multidimensional concept, in simple words this is an individual's own views about the quality of their life. Quality of Life is the measure of individual's perceived sense of well being, such as sense of satisfaction with life, work and personal relationships a combination of these components and health related components are form comprehensive Health Related Quality of Life. The Health Related Quality of Life of an individual is depends on the level of subjective well

being. Diabetic specific domains of Health Related Quality of Life relate how the diabetes is compromising individual's sense of well being psychologically, physically and socially (Borrot &Bush, 2008).

The World Health Organization Quality of Life group defined Quality Of Life as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" (WHOQOL, 1998). This definition emphasizes a holistic assessment that recognizes human tendencies to compare their situation with that of others, both on an individual and societal basis. This definition also reflects the broad nature of Quality Of Life that incorporates assessments of many aspects of an individual's life, including health, work, personal relationships, friendships, emotional state and environment. Only the person can assess his or her Quality Of Life.

Patrick & Erikson (1993) describe Health Related Quality Of Life as "the value that an individual assigned to the duration of life as modified by impairments, functional states, perceptions, and social opportunities that are influenced by disease, injury, treatment or policy". Health care researchers often prefer to measure Health Related Quality Of Life because it is not always possible or realistic to expect that a health related intervention will influence many of the broader aspects of Quality Of Life.

**Theoretical Perspectives on Quality of Life**

Multiple discrepancies theory of Quality of Life developed by Michalos (1983, 1985, and 1986) focuses on peoples' happiness and satisfaction with life as a whole and with health, finances, family, job, friends, housing area, recreation, religion, self-esteem, transit, and government services which indicates the individual's net satisfaction of life . Net satisfaction is theorized as being a function of multiple discrepancies or gaps between what people perceive they have in life compared to similar others; the best that people have had in the past versus what they expect, deserve and need results in perceived gaps in achieving goals (what people have versus what they want in life). Felt discrepancies in relation to others

and in past influence net satisfaction both directly and indirectly through goal achievement. Demographics (gender, age, education, and ethnicity) and conditioners (self-esteem, income, and social support) are related to net satisfaction and felt discrepancies. In the case of diabetic people these discrepancies are occurring due to the physical restrictions caused by the diabetes mellitus (e g., fatigue, inability to work hard, following diabetes self management) which will restructure the patients whole activities, and in a majority of cases this will decreases the achievements and there should be a discrepancy occur between the expectation and achievement.

Disease specific Health Related Quality Of Life is described by Polonosky (2000) as a multidimensional construct, on which each dimension can independently affect Quality Of Life (Cited by Sarika & Baby Shari, 2015). Diabetes-specific domains to be considered and included when considering Health Related Quality Of Life relate to how the disease is compromising an individual's sense of well-being psychologically, physically and socially. (Bradley et al., 1999; Jacobson, Barofsky, Cleary & Rand, 1988). Health Related Quality of Life assesses the person's happiness and satisfaction of life in all domains (physical, psychological and social) of life based on health condition. In the diabetic population, diabetes specific quality of life is based on their physical capacity to work and doing physical activities and self care activities (e g., eating, bathing etc) without depending others. Psychological satisfaction of diabetic population is based on the congruence between their life expectations and actual achievements, their perception of happiness in their life and their motivation to do the diabetes specific self care activities to diabetes management. Social satisfaction is also important dimension of health related quality of life, which is satisfied with the perception of support from others, especially family members; financial security to meet the expenses for treatment and the perception of himself as not a burden to family and community. If all these dimensions interacts in a healthy and positive manner, the patient experiencing high subjective well being, high motivation to adhere the diabetes self management and they will become free from health related stress and depression.

**Perceived Stress**

Stress is a very commonly used word, but stress can be a very real problem needs recognizing what situation is really stressful to particular individual. Stress involves a stressor and stress response that challenges the body's ability to maintain homeostasis. A stressor is any physical or mental challenge to the body that threatens homeostasis. Physical stressors are events that challenge the body to function beyond normal capacity (McEven, 2000). Examples of physical stressors include bodily injury, physical exertion, noise, overcrowding, and excessive heat or cold. Psychological stressors include challenges such as time-pressured tasks, speech tasks, mental arithmetic, inter-personal conflict, overcrowding, isolation and traumatic life events. Therefore both a physical stressor, such as being trapped outside in below-freezing temperatures, and a psychological stressor, such as participating in a public speaking task, can challenge the homeostasis of the body.

A stress response may consist of both a behavioural response and physiological response. People with diabetes are also suffer the stressful situations like death of someone close, divorce, moving house etc. as other people, but these may also stressful to their close relatives- spouses, parents and other family members. In diabetes mellitus patients, stress plays an important role to raise blood sugar levels, in some people stress appears to make blood sugar fall and causes low blood sugar level (hypoglycemia). In diabetics, under stress the body produces hormones adrenaline, what is called as the fight or flight hormone. These hormones cause the body to release stored glucose and fat for the extra energy that is required to deal with the stress, but they can only be used providing the body has enough insulin. This sudden extra production of glucose in people with diabetes causes the rise in blood sugar level. This is the reason behind the diabetic people react to stress by overeating, or taking less exercise due to lack of energy. The effect of stress in diabetics is lessened in those having a satisfactory perceived social support.

Perceived stress in diabetes is one of the negative psychological factors influencing diabetes mellitus. There are a number of studies in the area of relationship between stress and diabetes, but these studies didn't get a conclusion

that either stress is caused by the diabetes or the diabetes is the result of the patient's perceived stress, but they can only found that the changes in perceived stress will also make changes in the blood sugar level.

"Diabetes-related" stress as a person-environment relationship in which perceived diabetes-related demands (e.g., self-management treatment like diet and regular exercise) tax or perceived coping resources Karlsen et al. (2004). Stress originating from a perceived inability to cope with diabetes-related demands has been shown to adversely alter glucose control in Type 2 Diabetes Mellitus (Nozaki et al. 2009).

**Perceived Social Support**

When people threatened by stressful conditions, they wish to remain connected with others Schachter (1959). Social support can reduce the psychological impact of chronic stress and stressful life events, regardless of coping strategies that are used. Person with high levels of support show less psychological disorders under high level of perceived stress than do those with low levels of support (Cohen & Williamson, 1988). Though a person facing stress may need support, awkward attempts to provide comfort can actually make things worse. Unhelpful support efforts include trying to minimize the problem, suggesting that the difficulty in the person's own fault, and simply bumbling effects to help (Ingram et al.2001).

Social support is considered as psycho-social mediator of health status and moderator of life stress. Health psychologists have extensively studied the role of social support in psychological/ mental as well as physical health and have been given enormous amount of attention devoted to the social support-health connection.

The term "social support" means turning to other people for support in times of personal crisis. Wallston et al. (1983) define social support as 'the perceived comfort, caring, esteem or help a person received from others'. According to Cobb (1976), people with social support believed they are loved and cared for, esteemed and valued, and part of social network that can provide goods, services and mutual defense at times of need or danger. Sarason, Sarason and pierce (1990) define social

support as 'the physical and psychological comfort provided by other people'. Thus it is a multidimensional construct that includes not only the number of friends supplying support but also the satisfaction with the support.

Social support may be received or perceived type. Received social support refers to one's retrospective assessment of actual behavior (such as friends or relatives have cared me when I was ill), where as perceived social support refers to one's anticipation of social support in the future when in times of need (such as, there are people whom I can rely upon when I need care). Another aspect of social support is the kind of help person receives from others. For example, Wills (1985) has characterized four types of social support – esteem support (whereby other people increase one's own self-esteem); informational support (to offer advice); social companionship (support through activities); and instrumental support (physical help).

Individuals with high levels of social support are less likely to develop serious illnesses   (Berkman& Syme, 1979; Wallston et al, 1983). The influences of loving and caring relationships provide a sort of protective web around the individual, hence reducing his likelihood of falling ill Caplan (1974). Social support helps to reduce chances of illness and enable one to recover from illness more quickly (Cobb, 1976; Roy, Steptoe, & Kirschbaum, 1998), because social network affects one's ability to make health related behavior changes. In diabetic patients diabetes self care management is very important to recover from its complications, which includes the changes in life style like adherence to diabetes diet, physical exercise on regular basis, it becomes easier to the patient when he has getting support from family and friends.

**Diabetes Self Care**

Self-care in diabetes has been defined as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in social context, because most of day-to-day care in diabetes is handed by patients and/or families (Bradley, 1994; Johnson, 1994; McNabb, 1997). Diabetes self care behaviours have been related with the level of social

support receiving from others and self efficacy, and these factors were directly related to glycemic control. The effect of self-efficacy, social support and Provider Patient Communication on changes in diabetes self-care behaviours and glycemic control.   There are seven essential self-care behaviours in people with diabetes which predict good outcomes. These are healthy eating, being physically active, monitoring blood sugar, complaint with medications, good problem-solving skills, healthy coping skills and risk reduction behaviours (American Association for Diabetes Educators AADE7 self-care, 2008).

Diabetes self-care activities are behaviors undertaken by people with or at risk of diabetes in order to successfully manage the disease on their own (American Association for Diabetes Educators AADE7 self-care). All these self care behaviours have been found to be positively correlated with good glycemic control, reduction of complications and improvement in quality of life (Povey, 2007; Boule, 2001; American Diabetes Association, 2009; Odegard & Capoccia, 2007; Deakin., McShane., Cade., & Williams, 2005). Diabetes self-care requires the patients to make many dietary and life style modifications supplemented with the supportive role of health care staff for maintaining a higher level of self-confidence leading to a successful behavior change (Shobhana., Begum., Snehalatha., Vijay & Ramachandran, 1999).

Self-care activities refer to behaviours such as following a diet plan, avoiding high fat foods, increased exercise, self-glucose monitoring, and foot care (Glasgow & Strycker, 2000). Decreasing the patient's glycosylated hemoglobin level may be the ultimate goal of diabetes self-management but it cannot be the only objective in the care of a patient. Changes in self-care activities should also be evaluated for progress toward behavioural change (Walker, 1999).

The most important objective of monitoring is the assessment of overall glycemic control and initiation of appropriate steps in a timely manner to achieve optimum control. Self-monitoring provides information about current glycemic status, allowing for assessment of therapy and guiding adjustments in diet, exercise and medication in order to achieve optimal glycemic control. Irrespective of weight

loss, engaging in regular physical activity has been found to be associated with improved health outcomes among diabetics (ADA, 2011; Colberg., Sigal., Fernhall., Regensteiner., Blissmer & Rubin,2010; Mora., Lee.,Buring & Ridker, 2006; Physical Activity Guidelines Advisory Committee, 2008).

In diabetes, patients are expected to follow a complex set of behavioural actions to care for their diabetes on a daily basis. These actions involve, engaging in positive lifestyle behaviours, including following a meal plan, and engaging in appropriate physical activity; taking medications (insulin or an oral hypoglycemic agent) when indicated; monitoring blood glucose levels; responding to and self-treating diabetes related symptoms; following foot-care guidelines; and seeking individually appropriate medical care for diabetes or other health-related problems (Goodall & Halford, 1991). The proposed regimen is further complicated by the need to integrate and sequence all of these behavioural tasks in to a patient's daily routine. Diabetes self care activities also affected by the personality characteristics of the individual. In discussion with the physicians dealing with diabetics, it was also felt that, type D personality or distressed personality is a negative variable which reduces the patient's motivation to follow the self care management tasks; as it increases the stress level and lessens the person's social interaction.

**Type D Personality**

Early studies of personality and diabetes unsuccessfully attempted to identify personality styles that increased risk for new-onset diabetes. The next generation of personality studies in diabetes was more successful in linking personality traits in individuals with diabetes with health outcomes. For example, Lustman, Frank & McGill (1991) found that participants with higher levels of opportunism (i.e., individuals with high novelty-seeking, a low capacity to delay gratification and a low harm-avoidance) showed poorer glucose control. Likewise, individuals who endorsed higher levels of alienated personality characteristics were also less likely to have adequate glycemic control.  Rose, Fliege, Hilderbrandt, Schirop, & Klapp (2002) reported a positive association between dispositional optimism and diabetes quality of life.

Type D, the distressed personality, is defined as the interlocking effects of negative affectivity and high social inhibition (Mols, Holterhues, Nijsten, & Van de poll-Franse, 2010).  Type D personality is a normal, nonpathological construct that is defined by the two stable traits, Social Inhibition and Negative Affectivity (Denollet, 2005).  Negative affectivity indicates a tendency to experience negative emotions; social inhibition refers to a pattern of not expressing emotion related to fears to others' disapproval. Social Inhibition is the general tendency to inhibit the expression of emotions and behaviours in interpersonal contact, because of fear of disapproval or rejection by others, while Negative Affectivity is typified by the general tendency to experience a broad range of negative emotions and to have a negative view of self, others and the world. Hence, patients with this personality profile are inclined to experience negative emotions, such as irritability and worry, and to inhibit the expression of those feelings in social interactions (Denollet, 2005; Denollet., Schiffer.,  & Spek, 2010).

Although there is some misconception that the type D personality construct is nothing more than depression, there are several differences between the two constructs. While type D is a normal, chronic disposition encompassing not only Negative Affectivity but also how patients deal with these negative emotions due to the inclusion of the social inhibition component, depression is an episodic, psychopathologic marker that says nothing about how patients deal with depressive symptomatology (Denollet., Schiffer., & Spek, 2010). Hence, it is not surprising that most patients with a type D personality do not have a clinical diagnosis of depression, with the overlap being only around 25% (Denollet, 2005; Denollet., Jonge., Kuyper., et al 2009). In addition, despite type D patients displaying some depressive symptoms, they tend to experience a wider range of Negative emotions than patients with depression.

**Health Related Depression**

Depression is a common and often debilitating reaction to chronic illness. Up to one third of all medical in patients with chronic disease report at least moderate symptoms of depression and up to one quarter suffer from severe depression

(Moody, McCormick, & Williams, 1990; Rodin & Voshart, 1986). Although there is evidence that depression may occur somewhat later in the adjustment process than does denial or severe anxiety, it can also occur intermittently. Depression is common among stroke patients, cancer patients and heart disease patients, as well as for those suffering from many other chronic diseases (Taylor & Aspinwall,1990).

At one time, depression was treated as an unfortunate psychological result of chronic illness, but its medical significance is increasingly being recognized. Depression can be a sign of impending physical decline, especially among elderly men. Depression complicates treatment adherence and medical decision making. It interferes with   patients adopting a co managerial role, and it confers enhanced risk of mortality from a broad array of chronic diseases (Anstey & Luszcz, 2002). For all these reasons, the assessment and management of depression in chronic illness has become in paramount importance to health care providers and health psychologists, so is in diabetes.

Depression is sometimes a delayed reaction to chronic illness because it often takes time for patients to understand the full implications of their condition. During the acute phase and immediately after diagnosis, the patient may be hospitalized, be awaiting treatments, and have other immediate decisions to make. There may be little time to reflect fully on the implications of the disorder may begin to sink in.

Depression is important not only for the distress it produces but also because it has an impact on the symptoms experienced and on the overall prospects for rehabilitation or recovery (Schaeffer et al., 1999). Depression increases with the severity of the illness (for example, Cassileth et al.., 1985; Moody et al., 1990). The experiences of pain and disability, in particular, lead to depression (for example, Turner & Noh, 1988; Wulsin, Vaillant & Wells, 1999), which in turn, increases pain and disability. These problems are aggravated in those who are experiencing other negative life events, social stress and lack of social support (Bukberg, Penman & Holland, 1984; Thompson, Rivara & Thompson, 1989). Physical limitations may

predict depression somewhat better earlier in chronic illness, whereas psychological factors may better explain depression later on.

Nowadays, a variety of effective, cognitive and behavioural interventions have been developed to deal with the depression that so frequently accompanies chronic illness (Center for the Advancement of Health, 2000f). Treatment for depression may not only alleviate psychological distress but also improve functioning by reducing symptoms associated with the illness (Mohr, Hart, & Goldberg, 2003).

In recent years there is an increase in the number of people suffering with type 2 diabetes in Kerala. This may be attributed to many physiological and lifestyle factors, but there are some psychological factors also have notable influence on diabetes complications. With the present study the investigator planned to explore these psychological factors by classifying in to positive and negative based on their mode of influence on the diabetics. Among these the positive factors like Diabetes Related Quality of Life, Subjective Well Being, Perceived Social support and Diabetes Self-care helps to increase the individual's sense of life satisfaction in all areas of life and increase the self-confidence. Therefore these factors are also found to be helping to bring the glucose level under control. But the negative factors like perceived stress, health related depression and type D personality reduces the individual's sense of well-being and life satisfaction and increases the experience of anxiety in them, so these factors will have adverse effects on the glucose level control.

**Significance of the Study**

Type 2 diabetes is a lifestyle disease, occurring in the past few thousand years with increasing obesity and reduced physical activity occurring in populations with genetic tendency toward diabetes, type 2 diabetes has become almost epidemic in almost all corners of the world (Reddy,2009).

Psychological factors like Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, Perceived stress etc., are denoted to be highly

related with diabetes as one way or another, directly or indirectly, uniquely or in combination. On the basis of the type of impact on the patients' mental health and glucose level these variables can be classified as positive and negative. The Diabetes Related Quality of Life of an individual depends on the level of subjective well being. Diabetic specific domains of Health Related Quality of Life relate how the diabetes is compromising individual's sense of well being psychologically, physically and socially (Borrot &Bush, 2008).

Choe et al., (2001 a), found that the positive impact of diabetes was represented by overall well being, harmonious relationships, a rewarding life, and spiritual satisfaction, while the negative impact was represented by depression, fear, lack of support and psychological stress.

Usually diabetes is being managed by medical treatments using insulin or medications. As a casual factor of diabetes or an effect of being in diabetic stage, or under treatment certain other unhealthy style of living is also being found. Health experts like psychologists in health sector had tried out and pointed out the significance of psychosocial interventions which may create a direct /indirect effect upon diabetic patients (Sarika & Baby Shari, 2015). Endocrine patients with poor diabetes regimen adherence, poor adjustment to illness, stress exacerbating medical symptoms and/or self-care, psychological problems (especially mood and anxiety disorders), and cognitive problems were referred to psychological intervention. Clinical studies suggest that the most important reasons for psychological referral of endocrine patients are depressive disorders (with depression twice as common as dysthymia), life stress affecting illness, anxiety disorders, and poor medical regimen adherence. (Davis, Hess & Hiss, 1988)

In this context, the present study was planned to do an exploration in to psychological factors like Diabetes Self-Care, Diabetes Related Quality of Life, Perceived Social Support, Subjective Well Being, Perceived Stress, Health Related Depression, and Type D personality. The study also aimed to design and execute an intervention package for managing these factors in type 2 diabetics.

**Statement of the Problem**

In order to explore the psychological and psychosocial factors influencing type 2 diabetes mellitus, the investigation was planned for examine the variables of Diabetes Self-Care, Diabetes Related Quality of Life, Perceived Social Support, Subjective Well Being, Perceived Stress, Health Related Depression, and Type D personality in people with type 2 diabetes (living in their own hometown (Kerala) and those who were migrated to a distant place from hometown for job purposes) and to design an intervention package for the psychological factors influencing type 2 diabetics. So the problem be focused in this study is entitled as **"An Exploratory Study of Psychological Correlates of Type 2 Diabetes".**

**Definitions of Key Terms**

1.  Diabetes Related Quality of Life: Diabetes related quality of life is the changes occur in the individual's quality of life due to the impact of diabetes. Changes in the individual's perception and satisfaction of his health condition expected to on his age, ethnicity, income, culture, education and family status.

2.  Subjective Well Being : Subjective well being is a composite measure of independent feelings about a variety of life concerns, in addition to an overall feeling about life in positive and in negative terms, i.e. general well being and ill being.

3.  Perceived Social Support: Perceived social support is an individual's perception of how much he or she receives outside social support based on their age and cultural backgrounds.

4.  Diabetes Self Care: Diabetes self care is the patient's perceptions of the degree to which they adhere to recommendations for diabetes care and how well they adhere to their treatment prescriptions.

5.  Perceived Stress: Perceived stress is stress originating from perceived inability to cope with diabetes related demands in type 2 diabetic people.

6.  Health Related Depression: Health related depression in diabetes mellitus people are caused by their perception of poor diabetes self-management (i.e.,

diet modification, physical exercise, insulin injections) and resulting long term diabetes-related complications.

7.     Type D personality is also called distressed personality. This is a state of simultaneous experience of Negative Affectivity and Social Inhibition.

# Chapter II

# REVIEW OF LITERATURE

- ❖ Diabetes and Self care
- ❖ Diabetes and Health Related Quality of Life
- ❖ Diabetes and Social Support
- ❖ Diabetes and Subjective well-being
- ❖ Diabetes and Stress
- ❖ Diabetes and Depression
- ❖ Type D Personality and Diabetes
- ❖ Psychological Intervention and Type 2 Diabetes

The present chapter consists of a brief collection of scientific bases of the present study. A literature review is an evaluative report of studies found in the literature related to selected area of research. The review should describe, summarize, evaluate and clarify the literature, and it should give a theoretical basis for the research and help the researchers to determine the nature of their own research (Boote, & Beile, 2005). Related reviews of psychological correlates of type 2 diabetes were collected from both books and published journals and articles, and from those studies which giving more importance to the physiological reasons and studies of psychological factors for other chronic illnesses generally were exempted. The studies which were specifically associated with the psychological factors related to type 2 diabetes were selected, and the gists of the studies were gone through. Collected reviews were classified on the basis psychological variables, which were assumed from the reported common problems of participants in the pilot study. The studies were categorized into the following headings.

- Diabetes and Self Care
- Diabetes and Health Related Quality of Life
- Diabetes and Social Support
- Diabetes and Subjective Well – Being
- Diabetes and Stress
- Diabetes and Depression
- Type D Personality and Diabetes
- Psychological Intervention and Type 2 Diabetes

"Diabetes may be the direct result of psychological disturbances" Menninger (1935). "Adult-onset diabetes may increase proneness to specific stress" Slawson et al., (1963).

Psychological factors have an important role in the etiology of diabetes. Because diabetes is a disease of disordered physiologic and psychological adjustment (Stein & Charles, 1971). Also diabetic patients had a significantly higher rate of parental loss and severe family problems than others in the same age.

Events generating anxiety, specific intrapsychic conflicts, emotional deprivations, conscious and unconscious threats to security and actual unpleasant psychological experience might disturb diabetic control (Grant et al., 1974). If the diabetic patient understands a stressful situation is important to his security either consciously or unconsciously, that will make changes in the level of Ketone bodies and blood glucose level (Hinkle & Wolf, 1952).

Psychosocial factors that are directly or indirectly associated with glycemic control in type 2 diabetes patients including life events (Bradly, 1979; Mooy et al., 2000), and daily "hassles" (Aikens &Mayes, 1997) are negatively affect glycemic control. On the contrary, social support (Glasgow et al., 1989; Garay et al., 1995; Tillotson et al., 1996., Fukunishi et al., 1998), problem –focused coping, and self-efficacy (Kavanagh et al., 1993; Skelly et al., 1995; Talbot et al., 1997) related to good regimen- adherence and glycemic control.  Mood states and glycemic control has been significantly related; depression is present in 15%-20% of type 2 diabetes patients (Gavard et al., 1993) and is associated with poor glycemic control (Van der et al.,1996).  Treatment of depression reduces glycosylated heamoglobin (HbA1c) (Lustman et al., 2000). A small percentage of haemoglobin binds to glucose resulting in glycosylated haemoglobin (HbA1c) in the blood. This binding remains for the rest of the life of the red blood cell, which is nearly 3-4 months. The level of glycosylated haemoglobin depends on the long term level of glucose present in the blood and its duration (Doctor NDTV, 2010).   Diabetes specific distress is affected by poor regimen-adherence and glycemic control in type 2 diabetic patients (Polonosky et al., 1995; Welch et al., 1997).

While studying the causal relationship between psychosocial factors and glycemic control, diabetes- related self efficacy was the only factor that directly reinforced diabetes self care management. Diabetes self care management had a direct positive association with good glyceamic control, which indicated that self-efficacy and glyceamic control are significantly related and was one of the most important prospective factors in diabetes treatment research (Nakahara et al.,2006).

Self-efficacy has been reinforced by social support in diabetic people, rather than having direct effect on adherence (Glasgow et al., 1989). Bandura (1997) states that self efficacy develops because of physical and emotional states.  Daily hassles and diabetes – related distress may important for reinforcing self-efficacy which can indirectly affect adherence and glycemic control, therefore management of daily hassles and diabetes related distress will increase diabetic adherence and glycemic control. Psychosocial factors were directly influence glycemic control in type 2 diabetic patients, and other factors, such as social support, daily hassels, diabetes-related distress, and emotion focused coping indirectly influenced efficacy and glycemic control through self-efficacy.

Self efficacy is a powerful predictor and subsequent behavior that has connected to a wide range of health outcomes, mainly behaviours requiring determination towards long-range goals (Bandura, 1997). There is an association between self-efficacy for diabetes self-management and better self-reported life quality among individuals with diabetes (Rose et al., 2002). Self-efficacy expectations were related to lower levels of depression and anxiety (Fournier et al., 2002b).

Health related Quality of Life and diabetes self care behaviours are factors that individually influence blood sugar control. Identifying managing and influencing are important in diabetes care (Huang et al., 2010).

Health related Quality of Life is considered as an important outcome of type 2 diabetes. People with diabetes have significant unfavorable effects on Health related Quality of Life because diabetes is a life time condition (Jermendy et al., 2008: Mier et al., 2008). According to Chyun et al., (2006), "Quality of Life has been shown to be associated with long- term outcomes, disease progression and response to therapy in type 2 diabetes".

Complications of diabetes mellitus decreases quality of life in patients with the disease (Alberty KGMM et al, 1998; Kuzuya et al., 1999; Glasgow et al.,1997). If diabetes is controlled properly onset and progress of diabetes complications will be delayed. (DCCT, 1993; UKPDS, 1998; Okubo et al., 1995).

Among the psychosocial variables, lack of a partner having low social support, and having a mental health index score in the clinical range were risk factors of being diagnosed with diabetes for the first time in the elderly women. Only mental health index score in the clinical range and not having a current partner can significantly predict being newly diagnosed with diabetes (Strodl & Kenardy., 2006). Social support may play a significant role to facilitate health outcomes among people living with diabetes, which is related with improved blood sugar control and adherence to self-care regimens (Cheng & Boey, 2000: Fukunishi et al., 1998: Tang et al., 2008).

When life stress was high social support act as a buffer against stress, individuals having greater perceived social support showed tighter glycemic control than their counterparts with lower levels of perceived support when stress was low, social support was unrelated to glucose regulation (Wagner & Tennen.,2007; Griffith, Field & Lustman ,1990). There is a relationship with perceived stress and blood glucose among individuals who are using less effective coping strategies, and among those who are using more effective coping strategies stress and glucose were unrelated (Peyrot & Mc Murray, 1999).

The moderated effects highlight the potential complexity of the relationship between stress and metabolic control in diabetes. The operationalization of stress varies dramatically across studies from major life events (Griffith et al., 1990, Stenstorm et al., 1993) to daily hassles (Aikens & Mayer, 1997), to perceived stress ( Peyrot & Mc Murry, 1992).

Effect of the style of personality on new onset of diabetes shows that participants with higher levels of opportunism (i.e., individuals with high novelty seeking, a low capacity to delay gratification, and a low harm-avoidance) showed poor glucose control. Individuals having alienated personality characteristics were less likely to have adequate glycemic control (Lustman, Frank & Mc Gill (1991).

Depression is the most widely studying psychological problem in relation to type 2 diabetes, and diabetes doubles the chances of depression. They have a bidirectional relationship, which means, depression increasing the risk for

developing type 2 diabetes, and diabetes increasing the risk for consequent depression (Anderson, Freedland, Clouse & Lustman, 2001).

Meta analytical study examined the depression-glycemic control association, which discovered that depression is associated with hyperglycemia (Lustman et al., 2000). Actually, one in three individual with diabetes report increased depressive symptoms, suggests that depression may play an important role in predicting glycemic control.

States that combined effect depression and diabetes is associated with poor physical health. Social support and physical health has been linked to each other and to depression. Three possible models of the interrelationship among depression, social support and diabetes related medical symptoms can be established. There is a bi-directional relationship between depression and social support, both diabetes related medical symptoms and social support independently contributed to depression, depression also contributed to lower social support (Sacco,Yanover, 2006).

The study on existence of positive experiences in people with type 2 diabetes found that all the participants reported positive experience in coping with diabetes. 'Positive experience' is operationally defined as "positive thoughts or good feelings in coping with diabetes expressed by the participants". This positive experience can be categorized into three they are; positive appraisal, diversion and bonding (Yanakawa & Makincoto, 2008).

The positive impact and negative impact of diabetes was occurred together. Overall well-being, harmonious relationships, a rewarding life, and spiritual satisfaction were representing the positive impact; whereas depression, fear, lack of support, and psychological stress were representing the negative impact (Choe et al., 2001a).

In brief, psychosocial factors that directly and indirectly associated with glycemic control in type 2 diabetic patients including, diabetes self-care, health related quality of life, perceived social support, subjective well being, perceived

stress, health related depression, and type D personality. Among these factors self-efficacy can be reinforced by social support. People with diabetes have unfavorable effects on health related quality of life, complications of diabetes mellitus decreases health related quality of life. Social support acts as a buffer against stress, individuals having higher social support showed increased glycemic control. Depression and diabetes have a bidirectional relationship, i.e., depression increasing the risk of developing type 2 diabetes and diabetes increases the risk of depression. Person's overall well being also influences diabetes. If the people have positive well being, that will effect positively in glycemic control.

**Diabetes and Self Care**

Diabetes is challenging chronic disease which requires continuous self-management by controlling diet, maintaining regular exercise, taking medication, and monitoring blood glucose (American Diabetes Association, 2011). Diabetes self care behaviours have been related with the level provider patient communication, social support and self efficacy, and these factors were directly related to glycemic control. The effect of self-efficacy, social support and Provider Patient Communication on changes in diabetes self-care behaviours and glycemic control can be explored with longitudinal studies in patients with diabetes (Gao, et al., 2013).

One relevant factor in understanding the complex system of self management in type 2 diabetes is self-efficacy, which can be defined according to the social cognitive theory "as an individual's confidence in being able to carry out a behavior". Self-efficacy has an important role in understanding dietary behaviours and corresponding outcomes in type 2 diabetes mellitus, therefore improving dietary self-efficacy has positive effects on diabetes self management (Strychar., Elisha, et al.,2012). Self-efficacy has also been found to be associated with numerous factors in diabetic patients, including diverse diabetes management behaviours, which includes selected nutrients and some metabolic parameters.

Diet self-efficacy and diet self-management behaviours can predict better glycemic control, where as insulin use was predict poor glycemic control. If subjects

did not have their diabetes controlled, in most of the cases they had low self-efficacy, and they had suboptimal self-management behaviours. Including strategies to promote self-efficacy and self-management behaviours for patients will be useful in diabetes education programs. Therefore, skill building interventions and behavioural counseling will help the patients to become confident and be able to manage their diabetes (Al-Khawaldeh et al., 2012).

Self-management    techniques in type 2 diabetes have become a main strategy to health care providers (Norris, Engelgan & Narayan, 2001). Diabetes mellitus is disease which requires necessary diabetes Self-management (DSM) care abilities, to train the patient responsible to take care of themselves they are need be taught the diabetes Self-management skills, this will also help the patient to become capable and reliable (Sousa, Zauszniewski, Musil, McDonald & Milligan, 2004). Self-management of type 2 diabetes mellitus requires following a complex treatment schedule for long periods; this is challenging for the patient because that demands, strictly following healthy diet, regular exercise, optimum weight control, self-monitoring of blood glucose, and medication adjustment based on food intake in to the daily basis (Montague, Nicholo & Dutta, 2005). Because the adoption of healthy life style behaviours will produce optimum glycemic control for diabetes mellitus, therefore Diabetes Self-management is of great importance which in turn will help to reduce consequent severe and long term complications of diabetes (Norris et al., 2001; Sousa, Zawzniewski, Nusil, Lea & Davis, 2005).

Self-care behaviours of patients with type 2 diabetes are predicted by patients' beliefs about those behaviours, compared with their illness perceptions. Beliefs about diabetes self-care behavior are at least as important as beliefs about illness in predicting these self-care behaviours. Thus, the interventions focusing on behavior change with patient groups would be more effective by targeting beliefs about behavior, rather than beliefs about illness (French, Wade & Farmer, 2013).

From the above studies, it could be identified that, diabetes requires continuous self-management. Diabetes self-care can be influenced by social support and provider patient communication. Diabetes education programs may be helpful to

those having low self-efficacy. Self-management of type 2 diabetes mellitus requires continuing treatment schedule for long periods.

**Diabetes and Health Related Quality of Life**

Health Related Quality of Life is increasingly used as an outcome measure to monitor the burden of diabetes on the population. Compared to those with normal glucose levels persons with diabetes or poorly controlled blood glucose have worse health related quality of life (Rubin et al., 1999; Hoey et al., 2001; Wandell et al., 2000; Brown et al.,2000). A patient's quality of metabolic control and overall Quality Of Life can be predicted by perceived ability to control his or her diabetes and the anticipated benefits of this control predict adherence to diet and other treatments. Patients having major physical complications due to diabetes show worse health related quality of life, knowledge of health burden of diabetes and introducing alternative intervention strategies for preventing health burden will be helpful in diabetes treatment (Coffey, et al., 2002).

Quality of Life research in India states that  diabetes have negative impact on various life domains of Indian people with diabetes, the areas which are affected by diabetes are self confidence,  family life and their freedom to eat as they wish. It is suggested that improving Quality of Life along with biomedical outcomes such as blood glucose levels will help to achieve targets of diabetes management are more effectively (Singh, & Bradley, 2006).

Health Related Quality of Life is a multidimensional construct, of which each dimension can independently affect Quality of Life. Diabetes specific domains Health Related Quality of Life of diabetes relate how the disease is compromising on individual's sense of well–being psychologically, physically and socially (Borrot & Bush, 2008).  The impact generated by diabetes on the individual can be assessed by patients concern about anticipated effects of the disease, and the level of satisfaction the patient with themselves and how much they can enjoy their food. (Bradely et al., 1999., Jacobson, Barofsky, Clearly & Rand, 1988).

There are changes in all domains of Health Related Quality of Life after receiving diabetes education, which is significantly different between male and females. Diabetes decreases levels of both physical and emotional well-being in patients; diabetes education will help to improve Quality of Life and well being (Riaz et al., 2013).

Older age females having decreased quality of life compared with males and the following factors also decrease quality of life in persons having diabetes, those factors are; low socio-economic status, cardiovascular disease, microvascular complications, congenital heart failure, depression, insulin use, and number of medications. This shows that type 2 diabetic patients have a substantially decreased Quality Of Life related with symptomatic complications. Treatment of depression will help to improve Health Related Quality of Life in type 2 diabetes (Wexler., Grant., Wittenberg, et al.2006,).

Health Related Quality of Life and Depression: Physical and mental functioning of patients with diabetes can be affected by anxiety, depression and negative beliefs about illness, but these cannot affect metabolic control in patients with diabetes (Paschalides et al., 2004). Study also states that both negative beliefs about diabetes (particularly perceived symptom burden, consequences and control) and emotional factors (anxiety and depression) have to be addressed to optimize Health Related Quality of Life in people with diabetes.

There is less research for studying the impact of depression on glycemic control and Health Related Quality of Life in diabetes. Depression has been shown to be related with impaired metabolic control (Lustman et al, 1992; Hanninen et al, 1999), which in turn, may result in more diabetes complications and poorer Health Related Quality of Life (Snoek &Skinner, 2000). Depression and glycemic control in diabetes have been linked with the behavioural mechanisms, such as impaired compliance with routine monitoring and treatment, and reduced adherence to diet (De Groot et al., 1999). Direct pathophysiological effects of anxiety and depression, stress, possibly acting via the hypothalamic-pituitary-adrenal axis or the sympathetic nervous system, may also be important (Goetsch, 1989; Surwit et al., 1993).

Depression and personal illness representation are interconnected in patients with diabetes, there is a relationship among depression and poorer perceived control, (Bradley, 1994); the diabetes have serious consequences was associated with anxiety and depression (Hampson et al.1995; Toobert, 1990). This shows that the impact of personal illness representations and depression on metabolic control and Health Related Quality of Life are unlikely to be independent of each other. One study attempted to establish the relative importance of depression and illness representations in predicting glycemic control and health related quality of life by measuring both of these dimensions in the same patients (Hampson et al, 1995), study found that illness beliefs (perceived seriousness of diabetes, beliefs about treatment, effectiveness and perceived control over diabetes) were independently associated with HbA1C, eating patterns, physical functioning and mental health in patients with type 2 diabetes, where as anxiety and depression only predicted the mental health aspects of Quality of life. These results suggest that psychological interventions directed at these personal illness representations are likely to have a greater impact on management of diabetes and physical functioning than do treatments focusing on relief of depression. Treatment of depression however, is likely to result in a direct improvement in mental functioning, without changing physical functioning.

Higher levels of social support and acceptance of diabetes lead to lower perceived difficulty with Self-Care Behaviours required controlling diabetes, which means high levels of social support, increases the acceptance of diabetes and reduces the perceived difficulty of self care behaviours (Misra & Lager, 2008). Diabetic patients' outcome expectation, coping, and mastery of skills along with social, physical and the environmental factors promote important lifestyle changes that improve their Quality of Life (Gallent 2003; Glanz et al., 1997).

Dealing with emotional stress, coping and adjustment to disease, as well as for compliance to their treatment regimen are important for improved Quality of life. (Cox, 1994; Cox and Gonderfredrick, 1992; Kaba et al., 2000). Similar to denial, acceptance was not associated with knowledge of the disease (Garay-Sevilla et al.,

1999). Type 2 Diabetes Mellitus patients with higher levels of acceptance leads to perceived lower difficulty with Self Care Behaviours and reported higher Quality of Life. This means increase Quality of Life by reducing tension and by providing a greater sense of awareness that leads to psychological, physical and spiritual advantages in type 2 diabetes mellitus (Hasse, Britt, Coward, Klineleidy & penn, 1992; Kaba et al, 2000).

Disease acceptance is an important construct for coping with the disease and may be targeted in intervention programs by enhancing motivation, providing encouragement and creating a supportive environment to improve the positive association between disease acceptance and social support, the self care behaviours and Quality of Life (Aalto et al., 1997; Langford et al., 1997).

Older adults with diabetes were more likely to have poor health status and poor Health Related quality of Life, and also the adverse affects of diabetes on Health Related quality of Life increases the risk of mortality and morbidity among persons with type 2 diabetes (Brown et al., 1978).

Diabetes complications and female gender were more related with worse physical and psychological well-being than with males, and socio-economic variables were mainly related to general well-being. Increased levels of treatment satisfaction were related with a better disease perception and better physical and psychological well-being. Health related quality of life and treatment satisfaction are associated with each other and those affected by a complex interplay between clinical and socio-economic variables (Nicolucci., Cucinotta et al.,2009 ).

Domains of Quality of Life and patient satisfaction have been influenced by the presence of co-morbid conditions and unfavourable socio-economic characteristics and their interaction with the severity of diabetes and its complications (Rubin & Peyrot, 1999). Subjective health perception is influenced not only by the severity of conditions, but also by the underlying socio economic status. Unemployed patients or those who are living alone were strongly associated with significantly lower levels of treatment satisfaction.

Psychological and physiological well being of patients having diabetes is not only influenced by metabolic control, but also influenced by how the patients perceive treatment efficacy and how they feel. This states that, Quality of life has a stronger association with hyperglycemic and hypoglycemic symptoms, than with HbA1c levels (Kleefstra et al., 2005).

The patient identified concerns regarding insulin use represent some aspects of Quality of Life. Patient concerns about the effects of insulin use are valid; insulin therapy is often needed to achieve treatment targets. Reducing the impact of Quality of life by addressing barriers will help the patients to improve metabolic control and provide enduring information and support (Funnell, 2008).

After controlling for demographic and medical variables, the level of self reported exercise was the only significant self management behavior to predict the Quality of life, moderate-intensity physical activity programs could be initiated with diabetic individuals will help to improve Quality of Life (Glasgow et al., 1997).

After controlling for age, marital status, education, illness duration, and severity of complications, Quality of life ratings of persons with type 2 diabetes reported fewer impact of diabetes and less worries about diabetes on the Diabetes Quality of Life and improved social functioning than persons with type 1 diabetes (Jacobson et al., 1994).

In brief, decrease in health related quality of life in diabetic people have negative impact on various life domains like self-confidence, family life and their freedom to eat as they wish. Depression in diabetic patients is related to impaired glycemic control which in turn results more diabetes complications and poorer health related quality of life. Disease acceptance in type 2 diabetic patients improves diabetes self care and that will report higher health related quality of life. Increased level of treatment satisfaction was related with better disease perception and better well being; these have been negatively influenced by unfavourable socio economic characteristics.

**Diabetes and Social Support**

"Social support is a comprehensive experience which includes voluntary connection and casual relationships with others" (Bardach et al., 2011). It is an observation that one is accepted, cared for, and provided with support from certain people or a specific group or the awareness of real support received from others. Social support can be positive or negative and can develop from different sources, including family members, friends, and peers (informal support) and health care professionals and agencies (formal support) (Dam et al., 2004; & Ford et al., 1998).

Dam et al tried to classify three different perspectives in defining social support (Dam et al., 2004). First, "social support is a free exchange of resources between at least two people that increases the well-being of the receiver". Second, "social support is evidence from others that an individual is valued and part of a network of mutual communication and obligations". Third, "social support is the degree to which an individual's social needs are met through various types of interactions".

Ford et al also classified social support in to four categories; emotional, tangible, informational and companionship (Ford et al., 1998; & Taylor 2011). Emotional support includes the expression of feelings indicating value and worth. It embodies warmth and nurturance provided by sources of support (Dam et al., 2004; & Taylor 2011); Tangible support describes the concept of provision, including financial assistance, material goods and services (Heaney, 2008). Informational support is the use of information, advice, guidance and suggestions to help others solve problems (Krause et al., 1986 & Willis, 1991). Companionship support encompasses a sense of social belonging and the presence of companions for engagement in shared social activities (Uchino, 2004).

Perceived social support is important more than actual social support; and perceived social support related to one's diabetes routine was most strongly related to compliance with diet and management. Subjects with better social supports are significantly better controlled than subjects with low supports in high life stress conditions. Decreased perceived social support predicts deterioration of control

(Schwarz et al., 1991). Robinson et al., (1988) utilization of social support studies have counted the visual and non visual contacts with family, relatives, and neighbor, found that global family stress, possibly in combination with a reduced number of social contacts, may act as a cause for the increase in diabetes, and that social support may act as a barrier against stress and disease onset.

Social Support provides the opportunity for type 2 Diabetes Mellitus patients to express their needs/concerns, to receive emotional/informational support and services that create a sense of stability, and to improve outcome expectations. (Aalto et al, 1997; Ford et al, 1998; Gafvels & Lithner, 1997; Williams & Bond, 2002). Receiving support therefore not only reduces anxiety and stress but also motivates and reinforces behavioural change directly or through expectations for reinforcement (Tillotson & Smith, 1996). Social Support improves adherence behaviours (such as diet and physical activity), influences metabolic control, and contributes to weight loss, thus preventing hyperglycemic and hypoglycemic episodes that lead to complications.

Social support helps to promote better patients' adjustment and good psychological and physical health. Emotional problems, excessive worry, self-preoccupation and stress proneness are connected with lack of social support (Blazer, 1982; House et al. 1982). Social isolation may cause worsening of an illness and speeding up death (Seligman, 1991). Lack of social support may result, patient respond negatively to their illness and keep their illness or problem hidden, which causes increased stress in them. Sometimes, knowledge of receiving help may produce adverse effect so; social support is more significant if "invisible" (Bolger, Zuckerman & Kessler, 2000). If there a "match" between the specific types of support needed in the particular situation results the effect of social support is more valuable (Cohen & Mckay, 1984).

Social support have major influence on health by making the person to experience less negative emotions (Cohen & Herbert, 1996; Cohen, 1988). In general social support contributes to positive adjustment, personal growth and increased well-being (Cohen & Wills, 1985). Relationships are the basis of social

support and these relationships are main sources of happiness that helps to improve mental and physical health. Intimate type of relationship such as intimate ties with friends and families was the greatest source of support which will decrease the mortality rate (Berkman & Syme, 1979). Social support also moderates the effect of life –style incongruity on blood pressure (Drassler, 1991) and has been found to buffer the effect of stress on diastolic blood pressure responses (Gerin & Pickering, 1995).

Social Support and Health: With continued exploration researchers have found possible connections between social support and mental health. Two theories have been developed for addressing these relations; the "buffering hypothesis" and the "direct effect hypothesis" (Cohen, & Wills, 1985; Vaux, 1988, & Thotis, 1985). The buffering hypothesis states that social support is defensive (or buffering) in stressful situations, and also individuals with lower levels of social support are more affected by stressful events. This type of support is often observed during perceptions of social support, rather than in situations of received support or social integration. Krause explored this theory further, opposing that, to a certain point, social support may function to manage stress but eventually decrease the symptoms of long term stress. If there is little or no social support, health related stressors will have harmful effects on the well-being, with stronger support these effects will be eliminated (Cohen & MC Kay, 1984). Thus, the role of social support as a buffering agent is important in individuals facing stressful life events.

The direct (main) effects hypothesis states that people with high levels of social support are more healthier than people with low social support, regardless of the stress (Bardach et al,2011). Perceived social support directly effects mental health outcome; physical health outcomes are effected by both perceived support and social integration (Uchino, 2004).

Social Support and Diabetes Distress in Type 2 Diabetes Mellitus: If there is greater support satisfaction distress will be reduced after controlling for diabetes burden. Support satisfaction and number of supports significantly moderated the relationship between diabetes burden and distress. Social support acts as a buffer

that may protect against diabetes distress (Rachel, Beck, Tanenbaum, & Gonzalez, 2014).

Emotional distress caused by diabetes-related burden may depend on the quality and quantity of social support. Studies revealed that medical patients with more social support also report better adjustment and reduced emotional distress (Bukberg et al., 1984; Hann et al, 1995; Trunzo et al., 2003; Serovich et al., 2001).

Low emotional support and work stress may increase the risk of type 2 diabetes in women, but not in men. Work stress and low emotional support may effects future type 2 diabetes occurrences in women (Norberg et al, 2006). Social support has been found to be an important aspect of disease prevention and awareness. Also, it decreases stress and is beneficial in diagnosis acceptance, emotional adjustment (Sacco, 2006).

Adults with type 2 diabetes having diabetes related distress are relatively constant over time and may be hard to change. Therefore, health care professionals should devote more consideration to non clinical factors such as social support when addressing diabetes related distress. (Karlson & Bru, et al., 2014).

When threatened by stressful conditions persons try to relate with others, rather than remain alone Schachter (1959). Social support acts as a moderator in the association between the perceived stress and psychological disorder. Person with high levels of support show less psychological disorders under high level of perceived stress than do those with low levels of support (Cohen & Williamson, 1988). Though a person facing stress may need support, awkward attempts to provide comfort can actually make things worse. Unhelpful support efforts include trying to minimize the problem, suggesting that the difficulty in the person's own fault, and simply bumbling effects to help (Ingram et al., 2001).

Social Support and Diabetes self Care: Social support has been effect self-management to achieve glycemic control and improving outcomes (Mcewen et al.,2010; Song et al., 2012; Smith & Weinert, 2000;& Nicklett & Liang, 2010)..

Higher levels of social support is important  for  better glycemic control, increased knowledge, improved treatment adherence, and better quality of life (Trief et al, 2011; Zhang et al.,2007). Increased mortality and diabetes related complications are caused by lack of social support, and social support was strongly related with mortality therefore specific interventions should be required to increase social support (Ciechanowski et al., 2010; Zhang et al., 2007).

Social support has been reducing the effects of health related burden on mental health in elderly people (Hagerty &Williams 1999). When one ages lack or reduction of contact with others occurs, that has been connected to a number of physical and mental health problems plus increased mortality after myocardial infarction (Berkman et al, 1992).

Reduced social support more than one year was found to be linked with increased psychiatric symptoms, including depression (George, Blazer, Hughes & Fowler, 1989), in a sample of old people. Also, it was found that the most significant factor was quality, not quantity, of the support.

Social Support and Depression in Type 2 Diabetes Mellitus: Social support has been function as a defense from increasing or exacerbating depression (Brown & Harris 1978). There is a significant relationship between reduced social support and the development of depression in people more than 65 years (Prince et al., 1997). Lack of instrumental support was associated with depression in older people (McCurren, Hall, & Rowels 1993), especially those with higher levels of functional disability and therefore greater handicap (Prince et al, 1997a). There is an important relationship between depression and tangible (instrumental) support (Oxman, Berkman, Kas, Freeman, & Barret 1992).

Those who have sufficient emotional support and dense social network were help to reduce depression, also this was restricted to contact with children rather than friends or other relatives (Oxman et al, 1992). Instrumental support act as a buffer against decline in performance of instrumental actions of daily living, which are primarily a real indicator of severity of depression (Hay et al. 2001). Other social factors that have been connected with an increased risk of depression include the

loss of a spouse, lack of a spouse low frequency of social contacts and moving in to nursing home (Routasalo et al, 2006).

Emotional distress specific to living with the burden of diabetes and its management, or diabetes distress is more common than depression among patients and is more closely associated with problematic diabetes self-management and glycemic control (Delahanty et al., 2007, Welch et al., 1997, & Fisher et al., 2010). Diabetes complications have been cross-sectionally associated with increased diabetes distress (Leyva et al., 2011, Karlsen et al., 2011 & Lioyd et al., 2010) and predict the onset of significant diabetes distress over time with the occurrence of negative life events amplifying the strength of this relationship.

Rise of emotional support to patients significantly increase the active coping for the disease, and influence controllability of health, and also reduces helplessness. Controllability of health is affected by behavioral support. Self-efficacy reduces stress response of patients. It was also found that higher perceived availability of social support have observed in subjects who received support from their children, compared to those who without receiving support from their children (Kanbra, 2008).

If patient is an additional family member with diabetes; if patients with an increased number of friends with diabetes and Patients with a higher prevalence of diabetes within their social networks expressed greater anxiety about diabetes and diabetic complications more than patients without these social networks. physicians can better understanding in patient's perspectives on their disease may help them to determining disease burden within patient's social networks and eventually help them achieve significant change in behavior ( Mani et al., 2011).

Higher levels of social support are associated with enhanced clinical outcomes, reduced psycho-social symptomatology, and the change of helpful lifestyle activities to control their diabetes (Storm & Egede, 2012). In patients with type 2 diabetes, diabetes education and also perception and utilization of social support is effective for decreasing sugar level (Fukunishi et al., 1998).

In brief, perceived social support is more important in diabetic individuals more that actual social support, perceived social support related to one's diabetes routine was most strongly related to compliance with diet and management. Social support acts as a buffer that may protect against diabetes distress. A higher level of social support is helps to improve glycemic control, improved treatment and better quality of life. In elderly people having diabetes reduced social support and depression is significantly correlated. Diabetes education and also perception and utilization of social support are effective for decreasing sugar level in patients with type 2 diabetes mellitus.

**Diabetes and Subjective Well –Being**

Psychological well being is the combination of feeling good and functioning effectively. Sustainable well being does not require individuals to feel good all the time; the experience of painful emotions (e g., disappointment, failure, grief) is a normal part of life, and being able to manage these painful or negative emotions is essential for long term well-being (Huppert, 2009).

Neurochemical effects on subjective well being by stressors: Experiencing stressors activates the hypothalamic-pituitary adrenal (HPA) axis, as evidenced by increased secretion of the stress hormone called cortisol. However, individual differences in psychological well being (including self-esteem and emotional style) can modulate stress - induced elevations in cortisol (Jacobs et al., 2007; Polk, Skoner, Kirschbaum, Cohen, & Doyle, 2005; Pruessner, Hellhammer, & Kirschbaum, 1999; Smyth et al., 1998)

Levels of cortisol secretion vary markedly throughout the day. A healthy pattern involves a post awakening peak and a 20- fold decrease later in the day (Clow, 2004). Several studies have found that this healthy pattern is associated with high scores on measures of well- being (Positive effect, optimism, psychological well being), but not with scores on measures of ill being (negative effect, pessimism, anxiety and fear) (Lai et al., 2005; Ryff et al., 2006; Steptoe & Wardle, 2005). Thus, the association between well being and the cortisol cycle has been demonstrated not to be the inverse of the known association with stress or distress. Both positive and

negative states are associated with the cortisol response, but independently of each other.

Another neurochemical associated with mental state is serotonin. Serotonin levels are reduced in depression and most modern anti depressant drugs, known as serotonin reuptake inhibitors (SSRIs), act by increasing the amount of serotonin available to brain cells. To understand the relationship between serotonin and positive mental states (Flory, Manuck, Matthes, &Muldoon 2004) found that serotonin level was related to positive mood averaged across seven days, but not to negative mood, although it was related to a measure of neuroticism. The study conclude that deficiencies in serotonergic function may reflect the relative absence of positive mood, these findings support the idea that mental well being and ill being have different neurobiological as well as behavioural effects.

One of the strongest predictors (drivers) of our usual emotional style is personality, particularly the dimensions of extraversion and neuroticism. Extraversion (sociability) is strongly associated with a positive emotional style (e g., Argyle & LU, 1990; Diener, Suh, Lucas & Smith, 1999).

Personality is related not only to how we feel but also to how well we function psychologically. Cross sectional studies have shown strong associations between psychological well being and both extraversion and neuroticism ( De Neve & Cooper, 1998; Ruini et al, 2003; Vitterso, & Nilsen, 2002).

A recent longitudinal study using the Ryff scale, in which personality was measured three decades before the assessment of psychological well being shows a much larger effects of extraversion than of neuroticism (Abbott et al., 2008). Indeed the effect of neuroticism on well being was mediated entirely through psychological distress; its effect on well being entirely disappeared once psychological distress was controlled for.

Demographic factors and Well-being: Demographic characteristics also show some differential effects for well being and ill being. Most of large surveys showed little evidence of gender differences (e g., Donovan & Halpern, 2002; Helliwell,

2003) some showed higher scores for men   (e g., Stephens, Dulberg & Joubert,1999), while others showed higher scores for women on some sub scales such as those assessing social functioning  (e g., Huppert, Walters, Day & Elliot, 1989; Ryff & Singer, 1998b).

The association between age and mental well being is also complex. Large surveys using single item measures of well being (e g., overall rating of life satisfaction) usually found a U-shaped relationship with age: younger and older people tend to have higher well being scores than the middle aged, although there may be a decline in well being among the very old (e g., Blanchflower & Oswald, 2008; Clark & Oswald, 1994).

Interactions between age and gender have also been reported: data from the British Health and Lifestyle survey show that, compared to middle aged and younger men, older men have lowest number of symptoms of psychological distress, but also the lowest scores on a measure of positive psychological well being. On the other hand, compared to other age groups, older women have the highest score on symptoms of psychological distress and also the lowest scores on positive well being (Huppert & Whittington, 2003).

Being married is usually associated with higher life satisfaction and lower rates of psychological ill health (review by Dolan, Peasgood & White, 2008). But the direction of causation is not clear, since individuals with high levels of psychological well being are more likely to get married (Diener, 2000). Some longitudinal studies have found that, while getting married is good for one's psychological well being (e g., Zimmermann & Easterlin, 2006). A Recent study has shown that one dimension of well being; autonomy is higher among women who have been divorced or separated, compared with married or never married women (Lindfors, Berntsson & Lundberg, 2006).

Major Socio economic factors tend to have comparable effects on mental well being and ill being. There is social gradient where by higher levels of income and socio economic status are associated with higher levels of well being and lower

rates of disorder (e g., Dolan et al., 2008; Ryff & Singer, 1998b), although this effect diminishes at progressively higher levels of income.

Educational qualification has effects on mental health. In a study by (Chevalier & Feinstein, 2006) found that men with a high level of education were more likely to be depressed than those with less education. They suggest that the increase in depression associated with the highest level of education may be an indication of the job-related stress of occupation requiring a degree. The reverse gradient for education could also reflect the role of education in raising expectations which may not have been full filled. Thus, raising educational attainment does not of itself guarantee that well being will be improved.

Human studies on physiological indicators reviewed evidence that chronic stress was related to hypertension and adult onset diabetes (Saplosky, 2005). Evidence also comments major stressful events to physiological changes. Work stress has been related to systematic differences in cortisol (Schlotz, Hellhammer, Schulz, & Stone, 2004). People with work overload and worry showed higher cortisol levels on weekdays but not weekends. Those reporting the most work stress showed the greatest weekend – weekday differences in waking cortisol response.

High subjective well being can influence other aspects of quality of life of patients. Positive emotions predicted recovery of greater functional status among stroke patients (Ostir, Berges, Ottenbacher, Clow & Ottenbatcher, 2008). Kung et al. (2006) found, however, that optimism was more strongly associated with quality of life in survivors of thyroid cancer than those with head and neck cancer. Thus, Subjective Well Being helps not only health but quality of life when a person is sick.

Psychological well being as the resulting, self – affirming manifestation of subjective well being is closely correlated with the status of identity, capacity for emotional regulation, personal goals, values, effective coping strategies, social support and social status, education level, and objective and self-estimated state of health (Ryff,2008).

A study was conducted by Naess., Eriksen., Midthjell., & Tambs. (2004) based on the assumption that people with diabetes report lower psychological well-being than do people with no reported disease, and new treatment regimens for diabetes including improved insulin and treatment with medicines, easier blood sugar tests, and transfer of responsibility from doctor to patient have power to enhance well being in diabetes people. The researchers analyze changes in psychological well-being between 1984 to 1986 and 1995-1997 among diabetic patients. On these two occasions, the entire adult population of one country in Norway was invited to a health screening    (the Nord-Trondelag health Studies, HUNT 1 and HUNT 2). People with diabetes reported significantly lower well being than people with no reported diabetes.

In summary, psychological well being is the combination of feeling good and functioning effectively. There are only a few studies have been found which studied the relationship between diabetes and subjective well being, therefore in this section the studies in the related areas were included. These studies stated that stressors have neurochemical influence on subjective well being by induced elevation of  stress hormone cortisol and decreased serotonin level which will induce depression, and these will decreases subjective well being. Personality is one of the strongest predictors of subjective well being, extraversion is associated with positive psychological well being and neuroticism, which is mediated by distress, is associated with negative well being. Demographic factors like age, gender and marital status also influences subjective well being. Socio economic factors like education, job and social status is also correlated with subjective well being. People with diabetes report lower subjective well being than people without subjective well being.

**Diabetes and Stress**

Karlsen et al (2004) defined 'diabetes-related' stress as a person-environment relationship in which perceived diabetes related demands (e g., self-management treatment like diet and regular exercise) tax or exceed perceived coping resources". A person with perceived inability to cope with diabetes related demands causes

occurrence of stress that have an adverse effect on glucose control in people with type 2 diabetes mellitus (Nozaki et al., 2009). Those who have good glucose control had less diabetes-related stress and they are more satisfied with their treatment regimen. But the adults with type 2 diabetes those who have greater diabetes-related distress had more diabetes related complications and poorer glucose control.

When comparing psychological distress of adults with and without diabetes, adults with diabetes are more probable to experience serious psychological distress than adults without diabetes (Shin & Chiu et al., 2012). Chronic hyperglycemia is potentially contributed by stress (Surwit, Feinglos, et al. 2002). According to the founder of modern psychiatry, Henry Mandsley "This we know: that diabetes is sometimes caused in man by mental anxiety," by this observation Mandsley found that diabetes often followed by sudden traumatic incident.

The middle aged people who have experienced major stressful life events during the past five years have showed a chance to newly diagnose diabetes among 5% of them (Mooy, Devries et al., 2000). The prevalence of so far undetected diabetes and the number of stressful events shows a positive association.

A study named "stress and chronic illness: the case of diabetes" by Morris, Moore, & Morris, 2011, addressing the relationship between stress and blood sugar level in people with diabetes.   Stressors are events or situations that elicit physical (e g., headache, sleeplessness, breathlessness), physiological (e g., increased heart rate, blood pressure, respiration) or psychosocial (e g., mood swings, anxiety, depression) reactions (Cooper & Palmer 2000). The relationship between stress and diabetes shows a bidirectional association, which makes this relation complex (Cox & Gonder Frederick 1992). Which means chronic stress can affect diabetes, and vice versa. By physiological means (e g., by releasing stress hormones, such as epinephrine, which trigger the release of glucose in to the blood) stress can directly affect blood glucose, or stress can indirectly affect blood glucose by negatively affecting self-care behaviours of the person which include adherence to diet or exercise. Decrease in metabolic control has associated with chronic life threatening stress (Inui. et al., 1998).

Stress and Self-Care in Type 2 Diabetes Mellitus: In 17th century Thomas Willis confirmed the relationship between hyperglycemic response (unacceptably high levels of blood sugar) to stress (Batch & Surwit 2008). The effect of stress on glucose control in diabetes is difficult to understand, particular (e g., Kramer et al., 2000; Riazi et al 2004) and its research is interrupted with some practical limitations (Kramer et al, 2000). Researchers have proposed that the indirect effect of stress on diabetes control occurs because stressed individuals with Type 1 Diabetes Mellitus and Type 2 Diabetes Mellitus may have difficulty maintaining their self-care regimens (e g., diet, regular exercise), which can then lead to altered (i. e., raised) blood glucose levels (Landel-Graham et al 2003; Peyrot et al., 1999).

Psychological distress interacted with type 2 diabetes intensify the discomfort and disability normally associated with diabetes, which shows the major impact of social factors on disability on diabetes (Fougeyrollas et al., 1998).

Coexisting psychological distress and activity limitations in daily life effect the adherence of self-care responsibilities (e g., modification of lifestyle, monitoring) that are essential for the control of glucose levels and the prevention of further complications of diabetes have been increases short-term disability in subject with diabetes (Glasgow et al., 1999). Activity limitations in daily life and psychological distress may affect self-care behaviours independently of each other (Lustman et al., 1997). High level of psychological distress, which is a good indicator of the presence of mood and anxiety disorders generally (Kessler et al., 2002), may be a reaction to the activity limitations in daily life, resulting in a so-called "feed back loop" a negative emotion may lead to treatment noncompliance, noncompliance further exacerbates activity limitations, activity limitations lead to increased psychological distress and so on, resulting in a cycle of ever-worsening outcomes (disability) for the individual (Di Matteo et al., 2000).

Serious psychological distress in individuals with diabetes causes depression, anxiety and other disorders (Li, Ford, Zhao et al, 2009). Individuals with diabetes and psychological distress shows higher risk for diabetes related complications and increased mortality (Hamer, Stamatakis et al, 2010). There is a combined effect of

psychological distress and activity limitations on short term disability in patients with type 2 diabetes. If psychological distress may be detected and managed properly that would be beneficial for persons with diabetes (Schanitz et al., 2008).

In conclusion, type 2 diabetes mellitus individuals, who have less diabetes-related distress are more satisfied with their treatment regimen and have good glucose control. Stress can also affect diabetes by psychological means, by releasing stress hormones, like epinephrine, which trigger the release of glucose in to the blood. Psychological distress and coexisting activity limitations in daily life effect adherence to self-care responsibilities essential for glucose level control.

**Diabetes and Depression**

Depression is more common in individuals with diabetes than in the general population (Anderson, Freedland, Clouse, & Lustman, 2001). Meta-analysis suggests that depression is between 60 and 100% more common in adults living with diabetes (Anderson et al., 2001 & Ali et al., 2006). Furthermore, research demonstrates that most individuals with diabetes who endorse depressive symptoms on self-report measures are not clinically depressed (Fisher et al., 2007; Peyrot & Rubin 1997).

The prevalence of depression to be 3.7 times higher among people newly diagnosed (Palinkas et al., 1991). Another study of people with type 2 diabetes reported similar findings where the people previously diagnosed with diabetes reported a higher prevalence of depression (25%) than did people newly diagnosed (11.5%) and those with no diabetes diagnosis 11.7%; (Rajala et al., 1997). These studies suggest that knowledge of having a diagnosis of diabetes may be associated with depressive symptoms.

"An increased rate of depression has been seen in people having diabetes mellitus. The mean prevalence of depression in people with diabetes mellitus has been reported to be as high as 31.7% (Anderson et al., 2001). An increased prevalence of depression in people with diabetes mellitus (26.1- 29.8%) has been

observed compared to first degree relatives 9.5% (Popkin et al., 1988), the general population 16% (Gavard et al., 1993)".

Depression and Diabetes Self-Management in Type 2 Diabetes Mellitus: "Depressive symptoms in people with Diabetes mellitus are of concern because of their association with poor diabetes self-management (i.e., diet modification, physical activity, insulin injections) and an increased risk for diabetes-related complications (Black, 1999; De Groot et al, 2001). Furthermore, co morbid depression in people with diabetes mellitus is associated with functional disability, low work productivity, and low health service use (Black, 1999; Black & Markides, 1998; Ciechanowski et al., 2000). As a result, increased attention in recent years has been given to understanding the relationship between depressive symptoms and diabetes mellitus (Lustman et al., 2000; Talbot & Nouwen, 2000)".

Symptoms of depression and anxiety did not predicted by diabetes, but these are emerged as significant risk factors for onset of type 2 diabetes independent of recognized risk factors for diabetes, such as socio economic factors, lifestyle, and markers of the metabolic syndrome. The co morbidity between depression and anxiety is the most important factor, and this may predict occurrence of diabetes. Individuals having symptoms of depression and anxiety in their life had increased risk of onset of diabetes (Engum , 2005).

Depression and its related symptoms form a major risk factor in the occurrence of type 2 diabetes and may speed up the onset of diabetes complications (Musselman, Betan, et al., 2003). Improving dysphoria and other signs and symptoms of depression in patients with diabetes by Short term treatment for depression will help to improve diabetes.

Social Support, Depression and Type 2 Diabetes Mellitus: Diabetes complications associated with Social support were significant correlates of depression these can produce variance in depression. Older people with diabetes should be cared by nurses or other medical persons, can reduce the level of depression in them, due to this their diabetes complications also decreases (Bai, Chiou et al., 2006).

Depression affects the treatment outcome and is related with poor health conditions (Cassano &  Fava, 2002; Wing et al., 2002) depression is associated with change in pathological and physical conditions and likely induces diabetes – related complications (Musselman et al., 2003). There is a relationship between health burden and depression, health burden is heavier in diabetic persons with depression than diabetic persons without depression or depressed individuals without diabetes (Black, 1999).

There is a stronger relationship between depression-diabetes symptom than the relationship between diabetes symptoms with measures of glycemic control and diabetes complications.  People with depression have a tendency to focus on illness episodes and medical symptoms and selectively recall negative or unpleasant events. This will lead to painful symptoms and functional limitations, these can induce psychological distress and depression. Depression is associated with increased symptom burden, functional disability and medical costs related to a chronic medical condition such as diabetes. These all factors related to diabetes will lead to an increased rate of depression among persons with diabetes. (Ludman, Katone, Russo et al.,2004)

There is an increased risk of developing depression in people with diabetes; the nature of the relationship between depression and diabetes not yet significantly established, and further studies are required to study this relationship (Roy & Liayd, 2012).

 Diabetes people with coexisting depression showed decreased adherence to treatment, poor metabolic control, more difficulty rates, decreased Quality of Life, they have high health care use and cost, increased disability and lost productivity, and they also have increased death rates. Coexistence of diabetes and depression is connected with significant morbidity, mortality, and increased health care cost. (Edge & Ellis, 2010).

The causal mechanism underlying the association between the depressive symptoms and diabetes mellitus has yet to be elucidated. (Talbot & Nouwen, 2000). Two primary explanation for their relationship have been observed; 1) "depressive

symptoms are associated with biochemical changes (i e., hyperglycemia) due to diabetes mellitus," 2) "depressive symptoms are related to psychosocial hardships (i e., burden of illness on Quality of Life) associated with the illness (Jacobson, 1993; Lustman et al., 1992)". Depressive symptoms in people with diabetes mellitus are often addressed by behavioural (e g., CBT; Lustman et al., 1998) and /or medical (e.g., antidepressants; Goodnick, 2001) interventions.   Understanding of the relative influence of important bio psycho-social factors and association with their socio demographic moderators has useful in effective treatment for diabetic people with coexisting depression.

Depressive symptoms and Health Related Quality of Life: Previous researches have shown a relationship between glycemic control and indices of Health Related Quality of Life in people with diabetes mellitus and comorbid depression. (Kaholokula et al.,2003).

Diabetes mellitus affects Health Related Quality of Life by affecting people's physical, social and occupational functioning, and role obligations, this association has been found to be affected by severity of depressive symptoms (e g., Talbot & Nouwen, 2000).  Physical functioning, perceived threats on diabetes on daily life activities, and perceived social support were significantly associated with depressive symptoms in people with type 2 diabetes (Connel et al., 1994). Perceived disturbance of illness on work, social and recreational activities was significantly connected with depressive symptoms in people with type 2 diabetes (Talbot et al., 1999). People with type 2 diabetes have also reported a significant association between depressive symptoms and other indices of Health Related Quality of Life, such as degree of difficulty, leisure, work and family functioning (Mayou et al., 1990).

Onset of major depressive disorder (MDD) is independent of the onset of type 2 diabetes. MDD in diabetic individuals represents a multi determined experience due to interactions between bio-psychosocial factors. The interaction between bio-psychosocial factors also strengthens the chance of developing type 2 diabetes in healthy individuals.

Diabetes Distress, Depression, Quality of Life and Type 2 Diabetes: Depression severity was associated with poorer Quality of Life on the achievement and marginally associated with Quality of Life on psychosocial growth domain. Interventions designed to address both depression and diabetes distress may lead to better Quality of Life outcomes than a generalized depression intervention or an intervention for diabetes alone (Carper, Traeger et al., 2013).

Social support has been offer protection from developing or increasing depression in people with type 2 diabetes (Brown & Harris, 1978). There has a significant relationship found to be a decrease in social support may leads to the development of depression in type 2 diabetic people (Prince et al., 1997b). McCurren, Hall & Rowels (1993) found that lack of instrumental support was associated with depression in older people, especially those with higher levels of functional disability and therefore greater handicap (Prince et al, 1997a). Found a significant association between depression and tangible (instrumental) support Oxman, Berkman, Kas, Freeman & Barret 1992).

Depression can make the tasks required to manage diabetes which more difficult and, therefore, may be associated with a variety of diabetes complications (Anderson, Grigsby , et al 2002). According to data from the 1999 National Health Interview survey in the US, subjects with diabetes  major depression had higher functional disability compared to individuals with either diabetes or major depression alone (Egede,2004). Von Korff et al., 2005 found that among patients with diabetes complications and depression had higher work disability than those with either diabetes complications or depression alone.

In brief, an increased rate of depression has been seen in people having depression in diabetes mellitus is associated with poor diabetic self-management. There is a relationship between health burden and depression, health burden is heavier in diabetic persons with depression than diabetic persons without depression or depressed individuals without diabetes. Diabetes mellitus affects health related quality of life by affecting people's physical, social and occupational functioning; and this association has been found to be affected by severity of depressive

symptoms. Depression severity was associated with poorer quality of life. Interventions designed to address both depression and diabetes distress may lead to better quality of life outcomes than an intervention for diabetes alone.

## Type D Personality and Diabetes

Type D personality is a new factor in the area of health research. Almost all the studies related to type D personality were conducted in the area of cardio vascular disease. Therefore there are only a few studies for type D personality most among them did not reached in a conclusion. So that detailed studies requires in future understanding the effects of type D personality.

Type D Personality and Depression in Type 2 Diabetes Mellitus: Type D personality together with other psychological risk factors can increase the depression in primary care patients with type 2 diabetes (Nefs, Pouwer, Denollet & Pop. 2012)

Type D personality was independently associated with the metabolic syndrome in a cross-sectional study. The potential implications of these findings, especially from a clinical and preventive perspective, should be examined in the future (Tziallas et al., 2011).

Type D personality disrupts Hypothalamus-pituitary-adrenal axis dysregulation, resulted in elevated cortisol levels, has been associated with hypertension, hyperlipidemia and insulin resistance, which are the main components of metabolic syndrome. And also persons with type D personality has a tendency to experience anxiety or depressive symptoms which are both associated with metabolic syndrome. Type D personality was significantly associated with fasting blood glucose and waist circumference measurements. Therefore it could be hypothesized that the association between type D personality and metabolic syndrome may be mediated through the enhanced prevalence of anxiety or depressive symptoms in type D personality. (Tziallas et al., 2011)

In industrialized societies health problems resulting from obesity is growing and obesity and its related diseases has become one of the main causes for death. Environmental influences are crucial for the interaction between genetic,

neurohormonal and metabolic factors that may be important in understanding individual differences in the development of obesity and metabolic disease like type 2 diabetes. Therefore successful treatment can be predicted by the interactions between the personality of an individual and the environment (Boersma & Benthhem et al., 2011).

Personality, Health Related Quality of Life, Subjective Well Being And Type 2 Diabetes Mellitus: An individual's sense of well being or quality of life is related to self-perception and relationship with others (Trento et al., 2004), Quality of Life may also be determined by pleasant and unpleasant evaluation of life events and satisfaction with life. Personality has been found a strong and constant predictor of subjective well being and life satisfaction (Bornstein, 1998; Diener et al., 1999).

Negative affectivity was negatively associated with the majority of the Health related quality of life scales. Therefore, individuals higher in negative affectivity are more likely to complain about their health concerns or are more sensitive to them. While planning treatment for individuals based on Health related quality of life is important to consider level of Negative Affectivity because specific interventions may differ depending on the individual's degree of Negative Affectivity (Kressin, Spiro III, & Skinner., 2000).

Personality characteristics have been found to affect health behavior. This includes individuals thinking that they need to visit and actually visit their General Physician versus the presence of actual disease necessitating medical assessment (Bornstein, 1998). Likewise, adherence to medication structures and necessary life style changes for self-managing disease states can also potentially be affected by the individual's personality (Smith & SpiroIII, 2002).

Personality affects one's sense of well-being, adaptation and coping in the event of a new life-changing situation. Based on one's personality a person has a tendency to be happy or unhappy, inherent traits of optimism and pessimism, and the influence of life circumstances affects one's sense of well-being (Diener et al., 1999).

In summary, type D personality together with other psychological risk factors can increase the depression in primary care patients with type 2 diabetes. An individual's sense of well being or quality of life is related to self perception and relationship with others, personality has been found a strong and constant predictor of subjective well being and life satisfaction.

**Psychological Intervention and Type 2 Diabetes**

Endocrine patients with poor diabetes regimen adherence, poor adjustment to illness, stress exacerbating medical symptoms and/or self-care, psychiatric problems (especially mood and anxiety disorders), and cognitive problems were referred to psychological intervention. Clinical studies suggests that the most important reasons for psychological referral of endocrine patients are depressive disorders (with depression twice as common as dysthymia), life stress affecting illness, anxiety disorders, and poor medical regimen adherence (Davis, Hess & Hiss, 1988).

Steed, Cooke, & Newman, (2003) stated that educational and self-management interventions that evaluated quality of life revealed a consistent advantage for self-management interventions. Interventions directed toward emotional distress appeared to be associated more frequently with improvements in depression, as compared to educational and self-management interventions.

Self-care activities of chronic disease (i e., Type 2 Diabetes Mellitus) supports Orem's theory of self-care through various relationships. The theory has two concepts which are related to successful self care, these are: therapeutic self-care demand and self-care agency. Therapeutic self-care is a summation of the measure of one's ability to perform the demands of self-care in relation to his/her life condition.  Self-care agency is an individual's ability to perform self-care activities, or health endorsing behaviours on one's own behalf to maintain healthy life style (Orem, 1979; Orem 1991). When Patients are able to produce effective self-care, it shows that they have awareness about themselves and their disease condition. Similarly, their estimative activities' objective is to define what is to be achieved with respect to self-care and the relevant knowledge or awareness encompasses internal and external conditions of the individual (Orem,1995).  The

maintenance and development of self-care agency depends on the individual's age, marital status, level of education, socio- economic status and so on (Carter, 1998; Mapanga and Andrews, 1995).

Diabetes regimen adherence and Self-care Behaviour: Regimen adherence improves Blood Glucose levels and significantly reduces long term complication rates (DCCT Research Group, 1993), noncompliance with diet recommenations and insulin adminstartion has been reported by most (58-80%) of diabetes mellitus patients (Sarafino, 1994). Poor adherence is associated with anxiety and depression, maladaptive personality traits (Lustman, Frank, & McGill,1998), and poor coping skills (Delimeter, Kurtz, Bubb, White & Santiago, 1987). Social and family factors seems to be relevant in self management of diabetes mellitus. The lack of diabetes specific, family support predicts non adherence in adults with Non Insulin Dependent Diabetes Mellitus (Glasgow & Toobert, 1989).

An accurate food planning will help the diabetes patient to maintain a stable blood glucose level, reduce the cardiovascular risk factors and help the patient to get a well balanced diet. Monitoring of metabolic parameters as HbA1c, blood glucose, control of blood pressure, body weight as well as quality of life are also essential to assess the need for changes in diet therapy (International Diabetes Institute, 2005). Both low and high protein diets decrease fasting glucose, weight, insulin concentrations and total and abdominal fat (Parker, Noakes, Luscombe & Clifton, 2002).

Physical activity is a key element in the diabetes type 2 self-care as it can help the patient to lose weight, and then also improve the body's insulin sensitivity and glycemic control. (Guerci et al., 2003; Svenska diabetes forbundet, 2006). The common health goal is to achieve at least 150 minutes of physical activity every week, and it is been shown that people who have diabetes and exercise regularly have considerably lower mortality rates over 12-14 years. Kirk, Mutrie, MacIntyre & Fisher (2003) showed that exercise consultation increases the physical activity level in people with type 2 diabetes, when compared with patients getting standard exercise leaflets.

Some psychological interventions have been known to improve regimen adherence, like., effective behavioural programs typically include nutrition and exercise counselling, self-monitoring, stimulus control techniques, and contingency contracting (Sarafino, 1994; Masters, Burish, Hollon, & Rimm, 1987). Hartwell, Kaplan, and Wallace (1986) describe a behavioural dietary intervention for Non Insulin Dependent Diabetes Mellitus patients to identify the environmental indications and to modify these with self monitoring, behaviour change and the modification of self-defeating cognitions related to the regimen adherence.

Most of the risk factors can be prevented by life style changes for people at high risk. These changes in life style include healthy food habits, regular exercises and regular meetings with the health care providers (Tuomiletho et al. 2001).

Stress and Coping interventions: Stress management interventions have been evaluated for their effects on diabetes outcomes. In a study conducted by Surwit et al., 2002 diabetes education program with or without stress management training provided with 108 individuals with type 2 diabetes. At one year follow up stress-management training was associated with a small but significant and clinically meaningful reduction in Fasting Blood Sugar level.

An important component of cognitive behavioural approaches is behavioural activation, in which individuals are coached on increasing the frequency in their daily lives of activities and behavior patterns that are pleasurable. General self-management and healthy coping programs should give time to monitoring activities and behavior patterns that are generally associated with pleasure and positive emotions versus those that generally lead to distress. Cognitive behavioural strategies may sound like common sense; it requires a fair amount of skill to help people apply these to their own behavior.

Behavioural stress reduction studies in Diabetes Mellitus have shown mixed results. Some show improvements following biofeedback-assisted progresssive muscle relaxation training, while others show no change or inconsistent responses (Cox & Gonder-Frederick, 1992). While it is currently unclear whether relaxation training is generally efficacious, it possibly benefits NIDDM patients who have high

baseline  Blood Glucose (Lammers, Naliboff, & Straatmeyer, 1984) or daily stress (Bradley, Moses, Gamsu, Knight, & Ward, 1985). In clinical practice a variety of types of relaxation training can usually be expected to produce atleast psychological benefits in most distressed medical patients who are not dissociative, actively psychotic, or severely  depressed. Although the research has tended to focus on progressive muscle relaxtaion and frontalis EMG biofeedback, it is conceivable that benefit could also result from other stress management approaches such as imagery-based relaxation, autogenic training, cue-controlled relaxation, passive relaxation, mindfulness meditation, yoga, simple diaphramatic breathing training, and a variety of less standard stress management methods.

Self-Efficacy Interventions: Self-efficacy for diabetes is the discovery and development of one's inherent capacity to be responsible for one's own life (Funnell & Anderson, 2003). Self efficacy interventions focuses on empowerment of diabetes self management behaviours and also psychosocial self efficacy. This includes psychosocial issues such as managing stress, obtaining family support, negotiating with health care professionals and employers, and dealing with uncomfortable emotions (Anderson, Funnell, Fitzgerald, & Marrero, 2000). The analysis results of the data of trial test of the empowerment intervention program showed sustained improvements in self-efficacy and a modest improvement in blood glucose of the participants.

Intervention for Depression in Diabetes: Depression prevalance is elevated Diabetes Mellitus, occuring up to six times the rate normally observed in the genral population (Lustman, Griffith, Clouse & Cryer, 1986). Patients with fewer diabetes complications and good adherence to Blood Glucose self-monitoring improved more with CBT. Interventions increasing activity level or general self-care may cause unanticipated improvements in Blood Glucose control. Although such changes are medically therapeutic, medically supervised regimen adjustments may be necessary to prevent hypoglycemic episodes.

Depression in type 2 diabetic individuals can make decrease in glycemic control. This can be evident from the study conducted by Katon et al., (2004) found

that compared to usual care for diabetes, a collaborative care model including educating the patient, antidepressant medication support, or problem solving therapy by the physician is more effective to improve depression in diabetics. But improved depression alone did not result improved glycemic control. In another controlled trial by Lustman, Griffith, Freedland, Kissel, & Clause, (1998) compared diabetes education plus 10 weeks of Cognitive Behaviour Therapy. A greater proportion of Cognitive Behaviour Therapy treated participants, compared to controls achieved depression remission. At six month follow up Cognitive Behaviour Therapy treated participants had better glycemic control. These studies states that depression in diabetic individuals can be treated effectively with psychological depression intervention.

These studies have concluded that, endocrine patients with psychological problems like depression, stress and anxiety disorders will refer to psychological interventions. Orem's theory of self-care states that therapeutic self-care demand and self-care agency are related to successful self care. Diabetes regimen adherence improves blood glucose level and reduces long term complications of diabetes. An accurate food planning and physical activity is the key element of self-care in type 2 diabetics. Studies have shown that stress management interventions by using progressive muscle relaxation technique are beneficial to distressed type 2 diabetics. Depression in diabetics is negatively affecting glycemic control; to reduce depression in type 2 diabetics Cognitive Behaviour Therapy techniques are beneficial. These reviews suggests that while using effective psychological intervention techniques the psychological problems influencing glycemic control in type 2 diabetics can bring down.

This chapter included related studies in the area of present research; which indicate the significance of psychological factors together with the related physiological factors on type 2 diabetes. By analyzing the related studies the researcher has got a clear picture regarding the importance of psychological factors correlated to type 2 diabetes, there were two types of studies identified, one set of studies were described that type 2 diabetes was caused by experiencing

psychological factors like perceived stress or lack of subjective well being etc. and the another set of studies were described that the psychological factors were experienced as a result of type 2 diabetes. Whatever it may be, either correlated factor or causal factor, the present study has given importance that the psychological factors being existed with the type 2 diabetes.

Almost all the studies related to the psychological factors related to type 2 diabetes were conducted in Western countries, only very few studies have found from Eastern countries especially from India, even though the recent statistics proves that India have the world's second largest diabetic population. In this context, to study the reason behind the raise of India's diabetic population is more relevant, and also it is very useful to develop an intervention package based on the psychological problems faced by the diabetic people in the country. On the basis of these objectives the researcher conducted the present exploratory study in the psychological correlates of type 2 diabetes in Kerala population, and designed an intervention package on the basis of the specific area which needed psychological intervention. The present study had also planned to compare the differences in the psychological factors related to type 2 diabetes on the basis of locality of living/ country of living (Those who are living in Kerala and those who were migrated to United Arab Emirates for job purposes).

**Objectives of the Study**

1. To explore psychological correlates of type 2 diabetes.
2. To design a psychological intervention package to manage the psychological correlates that related to type 2 diabetes mellitus.
3. To study the disparities in psychological factors influencing type 2 diabetes among two groups based on their locality of living (those who are living in their own home town and those who were migrated to another country for job purposes).
4. To study the relationship among different psychological factors in type 2 diabetics; namely, positive factors like diabetes related quality of life, subjective well being, perceived social support, and diabetes self care and

negative factors like health related depression, perceived stress and type D personality.

5.  To study the interaction effect of diabetes related quality of life, perceived social support, perceived stress, diabetes self care, and type D personality on subjective well being and health related depression in type 2 diabetics.

6.  To study the predictability of diabetes related quality of life, perceived social support, diabetes self care, perceived stress, and type D personality on subjective well being and health related depression in type 2 diabetics.

7.  To study the role of different demographic factors (Age, Sex, Marital Status, Education and Socio Economic Status) on subjective well being and health related depression in type 2 diabetics.

Based on all these objectives the following hypotheses were developed and tested in the following section.

**Hypotheses**

A hypothesis is a prediction about the outcome of the research. The hypothesis often known as a research hypothesis, experimental hypothesis or alternative hypothesis, predicts that there will be a difference between conditions, or that there is an association between variables. For the present research the following hypotheses were formed.

1.  There will be significant relationship between variables of Diabetes Self-Care, Diabetes Specific Quality of Life, Perceived Social Support, Subjective Well Being, Perceived Stress, Health Related Depression, and Type D personality.

2.  There will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, and Type D Personality on Subjective Well Being.

3.  There will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived stress, Type D personality on Health Related Depression.

4.　　There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting blood sugar level, (Type D personality) Negative Affectivity and Social Inhibition on Health Related Depression.

5.　　There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar level, Type D personality (Negative Affectivity and Social Inhibition) on Subjective Well Being.

6.　　There will be significant interaction between the Locality of living/ Country of living and the psychological variables of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being and Health Related Depression.

7.　　There will be significant interaction between the classificatory factors of Age, Sex, Marital Status, Education and Socio Economic Status on Subjective Well Being.

8.　　There will be significant interaction between the classificatory factors of Age, Sex, Marital Status, Education and Socio Economic Status on Health Related Depression.

# Chapter III

# METHOD

- ❖ Phase 1 - Exploring Psychological Variable
- ❖ Phase 2 - Selecting & Adapting Questionnaires
- ❖ Phase 3 - Data Collection & Analysis
- ❖ Phase 4 - Designing Intervention

Research methods or techniques, refer to the methods that researchers used in performing research operations, all those methods used by the researcher during the course of studying his or her research problem are termed as research methods or research designs. Truly, research methods are the blueprints of the entire research, which providing a master plan specifying the methods and procedures for collecting and analyzing the needed information. In the beginning of the present study, the researcher has no in depth knowledge in the area of research, there were no similar studies conducted in Eastern countries. With the present study the researcher intended to identify the psychological factors influencing type 2 diabetics. The study also attempted to find how those factors are affecting the changes in the psychological functioning and diabetes self care. To explore all those matters the researcher adopted particular methods. The study plan included the selection of sample, mode of data collection, finding the definite areas of exploration, derivation of variables and also the proposed designing of intervention on the basis of need assessment and available literature of previous researches.

The present study has an exploratory research design, which is mostly carried out when there is no sufficient information available about the issue to be studied, or the researcher had either no knowledge or limited knowledge. In present study the researcher had a limited knowledge regarding the psychological factors related to type 2 diabetes, therefore the exploratory method has been adopted.

**Phases of Research**

The entire research has been conducted in four major phases, they are following

- **Phase I:** Pilot study/ Exploring psychological variables affecting Type 2 Diabetes

- **Phase II:** Adapting Questionnaires and Rating Scales

- **Phase III**: Data Collection and analysis

- **Phase IV:** Designing and Implementation of intervention.

**Phase I**: **Exploring Psychological Variables**

In this phase the researcher planned to explore psychological factors related to type 2 diabetes mellitus. In order to identify those factors in the study the three categories of exploration had carried out, those categories are as following;

## 1. Pilot study

Pilot study is an informal exploratory investigation which serves as a guide for a larger study. In the present study the researcher planned to get a clear idea about the psychological factors affecting type 2 diabetes mellitus. Through the pilot study the researcher got the general idea of the psychological factors related to type 2 diabetes either affects positively or negatively.

**a. Participants**:  Participants for the pilot study consisted of 50 type 2 diabetic patients (both males and females) in the age group of 40-65 years from endocrinology department of leading medical college hospital Thrissur, two diabetic clinics from Thrissur, and also the data, that had been  collected from the individuals diagnosed as type 2 diabetics from their own home or workplace based on their convenience, from different districts of Kerala (Thrissur, Malapuram, Palakkad Kannur, Eranakulam and Pathanamthitta). The following table gives the distribution of participants for pilot study.

*Table 1: Distribution of samples for pilot study*

| Sex | Male | Female | Total |
|-----|------|--------|-------|
| No. | 22 | 28 | 50 |

**b. Measures of data collection:** The data for pilot study was collected using an unstructured face-to-face interview method. To identify the common psychological factors associated with the type 2 diabetes that experienced by the patients after getting diagnosed as type 2 diabetes. The researcher requested the participants to talk about all their physical and psychological experiences after the diagnosis of diabetes and the compromises they had made in their routine activities.

**c. Procedure:** The pilot study for the research was conducted in duration of one month. Informed consent from the participants was taken beforehand and the researcher fixed an appointment based on their convenience. In the case of the participants who won't attend endocrinology department of the medical college and diabetes clinic, the investigator went directly to their home, workplace or the convenient place to meet them. For those who were attending hospital endocrinology department and diabetes clinic the investigator gathered permission from authorities of the institution and department heads before going to meet them.

**d. Data analysis**: The collected data were analyzed using content analysis. The researcher analyzed the responses of all participants of the pilot study. From the content analysis results, the researcher identified the common psychological factors affecting type 2 diabetes mellitus patients.

Based on the information acquired through the pilot study regarding the common psychological variables affecting type 2 diabetes, the researcher had conducted an analysis of previous studies in the related. The second category of the exploration of variables was the analysis of studies.

## 2. Analysis of Previous Studies

This involves a secondary analysis of available information already published in some form. Related reviews of psychological correlates of type 2 diabetes were collected from both books and published journals and articles, and from those studies those giving more importance to the physiological reasons and studies of psychological factors for other chronic illness generally were exempted. The studies which were specifically related with the psychological factors related with type 2 diabetes were selected which included more than 250 studies and the gist of the studies were gone through. Most of the related studies collected are conducted after the year of 2000, but studies that were conducted and published before 2000 were also involved on the basis of its relevance on present study. Each study based on the variables was again classified chronologically. Importance was given to those studies which indicated direct link between the psychological background and

pancreas function. Later each study was thoroughly analyzed qualitatively, and in each group a Meta analysis was conducted.

Collected reviews were classified on the basis psychological variables related to type 2 diabetes, which were assumed from the common psychological difficulties expressed by the participants of the pilot study. The available studies were categorized into the following headings;

- **Studies on Psychosocial factors influencing in Type 2 Diabetes** (4 studies identified).

The previous studies results in this area expressed that the psychosocial factors that directly and indirectly associated with glycemic control in type 2 diabetic patients including, diabetes self-care, health related quality of life, social support, subjective well being, perceived stress, health related depression, and type D personality.

- **Studies on psychological factors affecting diabetes self management**

Studies in this area described that diabetes requires continuous self-management. Diabetes self-care can be changed by social support and provider patient communication. Diabetes education programs may be helpful to those who are having low self-efficacy. Self-management of type 2 diabetes mellitus requires adherence to treatment schedule for long periods.

- **Studies on Health  Related Quality of Life and type 2 Diabetes**

Studies in this topic state that, health related quality of life in diabetic people has negative impact on various life domains like self-confidence, family life and their freedom to dine as they wish**.** And some studies also suggested that quality of life relates directly to how well control the diabetes, which means those who have better control over their blood glucose levels and who maintain healthy lifestyles experience a better quality of life. Depression in diabetic patients is related to impaired glycemic control which in turn results more diabetes complications and poorer health related quality of life.  Based on the combined influence of diabetes related quality of life and other psychological variables identified the studies were classified as following;

- ➢ Diabetes Related Quality of Life and type 2 Diabetes- 15 studies identified.
- ➢ Diabetes Related Quality of Life and Social Support - 2 studies identified.
- ➢ Diabetes Related Quality of Life and Self-Management- 3 studies identified
- ➢ Diabetes Related Quality of Life and Well-being

- **Stress and type 2  Diabetes**

In general, previous studies had established that, type 2 diabetic people, who had less diabetes-related distress, are more satisfied with their treatment regimen and have good glucose control. Stress can also affect diabetes by psychological means, by releasing stress hormones, like epinephrine, which trigger the release of glucose in to the blood. Studies related with the stress and diabetes was sub categorized on the basis of different combinations and is as follows;

- ➢ Stress and Type 2 diabetes -26 studies identified, and
- ➢ Stress  and Self-management -6 studies identified

- **Social Support and type 2 Diabetes**

Studies in the relationship between social support and type 2 diabetes emphasized that, perceived social support related to one's diabetes routine was most strongly related to compliance with diet and self care management. Social support acts as a buffer that may protect against diabetes distress. Higher levels of social support help to improve glycemic control, improved treatment satisfaction and better quality of life.  Related studies associated with social support and diabetes, and combined effect of social support and other psychological variables on diabetes were also analyzed. Those studies were classified as following;

- ➢ Social Support – 9 studies identified
- ➢ Social Support and Diabetes- 16 studies identified
- ➢ Social Support and Depression- 9 studies identified

- ➢ Social Support and Mental Health- 2 studies identified
- ➢ Social Support and stress -13 studies identified
- ➢ Social Support and Self-Management- 4 studies identified

- **Depression and type 2  Diabetes**

Previous researches related with the association between depression and type 2 diabetes state that, increased rate of depression has been seen in people having diabetes mellitus is associated with poor diabetic self-management. There is a relationship between health burden and depression, health burden is heavier in diabetic patients with depression that in than diabetic patients without depression or depressed individuals without diabetes. Related studies in this topic had been classified under the following headings;

- ➢ Depression and diabetes- 28 studies identified
- ➢ Depression and self-care- 2 studies identified

- **Subjective Well being and type 2  Diabetes**

There were only a few studies conducted stating the relationship between subjective well being and type 2 diabetes, so the researcher has gone through the related studies in this area. Available studies were stated that, the type 2 diabetics subjective well being was negatively influenced by the elevation of stress hormone cortisol and decreased serotonin level which will induce depression, and these will decrease subjective well being in them. The available studies were classified as;

- ➢ Well being and type 2 diabetes- 3 studies identified.
- ➢ Well being and Health Related Quality of Life- 1 study identified

- **Personality and type 2 Diabetes**

Most of the studies in type D personality were conducted in cardiac patients, only limited studies could found that demonstrate the relation between type D personality and type 2 diabetes mellitus.  Those studies emphasis that type D personality together with other psychological risk factors can increase the depression

in primary care patients with type 2 diabetes. Available studies in this topic were classified in to the following categories.

➢ Personality and type 2 diabetes -3 studies identified

➢  Personality and Subjective Well being- 3 studies identified

➢ Personality and Health Related Quality of Life- 1 study identified.

Subsequent to Pilot study and Analysis of available studies, the researcher got an idea of psychological factors related to type 2 diabetes. To make it obvious the researcher discussed this with the health professionals,

## 3.  Meeting Experts

This phase includes the discussion with health professionals to obtain their views and opinions regarding the study.

**a. Participants:** For the purpose of getting professional suggestions, the researcher interviewed health professionals including general physicians, psychiatrists, endocrinologists and psychologists in health sector.   The details of health professionals interviewed are given in the following table;

*Table 2: Distribution of experts interviewed*

| Professional categories | No. of participants |
|---|---|
| General physicians | 3 |
| Psychiatrists | 3 |
| Endocrinologists | 2 |
| Psychologists in Health sector | 4 |
| Total | 12 |

**b. Instruments**

Semi-structured interview schedules were prepared to collect information regarding the topic of the study by using person-to –person interview method. The professionals were requested to express their ideas, observations and suggestions regarding the influence of psychological factors and the importance of considering psychological aspects in the treatment of type 2 diabetes.

**c. Mode of data collection**

An appointment was fixed to meet the experts beforehand. The researcher either met them directly on their own clinics/ hospitals where they were practicing or interviewed over phone based on their convenience. The researcher approached them with the semi structured interview schedule prepared with the help of the research guide and the researcher noted down the important points of the professional's responses for each question.

**d. Data analysis**

The data collected from experts were statistically analyzed using the simple statistical method of content analysis. The analysis results were helped to identify the psychological factors related to type 2 diabetes, and also the nature of influence of these factors on type 2 diabetics, specifically either facilitating or inhibiting patients well being, diabetes self  care management and life satisfaction. With the help of review of previous studies in related topic and discussions with specialists in Health Psychology, Clinical psychology, Endocrinology and general medicine the researcher got a clear idea of common psychological, physical and social issues experienced by type 2 diabetics.

Based on these assumptions the researcher identified the following psychological variables for the present study.

Psychological factors identified

1.  Diabetes  Related Quality of Life
2.  Subjective Well Being

3. Perceived Social Support

4. Diabetes Self Care

5. Perceived Stress

6. Health Related Depression, and

7. Type D personality (Negative Affectivity & Social Inhibition)

These variables have been classified as positive factors and Negative factors based on nature of their influence on type 2 diabetics, specifically either facilitating or inhibiting patients well being.

From the previous studies the researcher had been identified that some psychological factors helped to increase the experience of life satisfaction and well being, and will decrease the experience of distress and miserable feelings in type 2 diabetic patients. Enhancing these factors will facilitate the self care management in type 2 diabetic patients and that in turn help to put blood sugar level under control. These factors are considered as positive psychological factors related to type 2 diabetes. Positive factors identified for the present study were namely,

1. Diabetes Related Quality Of life

2. Subjective Well Being

3. Perceived Social Support, and

4. Diabetes Self Care

The researcher had found that some psychological factors will decrease the experience of positive perspectives toward life and increases the experience of psychological distress in type 2 diabetic patients. Reducing these factors will help to increase the well being and facilitate diabetes self management in type 2 diabetics, that in turn helps to control blood sugar level in them. These factors are considered as negative psychological factors related to type 2 diabetes. Negative factors that are identified for the present study were namely,

1. Perceived Stress

2. Health Related Depression, and

3. Type D personality

**Phase II: Selecting and Adapting Questionnaires and Rating Scales**

   To assess the variables in the study, different questionnaires and rating scales were adopted from authorized publishers on the basis suitability for the culture, where the study had been planned to be conducted. Original version of all the questionnaires and rating scales were in English, this original version had used for those who were able to understand English. But majority of the participants of the present study were Malayalam speaking, therefore the questionnaires were translated in to Malayalam and its items were re standardized. To assess the seven variables identified those affecting type 2 diabetics, the investigator had adopted the following seven questionnaires and rating scales, and to collect more personal details of the participant a Personal data sheet was also used. The instruments adopted for the study are following;

**Instruments**

   The instruments used for the present study included questionnaires and rating scales. Each of those instruments was their own instructions and response options, the instructions were printed in the beginning of each instrument. The researcher collected data by using face-to-face interview method to make the participants more comfortable, because majority of the participants were in the age group of 50 to 70 years, therefore they have shown less interest to read every question and mark appropriate options in the questionnaire. So the researcher read all statements and its response options loudly and instructed them to select answers which are more appropriate for them, and the researcher herself marked the answers to ensure that participants have attended all the items. The instruments used for the present study are following;

1.   **Quality of Life Instrument for Indian Diabetes Patients (QOLID)** Nagpal et al., (2009)

   This is an Indian scale for assessment of quality of life of patients with diabetes.  It consists of 34 questions representing 8 domains namely; Role limitation due to physical health (item nos:1,2,3,4,5,6), Physical endurance (item nos:

7,8,9,10,11,12), General health (item nos: 13,14,15), Treatment satisfaction (item nos: 16,17,18,19), Symptom botherness (items 20,21,22), Financial worries (item nos: 23,24,25,26), Emotional/mental health (item nos: 27,28,29,30,31) and Diet satisfaction (items 32,33,34) of diabetes related quality of life of type 2 diabetic people. The instructions to fill this questionnaire were as follows " the following statements assess your feeling about the impact of diabetes on your quality of life each statements have five responses and you can chose the one which is more appropriate for you". (Both English and Malayalam translated questionnaires were appended as Appendix 1 A & 1 B)

Scoring and interpretation: All statements were scored on a 5-point scale as 1, 2, 3, 4, and 5. The scores for eight sub fcators can be calculated by adding scores for each individual item for each sub factor, and the total score for diabetes related quality of life can be calculated by adding total scores of eight sub factors. Higher overall scores indicate increased diabetes related quality of life and lower overall score indicates lesser diabetes related quality of life. Reliability of the questionnaire using Chronbach's alpha was.89 which shows high internal consistency and the Validity coefficient was found to be .72.

## 2. Perceived Stress Scale (PSS) (Cohen et al., 1983)

PSS is the most widely used psychological instrument developed by Cohen et al., (1983) for measuring the perception of stress. It is a measure of degree to which situations in one's life are appraised as stressful. It helps to determine how unpredictable, uncontrollable and overloaded respondents find their lives. This is a 10 item scale, each statement has five responses are; Never, Almost Never, Sometimes, Fairly Often, and Very Often respectively. The respondents were instructed to choose the appropriate options what was most suitable for them. Reliability shows that the PSS has good internal consistency, with alpha of 0.78; no data on stability were reported. Validity: PSS has established good construct validity. (Both English and Malayalam perceived stress scale was appended as Appendix 2 A & 2 B)

Scoring and interpretation: The scoring for perceived stress scale was apparently changed for positive and negative items. Positive items were scored as 0,1,2,3, and 4 respectively for each responses, and for negative items (item nos: 4,5,7 and 8) were scored reversely as 4,3,2,1,and 0 respectively. The score was obtained by summing all individual item scores. Higher perceived stress scale scores associated with higher levels of stress. Higher scores associated with an increase in a person's vulnerability to compromised health, especially if a big life stress occurs in a near future, higher scores also indicate increased susceptibility to stress-induced illness. The interpretation of scores of perceived stress scale is given in the following table.

*Table 3: Interpretation of PSS score*

| Range of total Score | Perceived stress level | Health concern level |
|---|---|---|
| 0-7 | Much lower than average | Very low |
| 8-11 | Slightly lower than average | Low |
| 12-15 | Average | Average |
| 16-20 | Slightly higher than average | High |
| 21 and over | Much higher than average | Very High |

### 3. The Self-Care Inventory (SCI) (La Greca, 1992)

SCI is a 14-items self report measure. To assess patient's perceptions of the degree to which they adhere to treatment recommendations for their diabetes self-care. Each statements of the inventory has six response options, are Never, sometimes following recommendations, Follow recommendations about 50% of time, Usually do as recommended, always do this as recommended without fail, and Not applicable or cannot rate this item. The first five responses gave scores as 1,2,3,4 and 5 respectively   Reliability: internal consistency reliability for the SCI items have been reported to be 0.80 or higher in several studies of children and adolescents.  The Self Care Inventory has been appended as appendix 3.

Scoring and Interpretation: The overall score for Self Care had found by calculating average of 7 items, the item numbers are 1, 2, 5, 6, 7, 8, and 13. That is because proper self –care in those areas should be linked with better metabolic control. Increased score in SCI indicates healthy self care adherence without fail in diabetics and low scores indicate poor adherence to diabetes self care.

**4. The Subjective Well- Being Inventory (SUBI)** (Sell et al., 1992)

SUBI is designed to measure feelings of well being or ill being as experienced by an individual or a group of individuals in various day-to-day life concerns. This inventory consists of 40 items (19 positive and 21 negative) and it measures 11 factorial dimensions (general well being-positive effect, expectation-achievement congruence, confidence in coping, transcendence, family  group support, social support, primary group concern, inadequate mental mastery, perceived ill health, deficiency in social contacts, general well being- negative effect). The scale has high inter- rater reliability. Inter- scores reliability and test-retest reliability. The scale also have high significant in validity.  The test-retest reliability of Subjective well being inventory is 0.79 and the validity is 0.86. There were 3 response options for each item, the respondent was instructed to mark the response what was more suitable for him/ her. The subjective well beings inventory both English and Malayalam have been appended as appendix 4 A & 4B

Scoring and interpretation: For this inventory scoring was apparently changed for positive and negative items, the positive items were scored as 3, 2, and 1 respectively for each response, and negative items were scored as 1, 2 and 3 respectively. The total scores for 11 sub factors were obtained by adding scores for individual items and overall score for subjective well being were obtained by adding scores for sub factors. High scores indicate increased subjective well being and low scores indicate poor subjective well being in respondents.

**5. DS-14 Questionnaire (**Johan Denollet , 2010)

Type D personality was assessed using DS-14, consisting of two seven- item subscales of Negative Affectivity (NA) and Social Inhibition (SI). The NA

dimension comprises three lower- order traits including dysphoria (items 4, 7, 13), worry (items 2, 12) and irritability (items 5, 9). The SI dimension also include three lower-order traits: discomfort in social interactions (items6, 8, 14), reticence (items 10, 11), and social poise (items 1, 3). Reliability: the internal consistency reliability of the overall scale was very good with a Chronbach's alpha of 0.86. The Chronbach's alpha for the 2 subscales were 0.79 and 0.81 for social inhibition and negative affectivity respectively. The DS-14 scale also found high criterion validity (Denollet, 2005). The DS-14 questionnaire is appended as appendix 5.

Scoring and interpretation: Items were scored on a five point rating scale ranging from 0 ("false") to 4("true") (total score ranging from 0-28 for each subscale). The scores have been obtained for two sub factors (Negative Affectivity and Social Inhibition) by adding individual items separately. Those who obtain a score of ten or more on both scales are classified as type D personality.

**6.    'Multidimensional Scale of Perceived Social Support' (MSPSS)** by Zimet G, D et.,al (1988).

Multidimensional Scale of Perceived Social Support is a 12 item inventory, which assess perceived adequacy of social support from Significant others, Family, and Friends. Items representing perceived support from significant others were 1,2 5 and 10, items representing perceived support from family were 3,4,8, and 11, and the items 6,7,9,and 12 represents the perceived support from friends Each item is rated on a 7-point scale, score 1 for statements for "Very strongly disagree", 2 for "strongly disagree", 3 for "mildly disagree", 4 for "neutral", 5 for "mildly agree", 6 for "strongly agree" and 7 for "very strongly agree". The respondents were requested to rate which is more appropriate for them. The MSPSS questionnaires for both English and Malayalam are appended as appendix 6 A & 6 B.

The internal reliability, factorial validity, and sub scale validity of the MSPSS using three different subject groups (Pregnant women, Adolescents, and Pediatric residents) the MSPSS found to have good internal reliability across subject groups. The coefficient alpha values ranged from 0.81 to 0.90 for the Family sub scale, from 0.90 to 0.94 for friends sub scale, from 0.83 to 0.98 for the significant

other subscale, and from 0.84 to 0.92 for the scale as a whole. In addition strong factorial validity was demonstrated, confirming the three-sub scale structure of the MSPSS: Family, Friends and Significant Others (Zimet, Farley, Werkman, & Berkoff, 1990).

Scoring and interpretation:  The scores for three sub factors were found by adding items representing each sub factor. And a total score for perceived social support attained by adding scores for three sub factors.  The interpretation of perceived social support is shown in the table following;

*Table 4: Interpretation of MSPSS scores*

| Score of MSPSS | Level of perceived social support |
|---|---|
| 69-84 | High acuity |
| 49-68 | Moderate acuity |
| 12-48 | Low acuity |

## 7. 'Patient Health Questionnaire' (PHQ-9) by Kroenke, K et al (2001).

PHQ- 9 is the 9 items depression scale which is a dual purpose instrument that, with the same nine items can establish provisional depressive disorder diagnosis as well as grade depressive symptom severity. The questionnaire consists of nine questions which assess the items which experiencing persons for the past 2 weeks. Each item has four response options (i.e., Not at all, several days, more than half the days, and nearly every day) and the respondents were instructed to select the answers which are most appropriate for them from the options. Reliability of the PHQ-9 questionnaire was found that the Chronbach's alpha coefficient was 0.857. The correlation coefficients of each item with the total scores of the scales were 0.588 to 0.784 and these are statistically significant ($p<0.01$). PHQ-9 also found high criterion validity (Bian, Li, Duan & Wu, 2011).  The patient health questionnaire (PHQ-9) is attached as appendix 7.

Scoring and interpretation: The scores range from 0-3. 0 represent 'not at all', 1 represent 'several days' 2 represent 'more than half of the days' and 3 is 'nearly every day'. The overall scores were obtained by adding scores for individual items. Interpretation of PHQ-9 scores is given in the following table.

*Table 5: Interpretation of PHQ-9 scores*

| PHQ-9 Scores | Depression severity |
|---|---|
| 1 to 4 | None |
| 5 to 9 | Mild depression |
| 10 to 14 | Moderate depression |
| 15 to 19 | Moderately severe depression |
| 20 to 27 | Severe depression |

## 8. Personal Data Sheet

A data sheet was developed and employed in the current study to collect information on the relevant variables such as age, gender, education, marital status, religion, domicile, duration of illness, type of treatment and blood sugar level (Personal data sheet as appended as appendix 8).

**Translation and re-standardization in to Malayalam**

The Questionnaires were re-standardized after translated in to Malayalam, the detailed description of this are as following;

1. **Subjective Well Being Inventory (SUBI)**

The original Subjective Well Being Inventory developed by Sell et al., (1992) consists of 40 items and 11 factorial dimensions (general well being-positive effect, expectation-achievement congruence, confidence in coping, transcendence, family group support, social support, primary group concern, inadequate mental mastery, perceived ill health, deficiency in social contacts, general well being-negative effect) was translated into Malayalam and adapted for Kerala population.

For this purpose the original English version of SUBI was translated into Malayalam using forward and backward translation. For the cultural reasons some meaning of Malayalam items were adjusted to better reflection of the meaning of original items, no items were added or subtracted for the cultural reasons. For statistical analysis both English and Malayalam version of the inventory is administered to 60 samples. The reliability of the Malayalam on English version of the inventory is measured by using Karl Pearson' product moment correlation (r) of its subscales.

*Table 6: The correlation (r) between the English and Malayalam version of Sub factors of Subjective Well Being Inventory (SUBI)*

| Factors | Correlation (r) |
| --- | --- |
| SU 1 | 0.77 ** |
| SU 2 | 0.75 ** |
| SU 3 | 0.63 ** |
| SU 4 | 0.67 ** |
| SU 5 | 0.88 ** |
| SU 6 | 0.91 ** |
| SU 7 | 0.82 ** |
| SU 8 | 0.79 ** |
| SU 9 | 0.83 ** |
| SU 10 | 0.50 ** |
| SU 11 | 0.74 ** |
| SUB I Total | 0.92** |

**P<.0.01

## 2. **'Quality of Life Instrument for Indian Diabetic Patients' (QOLID)**

The original Quality of Life Instrument for Indian Diabetic Patients developed by Nagpal et al., (2009) consists of 36 items and 8 factorial dimensions (Role limitation due to physical health, Physical endurance, General health, Treatment satisfaction, Symptom botherness, Financial worries, Emotional/mental

health and Diet satisfaction) was translated into Malayalam and adapted for Kerala population. For this purpose the original English version of QOLID was translated into Malayalam using forward and backward translation. No items were added or subtracted for the cultural reasons. For statistical analysis both English and Malayalam version of the inventory were administered to 60 samples.   The reliability of the Malayalam on English version of the inventory is measured by using Karl Pearson' product moment correlation (r) of its subscales.

*Table 7: The correlation (r) between the English and Malayalam version of Sub factors of Quality of Life Instrument for Indian Diabetic Patients (QOLID)*

| Factors | Correlation (r) |
|---------|-----------------|
| QOLID 1 | 0.61** |
| QOLID 2 | 0.66** |
| QOLID 3 | 0.82** |
| QOLID 4 | 0.73** |
| QOLID 5 | 0.90** |
| QOLID 6 | 0.84** |
| QOLID 7 | 0.63** |
| QOLID 8 | 0.78** |
| QOLID Total | 0.88** |

**P<.0.01

### 3.  'Multidimensional Scale of Perceived Social Support' (MSPSS)

The original Multidimensional Scale of Perceived Social Support developed by Zimet G, D et.,al (1988).  Consists of 12 items and which measures social support in 3 dimensions (Support from Significant Others, support from Family and support from friends) has translated into Malayalam and adapted for Kerala population. For this purpose the original English version of MSPSS is translated in to Malayalam using forward and backward translation. No items were added or subtracted for the cultural reasons. For statistical analysis both English and Malayalam version of the inventory is administered to 60 samples.  The reliability of

the Malayalam on English version of the inventory is measured by using Karl Pearson' product moment correlation (r) of its subscales.

***Table 8: The correlation (r) between the English and Malayalam version of Sub factors of Perceived Social Support Questionnaire***

| Factors | Correlation (r ) |
|---------|------------------|
| SO | 0.91 ** |
| FA | 0.93 ** |
| FR | 0.93 ** |
| Total MSPSS | 0.94 ** |

**P<0.01

4. **Perceived Stress Scale (PSS)**

The original version of PSS developed by Cohen et al., (1983) consists 10 items for measuring the perception of stress was translated in to Malayalam and adapted for Kerala population. For this purpose the original English version of PSS is translated in to Malayalam using forward and backward translation. For this questionnaire also no items were added or subtracted for the cultural reasons. both the English version and translated Malayalam versions were administered to 60 samples, and correlation between these two versions have found by Karl Pearson's Product Moment Correlation (r ) is  0.76.

**Phase III: Data Collection**

In this phase, the researcher collected data using adopted instruments to assess the selected variables of the study.

a. **Participants**: Total participants of the study consisted of 256 type 2 diabetic middle aged people (male- 121 and female-135) age ranging from 30 to 65 years., among those 256 type 2 diabetic patients 226 were living in their own hometown (Kerala) and 30 were migrated to a distant place from their own hometown (United Arab Emirates) for job purposes more than 10 years. Participants were selected from Endocrinology departments of hospitals and a leading private medical college in

Thrissur district, and also from diabetic clinics from Thrissur, Kerala and a number of data were collected by meeting patients diagnosed as type 2 diabetics,   the researcher met them directly at their home. The data were also collected from type 2 diabetic patients from the diabetic clinics and endocrinology departments of United Arab Emirates for comparing the difference in the psychosocial variables based on the locality of living. Participants included the people who were employed /unemployed; married/unmarried and those who were well educated or not. Only natives of Kerala were included in the study.

b. **Mode of data collection**: Purposive sampling technique and snowball sampling technique were used for selecting participants for the study. The researcher followed face-to-face interview technique to fill questionnaires, rating scales and personal data sheet.

c. **Procedure**: Data collection began with the approval from both the institutions and the consultant endocrinology departments from data have been collected.  After getting approval the researcher requested endocrinologist to refer those patients who are fulfilling inclusion criteria. Then the researcher gave a description of the purpose of present study, after receiving informed consent from patients face to face interview were conducted to fill the socio demographic data sheet and questionnaires, and rating scale for the present study. Fasting blood sugar levels were asked to the patients and requested to produce the laboratory report that recently checked, and more other information related to health were collected from their hospital records. No blood samples were collected for the purpose of present study because the samples who are already diagnosed as having type  2 diabetes by an Endocrinologist or general physician, and those who were taking medicines for diabetes not less than 6 months.

*Table 9:  Distribution of Samples selected for the research study*

| Locality | Male | Female | Total |
|----------|------|--------|-------|
| Kerala | 99 | 127 | 226 |
| Migrated to UAE | 22 | 8 | 30 |
| Total | 121 | 135 | 256 |

Inclusion criteria:

➢ Participants were in the age group between 30-70 years.

➢ Participants were diagnosed as Type 2 Diabetics and under medication for minimum of six months

➢ Patients with no other illnesses diagnosed (e g., cancer, cardiac illness, Psychiatric problems etc)

➢ Samples selected from migrated population from individuals who were migrated more than 10 years for job purposes.

*Table 10: Distribution of samples based on age*

| Age | No: of diabetic patients |
|-----|--------------------------|
| Below 40 years | 22 |
| 40-50 years | 59 |
| 50-60 years | 87 |
| 60-70 years | 88 |
| Total | 256 |

*Table 11: Break up of samples based on marital status*

| Marital status | No: of diabetic patients |
|---|---|
| Unmarried | 11 |
| Married | 213 |
| Separated | 3 |
| Widowed | 29 |
| Total | 256 |

*Table 12: Break up of samples based on Education*

| Education | No: of diabetic patients |
|---|---|
| Below higher secondary | 146 |
| Higher secondary | 36 |
| Degree | 66 |
| Technical education | 8 |
| Total | 256 |

*Table 13: Distribution of samples based on socio economic status*

| Socio Economic Status | No: of diabetic patients |
|---|---|
| Upper class | 57 |
| Middle class | 150 |
| Lower class | 49 |
| Total | 256 |

**d. Statistical analysis of the data**

Statistical analysis is very important in psychological studies, because psychology is a science, and like all sciences psychology advances through research involving observation. That is, psychologists learn new facts by making systematic

observations about subjects (people). People are not the easiest of things to observe because they vary both between individuals and over time. That is, they differ in terms of how they react in a particular situation, and how a person reacts in a situation today might be quite different from how they react tomorrow. This means that the data collected by psychologist are much more 'noisy' than data collected in some other sciences. In order to be able to determine how, in general, people react in a given situation, the psychologist will probably need to test several different individuals on several different occasions and then make use of statistical techniques to determine what trends are present in the data. So particular statistical analysis are needed to use in psychology research. (Brace, Kemp & Sneglar, (2012).

The following statistical analysis techniques are used in present study;

**Descriptive analysis**

Descriptive statistics summarize large volume of data by using numbers or graphs and charts. Descriptive statistics can help us understand important aspects of a data set. Common descriptive statistics includes measures of central tendency (mean, median, and mode), measures of dispersion (range, minimum, maximum, standard deviation and variance), percentage, skewness and kurtosis of the variables were calculated.

For the present study the necessary descriptive statistics like Arithmetic mean, Median, Mode, Standard Deviation, Skewness and Kurtosis of the variables Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related depression and Type D personality (Negative Affectivity and Social Inhibition) were calculated.

**Correlation analysis – Karl Pearson Product Moment Correlation**

A test of correlation will provide with a measure of the strength and direction of such a relationship (Brace, Kemp & Sneglar, (2012). A co-efficient of correlation is a single number that tells us to what extent two variables are related, that is to what extent variation in one goes with variation in the other (Guilford, 1982). In a correlation there is no independent variable, it simply measures two variables.

The Pearson product moment correlation coefficient (r) indicates the strength of the correlation. The correlation coefficient takes any value between plus one and minus one. The sign of the correlation coefficient (- , +) indicates the direction of the relationship. A positive correlation coefficient indicates the variables will increases while the other variable increases; and as one decreases the other will also decreases. The negative correlation coefficient indicates two variables are in opposite direction, which means if one variable increases the other variable will decrease and vice – versa.

**Interpretation of correlation coefficient**

When r =0, there is no correlation between two variables; r = -1 indicates perfect negative correlation; r = 1 indicates perfect positive correlation; r = 0 to .2 indicates weak correlation; .3 to .6 indicates moderate correlation, and 7 to 1 strong correlation (Brace, Kemp & Sneglar, (2012). The strength of the correlation alone is not necessarily an indication of whether it is an important correlation; normally the significance value should also be considered. With small sample sizes this is crucial, as strong correlations may easily occur by chance. With large to very large sample sizes, however, even a small correlation can be highly statistically significant.

For the present study Karl Pearson Product Moment Correlation test is to find out the correlation between variables Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related depression and Type D personality (Negative Affectivity and Social Inhibition) were calculated.

**Multiple Regression analysis**

Regression is a statistical technique that allows predicting someone's score on one variable on the basis of their scores on one or more other variables. Regression involves one dependent variable, which is known as ' criterion variable', and one or more independent variables, which refers to as the 'predictor variables'; multiple regression involves two or more predictor variables. Multiple regressions

allow the researcher to identify which set of predictor variables together provide the best prediction of that score.

**The multiple regression equation**

The multiple regression equation allows us to predict the criterion variable 'Y' from the set of predictor variables X1, X2, X3, X4, etc.

$Y' = A + B1X1 + B2X2 + B3X3 + \ldots\ldots + Bk\ Xk$

Where:

Y' is the predicted value of the criterion variable.

A is the Y intercept for multiple regression, the value predicted for Y when all Xs equal 0.

B is the regression weight, or regression coefficient, for each predictor variable; a B indicates how much Y' will change if that X changes by one unit.

**Regression coefficients**

Regression coefficients (or regression weights) are measures of how strongly each predictor variable influences the criterion variable, if all the other predictor variables were held constant.

**B ( Unstandardised / Partial regression coefficient)**

B indicates the change in the measured units of the criterion variable for a change in one unit on the predictor variable (if all other predictors are held constant).

**Beta (standardized regression coefficients)**

Beta is the standardized regression coefficient, which is measured in units of standard deviation allowing to more easily comparing the influence of several predictors. A higher beta value of one predictor variable indicates a greater impact of that predictor variable on the criterion variable.

A regression coefficient either negative or positive, indicating whether an increase in the predictor will result in a decrease or increase in the criterion variable.

**R, R square, Adjusted R square**

R is the measure of the correlation between the observed values of the criterion variable and its predicted values.

R square indicates the proportion of the variance in the criterion variable which is accounted for by the model.

Adjusted R square value is calculated which takes to account the number of predictor variables in the model and the number of observations (participants) that the model is based on.

In the present study the multiple regression analysis is performed to get a clear idea of the variables which are predicting Subjective well being and Health related depression in type 2 diabetic patients. The dependent variables were subjective well being and health related depression and the predicted variables that were subjected to the analysis included Diabetes Related Quality of Life, Diabetes Self Care, Fasting Blood Sugar Level, Perceived Social Support, Perceived Stress and Type D personality (Negative Affectivity and Social Inhibition)

**Analysis of Variance (ANOVA)**

Analysis of Variance or ANOVA is the statistical procedure which is very widely used to test for differences in experimental designs involving more than two groups or conditions and / or more than one independent variable (Brace, Kemp & Sneglar, (2012).

**Main effects and interactions**

Using ANOVA we can analyze data from studies that incorporate more than one factor. We can assess both the effect of each of these factors on their own and the interaction between the factors. The 'main effect' is used to describe the independent effect of a factor. For example, in a three way ANOVA, three main

effects will be reported. An interaction that assesses how two factors combine to affect performance is called a two-way interaction. When three factors are involved, the interaction is known as a three-way interaction.

**One - way Analysis Of Variance**

In a one – way ANOVA, where the single factor is called A, will give rise to just a single main effect of A.

**Two - way Analysis Of Variance**

A two –way ANOVA, where the factors are called A and B, will give rise to two main effects (main effect of A and main effect of B), and a single two –way interaction (A*B). This is a total of three results (3 F-ratios).

**Three - way Analysis Of Variance**

A three – way ANOVA, where the factors are called A, B and C, will give rise to three main effects (main effect of A, main effect of B and main effect of C), three two –way interactions (A*B, A*C and B*C) and a single three-way interaction (A*B*C). This is a total of seven results.

For the present study the three - way ANOVA was done to find out the role of Diabetes Related Quality of Life, Diabetes Self Care, Fasting Blood Sugar Level, Perceived Social Support, Perceived Stress and Type D personality (Negative Affectivity and Social Inhibition) on Subjective Well Being and Health Related Depression of Type 2 Diabetic Patients. And the role of demographic factors of Age, Sex, Marital Status, Education and Socio Economic Status on Subjective Well Being and Health Related Depressi**on.**

**Phase IV**: **Designing and Implementation of Intervention**

Based on the review of available literature, and the analysis of data collected for the study, the researcher identified the psychological needs including emotional, cognitive and behavioral functioning of type 2 diabetic people and psychological factors to be intervened. Then the researcher reviewed the related studies which

dealt with the psychological intervention techniques used in the treatment of chronic illnesses. From those studies the researcher identified the intervention strategies what would be useful in modifying the psychological factors experiencing type 2 diabetics assessed by using instruments for the selected variables of the present study.

**Sample**

For the purpose of intervention a small sample of 50 participants were selected. They had provided four clusters of intervention designed by the researcher either single or in combinations for eight weeks period based on their area which requires monitoring. The distribution of sample for the intervention is shown in the following table;

*Table 14   :  Distribution of samples to different groups for intervention*

| SL NO: | Intervention | No. of  Participants |
|--------|--------------|----------------------|
| 1 | Self Care (SC) | 6 |
| 2 | Social Skills (SS) | 4 |
| 3 | CBT | 5 |
| 4 | relaxation | 5 |
| 5 | SC & SS | 3 |
| 6 | SC & CBT | 4 |
| 7 | SC& Relaxation | 2 |
| 8 | SS&CBT | 2 |
| 9 | SS & Relaxation | 2 |
| 10 | CBT & Relaxation | 5 |
| 11 | SC & Relaxation | 2 |
| 12 | SC & SS & CBT | 2 |
| 13 | SC& SS& Relaxation | 2 |
| 14 | SC & CBT& Relaxation | 2 |
| 15 | SS & CBT &Relaxation | 2 |
| 16 | SC& SS & CBT & Relaxation | 2 |
|  | Total | 50 |

Those intervention techniques had been classified in to four major clusters, those were:

- Self care
- Social Skills
- Cognitive Behavior Therapy, and
- Relaxation

These techniques had given either single or in combination for a period of 8 weeks**.**

**Self-Care**

Self-care modification was the first strategy of intervention that was the combination of the following three techniques;

- Diet
- Exercise
- Health Monitoring & Record keeping

Self-care intervention techniques were given to those with poor adherence to Diet, Exercise and Glucose Level monitoring (Those who had low scores in Self Care Inventory).

They have provided;

- Diet Charts
- Exercise schedules
- Records for noting Fasting Blood Sugar Level    for weekly basis

**Social Skill Training**

Social skill training or life skill training was the second strategy of intervention package. In this the investigator focused the modification in the following areas;

- Self awareness
- Effective communication
- Empathy
- Interpersonal relationship

Social skill training interventions had given to those having low scores in Perceived Social Support or Health Related Quality of Life or Subjective Well Being.

They had given training in the following areas;

- Developing positive self awareness
- Effective communication tasks (e g., talk at least one stranger every day)
- Developing interpersonal relationships.

Participants in this group have also given an 'activity schedule' (time table).

**Cognitive Behavioural Therapy (CBT)**

Cognitive Behaviour Therapy includes a number of intervention techniques for different psychological factors. For the present intervention package the researcher selected the following CBT techniques.

- Attitude change
- Irrational thinking
- Positive thinking & cognitive restructuring.

Cognitive Behaviour Therapy techniques had given to those having high scores in Perceived Stress or Health Related Depression or Type D personality.

They had given training in the following areas;

- Positive changes in attitudes.
- Change irrational thinking pattern
- Provided diary which had been written positive thoughts instead of their thoughts what they had disclosed, and instructed them to read those written matters when negative thoughts were appearing.

**Relaxation**

Relaxation techniques were ancient techniques that commonly used to improve individual well being and reduce stress. The researcher included the following relaxation techniques in the intervention package.

- Pranayama

-  Progressive muscle relaxation.

Relaxation techniques were provided those having high perceived stress and uncontrolled Fasting Blood Sugar;

They have given training in

- Pranayama/Breathing exercise, and

- Progressive Muscle Relaxation

 The combination of above mentioned intervention strategies were also used as per the need, for managing identified psychological factors of the participant.

# Chapter IV

# RESULT AND DISCUSSION

❖ Preliminary Analysis

❖ Correlation Analysis

❖ Multiple Regression Analysis

❖ Analyss of Variance (ANOVA)

The present chapter consists of the detailed description of the analysis of the data. The analysis was carried out to test the hypothesis formulated in the research. The statistical techniques used in this chapter include the descriptive statistical analysis for the preliminary analysis of the data. The correlation analysis to assess the inter relationships of the variables. Regression analysis was used to assess the predictability of the independent variables on dependent variable. The three way ANOVA was carried out to assess the impact of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Fasting Blood Sugar Level Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being and Health Related Depression; and also to assess the impact of socio demographic factors on Subjective Well Being and Health Related Depression. Additionally, a two way ANOVA was conducted to assess the Impact of the locality of living and independent variables on Subjective Well Being and Health Related Depression. The detailed descriptions of the results and the supporting studies for the results have been presented in this section.

1. **Section 1**

    Preliminary Analysis

2. **Section 2**

    Correlation Analysis

3. **Section 3**

    Multiple Regression Analysis

4. **Section 4**

    Three way ANOVA of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Fasting Blood Sugar Level Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being and Health Related Depression.

5. **Section 5**

 Three Way ANOVA of Socio Demographic factors on Subjective Well Being and Health Related Depression.

6. **Section 6**

   Two Way ANOVA assesses the Impact of the locality of living and independent variables on Subjective Well Being and Health Related Depression.

**SECTION 1**

**Preliminary Analysis**

Descriptive statistics summarize large volume of data by using numbers or graphs and charts. Descriptive statistics can help us understand important aspects of a data set. Common descriptive statistics includes measures of central tendency (mean, median, and mode), measures of dispersion (range, minimum, maximum, standard deviation and variance), percentage, skewness and kurtosis of the variables were calculated.

In present study, to obtain general idea of nature of the distribution of variables, the fundamental descriptive statistics like Arithmetic Mean, Median, Mode, Standard Deviation, Skewness and Kurtosis of the variables were calculated. The most important and commonly used average is Arithmetic mean, which is the arithmetic average of a set of scores.  The Standard Deviation is the measure of spread out away from the mean. Distributions with big Standard Deviations have more variability than distributions with small standard deviations. The two concepts Skewness and Kurtosis were used to get an idea about the shape of the frequency curve of a distribution. Skewness is a measure of lack of symmetry whereas Kurtosis is a measure of relative peakedness or flatness of a distribution compared to the normal distribution. In a normal distribution the mean equals median exactly and there is no skewness. In a negatively skewed distribution the value of median will be higher than that of the value of the mean. Normal distributions produce kurtosis statistic of about Zero. As the Kurtosis statistics departs further from Zero, a positive

value indicates the possibility of leptokurtic distribution (that is, too tall) or a negative value indicates the possibility of a platykurtic distribution (that is, too flat). When a curve is neither peaked nor flat topped, it is called mesokurtic (normal).when the distribution and related curve is normal, the value of kurtosis is 0.263(Ku=0.263).

**Descriptive Analysis of the Data**

Mean median, mode, standard deviation, skewness, and kurtosis of the distributions of variables Diabetes Related Quality of Life, Subjective Well-being, Perceived Social Support, Diabetes Self-Care, Perceived Stress, Health Related Depression, and two factors of Type D personality; Negative Affectivity and Social Inhibition. Details of the results are presented in table 15.

*Table 15: Descriptive statistics of the variables under investigation*

| Variables & Sub factors | Mean | Median | Mode | S.D | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| **Diabetes Related Quality Of Life** | | | | | | |
| Role limitation due to physical health | 24.67 | 27 | 30 | 5.96 | -1.10 | .39 |
| Physical endurance | 23.50 | 25 | 30 | 5.87 | -.83 | -.24 |
| General health | 9.98 | 10 | 10 | 2.99 | -.24 | -.70 |
| Treatment satisfaction | 16.25 | 17 | 17 | 2.80 | -.85 | .65 |
| Symptom botherness | 11.59 | 12 | 12 | 2.70 | -.80 | .24 |
| Financial worries | 16.37 | 17 | 20 | 3.53 | -.70 | -.42 |
| Emotional/mental health | 19.98 | 21 | 24 | 4.12 | -.96 | .51 |
| Diet satisfaction | 10.67 | 11 | 11 | 1.69 | -.26 | .86 |
| **Subjective Well-Being** | | | | | | |
| General well-being-positive affect | 6.55 | 7 | 9 | 2.13 | -.33 | -1.20 |
| Expectation-achievement congruence | 7.27 | 8 | 9 | 1.99 | -.93 | -.21 |
| Confidence in coping | 6.55 | 7 | 9 | 1.92 | -.25 | -1.13 |
| Transcendence | 6.88 | 7 | 6 | 1.55 | -.31 | -.54 |
| Family group support | 7.72 | 8 | 9 | 1.72 | -1.33 | .73 |
| Social Support | 7.65 | 9 | 9 | 1.72 | -1.11 | .35 |
| Primary group concern | 7.17 | 8 | 9 | 2.46 | -1.41 | 1.20 |
| Inadequate mental mastery | 12.85 | 12 | 12 | 3.48 | .42 | -.50 |
| Perceived ill health | 13.77 | 14 | 17 | 2.97 | -.50 | -.76 |

| Variables & Sub factors | Mean | Median | Mode | S.D | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| Deficiency in social contacts | 7.46 | 9 | 9 | 2.09 | -1.10 | -.21 |
| General well-being- negative affect | 7.54 | 8 | 9 | 2.04 | -.46 | 2.17 |
| **Perceived Social Support** | | | | | | |
| Significant Others | 20.94 | 23 | 28 | 7.10 | -.81 | -.60 |
| Family | 21.66 | 24 | 28 | 6.26 | -.999 | .34 |
| Friends | 17.79 | 19 | 28 | 7.89 | -.28 | -1.2 |
| **Perceived Stress** | 30.66 | 30 | 29 | 9.01 | .04 | -.83 |
| **Diabetes Self Care** | 3.70 | 4 | 4 | .91 | -.62 | .17 |
| **Health Related Depression** | 6.83 | 4 | 0 | 8.38 | 1.79 | 3.24 |
| **Negative Affectivity** | 7.94 | 7 | 0 | 6.51 | .60 | -.53 |
| **Social Inhibition** | 9.86 | 7 | 4 | 7.51 | .69 | -.57 |

Table 15  shows the measures of central tendencies (Mean, Median, and Mode) and Standard deviation, Skewness and Kurtosis of the variables and sub variables of the present study;  Diabetes Related Quality of Life (Role limitation due to physical health, Physical endurance, General health, Treatment satisfaction, Symptom botherness, Financial worries, Emotional/ Mental health, and Diet satisfaction), Subjective Well-being (General well-being- positive affect, Expectation-achievement congruence, Confidence in coping, Transcendence, Family group support, Social support, Primary group concern, Inadequate mental mastery, Perceived ill health, Deficiency in social contacts, General well-being –negative affect), Perceived Social Support, Diabetes Self-Care, Perceived Stress, Health related depression, and two factors of Type D personality- Negative Affectivity and Social Inhibition are estimated for the whole sample.

Table 15 indicates the values of the major measures of central tendency, viz; arithmetic mean, median, mode for the sub factor of diabetes related quality of life called role limitation due to physical health (which measures is there any compromises required in one's work expectations due to the physical problems caused by diabetes) values of mean (24.67), median (27) and mode (30), which shows almost similar values. The standard deviation is 5.96. Regarding the

symmetry of the distribution, the value of skewness is -1.098 which means the distribution is negatively skewed. The value of kurtosis, the measure of peakedness, is 0.39, which suggests the distribution is not much leptokurtic. Therefore the distribution of role limitation due to physical health for the whole sample is normal.

The sub factor of diabetes related quality of life namely, physical endurance (this factor measures the person's general health and well-being by rating person's ability to perform various activities in last three months), has got values for measures of central tendency, mean (23.50), median (25) and mode (30), which shows almost similar values. Standard deviation was found to be 5.87. The values for skewness and kurtosis were found to be -0.83 and -0.24. This shows the distribution is slightly negatively skewed and the value of kurtosis indicates the distribution is platykurtic, but as the magnitude is negligibly small, the distribution can be considered as normal.

Another sub factor called general health (this measures the person's general health by rating some of his physical functions) of diabetes related quality of life, has got values for measures for central tendency, mean (9.98), median (10) and mode (10), which shows similar values. Standard deviation was found to be 2.99. The values of skewness and kurtosis were found to be -0.24 and -0.70. Which shows the distribution is slightly negatively skewed and the value of kurtosis indicates the distribution is platykurtic. Thus the variable general health can be considered as normally distributed.

The sub factor of  diabetes related quality of life namely, treatment satisfaction (this factor measures how satisfied the person with the current treatment for diabetes and time spend for daily exercises to control diabetes) has got values for measures of central tendency, mean (16.25), median (17) and mode (17), all these values were almost equal. Standard deviation was found to be 2.80. The values of skewness and kurtosis were found to be -0.85 and 0.65, this shows the distribution is slightly negatively skewed and the value of the kurtosis indicates the distribution is slightly leptokurtic, but as the magnitude is negligibly small, then the distribution can be considered as normal.

Another sub factor of diabetes related quality of life namely, symptom botherness (measures how people are concerned with and how frequently diabetes specific symptoms occur) is found to have mean of 11.59, median 12 and mode 12, all these three measures are not remarkably different. Standard deviation was found to be 2.70. The measure of asymmetry, skewness is -0.803 suggests that the distribution is slightly negatively skewed. The positive value of kurtosis (0.24) suggests that that the distribution is leptokurtic, which is very close to zero indicating that the distribution can be considered as mesokurtic.

Another sub factor of diabetes related quality of life called financial worries (this variable is focused on person's perception of how diabetes affects financial plans of their family or rate is it a financial burden) has got the values for measures of central tendency, mean (16.37), median (17) and mode (20), all these values found to be almost equal. Standard deviation was found to be 3.535. The measure of skewness is -0.698, suggests that the distribution is slightly negatively skewed. The measure of peakedness of the distribution value obtained as kurtosis (-0.418) suggests that the distribution is platykurtic. Thus the factor financial worries can be considered as normally distributed.

The sub factor of diabetes related quality of life namely, emotional/mental health (assess how satisfied the person within himself and in his social and family relationships) has got the values for measures of central tendency, mean (19.98), median (21) and mode (24), all these values found to be almost equal. Standard deviation was found to be 4.125. The values of skewness and kurtosis were found to be -0.959 and 0.509, which indicates the distribution is slightly negatively skewed and the value of kurtosis indicates the distribution is slightly leptokurtic.

The diet satisfaction (This factor assesses how satisfied the person by modifying his own diet demanded for the diabetes management) sub factor of diabetes related quality of life has got the values for measures of central tendency, mean (10.67), median (11) and mode (11), these three values are almost equal. Standard deviation was found to be 1.688. The measure of asymmetry skewness is -0.263 suggests that the distribution is slightly negatively skewed, but the magnitude

is negligibly small then the distribution is considered as not skewed. The measure of peadkedness of the distribution value obtained as kurtosis (0.862) suggests that the distribution is leptokurtic. Distribution of mean values for the sub-factors of diabetes related quality of life has given in the following figure;
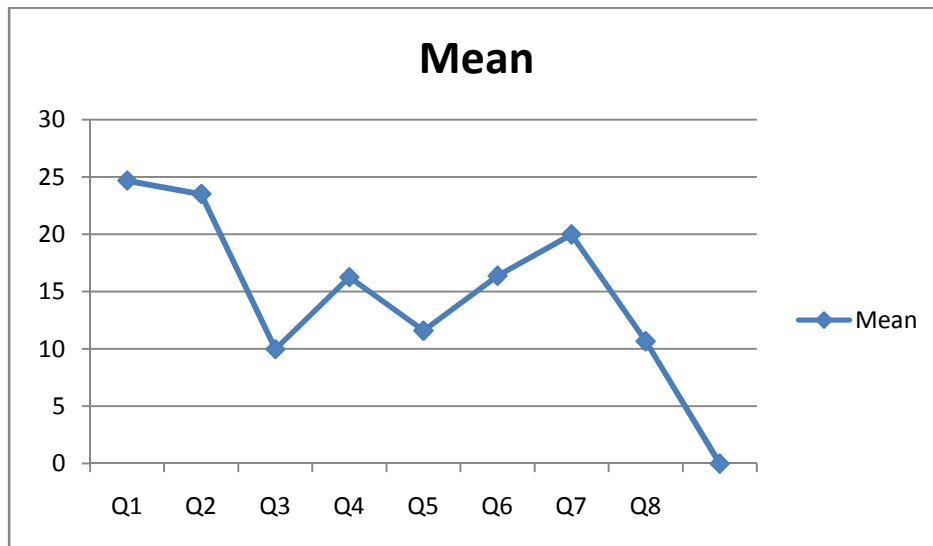


*Figure 1: Distribution of mean values of sub-factors of Diabetes Related Quality of Life.*

The next variable of the study was subjective well-being. One of the sub factors of subjective well being namely, General well-being- positive affect (this factor reflect feelings of well-being arising out of an overall perception of life as functioning smoothly and joyfully) found to have mean 6.55, median 7 and mode 9, all these three factors were not remarkably different. Standard deviation was found to be 2.134. The values of skewness and kurtosis were found to be -0.326 and -1.20, which shows that the distribution is slightly negatively skewed and measure of peakedness shows that the distribution is slightly platykurtic, but the magnitude is negligibly small. Then the distribution can be considered as approximately normal.

Another sub factor of subjective well being called expectation- achievement congruence (this factor refers to feelings of well-being generated by achieving success and the standard of living as per one's expectations, or what may be called satisfaction) has got the values for measures of central tendency, mean (7.27),

median (8) and mode (9), these three values are almost equal. Standard deviation was found to be 1.987. The measure of asymmetry skewness is -0.934 suggests that the distribution is slightly negatively skewed. The measure of peakedness of the distribution value obtained as kurtosis (-0.211) suggests that the distribution is platykurtic, but the magnitude is negligibly small, the distribution can be considered as mesokurtic.

The sub factor of  subjective well being namely, confidence in coping (the ability to adapt to change and to face adversities without breakdown) has got the measures of central tendency, mean (6.55), median (7) and mode (9), these three values are almost equal. Standard deviation was found to be 1.923. The values for skewness and kurtosis were found to be -0.255 and  -1.130, this indicates the distribution is slightly negatively skewed, but comparatively small index of skewness implies that the distribution can be considered as non skewed . Measure of peakedness of the distribution suggests that the distribution is platykurtic.

Another sub factor of subjective well being called transcendence (reflect feelings of subjective well-being derived from values of a spiritual quality) has got mean (6.88), median (7) and mode (6) are found to be almost equal. Standard deviation was found to be 1.547. The values for skewness and kurtosis were found to be -0.308 and -0.542, which shows that the distribution is slightly negatively skewed and the measure of peakedness shows that the distribution is platykurtic, magnitude is negligibly small then the distribution can be considered as normal.

The Family group support (this factor reflects positive feelings derived from the perception of the wider family as supportive, cohesive and emotionally attached) sub factor of subjective well being  has got the values for measures of central tendency, mean (7.72), median (8) and mode (9), these three values are almost equal. Standard deviation was found to be 1.717. The measure of asymmetry skewness is -1.332 suggests that the distribution is slightly negatively skewed, but the magnitude is negligibly small then the distribution is considered as not skewed. The measure of peadkedness of the distribution value obtained as kurtosis (0.731) suggests that the distribution is leptokurtic.

Another sub factor of subjective well being that is, Social Support (the social environment beyond the family as supportive in general and in terms of crisis) has got the values for measures of central tendency, mean (7.65), median (9) and mode (9), these three values are almost equal. Standard deviation was found to be 1.718. The measures of skewness and kurtosis were found to be -1.113 and 0.353. This shows that the distribution is slightly negatively skewed and the measure of peakedness shows that the distribution is leptokutic, but the magnitude is negligibly small then the distribution can be considered as mesokurtic.

The primary group concern (feelings about primary family would perhaps form a part of overall well-being and had not anticipated this factor as an independent concern) sub factor of subjective well being found to have mean (7.17), median (8) and mode (9) are almost equal. Standard deviation was found to be 2.484. The values for skewness and kurtosis were found to be -1.408 and 1.203, which indicates that the distribution is slightly negatively skewed and leptokurtic.

The sub factor of subjective well being namely, inadequate mental mastery (a sense of insufficient control over, or inability to deal efficiently with, certain aspects of everyday life that are capable of disturbing the mental equilibrium) has got the values for measures of central tendency, mean (12.85), median (12) and mode (12), these three values are almost equal. Standard deviation was found to be 3.481. The measure of asymmetry skewness is 0.420 propose that the distribution is slightly positively skewed, but the magnitude is negligibly small then the distribution is considered as not skewed. The measure of peadkedness of the distribution value obtained as kurtosis (-0.500) recommends that the distribution is platykurtic.

Another sub factor of subjective well being called perceived ill health ( this factor measures the happiness and worries  perceived by the individual on the basis of his illness) has got the values for mean (13.77), median (14) and mode (17). This suggests that the mean and median of the variable are almost equal but the mode is slightly greater than the two. Standard deviation is found to be 2.975. The values for skewness and kurtosis found to be -0.505 and -0.757. This indicates that the

distribution is slightly negatively skewed and the peakedness implies that that the distribution is platykurtic.

The subjective well being sub factor called deficiency in social contacts (the items representing this factor are worries about being disliked and feelings of missing friends) has got the values for measures of central tendency, mean (7.46), median (9), and mode (9), these three values are almost equal. Standard deviation is found to be 2.088. The values for skewness and kurtosis found to be -1.096 and -0.206. This indicates that the distribution is slightly negatively skewed and the peakedness implies that the distribution is platykurtic, but the magnitude is negligibly small then the distribution can be considered as mesokurtic.

Another factor of subjective well being namely, General well-being-negative affect (this factor reflects a generally depressed outlook on life) has got the measures of central tendency, mean (7.54), median (8) and mode (9), these three values are almost equal. Standard deviation was found to be 2.044. The measure of asymmetry skewness is -0.461 suggests that the distribution is slightly negatively skewed, but the magnitude is negligibly small then the distribution is considered as not skewed. The measure of peadkedness of the distribution value obtained as kurtosis (2.174) suggests that the distribution is leptokurtic. The distribution of mean values of the sub-factors of subjective well being has given in figure 2;
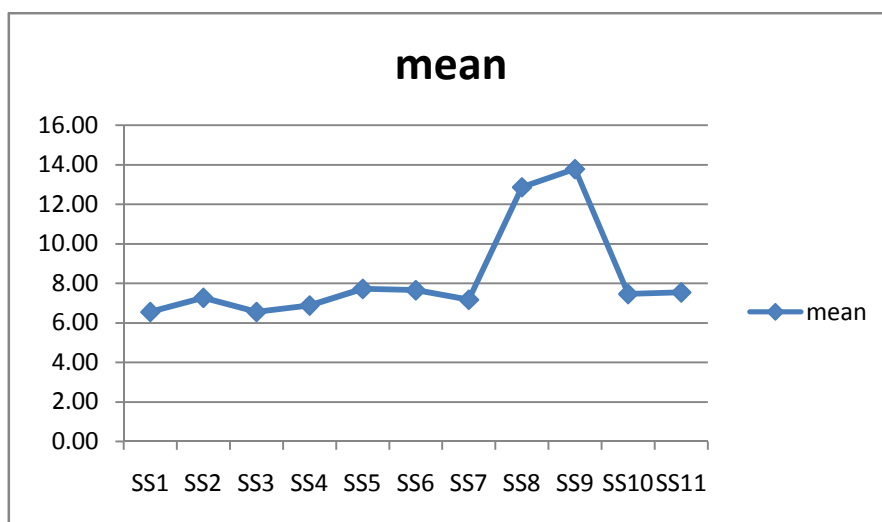


*Figure 2: Distribution of mean values of sub-factors of Subjective Well-Being.*

The next variable in the study was Perceived Social Support. One of the sub factors perceived social support, support from Significant others (which indicates the perception of the presence of some important person to support in all situations) has got values for the measures of central tendency, mean (20.94), median (23) and mode (28). This suggests that the mean and median of the variable are almost equal but the mode is slightly greater than the two. Standard deviation was found to be 7.097. The measure of asymmetry skewness is -0.814, indicates that the distribution is slightly negatively skewed. The measure of peakedness of the distribution value obtained as kurtosis (-0.598) suggests that distribution is platykurtic.

Another sub factor of perceived social support called Support from family (this factor measures the person's awareness of support from family in a tough situation) has got values for the measures of central tendency, mean (21.66), median (24) and mode (28), these three values are almost equal. Standard deviation was found to be 6.265. The measure of asymmetry skewness is -0.999, indicates the distribution is slightly negatively skewed. The measure of peakedness of the distribution value of kurtosis (0.337) implies that the distribution is leptokurtic, but the magnitude is negligibly small then the distribution can be considered as mesokurtic.

The Support from friends (which means the person's observation of supporting friendships in all situations of life) sub factor of perceived social support has got the values for mean (17.79), median (19) and mode (28). This suggests that the mean and median of the variable are almost equal but the mode is slightly greater than the two. Standard deviation is found to be 7.894. The values for skewness and kurtosis found to be -0.276 and -1.220. This indicates that the distribution is slightly negatively skewed but the magnitude is negligibly small then the distribution is considered as not skewed and the peakedness implies that that the distribution is platykurtic. The average of the sub- factors of subjective well being have shown in the following table
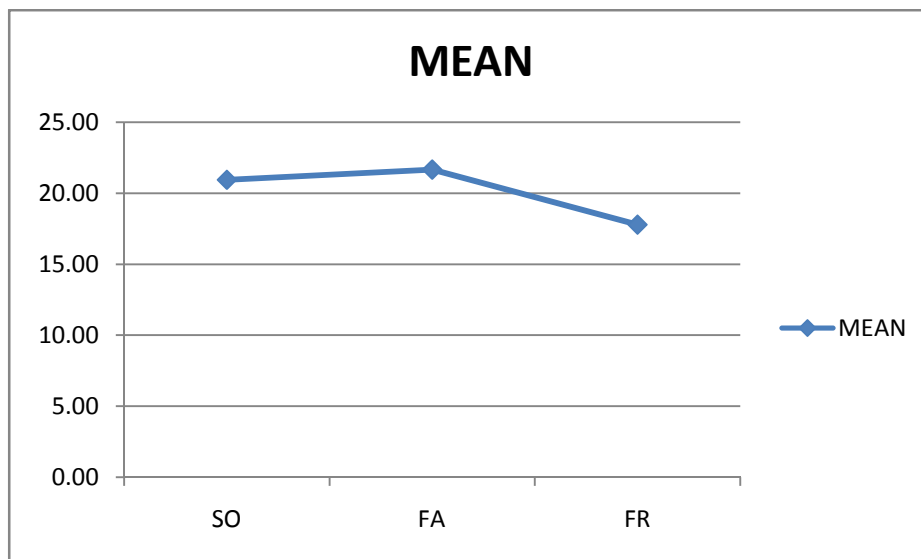
**Figure 3: Distribution of the mean values of the sub-factors of perceived social support.**

Another variable of the study was Perceived Stress (stress originating from perceived inability to cope with diabetes related demands in type 2 diabetic people) has found to be a mean of 30.66, median 30 and mode 29. This indicates that the three measures are not remarkably different. Standard deviation has found to be 9.015. The measure of asymmetry, skewness is 0.044; a negligibly small value indicates that the distribution is slightly negatively skewed but not markedly. The negative value of kurtosis (-0.826) suggests that the distribution is platykurtic. Hence the variable perceived stress is approximately normally distributed.

Diabetes Self Care (Self care is the patient's perceptions of the degree to which they adhere to recommendations for diabetes care and how well they adhere to their treatment prescriptions) is the next variable in the present study, which has got values for the measures of central tendency, mean (3.70), median (4) and mode (4), these three values are almost equal. Standard deviation was found to be 0.911. The measure of asymmetry skewness is -0.621, indicates the distribution is slightly negatively skewed. The measure of peakedness of the distribution value of kurtosis (0.169) implies that the distribution is leptokurtic, but the magnitude is negligibly small then the distribution can be considered as mesokurtic.

The variable Health related depression (Health related depression in diabetic mellitus people are caused by their perception of poor diabetes self-management and resulting long term diabetes-related complications) has found to have a mean of 6.83, median 4 and mode 0. This suggests that mean and median are almost equal but the mode is slightly less than these two. Standard deviation is found to be 8.381. The measure of asymmetry, skewness is 1.788 indicates that the distribution is slightly positively skewed. The measure of peakedness of the distribution, value of kurtosis (3.243) implies that the distribution is leptokurtic.

One of the type D personality factor is Negative Affectivity (the tendency to experience negative emotions) has got the values for measures of central tendency mean (7.94), median (7) and mode (0). This suggests that the mean and median are almost equal but the mode is less than these two. Standard deviation has found to be 6.506. The values for measures of skewness and kurtosis were 0.596 and -0.528. This indicates that the distribution is slightly positively skewed but the magnitude is negligibly small then the distribution is considered as not skewed and the peakedness implies that that the distribution is platykurtic.

Another factor of type D personality called Social Inhibition (the tendency to inhibit the expression of these emotions in social interaction) is found to have mean value of 9.86, median 7 and mode 4. This suggests that the three measures are not remarkably different. Standard deviation found to be 7.508. The measure of asymmetry, skewness is 0.691 indicates the distribution is slightly positively skewed. The measure of peakedness of the distribution, value of kurtosis (-0.571) implies that the distribution is platykurtic, but the magnitude is negligibly small then the distribution can be considered as mesokurtic.

**SECTION 2**

**Relationship among the variables**

In order to find out the relation among psychological factors under the study in type 2 diabetics, a series of correlations were calculated among the variables, namely, Diabetes Related Quality of Life, Subjective Well-being, Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related Depression and Type D personality (Negative Affectivity and Social Inhibition) using Karl Pearson Product Moment Correlation Test. The present study attempts are made to study a few factors together – which is exploring its mutual influences through correlation. The above mentioned variables in the present study have been classified into positive and negative variables, based on its effect on health in general. Among these the factors like Diabetes Related Quality of Life, Subjective Well-being, Perceived Social Support, and Diabetes Self Care are considered as positive variables; and the variables like Perceived Stress, Health Related Depression and Type D personality (Negative Affectivity and Social Inhibition) are considered negative variables.

The inter correlations of these variables include, 8 sub factors of diabetes related quality of life and overall diabetes related quality of life, 11 sub factors of subjective well-being and overall subjective well-being, 3 sub factors for perceived social support and overall perceived social support, two factors for type D personality (NA, SI) and overall diabetes self-care, overall perceived stress, overall health related depression. Among the total 189 correlations 172 are significant, out of them 159 are significant at 0.01 levels and 13 of them are significant at 0.05 levels.

**Correlation Among Diabetes Related Quality Of Life And Subjective Well-Being, Perceived Social Support, Diabetes Self Care, Perceived Stress,  Health Related Depression, Type D Personality  (NA & SI).**

Subjective well-being is a composite measure of independent feelings about a variety of life concerns, in addition to an overall feeling about life in positive and

in negative terms, that is, general well-being and ill being. Subjective well being and ill being in diabetic patients depend upon the impact generated by diabetes on the individual, which can be assessed by patient's concern about anticipated effects of the disease and the level of satisfaction the patients themselves and how much they can enjoy their food (Bradley et al., 1988). Subjective well being and person's quality of life that is, the perception of one's life are highly dependent. From table 16 correlation matrix can be found that diabetes related quality of life is highly positively correlated with subjective well being in 0.01 level of significance (r= 0.658). From these results it can be found that the health related quality of life and subjective well being of individuals with type 2 diabetes mellitus is significantly related, which states that if subjective well being increases health related quality of life also increase and vice versa. In a research study by Kleefstra et al., (2005) it states that psychological and physiological well being of patients having diabetes has not only been influenced by metabolic control, but also by how the patient perceives treatment efficacy and how they feel. This states that, Diabetes Related Quality of Life (DRQOL) has a stronger association with hyperglycemic and hypoglycemic symptoms in diabetic patients. The diabetic patient's sense of life satisfaction and diabetes related quality of life or perceived satisfaction of their life after the diagnosis of diabetes is related, that means diabetic patients life satisfaction will be increased by enhancing their perception of diabetes related quality of life by using intervention techniques like positive thinking and cognitive restructuring. Health Related Quality of Life is a multidimensional construct, in which each dimension can independently affect Quality of Life. Diabetes specific domains of Health Related Quality of Life of diabetes relate how the disease is compromising on individual's sense of well –being psychologically, physically and socially (Borrot & Bush, 2008). Correlation between Diabetes related quality of life and its sub factors on, subjective well being and its factors are given in the table 16.

*Table 16: correlation between Diabetes related quality of life on subjective well being*

|  | SU1 | SU2 | SU3 | SU4 | SU5 | SU6 | SU7 | SU8 | SU9 | SU10 | SU11 | SU TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QOL1 | .458** | .262** | .462** | .128* | .220** | .206** | .060 | .223** | .603** | .168** | .369** | .498** |
| QOL2 | .469** | .262** | .396** | .150* | .219** | .229** | .090 | .144* | .643** | .189** | .390** | .495** |
| QOL3 | .509** | .362** | .421** | .171** | .274** | .300** | .118 | .182** | .615** | .198** | .397** | .549** |
| QOL4 | .271** | .290** | .189** | .174** | .289** | .274** | .193** | .011 | .329** | .147* | .245** | .350** |
| QOL5 | .341** | .224** | .373** | .120 | .116 | .044 | .050 | .172** | .418** | .068 | .317** | .356** |
| QOL6 | .419** | .498** | .280** | .288** | .209** | .339** | -.041 | .110 | .378** | .119 | .318** | .427** |
| QOL7 | .634** | .644** | .453** | .387** | .501** | .582** | .155* | .227** | .546** | .389** | .548** | .739** |
| QOL8 | .223** | .099** | .191** | .105 | .182** | .152* | .092 | .138* | .290** | .107 | .236** | .287** |
| QOL TOT | .597** | .462** | .502** | .261** | .347** | .373** | .116 | .219** | .250** | .499** | .658** | .658** |

** Correlation is significant at the 0.01 level (2- tailed

* Correlation is significant at the 0.05 level (2-tailed).

Perceived social support is an individual's perception of how much he or she receives outside support based on their age and cultural background. Correlation between Diabetes Related Quality of Life and Perceived Social Support, Diabetes Self-Care, Perceived Stress, Health Related Depression and Dimensions of Type D Personality can be found from the table 17. From table 17 it can be found that the overall perceived social support and overall diabetes related quality of life are significantly positively correlated (r = 0.539). This indicates that changes in diabetes related quality of life also changes the person's perception of outside social support. Becoming diabetic, lower the individual's perceived satisfaction in different areas of life, like job satisfaction, expectation and achievement congruence level, and also difficulties caused by diabetes symptoms like increased hunger, thirst and increased urination which in turn decrease their quality of life. If they have received healthy support from the family members or close friends or from others in the society, the

person's perception of difficulties related to the management of diabetes can be reduced to an extent. Therefore the diabetic patient's perceived satisfaction of life could be enhanced by increasing perceived social support by using psychological techniques like social skills training and cognitive behavioural techniques. Higher levels of social support is important for better glycemic control, increased knowledge, improved treatment adherence and better quality of life (Trief et al., 2011 & Zhang et al., 2007).

*Table 17: Correlation among Health Related Quality of Life and Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related Depression, Negative Affectivity and Social Inhibition*

|  | SO | FA | FR | SS TOTAL | SCI | PSS | PHQ9 | NA | SI |
|---|---|---|---|---|---|---|---|---|---|
| QOL1 | .346** | .341** | .413** | .442** | .122 | -.365** | -.591** | -.417** | -.163** |
| QOL2 | .369** | .375** | .406** | .460** | .149* | -.272** | -.587** | -.365** | -.142* |
| QOL3 | .386** | .420** | .369** | .467** | .219** | -.334** | -.587** | -.424** | -.128* |
| QOL4 | .138* | .206** | .143* | .191** | .496** | -.096 | -.294** | -.231** | -.150* |
| QOL5 | .123** | .170** | .137* | .170** | .185** | -.304** | -.405** | -.281** | -.115 |
| QOL6 | .187** | .292** | .220** | .275** | .183** | -.179** | -.451** | -.305** | -.098 |
| QOL7 | .464** | .681** | .512** | .653** | .234** | -.447** | -.601** | -.513** | -.199** |
| QOL8 | .249** | .238** | .235** | .288** | -.018 | -.253** | -.317** | -.169** | -.194** |
| QOL TOT | .413** | .489** | .454** | .539** | .260** | -.398** | -.692** | -.490** | -.201** |

** Correlation is significant at the 0.01 level (2- tailed
* Correlation is significant at the 0.05 level (2-tailed).

Diabetes self-care is the patient's perception of the degree to which they adhere to recommendations for diabetes care and how well they adhere to their treatment recommendations. The relation between diabetes self care and diabetes related quality of life has been found in the table 17. The correlation matrix indicates that the diabetes self care and diabetes related quality of life are positively correlated

(r= 0.260). The results specify that type 2 diabetic people's diabetic self care including diet satisfaction and regular checkups of fasting blood sugar and record keeping are also influenced by the patient's health related quality of life or vice versa.  Huang et al, (2010) conducted a study to identify risk factors and protective factors and to examine the impact of risk factors and protective factors on adaptive outcomes in people with diabetes,  results found that the health related quality of life and diabetes self care behaviours are factors that individually influence blood sugar control. Identifying and managing influencing factors are important in diabetes care. The positive correlation between these two factors indicates that the enhancing one of these variables with intervention will automatically increase the other and to a great extend on determining the other.

Perceived stress is the measure of persons own judgment on the degree to what extent their life is stressful. Correlation matrix for diabetes related quality of life and perceived stress have been given in the table 17. The correlation results indicate that perceived stress has a significant negative correlation with overall diabetes related quality of life (r= -0.398) in 0.01 level of significance. This correlation result shows that the diabetes related quality of life and perceived stress are negatively related in type 2 diabetics. Which means if stress due to perceived inability to cope with the diabetes related demands (diabetes self care adherence) will be controlled with psychological intervention techniques like relaxation, the diabetes related quality of life will be automatically increased.

Health related depression is a debilitating reaction to chronic illness; medical patients with chronic disease have reported at least moderate symptoms of depression and a small number suffered with severe depression. Correlation between diabetes related quality of life and health related depression shows both these variables are negatively related (r= -0.692). Supporting evidence also states that diabetic patients with coexisting depression showed decreased adherence to treatment, poor metabolic control and decreased quality of life. This shows that type 2 diabetic people's perceived life satisfaction has been decreased by the experience of depression caused by the forced changes they have made in their lifestyle,

controlled food, decreased energy level and continuous medication (Edge & Ellis, 2010). If the health related depression in type 2 diabetics will be reduced using psychological intervention techniques the diabetes related quality of life will be enhanced.

Type D personality is also known as distressed personality, because Type D personality refers to the simultaneous experience of Negative Affectivity (the tendency to experience negative emotions) and Social Inhibition (the tendency to inhibit the expression of emotions in social interaction). The correlation between type D personality factors and diabetes related quality of life indicates that the Negative Affectivity (r= -0.490) and Social inhibition (r= -0.201) are negatively correlated with diabetes related quality of life. From these results it is evident that the type 2 diabetic patients with negative thoughts, tendency to experience negative emotions and those who are unable to express their emotions socially as experienced by them will decrease the perceived satisfaction of life or quality of life related with diabetes. With the psychological intervention techniques to increase satisfaction with life related to diabetes the individual's tendency to experience negative emotions and negative expression of emotions would be decreased.

Among the eight sub factors of diabetes related quality of life, eight were positively correlated with overall subjective well being in 0 .01 level of significance (the correlation coefficients for role limitation due to physical health is 0.498; physical endurance is 0.495; general health is 0.549; treatment satisfaction is 0.350; symptom botherness is 0.356; financial worries is 0.427; emotional/ mental health is 0.739 and for diet satisfaction is 0.287 on 0.01 level of significance). These results indicate that the sub factors of diabetes related quality of life have a significant relation with satisfaction on general health, treatment satisfaction, satisfaction with diabetes diet are positively related to the subjective well being of the type 2 diabetics, if those factors are worsen their overall subjective well being become reduced.

The role limitation due to physical health is one of the sub factors of diabetes related quality of life which assesses the limitations take place in their

social life (The correlation coefficients shows that the role limitation due to physical health sub factor of diabetes how often diabetes limits social life), work life (missing work due to diabetes health changes and how the requirement of regular medication and meals affect their work ) and travelling (how much travelling to be  avoided because of changes in health due to diabetes). From the scores it is evident that if a diabetic patient achieves high score in this sub factor, it indicates that no restrictions had brought to their social life, work life and their energy level to travel due to type 2 diabetes, if they achieve low score, it indicates that the diabetes had brought restrictions in their social life and work life and long travelling because of diabetes health changes. The role limitation due to physical health sub factor of diabetes related quality of life have positive relationship with the following sub factors of subjective well being namely; general well being positive effect is 0.458; expectation achievement congruence is 0.262; confidence in coping is 0.462; transcendence is 0.128; family group support is 0.220; social support is 0.206; inadequate mental mastery is 0.223; perceived ill health is 0.603; deficiency in social contacts is 0.168; and general well being negative effect is 0.369. This result indicates that the role limitation due to physical health is associated with the factors which contribute well being in type 2 diabetics.  The changes in these sub factors of subjective well being will also make changes in type 2 diabetics perception of role limitation due to physical health sub factor to determine their diabetes related quality of life.

Role limitation due to physical health is positively correlated with perceived social support (r = 0.442) and its three sub factors of support from others (r= 0.346), support from family (r = 0.341), and support from friends (r = 0.413) in 0.01 level of significance. From this result it can be found that perceived social support from family, friends and significant others are associated with the individuals sense of physical difficulties to accomplish activities which requires physical effort.

Individual's level of perception of physical incapability due to the diabetes or role limitation due to physical health has no relation with diabetes self care. This is significantly negatively correlated with perceived stress. From table 17 the

coefficient of correlation can be found to be -0.365. The result shows that the perceived stress and type 2 diabetics sense of physical incapability is negatively related, because if the patient is experiencing stress due to the inability to cope with diabetes demands, that will lead to the feeling of restricted in social and work life and interest to travel. Role limitation due to physical health factor of diabetes related quality of life is also significantly negatively correlated with the health related depression in type 2 diabetics. From table 17 the coefficient of correlation is found to be -0.591 that means when the individual's perception of role limitation due to physical health has enhanced with psychological intervention techniques the level of health related depression will decrease.

Type D personality factors of Negative Affectivity and Social Inhibition are negatively correlated with the role limitation due to physical health sub factor of diabetes related quality of life.  From table 17 coefficient of correlation has been found to be -0.417 for negative affectivity and -0.163 for social inhibition on 0.01 level of significance. This result shows that sub factors of type D personality (negative affectivity and social inhibition) are negatively associated with role limitation due to physical health. If the type D personality factors are dominated in type 2 diabetic people, their physical incapability due to diabetes occurrence will be increased.

Another sub factor of diabetes related quality of life namely, physical endurance (which assesses the individual's general health and well being by rating their own ability to perform various activities in the last three months like walking uphill, lifting heavy bags, carrying objects etc.) is positively correlated with the sub factors of subjective well being namely, general well being- positive effect (r= 0.469), expectation-achievement congruence (r= 0.262), confidence in coping (r= 0.396), transcendence (r= 0.171), Family group support (r= 0.219), social support (r= 0.229), inadequate mental mastery (r= 0.144), perceived ill health (r= 0.643), deficiency in social contacts (r=0.189) and general well being-negative effect (r=0.390). These results establish that the type 2 diabetics' capabilities to perform various physical activities are associated with all sub factors contributing subjective

well being in them. That means, if the patient feels adequate health to perform physical activities which is related to daily living will enhance his or her subjective well being. The only one sub factor of subjective well being, called primary group concern has no relation with the physical endurance, which indicates in type 2 diabetics' concern about their family have no relation with their perception of physical capability.

The physical endurance sub factor of diabetes related quality of life is positively correlated with perceived social support (r=0.460), and its three sub factors namely, support from significant others (r=0.369), support from family (r=0.375) and support from friends (r=0.406). From these results it is evident that the type 2 diabetics' sense of their physical strength can be enhanced with the supportive family, friends and society.

Type 2 diabetics' sense of physical strength or physical endurance is positively related with the diabetes self care (r= 0.149), this indicates the effective diabetes self care management will improve the individual's sense of physical capacity to perform daily life activities that require physical effort.

Physical endurance in type 2 diabetics is significantly negatively correlated with the perceived stress (r=-0.272), health related depression (r=-0.587) and type D personality factors of negative affectivity (r=-0.365) and social inhibition (r= -0.142). From these results it is evident that the type 2 diabetic patients' physical capability can be enhanced by reducing their perceived stress and health related depression by using psychological intervention techniques of relaxation and cognitive restructuring. And the type D personality factors of negative affectivity and social inhibition are negatively related with physical endurance. That is, if the patients have the tendency to experience negative emotions or unable to express their emotions as it happens, it can be lead to experience poor physical strength for doing daily life activities.

Another sub factor of diabetes related quality of life which represents individuals overall health, known as general health which is significantly positively correlated with all sub factors of subjective well being. The correlation coefficients

has given in the table 16 are as follows, general health and general well being - positive affect is 0.509; general health and expectation achievement congruence is 0.362; general health and confidence in coping is 0.421; general health and transcendence is 0.171; general health and family group support is 0.274; general health and social support is 0.300; general health and inadequate mental mastery is 0.182 ; general health and perceived ill health is 0.615; general health and deficiency in social contacts is 0.198 and general health and general well being negative effect is 0.397. These results indicate that the type 2 diabetics' general health representing the activities require concentration, like driving, reading and working is positively associated with the subjective well being and its sub factors. This signifies that type 2 diabetics' satisfaction with life or subjective well being is related with the perception of general health; experience of general health increases the subjective well being in them. The general health sub factor of diabetes related quality of life has no relation with the subjective well being sub factor known as primary group concern, which means the type 2 diabetics' concerned with family has no effect on determining their general health.

General health is significantly positively correlated with the perceived social support (r=0.467) and three sub factors of perceived social support namely, support from significant others (r=0.386), support from family (r=0.420) and support from friends (r=0.369). Which means that the social support and perception of overall health is related, if the type 2 diabetic individual receives healthy support from family, friends and others in the society will enhance their ability to concentrate on reading, driving and other works require attention. General health is also significantly positively related with the diabetes self care in type 2 diabetics (r=0.219). This result indicates that by enhancing diabetes self care adherence in type 2 diabetics with the help of diet charts, and exercise schedules their general health can also be enhanced.

The sub factor of diabetes related quality of life which determines the individual's sense of overall health is called general health which is significantly negatively correlated with the perceived stress, health related depression and the

type D personality factors of negative affectivity and social inhibition. The coeffient of correlation can be found from the table 16 as    -0.334 for perceived stress, -0.587 for health related depression and -0.424 for negative affectivity and -0.128 for social inhibition respectively. These results imply that if the type 2 diabetic patients' perceived stress due to inability to cope with the diabetes related demands increases the general health will be decreased. And the patient's experience of health related depression will also decrease person's satisfaction with general health. With the help of intervention techniques to manage the perceived stress and health related depression in type 2 diabetic people the general health can be enhanced.  The result also shows that the type D personality factors of negative affectivity and social inhibition has also negative relation with general health. This also indicates that the importance of interventions like assertiveness training and cognitive restructuring etc. which also has an effect on the general health in type 2 diabetics.

One of the sub factors of diabetes related quality of life is known as treatment satisfaction, which assesses the degree of their satisfaction with current treatment for diabetes. This is significantly positively correlated with the sub factors of subjective well being namely, general well being- positive affect is 0.271; expectation achievement congruence is 0.290; confidence in coping is 0.189; transcendence is 0.174; family group support is 0.289; social support is 0.274; primary group concern is 0.193; perceived ill health is 0.329; deficiency in social contacts is 0.147 and general well being negative effect is 0.245. These results indicate that the sub factors of subjective well being are related to the treatment satisfaction of type 2 diabetics. If the patient experiences healthy subjective well being, it will help to increase the treatment satisfaction in them. From the correlation matrix it can also be found that there is no significant relation between inadequate mental mastery of subjective well being on type 2 diabetics' level of treatment satisfaction.

Treatment satisfaction is significantly positively correlated with the perceived social support and its sub factors of support from others, support from family and support from friends in type 2 diabetics. From table 17 the correlation

coefficients can be found that r is 0.191 for perceived social support, r is 0.138 for support from others, r is 0.206 for support from family and r is 0.143 for support from friends respectively.　From this result it can be found that good social support received from family, friends and others from the society increases the level of satisfaction with treatment.

Treatment satisfaction in type 2 diabetics is significantly positively correlated with diabetes self care (r=0.496). That means the type 2 diabetic patients with adequate self care adherence will increase their satisfaction with treatment. Therefore, by enhancing diabetes self care management with diet chart and exercise schedules, the level of treatment satisfaction to be enhanced to an extent.

Type 2 diabetics satisfaction with current treatment or treatment satisfaction is negatively correlated with health related depression (r= -0.294) and type D personality factors of negative affectivity (r= -0.231) and social inhibition (r= -0.150) in them. This result has evidenced that the health related depression is negatively associated with the treatment satisfaction in type 2 diabetics if the patients experience increased health related depression.

The symptom botherness sub factor of diabetes related quality of life; which is related with how frequently the diabetes symptoms like excessive hunger and thirst occur in type 2 diabetics and how the individual is concerned about these symptoms. Symptom boterness is significantly positively correlated with following factors of subjective well being; namely, are general well being –positive affect (r= 0.341), expectation achievement congruence (r= 0.224), confidence in coping (r= 0.373), inadequate mental mastery (r= 0.172), perceived ill health (r= 0.418) and general well-being –negative affect (r= 0.317) in .01 level of significance. This result shows that these sub factors of subjective well being have positive relation with the symptom botherness, therefore the changes occurring in these factors will also bring change symptom botherness. The other sub factors of subjective well being namely, transcendence, family group support, social support, primary group concern and general well-being-negative affect are not significantly correlated with symptom botherness in type 2 diabetics.

The symptom botherness sub factor of diabetes related quality of life assesses the type 2 diabetic symptoms of excessive thirst, hunger and frequent urination for last three months. This factor is significantly positively correlated with the perceived social support and three sub factors of perceived social support. The coefficients can be found from table 17 are 0.170 for perceived social support, 0.123 for support from significant others, 0.170 for support from family and 0.137 for support from friends. This result states that the perceived social support and inconvenience due to the symptoms of diabetes are associated. Symptom botherness is significantly positively associated with diabetes self care with coefficient of correlation 0.185 in 0.01 levels of significance. From this it can be confirmed that, if the type 2 diabetics' botherness with diabetic symptoms increases the diabetes self care adherence also improve.

Symptom botherness in type 2 diabetics has significant negative correlations with perceived stress, health related depression and type D personality factor of negative affectivity with the coefficient of correlations of -0.304, -0.405 and -0.281 respectively.  This result supports that the botherness to diabetes symptoms are negatively related with perceived stress, health related depression and negative affectivity, which means the type 2 diabetics symptom botherness increases the experience of stress and health related depression and the experience of negative emotions will increase. The type D personality factor of social inhibition has no significant association with symptom botherness.

The diabetes related quality of life sub factor which assesses the priority of the expenditure toward management of diabetes and to how extent the expenditure for other aspects of life  such as entertainments like movies are limited, is known as financial worries. Which is significantly positively correlated with the sub factors of subjective well being namely; General well being positive affect is 0.419; Expectation achievement congruence 0.498; confidence in coping is 0.280; transcendence is 0.288; family group support is 0.209; social support is  0.339; perceived ill health is 0.378 and general well being negative affect is 0.318. From this result it has evidenced that socio economic status of the individual with diabetes

will affect subjective well being, if those with type 2 diabetes have sufficient financial support have good subjective well being than those with low financial support. There is a study conducted by Rubin & Peyrot, (1999) and it states that Domains of DRQOL and patient satisfaction have been influenced by the presence of co-morbid conditions and unfavourable socio-economic characteristics and their interaction with the severity of diabetes and its complications. Subjective health perception was influenced not only by the severity of conditions, but also by the underlying socio economic status. Unemployed patients or those who are living alone were strongly associated with significantly lower levels of treatment satisfaction. The subjective well being sub factors primary group concern, inadequate mental mastery and deficiency in social contacts have no significant relationship with the financial worries in type 2 diabetics.

Financial worries is significantly positively related with perceived social support and its three sub factors namely support from others, support from family and support from friends with the coefficients of correlations 0.275, 0.187, 0.292, and 0.220 respectively. The result indicates that the financial worries among type 2 diabetic patients are related with the social support received from family, friends and others in society. Financial worries are also significantly positively related with diabetes self care (r= 0.183) in 0.01 level of significance. Therefore if the type 2 diabetic patients have good financial status and receiving good financial support from others, has increased diabetes self care management.

Type 2 diabetics' perceived stress, health related depression and type D personality factor negative affectivity is negatively correlated related with financial worries. From table 17 the correlation coefficients found that -0.179, -0.451 and -0.305 respectively. This result demonstrates that the individual's decreased financial support will increase the experience of perceived stress due to the inability to cope with diabetes demands, depression due to diabetes burden and experience of negative emotions. The result also indicates that there is no significant relation between the financial worries and the type D personality factor of social inhibition in type 2 diabetics.

The emotional/mental health sub factor of diabetes related quality of life which assesses the individual's satisfaction with their personal roles and emotional support from others is significantly positively correlated with all factors of subjective well being. From table 16 the correlation coefficients are, 0.634 for general well being positive effect, 0.644 for expectation achievement congruence, 0.453 for confidence in coping, 0.387 for transcendence, 0.501 for family group support, 0.582 for social support, 0.155 for primary group concern, 0.227 for inadequate mental mastery, 0.546 for perceived ill health, 0.389 for deficiency in social contacts and 0.739 for general well being negative effect. The result evidenced that the individual's emotional or mental health and all sub factors of subjective well being is related in type 2 diabetic individuals, that means those who have higher level of mental health will increase the subjective well being.

The emotional and mental health is positively correlated with perceived social support (r= 0.653) and three sub factors namely support from others (r=0.464), support from family (r= 0.681) and support from friends (r= 0.512) of perceived social support. This result supports that the type 2 diabetics' level of emotional support and satisfaction in their relationships in personal life has high relation with the perceived social support from family and society. If the individual experiences healthy support their satisfaction in role playing in personal life and emotional satisfaction will have good quality of life. Emotional and mental health in type 2 diabetics is significantly positively related with diabetes self care (r=0.234). This indicates that the good emotional health or support leads to well management of diabetes self care.

Emotional or mental health in type 2 diabetics is significantly negatively correlated with perceived stress and health related depression with the coefficient of correlations of -0.447 and -0.601 respectively. From these results it is evident that there has a significant negative relation between the perceived stress due to the inability to cope with diabetes demands and the health related depression due to the diabetes occurrence. Therefore if the emotional or mental health or emotional support received from others has enhanced with the psychological intervention

techniques, the level of stress and health related depression will be decreased. Interventions with social skills training need a special reference here, to derive the same from the patients' efforts.

The type D personality factors of negative affectivity and social inhibition are also negatively correlated with emotional and mental health sub factor of health related quality of life with the coefficients of correlations of -0.601 and -0.513. The result shows that if the negative affectivity or the experience of negative emotions and social inhibition increases the emotional or mental health will decrease.

Another sub factor of diabetes related quality of life called diet satisfaction is significantly positively correlated with the following sub factors of subjective well-being; namely, general well being-positive affect (r=0.223), expectation achievement congruence (r= .099), confidence in coping (r= 0.191), family group support (0.182), social support (0.152), inadequate mental mastery (r= 0.138), perceived ill health (r= 0.290) general well being negative affect (r= 0.236).  This result indicates that the type 2 diabetics' acceptance of restriction they have made on is positively related with these sub factors of subjective well being.  The diet satisfaction in type 2 diabetics is not related with the following sub factors of subjective well being, namely, transcendence, primary group concern and deficiency in social contacts.

Diet satisfaction is significantly positively correlated with the social support (r= 0.288) and social support's sub factors of support from others (r= 0.249), support from family (r=0.238) and support from friends (r=0.235).  This states that type 2 diabetics receiving healthy support from family and society have increased satisfaction with diet. If the family is not supportive in making changes in food habits related to diabetes, the patients' satisfaction with diet will become unhealthy. There is no significant relation between diabetes self care and diet satisfaction among the type 2 diabetic patients.

Perceived stress and health related depression have significant negative relation with diet satisfaction of type 2 diabetics. From table 17 the correlation coefficients are found to be  -0.253 for perceived stress and -0.317 for health related

depression, these results support that when the patient experiencing increased stress and health related depression due to the diabetes occurrence will decrease their satisfaction with diet. Type D personality factors of negative affectivity (-0.169) and social inhibition (-0.194) also negatively correlated with the diet satisfaction in 0.01 level of significance. These also indicate that; if the patient is experiencing negative emotions and they are unable to express their emotions socially will have decreased satisfaction with diet. Those who are experiencing high negative affectivity and social inhibition have the tendency to have food items which are not recommend for diabetic patients; they are having these foods only for the sake of hiding from others that they are diabetic. This will lead to decreased satisfaction with diet. With the help of cognitive behavioural techniques of cognitive restructuring and social skills training to enhance their confidence to accept they are diagnosed as diabetic will help to improve diet satisfaction and limit their tendency to hide from others that they are diabetic and restrict them to have food which are not recommended to them.

**Correlation among Subjective Well Being and Perceived Social Support, Diabetes Self-Care, Perceived Stress, Health Related Depression and Type D Personality (NA & SI).**

To assess the correlation among the subjective well being and its sub factors on the variables of perceived social support, diabetes self care, perceived stress, health related depression and type D personality factors of negative affectivity and social inhibition, correlations were calculated by using Karl Perason's product moment correlation, and the coefficients are given in table 18.

*Table 18: Correlation between factors of subjective well being and other variables of the study*

|  | SO | FA | FR | TOT SS | SCI | PSS | PHQ9 | NA | SI |
|---|---|---|---|---|---|---|---|---|---|
| **SU1** | .494** | .420** | .411** | .528** | .198** | -.477** | -.590** | -.564** | -.164** |
| **SU2** | .281** | .372** | .340** | .395** | .278** | -.351** | -.456** | -.478** | -.214** |
| **SU3** | .217** | .255** | .309** | .314** | .126* | -.559** | -.448** | -.446** | -.303** |
| **SU4** | .268** | .341** | .317** | .369** | .152* | -.228 | -.239** | -.352** | -.222* |
| **SU5** | .494** | .616** | .373** | .580** | .266** | -.268 | -.281** | -.371** | -.146* |
| **SU6** | .381** | .585** | .428** | .549** | .229** | -.316 | -.352** | -.407** | -.141* |
| **SU7** | .354** | .222** | .023 | .230** | .221** | .017 | -.162** | -.129** | -.105 |
| **SU8** | .034 | .157** | .184** | .151* | -.025 | -.487** | -.270** | -.340** | -.023 |
| **SU9** | .364** | .353** | .383** | .440** | .187** | -.434** | -.634** | -.529** | -.206** |
| **SU10** | .301** | .411** | .443** | .462** | .004 | -.284** | -.257** | -.261** | -.137* |
| **SU11** | .439** | .400** | .294** | .447** | .108 | -.417** | -.583** | -.501** | -.183** |
| **SU TOTAL** | .524** | .595** | .508** | .645** | .238** | -.602** | -.655** | -.667** | -.282** |

** Correlation is significant at the 0.01 level (2- tailed

* Correlation is significant at the 0.05 level (2-tailed).

The correlation matrix shows that the subjective well being is positively correlated with overall diabetes related quality of life in .01 level of significance (0.658 p<.01) . From this correlation results it can be found that these two variables in type 2 diabetics were positively correlated and that will influence the glycemic control of diabetics. This suggests that the psychological intervention techniques and patient education programs to enhance quality of life will automatically increase subjective well being in type 2 diabetics. In a study conducted by Riaz et al., (2013)

it states that diabetes decreases levels of both physical and emotional well-being in patients, diabetes education will help to improve Quality of Life and well being.

Subjective well being and social support are highly positively correlated (0.645 p<0.01). Subjective well being is an overall feeling about life in positive and in negative terms, i.e. general well-being and ill-being, if the type 2 patients are receiving good support from the family and society their subjective well being also increase.

Diabetes Self Care is the patients' perception of the degree to which they adhere to recommendations for diabetes care and how well they adhere to their treatment prescriptions, is significantly positively correlated with the overall subjective well-being (0.238) in 0.01 level of significance. If the type 2 diabetics' adherence to diabetes self care is enhanced with diet charts and exercise schedules their subjective well being will also increase.

The perceived stress is significantly negatively correlated with overall subjective well being (r= -0.602). This result signifies the relationship among the positive and negative variables on type 2 diabetes. In the present study the subjective well being or individuals satisfaction of life is considered as positive factor based on its positive effect on diabetes; but the perceived stress is stress originating from perceived inability to cope with diabetes related demands in type 2 diabetic people is considered as negative factor based on their negative effect on type 2 diabetes. The result shows that the individual possesses decreased satisfaction with life increases the perceived inability to cope with diabetes demands.

The health related depression is significantly negatively correlated with overall subjective well being (r= -0.655) in 0.01 level of significance. Health related depression in diabetic mellitus people is caused by their perception of poor diabetes self-management and resulting long term diabetes-related complications. The result indicates that while one of the negative variables in the study that is health related depression increases the positive factor subjective well being which assesses individual's level of life satisfaction decreases. The study by Flory, Manuck, Matthes, & Muldoon (2004) found that serotonin level was related to positive mood

which means deficiencies in serotonergic function may reflect the relative absence of positive mood, these findings support the idea that mental well being and ill being have different neurobiological as well as behavioural effects especially changes in blood pressure and glucose level.

The correlation between type D personality factors and subjective well being indicates that the Negative Affectivity (NA is the tendency to experience negative emotions) and Social inhibition (SI is the tendency to inhibit the expression of these emotions in social interaction) are negatively correlated with overall subjective well being in diabetics (r= -0.667 and r= -0.282). From the result it can be found that when the person's tendency to experience negative emotions or person's tendency to inhibit the expression of emotions in social interaction increases the positive feelings of subjective well being or individual's overall feeling of life will become negative.

One of the sub factors of subjective well being, general well being positive affect is significantly positively correlated with social support (0.528) and three sub factors of perceived social support 0.01 levels. From the table 18 the correlation coefficient values for sub factors of social support have found to be 0.494 for support from others, 0.420 for support from family p<.01 and 0.411 for support from friends. This result indicates that the subjective well being positive affect in type 2 diabetics can be enhanced by good support from family friends and society. And they can feel their life is functioning smoothly and joyfully.

General well being positive affect is significantly positively correlated with the diabetes self care (r= 0.198). This result supports that if the type 2 diabetic follow the healthy pattern of diabetes self care their positive well being also becomes good.

The type 2 diabetic patients' overall perception of life is how much joyful for them, can be assessed by the subjective well being sub factor general well being positive affect which is significantly negatively correlated with the variables of perceived stress (r=-0.477), health related depression (r= -0.590), and type D personality factors of negative affectivity and social inhibition with the coefficients of correlations of -0.564 and -0.164 respectively. These results state that when the

type 2 diabetic patient experiencing perceived stress due to inability to cope with diabetes demands and health related depression their experience of happiness in life will be decreased. And also if they are experiencing negative emotions and unable to express it in a socially acceptable manner, they have decreased general well being positive effect. Therefore using psychological intervention techniques to control the experience of stress and health related depression in type 2 diabetics and educating them to experience more positive emotions than negative with cognitive restructuring will help to enhance their happiness in life or general well being positive affect.

Another sub factor of subjective well being is known as Expectation-achievement congruence, which measures feelings of well-being generated by achieving success and the standard of living based on one's expectations, is significantly positively correlated with perceived social support (r = 0.395) and three sub factors of perceived social support namely support from others (r = 0.281), support from family (r = 0.372) and support from friends (r = 0.340). Result indicates that type 2 diabetic patients having healthy support from family, friends and significant others in society have satisfied with their achievement. The expectation achievement congruence also has positive association with diabetes self care. From table 18 the correlation coefficient found to be 0.278, this indicates the type 2 diabetic patient's expectation-achievement congruence has positive relation with diabetes self care, so by enhancing diabetes self care will make changes in the Expectation-achievement congruence in them.

The expectation achievement congruence has significant negative correlations with perceived stress (r = -0.351) and health related depression (r= -0.456). The result supports that the experience of perceived stress and health related depression due to the diabetes will decrease the satisfaction with the level achievement among type 2 diabetics. The expectation achievement congruence sub factor is also negatively correlated with the type D personality dimensions of negative affectivity and social inhibition with the coefficient of correlations of -0.478 and -0.214 with 0.01 level of significance. This result indicates that

experiencing negative emotions and inability to express emotions as they really occur will decrease the type 2 diabetics satisfaction with achievement of success and standard of living as per their expectations.

The third sub factor of subjective well being is called confidence in coping reflects which is sometimes called positive mental health in an ecological sense, i.e. the ability to adapt to change and to face adversities without breakdown, is significantly positively correlated with perceived social support and its three sub factors with the coefficients of correlations of 0.314, 0.217, 0.255 and 0.309 respectively with 0.01 level of significance. The result determines that the type 2 diabetic patient perceiving good support from others has an increased ability to adapt changes in life style related with diabetes occurrence. Confidence in coping with diabetes which represents adapting changes in lifestyle without breakdown is also significantly positively correlated with diabetes self care (r = 126), this result supports while confidence in coping increases the diabetes self care also will increase.

Type 2 diabetics' confidence in coping is significantly negatively related with the variables of perceived stress, health related depression and type D personality factors of  negative affectivity and social inhibition,  with the coefficients of  correlation of -0.559, -0.448, -0.446 and -0.303 respectively. This shows that the confidence in coping in type 2 diabetics have negative relation with all these variables.

The another sub factor of subjective well being known as Transcendence reflects feelings of subjective well-being derived from values of a spiritual quality, is significantly positively correlated with perceived social support (r = 0.314) and three sub factors of perceived social support known as support from others (r = 0.268); support from family (r= 0.341) and support from friends (r = 0.317) in 0.01 level of significance. The result states that the type 2 diabetic people with healthy social support experiencing good spiritual values. The correlation results also indicate that the diabetes self care is positively associated with transcendence (r=0.152).

The spiritual quality or transcendence of the type 2 diabetics has no relation with the perceived stress. Transcendence has significant negative relation with the variables of health related depression (r=-0.239) and the type D personality factors of negative affectivity (r= -0.352) and social inhibition (r=-0.222). These results indicate that the experience of health related depression; negative emotions and social inhibition will reduce the type 2 diabetics subjective well being factor that contributes spiritual quality.

Family group support is one of the sub factors of subjective well being, which assesses the positive feelings derived from the perception of the wider family as supportive, cohesive and emotionally attached, is significantly positively correlated with perceived social support and three sub factors of perceived social support. The coefficients of correlations are 0.580 for social support, 0.494 for support from others, 0.616 for support from family and 0.373 for support from friends. This indicates that the feeling of support received from family in type 2 diabetics is associated with the perceived social support from family friends and others from society. Diabetes self care also has significant positive relationship with the family group support (r = 0.266). If the type 2 diabetic patient's family members are not cooperative to control lifestyle especially to adhere changes in diet that will negatively affect their well being. Family group support of the type 2 diabetics is also significantly positively correlated with diabetes self care (r = 0.266) in 0.01 level of significance. Which indicates family social support is related with self care. Perceived stress and family group support have no relation with type 2 diabetics.

The variables of health related depression and type D personality factors of negative affectivity and social inhibition have significant negative relation with the family group support of type 2 diabetics. The coefficients of correlation can be found from the table 18 as -0.281 for health related depression, -0.371 for negative affectivity and -0.146 for social inhibition. These results indicate that if the type 2 diabetic patient experiences less support and emotional attachment from family that will lead to experience health related depression, feeling of negative emotions and

inability to express their real emotions socially, so the supportive family is very important to decrease these negative feelings in them.

Another sub factor of subjective well being is social support; in this factor two separate areas of feelings of security and density of social networks have merged, this is also significant positive correlation with perceived social support (0.549) and three sub factors namely, support from others (0.381), support from family (0.585) and support from friends (0.428) of perceived social support. This shows that those who have feelings of security and thick social networks are been experiencing healthy social support. Diabetes self care is significantly positively correlated with social support (r = 0.229), this result supports that while social support in type 2 diabetics increases, their diabetes self care will also increase. Perceived stress and subjective well being's sub factor of social support have no significant relationship in type 2 diabetics.

Social support sub factor that assesses the subjective well being contributed by the perception of family support at the time of crisis is significantly negatively correlated with the variables of health related depression (r = -0.352), and type D personality factors of negative affectivity (r = -0.407) and social inhibition (r = -0.141). These results evidenced that when social support increases the experience of health related depression will decrease and also the experience of negative affectivity and social inhibition will decrease in type 2 diabetics.

Primary group concern is another sub factor of subjective well being, which assesses the feelings about primary family would perhaps form a part of overall well-being and has not anticipated this factor as an independent concern, is significantly positively correlated with perceived social support (r = 0.230) and its two sub factors namely support from others (r= 0.354) and support from family (r= 0.222) in 0.01 levels of significance. And the third dimension of perceived social support that is support from friends is not significantly correlated with primary group concern. The result indicates that the type 2 individuals who are satisfied with the relationships in the family have good support from family members and significant others from the society. Primary group concern is also positively

correlated with the diabetes self care with the correlation coefficient value of 0.221; this indicates that as the primary group concern increases the diabetes self care management also will increase in type 2 diabetic people.

Perceived stress in type 2 diabetics has no relation with primary group concern. The primary group concern has negative correlation with health related depression (r=-0.162), this result evidenced that while primary group concern or concern with family decreases the health related depression will increase. The type D personality factors of negative affectivity and social inhibition are also negatively correlated with primary group concern, from the table 18 the coefficients of correlations are found to be -0.129 and -0.105 respectively. This also indicates the negative relation among these factors on concern with family or primary group concern.

Another sub factor of subjective well being is inadequate mental mastery, which is a sense of insufficient control over emotions, or inability to deal efficiently with people, certain aspects of everyday life that are capable of disturbing the mental equilibrium have significant positive correlation with perceived social support (r = 0.151) and its two sub factors, that is support from family and support from friends (0.157 p<.01 and 0.184 p<.01). And this not significantly correlated with the perceived social support sub factor of support from significant others. From this result it can be found that the type 2 diabetics with good support from family and friends possess the capacity to control emotions and to deal effectively with people in everyday life. Inadequate mental mastery has no relation with diabetes self care in type 2 diabetic people.

Inadequate mental mastery is significantly negatively correlated with the variables of perceived stress and health related depression with the coefficients of correlation values of -0.487 and -0.270 respectively. This result evidenced that the type 2 diabetics' inability to control emotions and inability to deal with people effectively will increase the experience of stress and health related depression. Inadequate mental mastery has also significant negative correlations with type D personality sub factor of negative affectivity (r=-0.340), that means if the person

experiences negative emotions will decrease his/her ability to deal effectively with others. Another factor of type D personality called social inhibition has no relation with inadequate mental mastery.

The subjective well being sub factor called perceived ill health, is a one dimensional factor since happiness and worries over health and physical fitness are highly correlated, is significantly positively correlated with perceived social support and three sub factors of perceived social support, the coefficients of correlation values are shown in table 18 as 0.440 for social support and 0.364 for support from others, 0.353 for support from family and 0.383 for support from friends. This result indicates that individuals with type 2 diabetes have increased concern to health and fitness while they are receiving adequate level of social support.  The diabetes self care has significant positive relation with perceived ill health which represents the satisfaction with health and physical fitness, the correlation coefficient value has found to be 0.187. That indicates, by enhancing diabetes self care with intervention techniques the perceived health status will also increase.

Perceived ill health is significantly negatively correlated with the variables of perceived stress, health related depression and type D personality factors of negative affectivity and social inhibition. The coefficient of correlations for these variables are given in the table 18 as -0.434 for perceived stress, -0.634 for health related depression and -0.529 and -0.206 for negative affectivity and social inhibition. This indicates that while perceived stress or health related depression increases the type 2 diabetics satisfaction with physical fitness will decrease.   And also when negative affectivity and social inhibition increases the perceived health status will decrease.

The deficiency in social contacts is one of the sub factors of subjective well being, that assesses how much the person desired to have more friends, to what extent they miss their close friends and whether he or she is worrying that they do not have close personal relationships with others. If the person attained high score in this sub factor which indicates the person is satisfied with his or her present relationship with others but the low score indicates that the person was worried because of   lack of close relations with others and missing of their close friends.

The deficiency in social contacts sub factor is significantly positively correlated with perceived social support (r=0.462) and its three sub factors namely support from others(r=0.301), support from family (r=0.411) and support from friends (0.443) in 0.01 levels of significance. From this result it can be found that the type 2 diabetics with healthy social support have over concern regarding missing their close friends. Deficiency in social contacts has no relation with diabetes self care of type 2 diabetics.

Deficiency In social contacts is significantly negatively related with the variables of perceived stress, health related depression and type D personality factors of negative affectivity and social inhibition with the coefficients of correlation of -0.284,-0.257, -0.261 and -0.137 respectively. This result indicates that, feeling of missing friends' increases the perceived stress and health related depression will decrease in type 2 diabetics. The type D personality factors of negative affectivity and social inhibition will also decrease based on the increase in deficiency in social contacts.

Another sub factor subjective well being is General well-being –negative affect, this factor assesses the individual's feeling that his/ her life is boring; their concerns regarding future and if they are thinking that their life is useless. High score indicates that the individual has positive outlook with his/her life and didn't think that their life is boring and useless and they have little worries on future. The general well being- negative affect is significantly positively correlated with perceived social support (r= 0.447) and its three sub factors called support from others (r= 0.439), support from family (r= 0.400) and support from friends (r= 0.294) in 0.01 levels of significance. This result supports that if diabetic patients are receiving healthy support from family members and others, that can enhance their positive outlook on life and they won't feel life is useless. Diabetes self care has no relation with general well being negative affect.

General well being - negative affect have significant negative correlations with perceived stress, health related depression and type D personality factors of negative affectivity and social inhibition. The coefficients of correlation have given

in the table 18, as -0.417, -0.583, -0.501 and -0.183 respectively. From this result it can be found that if the type 2 diabetics' perceived stress and health related depression caused by diabetic demands will increase the feeling of uselessness in life, worries regarding future will also increase, and this in turn decreases positive well being in them. And also if the diabetic patients experience negative affectivity and social inhibition, it will increase negative perspective towards life.

**Correlation between Perceived Social Support, Diabetes Self-Care, Perceived Stress, Health Related Depression and Dimensions of Type D Personality**

*Table 19: Correlation among Diabetes Self Care, Perceived social support and its factors, Perceived Stress, Health related depression, Negative Affectivity and Social Inhibition.*

|  | SO | FA | FR | TOTSS | SCI | PSS | PHQ9 | NA | SI |
|---|---|---|---|---|---|---|---|---|---|
| SCI | .101 | .139* | .043 | .108 | - |  |  |  |  |
| PSS | -.246** | -.246** | -.371** | -.411** | -.070 | - |  |  |  |
| PHQ9 | -.363** | -.363** | -.334** | -.443** | -.215** | .438** | - |  |  |
| NA | -.425** | -.384** | -.388** | -.484** | -.189** | .549** | .570** | - |  |
| SI | -.334** | -.137* | -..282** | -.245** | -.072 | .184** | .132 | .324** | - |

** Correlation is significant at the 0.01 level (2- tailed

* Correlation is significant at the 0.05 level (2-tailed).

Diabetes self care is significantly positively correlated with one of the sub factors of perceived social support known as support from family, this result indicates that individuals diabetes self care adherence will be increased while he has received good support from family members. The correlation significant at 0.05 levels (r= 0.139).

Diabetes self care and health related depression are significantly negatively correlated at 0.01 level (-0.215), result shows that diabetes self care and health related depression are negatively associated, which indicates the health related depression in type 2 diabetics occurring as a result of their perception of poor self management, therefore health related depression increases the self management will definitely decrease. This result evidenced in a study conducted by Ciechanowski.,

Katon & Russo (2000) which states that individuals with diabetes and co-morbid depression have been shown to have poor adherence to diabetes medication, poor adherence to dietary recommendations; another study by Richardson, et al.,2008 states that they have poor glycemic control and more diabetes related complications (Simon. et al, 2005) and a higher risk of mortality than individuals with diabetes who are not depressed (Egede., Nietert., & Zheng., 2005).

Correlations between Self care and type D personality factors indicates type D personality factor Negative affectivity is significantly negatively correlated with diabetes self care in 0.01 levels (r= -0.189). The correlation results indicate that if Negative Affectivity or person's tendency to experience negative emotions increases diabetes self-care or adherence to diabetic diet and motivation to carry out physical activities will decrease.

Perceived stress in diabetics is significantly negatively correlated with overall perceived social support (r= -0.411), and also three sub factors of social support in 0.01 levels (support from significant others r= -0.246; support from family r= -0.246; and support from friends r= -0.371), which indicates that when the individual with type 2 diabetes is perceiving support from others in the family and society the intensity of the stress due to the perceived inability to cope with diabetes related demands will be decreased. This result supported by a previous study conducted by Schachter (1959) states that, when threatened by stressful conditions persons try to relate with others, rather than remain alone. Another study also evidenced that, social support acts as a moderator in the association between the perceived stress and psychological disorder. Person with high levels of support show less psychological disorders under high level of perceived stress than do those with low levels of support (Cohen & Williamson, 1988).

Perceived stress and health related depression in diabetics are two negative factors in the present study; these are significantly positively correlated in 0.01 levels (r= 0.438). In type 2 diabetics perceived stress occurring as a perceived inability to cope with the diabetes related demands, and health related depression is occurring as a result of their perception of poor diabetes self-management and consequent long term diabetes-related complications. This shows that both

perceived stress and health related depression is negatively affecting the patient's diabetes self care management. From the result it can be found that both these factors are affecting the individual in same directions, which means when perceived stress increases health related depression will also increase and vice versa.

Perceived stress is significantly positively correlated with negative affectivity and social inhibition in 0.01 levels (r= 0.549 and r= 0.184 respectively), this indicates the two dimensions of Type D personality that is Person's tendency to experience negative emotions (i. e., Negative Affectivity) and the person's tendency to inhibit the expression of these emotions in social interaction (i. e., Social Inhibition) increases the perceived stress will also increase in type 2 diabetics.

Health related depression in type 2 diabetics is significantly negatively correlated with overall perceived social support (r= -0.443) and also the three sub factors of perceived social support at 0.01 levels (Support from significant others is r= -.363; support from family is r= -.363 and support from friends is r= -.334). These results indicate that the type 2 diabetic patients' perception of support from others have the capacity to reduce the perception of poor self management, this is positively affecting the individuals life satisfaction. There are some studies supporting this finding, a study conducted by Brown and Harris 1978, found that social support has been offer protection from developing or increasing depression in people with type 2 diabetes. There found a significant relationship, that a decrease in social support may lead to the development of depression in type 2 diabetic people Prince et al., (1997b).

Health related depression in diabetics is significantly negatively correlated with diabetes self care at 0.01 levels (r= -0.215). This indicates that health related depression and self care are in opposite directions, if self care increases health related depression will decrease or vice versa. Depressive symptoms in people with Diabetes mellitus are of concern because of their association with poor diabetes self-management (like managements in diet modification, physical activity, insulin injections) and an increased risk for diabetes-related complications (Black, 1999; De Groot et al, 2001).

From table 19 the correlation between health- related depression and factors of type D personality can be found. This indicates that the health related depression is highly positively significant at the type D personality factor Negative affectivity in 0.01 levels (r= 0.570).  Result shows that the negative affectivity and health related depression in diabetics are in same direction, when one of these increases the other will also increase. One previous study supports the result, which states that type D personality together with other psychological risk factors can increase the depression in primary care patients with type 2 diabetes ( Nefs,  Pouwer, Denollet & pop.2012)

Type D personality factors Negative affectivity and Social Inhibition are significantly negatively correlated with perceived social support and its three sub factors  in 0.01 levels of significance (coefficients of correlation as given in the table 18 for negative affectivity on perceived social support is r= -0.484, support from significant others is r= -0.425, support from family is r= -0.384 , and support from friends is  r=  -0.388; and for social inhibition and perceived social support is r=-0.245, support from significant others is   r= -0.334, support from friends is r= -0.282 and perceived social support factor support from family, is   r= -0.137). This indicates that type D personality factors and perceived social support are in opposite directions, the result indicates that the type 2 diabetic persons receiving a healthy support from family and society have the tendency to perceive things more positively and they are able to express the emotions more freely and this will reduce the experience of Negative Affectivity and Social Inhibition.

Type D personality factor Negative Affectivity is significantly negatively correlated with diabetes Self care in 0.01 levels of significance (r= -0.189). The result indicates that negative affectivity and diabetes self care have a negative relation, when negative affectivity increases diabetes self care will decrease. This result indicates that if the patient is perceiving more negative emotions, the person has more chances for experiencing negative thinking, which will affect his/ her motivation to follow the diabetes self care activities.   This may lead to the inability to cope with diabetes self management.

**SECTION 3**

**Multiple Regression Analysis**

Regression is a statistical technique that allows predicting someone's score on one variable on the basis of their scores on one or more other variables. Multiple regression analysis for the present study involves two dependent variables (namely, Health Related Depression and Subjective Well Bing), which is also known as 'criterion variables', and seven independent variables (namely, Diabetes Related Quality of Life, Perceived social support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition of type D personality and Fating Blood Sugar level were considered as independent variables), which refers to as the 'predictor variables'. Multiple regressions allow the researcher to identify which set of predictor variables together provide the best prediction of that score. To test the hypothesis that there will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar level and Type D Personality on Subjective Well Being and health related depression, the following multiple regression analyses were carried out.

**Multiple Regression Analysis (Step-wise) Subjective Well-Being as Dependent Variable**

In this analysis Subjective Well-being was considered as the dependent variable, and all other variables of the study, namely- Diabetes Related Quality of Life, Perceived social support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition of type D personality and Fating Blood Sugar level were considered as independent variables. Stepwise regression analysis was made to find out maximum possible variance in subjective well-being that could be explained with the help of each of the independent variables. The summary of the multiple regression analysis is given in the table 20.

*Table 20: Multiple Regression Analysis (Step-wise) Subjective Well-Being as dependent variable*

| Independent variable | Variable abbreviations | Multiple Regression (R) | F-value for R | R Square | Partial Regression Coefficient(b) | Constant | Beta coefficient ($\beta$) |
|---|---|---|---|---|---|---|---|
| Negative Affectivity | NA | 0.667 | ** 203.325 (1,254) | 0.445 | -1.470 (NA) | 102.998 | -0.667 |
| Diabetes Related Quality of Life | DRQOL | 0.768 | ** 181.481 (2,253) | 0.589 | -0.999(NA) 0.284(DRQOL) | 61.484 | -0.453 0.436 |
| Perceived Social Support | SS | 0.803 | ** 152.860 (3,252) | 0.645 | -0.811 (NA) 0.208 (DRQOL) 0.238(SS) | 55.770 | -0.368 0.319 0.295 |
| Perceived Stress | PSS | 0.825 | ** 133.483 (4,251) | 0.680 | -0.597(NA) 0.191(DRQOL) 0.211(SS) -0.365 (PSS) | 69.099 | -0.271 0.293 0.261 -0.229 |
| Fasting Blood Sugar level | FBS | 0.832 | ** 112.301 (5,250) | 0.692 | -0.547(NA) 0.175(DRQOL) 0.217(SS) -0.370(PSS) -0.032(FBS) | 75.705 | -0.248 0.269 0.269 -0.233 -0.113 |

**significant at the 0.01 level

The first variable entered in the analysis is Negative Affectivity (NA), which is the most significant variable predicting Subjective Well-being (SUBI). The multiple regression value (R) for the variable is 0.667 and the value is significant at 0.01 level (F=203.325, for 1 and 254 df). The R signifies the strength of interaction between dependent variable and independent variable and it is 66.7% at this stage. The value of R square (0.445) proves that 44.5% of variance in subjective well being can be contributed by negative affectivity. The partial regression coefficient (b) shows that for a unit increment in NA there will be -1.470 unit decreases in Subjective Well being.  The result indicates that one unit increment in patient's tendency to experience negative emotions will predict the decrease in subjective well being in -1.470 units in type 2 diabetics.

The regression equation for this will be

SWB=102.998-1.470(NA)

Personality has been found to be a strong and constant predictor of subjective well being and life satisfaction (Bornstein, 1998). Personality affects one's sense of well-being, adaptation and coping in the event of a new life-changing situation. Based on one's personality a person has a tendency to be happy or unhappy, inherent traits of optimism and pessimism, and the influence of life circumstances affect one's sense of well-being (Diener et al. 1999).

The second significant variable in the analysis is (DRQOL) Diabetes related Quality of life, with the R value of .768, significant at 0.01 level (F= 181.481 for 2 and 253 df). The strength of the interaction between the two independent variables put together to the dependent variable is 76.8%. The value of R square predicts the variance accounted for by NA and DRQOL together to Subjective Well Being to be 58.9%.

The proportion of contribution to the dependent variable by these independent variables has shown by the value of 'b' i.e. for every unit change in NA and DRQOL respectively; there will be -0.999 and 0.284 unit change in Subjective Well being. The 'b' value of DRQOL is positive which suggests that in every unit increment of Diabetes Related Quality of Life there will be 0.284 unit increment in Subjective Well Being. From this result it can be predicted that every unit increment in the individual's perception and satisfaction of his health condition will also be increase overall feeling about life in positive way.

The regression equation at this point will be

SWB= 61.484- 0.999(NA) +0.284(DRQOL).

Psychological and physiological well being of patients having diabetes is influenced not only by metabolic control, but also influenced how the patients perceive treatment efficacy and how they feel. This states that, Quality of life has a stronger association with hyperglycemic and hypoglycemic symptoms (Kleefstra et al., 2005)

The third variable entered in the analysis is Perceived Social Support (SS) with the R value of .803, significant at 0.01 level (F= 152.860 for 3 and 252 df). The

strength of the interaction between the three independent variables put together to the dependent variable is 80.3%. The value of R square predicts the variance accounted for by NA, DRQOL and SS together to Subjective Well Being to be 64.5%.

The proportion of contribution to the dependent variable by these independent variables has shown by the value of 'b' i.e. for every unit change in NA, DRQOL and SS respectively; there will be -0.811, 0.208 and 0.238 unit change in Subjective Well being. The 'b' value of SS is positive which suggests that for every unit of increment in Perceived Social Support there will be 0.238 unit increment in Subjective Well Being. This shows that, the type 2 diabetic person receiving healthy support from others can think more positively about his overall life condition.

The regression equation at this point will be

SWB= 55.770-0.811(NA) + 0.208(DRQOL) + 0.238(SS).

Social support is a free exchange of resources between at least two people that increases the well-being of the receiver (Dam et al., 2004). Social support contributes to positive adjustment, personal growth and increased well-being (Cohen & Wills, 1985).

The next significant predictor variable in the analysis is (PSS) Perceived Stress with the R value of 0.825, has found to be significant at 0.01 level (F= 133.483 for 4 and 251 df). The strength of interaction between the four independent variables put together to the dependent variable is 82.5%. The value of R square predicts the variance accounted for by NA, DRQOL, SS and PSS together to Subjective Well Being to be 68%.

The proportion of contribution to the dependent variable by these independent variables has shown by the value of 'b' i.e. for every unit change in NA, DRQOL, SS and PSS respectively; there will be -0.597, 0.191, 0.211 and -0.365 unit change in Subjective Well being. The 'b' value of PSS is negative which suggests that for every unit of increment of perceived stress there will be -0.365 unit

decreases in Subjective Well Being. The result indicates that increase in the stress originating from perceived inability to cope with diabetes related demands in type 2 diabetic people will diminish the optimistic thinking on life conditions.

The regression equation at this point will be

SWB = 69.099-597(NA) + 0.191(DRQOL) + 0.211(SS) - 0.365(PSS)

Compared to middle aged and young men, older men have lowest number of symptoms of psychological distress, but also the lowest scores on a measure of positive psychological well being. On the other hand, compared to other age groups, older women have the highest score on symptoms of psychological distress and also the lowest scores on positive well being (Huppert & Whittington, 2003).

The fifth variable entered in the analysis is Fasting Blood Sugar level (FBS). Currently, a person is considered to have diabetes if the Fasting Blood Sugar level is 126 milligrams per deciliter (mg/dl) of blood or higher (Reddy, 2009). The current standard of 126 mg/dl defines diabetes based not on today's risk but on the future risk of developing a complication of the disease. In the present study, the researcher selected participants those who were already diagnosed as type 2 diabetics and under medication at least for six months duration. The researcher collected the participants' latest Fasting Blood Sugar value from their hospital records or laboratory report of blood sample analysis, for the purpose of the study. In the multiple regression analysis of the independent variables which predicts the changes in the dependent variable in the present study, the Fasting Blood Sugar level has entered as independent variable. Fasting Blood Sugar level with the R value of 0.832, significant at 0.01 level (F= 112.301 for 5 and 250 df). The strength of the interaction between the four independent variables put together to the dependent variable is 83.2%. The value of R square predicts the variance accounted for by NA, DRQOL, SS, PSS, and FBS together to Subjective Well Being to be 69.2%.

The proportion of contribution to the dependent variable by these independent variables has shown by the value of 'b' i.e. for every unit change in NA, DRQOL,SS, PSS, and FBS respectively; there will be -0.547, 0.175, 0.217, -

0.370, and -0.032 unit changes in Subjective Well being. The 'b' value of FBS is negative which suggests that for every unit of increment of sugar level there will be -0.032 unit decreases in Subjective Well Being. From the result it can be proved that the increase in fasting blood sugar level will decrease the individual's positive perception on life.

The regression equation at this point will be;

SWB =75.705 -0.547(NA) + 0.175(DRQOL) + 0.217(SS) -0.370(PSS) -0.032 (FBS)

A study was conducted by Naess., Erikson., Midthjell., & Tambs. (2004) based on the assumption that people with diabetes report lower psychological well-being than do people with no reported disease, and new treatment regimens for diabetes including improved insulin and treatment with medicines, easier blood sugar tests, and transfer of responsibility from doctor to patient, has the power to enhance well being in diabetes people. The study results have concluded that the people with diabetes reported significantly lower well being than people with no reported diabetes.

*Table 21: Multiple   Regression Analysis (Step-wise) Health Related Depression as dependent variable*

| Independent variable | Variable abbreviations | Multiple Regression (R) | F-value for R | R Square | Partial Regression Coefficient(b) | Constant | Beta coefficient (β) |
|---|---|---|---|---|---|---|---|
| Diabetes Related Quality of life | DRQOL | 0.692 | ** 233.999 (1,254) | 0.480 | -0.263 (DRQOL) | 41.883 | -0.692 |
| Negative Affectivity | NA | 0.741 | ** 154.395 (2,253) | 0.550 | -0.207 (DRQOL) 0.391(NA) | 31.250 | -0.544 0.304 |
| Fasting Blood Sugar Level | FBS | 0.748 | ** 106.997 (3,252) | 0.560 | -0.200 (DRQOL) 0.369(NA) 0.018(FBS) | 27.618 | -0.525 0.286 0.107 |

** Significant at the 0.01 level.

In this analysis Health Related Depression is considered as dependent variable; and all other variables of the study, Diabetes Related Quality of Life,

Perceived social support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition of type D personality and Fasting Blood Sugar level were considered as independent variables. Stepwise regression analysis has been used to find out maximum possible relationships caused by independent variables on dependent variable. The summary of multiple regression analysis – stepwise is given in table 21.

The first significant variable entered in the analysis is DRQOL (Diabetes related quality of life) which is the most significant variable in the prediction of Health related depression (PHQ9). The multiple regression value (R) for this variable found to be .692 and the value is significant at 0.001 level (F=233.999 for 1 and 254 df). The R signifies the strength of interaction between dependent variable and independent variable and it is 69.2% at this stage. The value of R square (0.480) proves that 48.0% of variance in Health related Depression can be contributed by Diabetes related quality of life. The partial regression coefficient (b) DRQOL is negative which suggests that for every unit of increment of Diabetes related Quality of life -0.263 unit decreases in Health Related Depression, which means when type 2 diabetics  perception and satisfaction of his health condition   expected to on his age, ethnicity, income, culture, education and family status increases, their perception of poor diabetes self-management (like managements in  diet modification, physical exercise, insulin injections) and resulting long term diabetes-related complications will decrease.

The regression equation at this point will be;

HRDPN= 41.883- 0.263(DRQOL)

Patients with type 2 diabetes have reported a significant association between depressive symptoms and other indices of DRQOL, such as degree of difficulty, leisure, work and family functioning (Mayou et al., 1990).  Depression severity was associated with poorer DRQOL on the achievement and marginally associated with DRQOL on psychosocial growth domain. Interventions designed to address both depression and diabetes distress may lead to better DRQOL outcomes than a

generalized depression intervention or an intervention for diabetes alone (Carper, Traeger et al.2013).

The second significant variable in the analysis was Negative Affectivity (NA). The multiple regression value (R) for this variable found to be 0.741 and the value is significant at 0.001 level (F=154.395 for 2 and 253 df). The R signifies the strength of the interaction between the two independent variables put together to the dependent variable is 74.1%. The value of R square (0.550) predicts the variance accounted for by DRQOL and NA together to Health related depression to be 55%.

The proportion of contribution to the dependent variable by these independent variables have been shown by the value of 'b' i.e. for every unit change DRQOL and NA respectively; there will be  -0.207 and 0.391 unit changes in Health Related Depression. The 'b' value of NA is positive which suggests that for every unit of increment in Negative Affectivity there will be 0.391 unit increments in Health related depression. This result predicts that if the type 2 diabetic individuals tendency to experience negative emotions increases the person's perception of poor self-management and resulting long term complications would be increased and the person appears to be more depressive.

The regression equation at this point will be

HRDPN= 31.250- 0.207(DRQOL) + 0.391(NA).

Type D personality together with other psychological risk factors could be increased the depression in primary care patients with type 2 diabetes (Nefs, Pouwer, Denollet & pop.2012).

The third significant variable in the analysis was Fasting Blood Sugar level (FBS) with the R value of 0.748, significant at 0.01 level (F=106.997 for 3 and 252 df). The strength of the interaction between the four independent variables put together to the dependent variable is 74.8%. The value of R square predicts the variance accounted for by DRQOL, NA and FBS together to Health related depression is 56.0%.

The proportion of contribution to the dependent variable by these independent variables is shown by the value of 'b' i.e. for every unit change DRQOL, NA and FBS respectively; there will be      -0.200, 0.369, and 0.018 unit changes in Health Related Depression. The 'b' value of FBS is positive which suggests that for every unit of increment in sugar level there will be 0.018 unit increments in Health related depression.

Regression equation at this point will be

HRDPN = 27.618- 0.200(DRQOL) + 0.369(NA) + 0.018(FBS).

Depression is more common in individuals with diabetes than in the general population (Anderson, Freedland, Clouse, & Lustman, 2001). Meta-analysis suggests that depression is between 60 and 100% more common in adults living with diabetes (Anderson et al., 2001; Ali et al., 2006). There is a stronger relationship between depression-diabetes symptom association than the relationship between diabetes symptoms with measures of glycemic control and diabetes complications.  People with depression have a tendency to focus on illness episodes and medical symptoms and selective recall of negative or unpleasant events. This will lead to painful symptoms and functional limitations, these can induce psychological distress and depression. Depression is associated with increased symptom burden, functional disability and medical costs related to a chronic medical condition such as diabetes. These all factors related to diabetes will lead to an increased rate of depression among persons with diabetes. (Ludman, Katone, Russo et al., 2004).

**SECTION 4**

**Role of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar Level, Negative Affectivity And Social Inhibition on Health Related Depression.**

Diabetes and depression are interrelated, studies reported that individuals with type 2 diabetes is twice as likely to be diagnosed with depression whether compared to healthy control group (Egede, Zheng & Simpson, 2002). Depressive episodes tend to occur more frequently and last longer among individuals with type 2 diabetes mellitus than without type 2 diabetes mellitus (Lustman, Clouse, Alrakawi, Rubin, & Gelenberg, 1997).

Health related depression will change individual's perspective towards the life in negative aspect, and will be decreased the patient's motivation to practice the diabetes self care activities and daily life activities. The factors like, diabetes related quality of life which determine the individual's acceptance of diabetes occurrence and diabetes management; Perceived social support is the person's perception that he or she receiving support from the family and society which will help to increase the motivation to live in a healthy manner; Perceived stress which will directly influence diabetes thorough its neuro endocrine effects, experiencing stress for long time will get chance to be depressed. And the type D personality factors of negative affectivity which is the person's tendency to perceive negative emotions and social inhibition which is the person's inability to express emotions as they are occurring; are influencing health related depression in one way or another.

In the present study to analyze the role of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar level, Negative Affectivity And Social Inhibition on Health Related Depression; a number of hypothesis were formed. And to test these hypotheses the following three way analysis of variances were calculated.

**Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Health Related Depression**

Quality of Life is the measure of individual's perceived sense of well being, such as sense of satisfaction with life, work and personal relationships a combination of these components and health related components that form comprehensive Health Related Quality of Life. The Health Related Quality of Life of an individual is depends on the level of subjective well being. Diabetic specific domains of Health Related Quality of Life relate how diabetes is compromising individual's sense of well being psychologically, physically and socially (Borrot &Bush, 2008). Diabetes related quality of life is an important factor affecting the self care management of diabetes. If the patient is satisfied with his physical, social and psychological health after getting diagnosed with diabetes, diabetes would not be a major crisis for them; but if the patient has low diabetes related quality of life, the diabetes would be a serious problem for them and they will begin to experience stress and health related depression, and their fasting blood sugar level will always be uncontrolled.

Wallston et al. (1983) define social support as 'the perceived comfort, caring, esteem or help a person received from others'. According to Cobb (1976), people with social support believed they are loved and cared for, esteemed and valued, and part of social network that can provide goods, services and mutual defense at times of need or danger. Social support is considered as psycho-social mediator of health status and moderator of life stress. Health psychologists have extensively studied the role of social support in psychological/ mental as well as physical health and have been given enormous amount of attention devoted to the social support-health connection. In case of diabetic people those who are receiving support from family members and from society have got more chance to enhance their positive feelings and satisfaction in life and reduced chances of stress and health related depression as a result of diabetes.

"Diabetes-related" stress as a person-environment relationship in which perceived diabetes-related demands (e.g., self-management treatment like diet and regular exercise) tax or perceived coping resources (Karlsen et al. 2004). Stress

originating from a perceived inability to cope with diabetes-related demands has been shown to adversely alter glucose control in Type 2 Diabetes Mellitus (Nozaki et al. 2009).

In order to find out the role of three levels of (Low, Moderate, and High) Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Health Related Depression, a three-way ANOVA has been used and the important observations are presented below.

*Table 22: Results of Three Way ANOVA of Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Diabetes Related Quality Of Life | B Perceived Social Support | C Perceived Stress | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 24.059** | .349 | 4.544** | 1.198 | .614 | 1.686 | 1.228 |

**p<0.01 *p<0.05

Table 22 shows one-way, two-way and three-way interaction among the variables Diabetes related Quality of Life, Perceived Social Support and Perceived stress on Health Related Depression. Main effects indicate significant F-values for Diabetes related Quality of Life and Perceived Stress on Health Related Depression and also F-value is not significant for Perceived Social Support and Health Related Depression. No significant two way interactions and three way interaction were found among Diabetes related Quality of Life, Perceived Social Support and Perceived Stress on Health Related Depression.

**Main Effects**

a) Diabetes Related Quality of Life on Health Related Depression.

Diabetes related Quality of Life is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for group of people with low Diabetes related Quality of Life. It can be noticed from table 22 that Diabetes related Quality of Life has a significant role on health related depression (F= 24.059; p<0.01). This also indicated that the type 2 diabetic patients with low level of life satisfaction have high health related depression. A research conducted by Wang, He & Zhao (2015) had identified that the patients with type 2 Diabetes Mellitus often have depression or depressive symptoms; impaired family functioning and poor Quality of Life found that family functioning and Quality of Life in patients with type 2 diabetes is more problematic than in individuals without diabetes.

*Table 22.1: Mean and Standard Deviation on Diabetes Related Quality of Life and Health Related Depression*

| Diabetes Related Quality of Life (DRQOL) | DRQOL (Low) N=72 | | DRQOL(Moderate) N=84 | | DRQOL(High) N=100 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 14.68 | 9.888 | 5.63 | 5.785 | 2.19 | 3.866 |

On the basis of mean scores it could be found that the diabetic people who have high level of Diabetes related Quality of Life have lower mean scores in Health Related Depression (M=2.19; S.D=3.866) and those having low levels of Diabetes related Quality of Life have higher mean scores in Health Related Depression (M=14.68; S.D=9.888), and the moderate Diabetes Related Quality of Life group have moderate level of health related depression.

b)   Perceived Stress on Health Related Depression

In this section the participants have been classified on the basis of perceived stress in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher health related depression for those having high level of Perceived Stress. It can be noticed from table 22 that Perceived Stress has significant role on health related depression (F= 4.544; p<0.01), which means the type 2 diabetic people those who are experiencing high stress because of perceived inability to cope with diabetes related demands reported increase in their health related depression, that is caused by their perception of poor diabetes self-management. This results are evidenced in a study conducted by Li , Ford , Zhao  et al,(2007) which found that, serious psychological distress in individuals with diabetes will cause depression, anxiety and other disorders.

*Table 22.2 Mean and Standard Deviation of Perceived Stress and Health Related Depression*

| Perceived Stress (PSS) | PSS (Low) N=90 | | PSS (Moderate) N=83 | | PSS (High) N=83 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 2.71 | 5.191 | 7.42 | 7.438 | 10.71 | 9.981 |

Based on the mean scores, it can be reported that the subjects who have high levels of perceived stress have significantly higher mean scores in health related depression (M=10.71; S.D=9.981). Those with low levels of perceived stress have significantly low health related depression (M=2.71; S.D=5.191). And those who are experiencing moderate level of perceived stress have moderate level of health related depression (M=7.42; S.D=7.438).

The strong relation of psychological background of the patient, on depression was evident here. As stress enhances chances for health related depression increases

in type 2 diabetics, where as diabetes related quality of life has got a directly opposite effect on depression.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes related Quality of Life; Perceived Social Support and Perceived Stress from the table 22 indicate that there is no significant two-way interaction between these three variables on Health Related Depression.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Diabetes related Quality of Life, Perceived Social Support and Perceived Stress. From the Table 22 it can be found that the three way interaction between levels of these three variables is not significant on Health Related Depression.

**Diabetes Related Quality of Life, Perceived Stress and Diabetes Self Care on Health Related Depression**

The expression of Diabetes Related Quality of Life (DRQOL) refers to Quality of life associated with health conditions in diabetic patients. Health Related Quality of Life is the value assigned to duration of life as modified by the impairments, functional states, perceptions and social opportunities influenced by disease, injury, treatment or policy Shumaker & Naughton (1995).

Stress may have role in the onset of diabetes, in metabolic control and quality of life. Relationship between diabetes and stress is complex (Lloyd, Smith & Weinger, 2005). Stress can have an influence on glycemic control in different ways, especially in some stress-reactive individuals (Riazi., Pickup & Bradley, 2004). Psychological effects on the neuro endocrine system induced by stress can affect directly blood glucose levels (Konen., Summerson, Dignan & 1993). Stress can induce indirectly alterations in health care practices; this is very important because diabetes is a largely self managed disease and stress, depression and psychological

status may have significant impact on self-management and health outcomes (Ciechanowski., Katon, ., Russo & Hirsch,2003); Paschalides., Wearden., Dunkerley., Bundy., Davies, R & Dickens (2004); McKellar., Humphreys & Piette (2004); Sultan & Hartemann (2001).

Diabetes self-care activities are behaviors undertaken by people with or at risk of diabetes in order to successfully manage the disease on their own (American Association for Diabetes Educators AADE7 self-care). All these self care behaviours have been found to be positively correlated with good glycemic control, reduction of complications and improvement in quality of life (Povey, 2007; Boule, et al., 2001; ADA, 2009; Odegard & Capoccia, 2007; Deakin., McShane., Cade., & Williams, 2005).

A three-way ANOVA was carried out to find the interaction effect of the three levels (low, moderate and high) of Diabetes Related Quality of Life, Perceived Stress and Diabetes Self-care on Health Related Depression.

**Table 23: Results of Three Way ANOVA of Diabetes Related Quality of Life, Perceived Stress and Diabetes Self Care on Health Related Depression**

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br>Diabetes Related Quality Of Life | B<br>Perceived Stress | C<br>Diabetes Self-Care | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 14.982** | 2.229 | 4.478** | .959 | 1.333 | 1.469 | .180 |

**p<0.01 *p<0.05

Table 23 shows one-way, two-way and three-way interaction among the variables Diabetes related Quality of Life, Perceived stress and diabetes Self-Care on Health Related Depression. Main effects indicate significant F-values for

Diabetes related Quality of Life and diabetes Self Care on Health Related Depression and also F-value is not significant for Perceived Stress and Health Related Depression. No significant two way interactions and three way interaction were found among Diabetes related Quality of Life, Perceived Stress and diabetes Self-Care on Health Related Depression.

**Main Effects**

    a) Diabetes Related Quality of Life on Health Related Depression.

Diabetes related Quality of Life is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes Related Quality of Life. It can be noticed from table 23 that Diabetes related Quality of Life has a significant role on health related depression (F= 14.982; p<0.01). The mean and standard deviation of Diabetes Related Quality of Life has already discussed in the table (22.1)

    b) Diabetes Self-Care and Health Related Depression

Diabetes Self-care is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes Self-care. It can be noticed from table 23 that Diabetes self-care has a significant effect on health related depression (F= 4.478; p<0.01). The result evidenced that the diabetic patient's motivation to modify diet, physical activity and glucose level monitoring will be affected by patient's experience of health related depression, at this point the patients reported low self care experiencing high level of health related depression. Depressive symptoms in people with diabetes mellitus are of concern because of their association with poor diabetes self-management (like diet modification, physical activity, insulin injections) and an increased risk for diabetes-related complications (Black, 1999; De Groot et al, 2001). Furthermore, co morbid depression in people with diabetes

mellitus is associated with functional disability, low work productivity, and low health service use (Black, 1999; Black & Markides, 1998; Ciechanowski et al., 2000).

*Table 23.1: Mean and Standard Deviation for Diabetes Self-Care and Health Related Depression*

| Diabetes Self-Care (DSC) | DSC (Low) N=88 | | DSC(Moderate) N=125 | | DSC(High) N=43 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 8.48 | 9.625 | 7.46 | 8.125 | 1.65 | 2.308 |

Based on the mean scores, it can be reported that the subjects who have low levels of Diabetes Self-Care have higher mean scores in health related depression (M=8.48; S.D=9.625). Those with high levels of Diabetes Self-care have low health related depression (M=1.65; S.D=2.308). And those having moderate level of diabetes Self-Care have experienced low level of health related depression compared to high group (M=7.46; S.D=8.125).

From the analysis it could be interpreted that self care on diabetes will have direct influence on diabetics, but it has also another influence on the related condition called depression. As pointed out earlier, in combination with self care, an additional effect could be generated against depression by the factor diabetes related quality of life.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables namely, Diabetes related Quality of Life, Perceived Stress and Diabetes Self Care from table 23; indicate that there is no significant two-way interaction between these three variables on Health Related Depression.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Diabetes related Quality of Life, Perceived Stress and Diabetes Self Care. From table 23 it can be found that the three way interaction between levels of these three variables is not significant on Health Related Depression.

**Diabetes Related Quality of Life, Diabetes Self Care and Fasting Blood Sugar level on Health Related Depression**

Diabetes self care is the patient's perception of the degree to which they adhere to recommendations for diabetes management and how well they adhere to their treatment prescriptions. Diabetes is challenging chronic disease which requires continuous self-management by controlling diet, maintaining regular exercise, taking medication, and monitoring blood glucose (American Diabetes Association, 2011). Diabetes self care behaviours have been related with the treatment provider patient communication, social support and self efficacy, and these factors were directly related to glycemic control.

In order to find out the role of diabetes related quality of life (Low, Moderate, and High), Diabetes Self-Care and Fasting Blood Sugar level on Health Related Depression, a three-way ANOVA has been carried out.

*Table 24: Diabetes Related Quality of Life, Diabetes Self Care and Fasting Blood Sugar level on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Diabetes Related Quality Of Life | B Diabetes Self-Care | C Fasting Blood Sugar Level | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 20.408** | 4.122** | .722 | 2.713** | .629 | 1.095 | .972 |

**p<0.01 *p<0.05

Table 24 shows one-way, two-way and three-way interactions among the variables Diabetes related Quality of Life, Diabetes Self-Care and Fasting Blood Sugar level on Health Related Depression. Main effects indicate significant F-values for Diabetes Related Quality of Life and diabetes Self Care on Health Related Depression and also F-value is not significant for Fasting Blood Sugar level and Health Related Depression. There is significant two-way interaction found among Diabetes Related Quality of Life and Diabetes Self-Care on Health Related Depression. No significant three way interaction could be found among Diabetes related Quality of Life, diabetes self-care and fasting blood sugar level on Health Related Depression.

**Main Effects**

a)  Diabetes Related Quality of Life on Health Related Depression.

Diabetes related Quality of Life is categorized in to three groups, viz., (low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes Related Quality of Life.

It can be noticed from table 24 that Diabetes Related Quality of Life has a significant role on health related depression (F= 20.408; p<0.01). The mean and standard deviation of Diabetes Related Quality of Life has already been discussed in the table (22.1)

b) Diabetes Self-Care on Health Related Depression

Diabetes Self-Care is categorized in to three groups, viz., (low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes Self-care. It can be noticed from table 24 that Diabetes Self-Care has a significant effect on Health Related Depression (F= 4.122; p<0.01). The mean and standard deviation of Diabetes Self-care has already been discussed in the table (23.1).

**Two-way interaction**

a) Diabetes Related Quality of Life and Diabetes Self-Care on Health Related Depression.

In this step the analysis was carried out to examine the difference in the scores in Health Related Depression among type 2 diabetic people as per their Diabetes Related Quality of Life and Diabetes Self-Care. From the table 24 the two way interaction between the levels of Health Related Quality of Life and Diabetes Self-Care yields a significant F-ratio on Health Related Depression (F=2.713, p<0.01). The result shows that the type 2 diabetic patients' diabetes related quality of life and diabetes self care together will affect the Health Related Depression. This is supported by the study of Lustman et al, (1992); Hanninen et al, (1999), which indicates that depression has been shown to be related with impaired metabolic control, which in turn, may result in more diabetes complications and poorer Health Related Quality of Life (Snoek &Skinner, 2000). Depression and glycemic control in diabetes have been linked with the behavioural mechanisms, such as impaired compliance with routine monitoring and treatment, and reduced adherence to diet (DeGroot et al., 1999).

*Table 24.1: Mean and Standard Deviation of Diabetes Related Quality of Life and Diabetes Self-Care on Health Related Depression*

| Variables | | Diabetes Related Quality Of Life | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Low (N=72) | | | Moderate(N=84) | | | High(N=100) | | |
| | | Diabetes Self Care | | | Diabetes Self Care | | | Diabetes Self Care | | |
| | | Low N=33 | Moderate N=36 | High N=3 | Low N=31 | Moderate N=42 | High N=11 | Low N=24 | Moderate N=47 | High N=29 |
| Health Related Depression | Mean | 15.97 | 14.33 | 4.67 | 5.03 | 6.98 | 2.18 | 2.62 | 2.62 | 1.14 |
| | S.D | 10.87 | 8.906 | 3.512 | 4.301 | 6.841 | 2.926 | 5.444 | 3.837 | 1.642 |

Based on the mean scores, it can be found from table 24.1, that low Diabetic Self-Care belonging to low Diabetes Related Quality of Life group experiencing high level of Health Related Depression (M=15.97;S.D=10.87). And high Diabetic Self-Care Belonging to high Diabetes Related Quality of Life group experiencing low level of Health Related Depression (M=1.14; S.D=1.642). From this result it can be found that the type 2 diabetic people with good adherence to diabetes self care and life satisfaction even though the person was suffering with diabetes has experiencing less health related depression than those who have less life satisfaction and poor adherence to diabetes self care.

By combining the interpretation of earlier analysis, it could be found that, in the two way effect on stress as well as in the two way effect on diabetes self care are directly different to each other. Self care added with diabetes related quality of life, will decrease depression where as stress; along with quality of life also decrease depression but not as higher effect as in self care. That is self care can be a very positive effect and stress has got a negative effect on depression. Both are influenced by the additional role of diabetes related quality of life.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Diabetes related Quality of Life, Diabetes Self Care and Fasting Blood Sugar level. From the Table 24 it can be found that the three way

interaction between levels of these three variables is not significant on Health Related Depression.

**Diabetes Related Quality of Life, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression**

Negative affectivity is the tendency to experience negative emotions. This will negatively affect the person's quality of life and increases the anxiety and depression in them. This will also adversely affect the person's motivation to diabetes self care adherence and leads to decrease in blood sugar control. Hence, patients with this personality profile are inclined to experience negative emotions, such as irritability and worry, and to inhibit the expression of those feelings in social interactions (Denollet, 2005; Denollet., Schiffer., Spek, 2010).

A three-way ANOVA was carried out to find the interaction effect of the three levels (low, moderate and high) of Diabetes Related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression.

*Table 25: Diabetes Related Quality of Life, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A<br>Diabetes Related Quality Of Life | B<br>Fasting Blood Sugar Level | C<br>Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 34.726** | 5.127** | 9.094** | .151 | 4.094** | 1.888 | .221 |

**p<0.01 *p<0.05

Table 25 shows one-way, two-way and three-way interaction among the variables Diabetes related Quality of Life, Fasting Blood Sugar level and Negative

Affectivity on Health Related Depression. Main effects indicate significant F-values for Diabetes related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression. There is significant two-way interaction found among Diabetes Related Quality of Life and Negative Affectivity on Health Related Depression. No significant three way interaction was found among Diabetes related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression.

**Main Effects**

a) Diabetes Related Quality of Life on Health Related Depression.

Diabetes related Quality of Life is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes related Quality of Life. It can be noticed from table 25 that Diabetes Related Quality of Life has a significant role on health related depression (F= 34.726; p<0.01).  The mean and standard deviation of Diabetes Related Quality of Life has already discussed in the table (22.1)

b) Fasting Blood Sugar Level on Health Related Depression

Fasting Blood Sugar Level is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for group with high Fasting Blood Sugar level. It can be noticed from table 25 that Fasting Blood Sugar level has a significant role on Health Related Depression (F= 5.127; p<0.01). The result also indicates that the type 2 diabetic patient with increased fasting blood sugar level increases the experience of depression due to the diabetes occurrence. A research study conducted by Edge & Ellis in 2010 had stated that diabetic people with coexisting depression showed decreased adherence to treatment, poor metabolic control, more difficulty rates, decreased Quality of Life, they have high health care use and cost, increased

disability and lost productivity, and they also have increased death rates. Coexistence of diabetes and depression is connected with significant morbidity, mortality, and increased health care cost.

*Table 25.1: Mean and Standard Deviation of Fasting Blood Sugar level and Health Related Depression*

| Fasting Blood Sugar Level (FBS) | FBS (Low) N=94 | | FBS (Moderate) N=101 | | FBS (High) N=61 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 4.05 | 6.317 | 7.14 | 7.728 | 10.61 | 10.506 |

Based on the mean scores, it could be found that the participants with high Fasting Blood Sugar level have higher mean scores in health related depression (M=10.61; S.D=10.506). Those with low Fasting Blood Sugar level have low health related depression (M=4.05; S.D=6.317). And those having moderate level of Fasting Blood Sugar have decreased health related depression compared to high group (M=7.14; S.D=7.728). From this result it could be found that increase in fasting blood sugar level will also increase the experience of depression in type 2 diabetic patients.

When fasting blood sugar level is high, it shows lack of insulin level or inactivity of insulin. That means though glucose is there in the body, it is not able to enter into different areas or cells of the body. This happens even to the areas that secrete hormones, which makes the person pleasant. This can also be the reason behind related depression. Serotonin is the neurochemical associated with positive mental state. Even though the glucose is present in the body the cells could not receive adequate amount of glucose which is necessary for the production of Serotonin. This in turn leads to the experience of depressive mood. Because deficiencies in serotonergic function may reflect the relative absence of positive mood (Flory, Manuck, Matthes, &Muldoon 2004), these findings support the idea

that fasting blood sugar level has a direct effect on the experience of depression in diabetics.

c)  Negative Affectivity on Health Related Depression

Based on the scores obtained by the participants Negative Affectivity is categorized into three groups, viz (Low, Moderate, high) and they are tested for their mean values for Health Related Depression. The results indicate significantly higher mean value for high groups of Negative Affectivity ($F=9.094$, $p<0.01$). This shows that increase in experience of negative emotions will also increase fasting blood sugar level in type 2 diabetics. Negative affectivity was negatively associated with the majority of the Health related quality of life scales. Therefore, individuals higher in negative affectivity are more likely to complain about their health concerns or are more sensitive to them. While planning treatment for individuals based on Health related quality of life is important to consider level of Negative Affectivity because specific interventions may differ depending on the individual's degree of Negative Affectivity (Kressin, Spiro III, & Skinner ,2000).

*Table 25.2: Mean and Standard Deviation for Negative Affectivity and Health Related Depression*

| Negative Affectivity (NA) | NA (Low) N=99 | | NA(Moderate) N=81 | | NA(High) N=76 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 2.73 | 4.651 | 6.86 | 7.014 | 12.14 | 10.355 |

Based on the mean scores, it could be found that the subjects who have high Negative Affectivity have higher mean scores in health related depression (M=12.14; S.D=10.355). Those with low levels of negative affectivity have low health related depression (M=2.73; S.D=4.651). And those having moderate level of Negative Affectivity have decreased health related depression compared to group with high Negative Affectivity (M=6.86; S.D=7.014).

Negative Affectivity is a major component of Type D personality. It has found to be directly high among the diabetics with high depression. This can be found to be correlated in the present study with diabetes where as in support of the previous studies which considered type D to be a causal factor too. A tendency to express emotions negatively as part of Negative Affectivity is directly found to be related to depression.

**Two-Way Interaction**

a) Diabetes Related Quality of Life and Negative Affectivity on Health Related Depression

In this step the analysis carried out to assess the difference in the scores of Health Related Depression among type 2 diabetic people as a result of their Diabetes Related Quality of Life and Negative Affectivity. From the table 25 the two way interaction between the levels of Diabetes Related Quality of Life and Negative Affectivity yields a significant F-ratio on Health Related Depression (F=4.094, p<0.01). From the results it can get the type 2 diabetic individuals experience of life satisfaction and experiencing negative emotions is affecting the health related depression. Type D personality together with other psychological risk factors can increase the depression in primary care patients with type 2 diabetes (Nefs, Pouwer, Denollet and Pop. 2012).

*Table 25.3: Mean and Standard Deviation of Diabetes related quality of Life and Negative Affectivity on Health Related Depression*

| Variables | | Diabetes Related Quality Of Life | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Low (N=72) | | | Moderate(N=84) | | | High(N=100) | | |
| | | Negative Affectivity | | | Negative Affectivity | | | Negative Affectivity | | |
| | | Low N=9 | Moderate N=24 | High N=39 | Low N=35 | Moderate N=28 | High N=21 | Low N=55 | Moderate N=29 | High N=16 |
| Health Related Depression | Mean | 11.44 | 10.96 | 17.72 | 3.43 | 6.82 | 7.71 | .85 | 3.52 | 4.37 |
| | S.D | 7.35 | 8.013 | 10.57 | 4.52 | 5.969 | 6.404 | 1.353 | 5.421 | 5.071 |

Based on the mean scores, it can be obtained from table 25.3, that high Negative Affectivity belonging to low Diabetes Related Quality of Life group experiencing high level of Health Related Depression (M=17.72;S.D=10.57). And low Negative Affectivity group belongs to high Diabetes Related Quality Of Life group experiencing low level of Health Related Depression (M=.85; S.D=1.353). This results indicates that the type 2 diabetic patients experiencing increased negative thoughts and less satisfied with their present life will experience high level of depression caused by their inability to cope with diabetes related self care and uncontrolled fasting blood sugar level.

Negative Affectivity is found to be directly related to depression as negative affective group has got high depression. Whereas from combination effect with diabetes related quality of life, it could be found that the score of depression is decreasing. This is almost a linear decrease unless one point while grouping the sample in to three groups on the levels of diabetes related quality of life and negative affectivity, to study diabetes related depression. This is also happens to be an interesting finding as the role of quality of life, even up on the type of personality, to generate depression. While designing intervention or try to support diabetics, enhancement of diabetes related quality of life can have a long lasting effect, even by controlling the related depression. Enhancing diabetes related quality of life means improving the areas of satisfaction of physical health, diet satisfaction, satisfaction with current treatment and botherness to symptoms in the diabetic people.

**Three-way Interaction**

A three-way ANOVA was carried out to find the independent and interaction effects of three levels of Diabetes related Quality of Life, Fasting Blood Sugar and Negative Affectivity. From the Table 25 it can be found that the three way interaction between levels of these three variables has no significant effect on Health Related Depression.

**Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression**

Type D, the distressed personality, is defined as the interlocking effects of negative affectivity and high social inhibition (Mols, Holterhues, Nijsten, & Van de poll-Franse, 2010).  Negative affectivity indicates a tendency to experience negative emotions; social inhibition refers to a pattern of not expressing emotion related to fears to others' disapproval. Hence, patients with this personality profile are inclined to experience negative emotions, such as irritability and worry, and to inhibit the expression of those feelings in social interactions (Denollet, 2005; Denollet., Schiffer., Spek, 2010)

A three-way ANOVA was carried out to find the interaction effect of the three levels (low, moderate and high) of Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression.

*Table 26: Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A Diabetes Related Quality Of Life | B Negative Affectivity | C Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 27.885** | 5.947** | 3.472** | 1.549 | 1.771 | .852 | 2.043** |

**p<0.01 *p<0.05

Table 26 shows one-way, two-way and three-way interaction among the variables Diabetes related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression. Main effects indicate significant F-values for

Diabetes related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression. There is no significant two-way interaction found among Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression. These variables have significant three-way interaction found on Health Related Depression.

**Main Effects**

    a) Diabetes Related Quality of Life on Health Related Depression.

Diabetes related Quality of Life is categorized in to three groups, viz., (low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes related Quality of Life. It can be found from table 26 that Diabetes related Quality of Life has a significant role on health related depression (F= 27.885; p<0.01).  The mean and standard deviation of Diabetes Related Quality of Life has already discussed in the table (22.1)

    b) Negative Affectivity on Health Related Depression.

Negative Affectivity is put in to three groups, viz (low, moderate, high) and they were tested for their mean values for Health Related Depression. The results indicate that significantly higher mean value for high groups of Negative Affectivity (F=5.947, p<0.01).The mean and standard deviation of Diabetes Related Quality of Life has already discussed in the table (25.2)

c) Social Inhibition on Health Related Depression

Social Inhibition is categorized in to three groups, viz (low, moderate, high) and they were tested for their mean values for Health Related Depression. The results indicate significantly higher mean value for moderate groups of Social Inhibition (F=3.472, p<0.01) on Health Related Depression. While type D is a normal, chronic disposition encompassing not only Negative Affectivity but also how patients deal with these negative emotions due to the inclusion of the social

inhibition component, depression is an episodic, psychopathologic marker that says nothing about how patients deal with depressive symptomatology (Denollet, Schiffer, & Spek, 2010). Hence, it is not surprising that most patients with a type D personality do not have a clinical diagnosis of depression, with the overlap being only around 25% (Denollet, 2005; Denollet., Jonge., Kuyper., et al 2009). In addition, despite type D patients displaying some depressive symptoms, they tend to experience a wider range of negative emotions than patients with depression.

*Table 26.1: Mean and Standard Deviation of Social Inhibition on Health Related Depression*

| Social Inhibition (SI) | SI (Low) N=112 | | SI(Moderate) N=69 | | SI(High) N=75 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 4.38 | 5.9 | 10.12 | 10.464 | 7.47 | 8.346 |

Based on the mean scores, it could be found that the subjects who have moderate level of social inhibition have higher mean scores in health related depression (M=10.12; S.D=10.464). Those with low levels of social inhibition have low health related depression (M=4.38; S.D=5.9). And those have high level of social inhibition have low level of health related depression compared to moderate level group (M=7.47; S.D=8.346). The results indicate that the type 2 diabetic patient who is moderately hiding emotions will increase the experience of health related depression.

Social Inhibition is one of the sub factors of type D personality. It highlights a person's nature on social interactions. Social inhibition refers to a pattern of not expressing emotion related to fears to others' disapproval, and it is the general tendency to inhibit the expression of emotions and behaviours in interpersonal contact, because of fear of disapproval or rejection by others. With the intervention techniques using social skills training, interpersonal communication training and cognitive behavior therapy techniques the social inhibition can be reduced to an

extent. By changing a part of social inhibition of type D personality will help to reduce the experience of health related depression in type 2 diabetics.

**Two-Way Interaction**

Table 26 indicates while considering the three levels of Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition, there is no significant two-way interaction among these variables.

**Three-way interaction**

Three-way analysis was done among Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression. From table 26, it has been found that significant independent interaction for three variables, two-way interaction found to be not significant among these variables. On three-way analysis the F value shows the significant interaction (F=2.043, p<0.01) among Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related Depression, which would be found that changes in the type D personality factors negative affectivity and social inhibition and diabetes related quality of life will affect the health related depression occurrence.

In order to assess the difference between the combinations, mean and standard deviations of the groups were computed. On analyzing mean scores of three way interactions it was found that highest mean score is 20.69 and this was scored by the group with low Diabetes Related Quality of Life, high Negative Affectivity and medium level of Social Inhibition. Lowest mean was found to be 0.62for group who have high Diabetes Related Quality of Life, low Negative Affectivity and low level of Social Inhibition.

The interpretation of three way analysis here also had shown the combined effect of two sub factors of type D personality as well as the specific role of diabetes related quality of life up on health related depression. The peculiar effect of moderate social inhibition indicates the type of coping mechanism that might have utilized by the sub sample with high social inhibition, which was not explored as part of the study. If diabetes related quality of life is low, along with a combined

effect of moderate social inhibition and high negative affectivity (that means high on type D personality group) brings out the highest depression group. Similarly, low social inhibition and low negative affectivity (that means low type D personality group) along with high diabetes related quality of life group constitute the low depression group. Diabetes related quality of life in all the groups works out to decrease depression.

**Perceived Social Support, Perceived Stress and Diabetes Self- Care on Health Related Depression**

Social support is a comprehensive experience which includes voluntary connection and casual relationships with others (Bardach et al 2011). It is an observation that one is accepted, cared for, and provided with support from certain people or a specific group or the awareness of real support received from others. Perceived stress is stress originating from perceived inability to cope with diabetes related demands in type 2 diabetic people. Coexisting psychological distress and activity limitations in daily life effect the adherence of self-care responsibilities (e g., modification of lifestyle, monitoring) that are essential for the control of glucose levels and the prevention of further complications of diabetes have been increase short-term disability in subject with diabetes (Glasgow et al.,1999). Diabetes self care is the patient's perceptions of the degree to which they adhere to recommendations for diabetes care and how well they adhere to their treatment prescriptions.

In order to find out the role three levels of Perceived Social Support (Low, Moderate, and High), Perceived Stress and Diabetes Self-Care on Health Related Depression, a three-way ANOVA has been carried out.

*Table 27: Perceived Social Support, Perceived Stress and Diabetes Self- Care on Health Related Depression.*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Social Support | B Perceived Stress | C Diabetes Self Care | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 4.709** | 4.633** | 7.514** | .788 | .066 | 1.072 | 1.061 |

**p<0.01 *p<0.05

Table 27 shows one-way, two-way and three-way interaction among the variables Perceived Social Support, Perceived Stress and Diabetes Self-Care on Health Related Depression. Main effects indicate significant F-values for Perceived Social Support, Perceived Stress and Diabetes Self Care on Health Related Depression. There is no significant two-way and three way interactions found among Perceived Social Support, Perceived Stress and Diabetes Self-care on Health Related Depression.

**Main Effects**

a) Perceived Social Support on Health Related Depression.

In this section the participants have been classified on the basis of perceived social Support in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for low groups of Perceived Social Support. It could be found from table 27 that Perceived Social Support has significant role on health related depression (F= 4.709; p<0.01). The result indicates that when the type 2 diabetic individual perceives less support from others will increase the occurrence of health related depression in him/ her. Social support is a

source of an individual's feel that he/ she is valued by others in their society, (Van Dam et al.,2004) and their life is meaningful to an extent, that will help to improve their satisfaction in social needs and will reduce the feeling of stress and depression in them.

*Table 27.1: Mean and Standard Deviation of Perceived Social Support on Health Related Depression*

| Perceived Social Support (SS) | SS (Low) N=85 | | SS (Moderate) N=70 | | SS (High) N=101 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 10.87 | 9.874 | 6.53 | 7.207 | 3.64 | 6.097 |

Based on the mean scores, it can be reported that the subjects who have low level of Perceived Social Support have higher mean scores in health related depression (M=10.87; S.D=9.874). Those with high levels of Perceived Social Support have low health related depression (M=3.64; S.D=6.097). And those have moderate level of Perceived Social Support have low level of health related depression compared to high level group (M=6.53; S.D=7.207). If the diabetic patient receives financial assistance from others and feeling that someone is available to help them (Heaney, 2008) will decrease the stress due to financial requirements to manage diabetes and feeling of burden to others that will also reduce the experience of health related depression in them.   Social support has been function as a defense from increasing or exacerbating depression (Brown & Harris, 1978). There is a significant relationship between reduced social support and the development of depression in people more than 65 years (Prince et al., 1997).  These studies are supporting the result of lack of social support will increase the depression in type 2 diabetic people.

b) Perceived Stress on Health Related Depression.

In this section the participants have been classified on the basis of perceived Stress in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for high groups of Perceived Stress. It can be noticed from table 27 `that perceived stress has significant role on health related depression (F= 4.633; p<0.01). The mean and standard deviation of Perceived Stress have already discussed in the table (22.2)

c) Diabetes Self-Care and Health Related Depression

Diabetes Self-care is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for low groups of Diabetes Self-care. It can be noticed from table 27 that Diabetes self-care is significant role on health related depression (F= 7.514; p<0.01). This result indicates that the decrease in motivation to follow diet modification, physical activity, insulin injections or taking medications on time and regular fasting blood sugar checkups will increase the experience of health related depression in type 2 diabetics. In a study Gavard et al., (1993) stated that individual's mood states and glycemic control has been significantly related, depression is present in 15-20% of type 2 diabetic patients. And in another study by Lustman et al., (2000) indicates that treatment of depression reduces the glycosylated hemoglobin. These studies point out the importance of improving self care management by using intervention techniques to reduce the health related depression in type 2 diabtics. The mean and standard deviation of diabetes self care has already discussed in the earlier sections (Table 23.1).

**Two-way Interaction**

In the two-way interaction, analysis has done among the three different variables Perceived Social Support, Perceived Stress and Diabetes Self-Care. Table 27 indicates that there has no significant interaction between these three variables.

**Three-way Interaction**

Table 27 indicates the interaction of three levels of Perceived Social Support, Perceived Stress and Diabetes Self-Care. F-value showed no significant three-way interaction among these three variables.

**Perceived Social Support, Diabetes Self Care and Fasting Blood Sugar level on Health Related Depression**

Perceived social support act as a buffer against the occurrence of depression in type 2 diabetic people and this will help to improve diabetes self-care activities, which will get better fasting blood sugar level in patients. Social support has been effect self-management to achieve glycemic control and improving outcomes (Mcewen et al., 2010; Song et al., 2012; Smith & Weinert, 2000; & Nicklett & Liang, 2010).

To find out the one-way, two-way and three-way interaction among the three levels (Low, Moderate, and High) of Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar level on Health Related Depression a three-way ANOVA was carried out.

*Table 28: Perceived Social Support, Diabetes Self Care and Fasting Blood Sugar Level on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Social Support | B Diabetes Self Care | C Fasting Blood Sugar Level | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 8.011** | 5.828** | 1.3 | 1.2 | .327 | .614 | 1.219 |

**p<0.01 *p<0.05

From Table 28 one-way, two-way and three-way interaction among the variables Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar level on Health Related Depression could` be found. Main effects indicate significant F-values for Perceived Social Support, and Diabetes Self Care on Health Related Depression. But the Fasting Blood Sugar level has no significant interaction on Health Related Depression. There is also no significant two-way and three way interactions found among Perceived Social Support, Diabetes Self-care and Fasting Blood Sugar level on Health Related Depression.

**Main effects**

a) Perceived Social Support on Health Related Depression.

In this section the participants have been classified on the basis of perceived social Support in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for low groups of Perceived Social Support. This indicates that the type 2 diabetics having low social support has increased health related depression. It can be noticed from table 28 that Perceived Social Support has significant role on health related depression (F= 8.011; p<0.01). The results have already been discussed in earlier sections (27.1)

b) Diabetes Self-Care on Health Related Depression

From the table 28 it can be observed that the Diabetes Self-Care of type 2 diabetic people has a significant role in diabetes Related Depression (F= 5.828, p<0.01). The mean and standard deviation of Diabetes Self-Care on Health Related Depression have discussed in detail in Table (23.1)

c) Fasting Blood Sugar Level on Health Related Depression

From the table 28 it can be observed that the Fasting Blood Sugar Level of type 2 diabetic people has no significant effect on Health Related Depression (F= 1.3, p<0.01). The mean and standard deviation of Fasting Blood Sugar level on Health Related Depression have already discussed in Table (25.1).

**Two-way Interaction**

The two-way interaction analysis has done among the three different variables Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar Level. Table 28 indicates that there is no significant two-way interaction between these three variables on Health Related Depression.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar level. From the Table 28 it could be found that the three way interaction among the levels of Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar level was not significant on Health Related Depression. This result indicates that the perceived social support, diabetes self care and fasting blood sugar level together make no significant change in the health related depression of type 2 diabetic individuals.

**Perceived Social Support, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression**

Social support has major influence on health by making the person to experience less negative emotions (Cohen & Herbert, 1996; Cohen, 1988). In general social support contributes to positive adjustment, personal growth and increased well-being (Cohen & Wills, 1985). Relationships are the basis of social support and these relationships are main sources of happiness helps to improve mental and physical health. Perceived social support related to one's diabetes routine was most strongly related to compliance with diet and management. Subjects with better social supports are significantly better controlled than subjects with low supports in high life stress conditions (Schwarz et al., 1991).

In order to find out the role of three levels (low, medium, high) Perceived Social Support, Fasting Blood Sugar Level and Negative affectivity on Health Related Depression in Type 2 diabetic people, a three-way ANOVA has been used and the major observations of the results are discussed below.

*Table 29: Perceived Social Support, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Social Support | B Fasting Blood Sugar Level | C Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 4.61** | 3.59** | 9.76** | .11 | 1.632 | 1.21 | 1.57 |

**p<0.01 *p<0.05

Table 29 shows one-way, two-way and three-way interactions among the variables Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression. Main effects indicate significant F-values for Perceived Social Support, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression. There is no significant two-way and Three-way interaction found among Perceived Social Support, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression.

**Main effects**

a) Perceived Social Support on Health Related Depression.

In this section the participants have been classified on the basis of perceived social Support in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for low groups of Perceived Social Support. It could be found from the table 29 that Perceived Social Support has significant effect on health related depression (F= 4.61; p<0.01). The results already have been discussed in earlier sections (Table 27.1)

b) Fasting Blood Sugar level on Health Related Depression.

In this section the participants have been classified on the basis of Fasting Blood Sugar level in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for high groups of Fasting Blood Sugar level. It could be noticed from table 29 that Fasting Blood Sugar level has a significant effect on health related depression (F= 3.59; p<0.01). The results have already been discussed in earlier sections (25.1).

c) Negative Affectivity on Health Related Depression.

Negative Affectivity is put in to three groups, viz (Low, Moderate, high) and they were tested for their mean values for Health Related Depression. The results indicate significantly higher mean value for high groups of Negative Affectivity (F=9.76, p<0.01).The mean and standard deviation of Negative Affectivity has already discussed in the table (25.2)

**Two-way Interaction**

In the two-way interaction, analysis was done among the three different variables Perceived Social Support, Fasting Blood Sugar Level and Negative Affectivity. Table 29 indicates that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity. From the Table 29 it can be found that the three way interaction between levels of Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity has no significant effect on Health Related Depression.

**Perceived Social Support, Negative Affectivity and Social Inhibition on Health Related Depression**

In order to find out the role three levels of Perceived Social Support (Low, Moderate, and High), Negative Affectivity and Social Inhibition on Health Related Depression, a three-way ANOVA has been carried out.

*Table 30: Perceived Social Support, Negative Affectivity and Social Inhibition on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br>Perceived Social Support | B<br>Negative Affectivity | C<br>Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 4.290** | 13.245** | 6.624** | 1.072 | .66 | 1.289 | 1.545 |

**p<0.01 *p<0.05

Table 30 shows one-way, two-way and three-way interaction among the variables Perceived Social Support, Negative Affectivity and Social inhibition on Health Related Depression. Main effects indicate significant F-values for Perceived Social Support, Negative Affectivity and Social Inhibition on Health Related Depression. There is no significant two-way and three way interactions found among Perceived Social Support, Negative Affectivity and Social Inhibition on Health Related Depression.

**Main effects**

   a)  Perceived Social Support on Health Related Depression.

        In this section the participants have been classified on the basis of perceived social Support in to three groups viz., low, moderate and high and the three groups have been tested for their mean values on Health Related Depression. The result indicates that significantly higher mean value for low groups of Perceived Social Support. It can be noticed from table 30 that Perceived Social Support has significant role on health related depression (F= 4.29; p<0.01). The results have already been discussed in earlier sections (Table 27.1)

   b)  Negative Affectivity on Health Related Depression.

        Negative Affectivity is categorized into three groups, viz (low, moderate, and high) and they were tested for their mean values for Health Related Depression. The results indicate significantly higher mean value for high groups of Negative Affectivity. It can be noticed from the table 30 that Negative Affectivity has a significant effect on Health Related Depression (F=13.245, p<0.01).The mean and standard deviation of Negative Affectivity has already discussed in the table (25.2)

   c)  Social inhibition on Health Related Depression.

        In this section the participants have been classified on the basis of Social Inhibition in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The results indicate significantly higher mean value for moderate groups of Social Inhibition. It can be noticed from table 30 that Social Inhibition has significant role on health related depression (F= 6.624; p<0.01). The results have already been discussed in earlier sections (26.1)

**Two-way Interaction**

        The two-way interaction, analysis was done among the three different variables Perceived Social Support, Negative Affectivity and Social Inhibition.

Table 30 indicates that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA has been conducted to find out independent and interaction effects of three levels of Perceived Social Support, Negative Affectivity and Social Inhibition. From the Table 30 it can be found that the three way interaction between levels of Perceived Social Support, Negative Affectivity and Social Inhibition has no significant effect on Health Related Depression.

**Perceived Stress, Diabetes Self Care and Fasting Blood Sugar Level on Health Related Depression**

The relationship between stress and diabetes shows a bidirectional association, which makes this relation complex (Cox & Gonder Frederick, 1992). Which means chronic stress can affect diabetes, and vice versa. By physiological means (e g., by releasing stress hormones, such as epinephrine, which trigger the release of glucose in to the blood) stress can directly affect blood glucose, or stress can indirectly affect blood glucose by negatively affecting self-care behaviours of the person which include adherence to diet or exercises. Decrease in metabolic control has associated with chronic life threatening stress (Inui. et al., 1998). Serious psychological distress in individuals with diabetes causes depression, anxiety and other disorders (Li , Ford, & Zhao  et al,2007).

In order to find out the role of three levels of Perceived Stress (Low, Moderate, and High), Diabetes Self-Care and Fasting Blood Sugar level on Health Related Depression, a three-way ANOVA has been carried out.

*Table 31: Perceived Stress, Diabetes Self Care and Fasting Blood Sugar Level on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Stress | B Diabetes Self Care | C Fasting Blood Sugar Level | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 12.188** | 6.517** | 1.535 | 2.341 | 1.358 | 1.014 | 1.475 |

**p<0.01 *p<0.05

Table 31 illustrates one-way, two-way and three-way interaction among the variables Perceived Stress, Diabetes Self-Care and Fasting Blood Sugar Level on Health Related Depression. Main effects indicate significant F-values for Perceived Stress and Diabetes Self-Care on Health Related Depression. There is  no significant two-way and three way interactions found among Perceived Stress, Diabetes Self-Care and Fasting Blood Sugar Level on Health Related Depression.

**Main effects**

   a) Perceived Stress on Health Related Depression.

In this section the participants have been classified on the basis of perceived Stress in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for high groups of Perceived Stress. It can be noticed from table 31 that Perceived Stress has a significant role on health related depression (F= 12.188; p<0.01). The mean and standard deviation of Perceived Stress has already been discussed in the table (22.2)

b) Diabetes Self-Care on Health Related Depression.

In this section the participants have been classified on the basis of Diabetes Self-Care in to three groups viz., low, moderate and high and the three groups were tested for their mean values on Health Related Depression. The result indicates that significantly higher mean value for low groups of Diabetes Self-care. It could be found from the table 31 that Diabetes self-care has a significant role on health related depression (F= 6.517; p<0.01). The mean and standard deviation of diabetes self care has already been discussed in previous sections (Table 23.1)

c) Fasting Blood Sugar Level on Health Related Depression

From the table 31 it can be observed that the Fasting Blood Sugar Level of type 2 diabetic people has no significant effect on Health Related Depression. The mean and standard deviation of Fasting blood sugar level on Health Related Depression have discussed in detail in the table 25.1.

**Two-way Interaction**

In the two-way interaction, analysis was done among the three different variables Perceived Stress, Diabetes Self-Care and Fasting Blood Sugar level. Table 31 indicates that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Perceived Stress, Diabetes Self-Care and Fasting Blood Sugar level. From the Table 31 it can be found that the three way interaction between levels of Perceived Stress, Diabetes Self-Care and Fasting Blood Sugar level is not significant on Health Related Depression.

**Perceived Stress, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression**

In order to find out the role of three levels of (Low, Moderate, High) Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression, a three-way ANOVA has been carried out.

*Table 32: Perceived Stress,* **Fasting Blood Sugar level** *and Negative Affectivity on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Stress | B Fasting Blood Sugar Level | C Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 6.626** | 4.481** | 6.937** | .960 | 2.164 | 1.122 | 1.912 |

**p<0.01 *p<0.05

From Table 32 one-way, two-way and three-way interaction among the variables Perceived Stress, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression could be found. Main effects indicate significant F-values for Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression. There has also no significant two-way and three way interactions found among Perceived Stress, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression.

**Main effects**

   a) Perceived Stress on health related depression

In this section the participants have been classified on the basis of perceived stress in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for high groups of Perceived Stress. It can be noticed from table 32 that Perceived Stress has a significant effect on health related depression (F= 6.626; p<0.01). The mean and standard deviation of Perceived Stress has already discussed in the table 22.2.

   b) Fasting Blood Sugar Level on Health Related Depression

Fasting Blood Sugar Level is categorized in to three groups, viz., (Low, moderate and high) and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for high groups of Fasting Blood Sugar level. It could be found from table 32 that Fasting Blood Sugar level has a significant role on health related depression (F= 4.481; p<0.01).  The mean and standard deviation has already discussed in the table 25.1.

   c) Negative Affectivity on Health Related Depression

Negative Affectivity is put in to three groups, viz (Low, Moderate, high) and they were tested for their mean values on Health Related Depression. The results indicate significantly higher mean value for high groups of Negative Affectivity. It could be found from the table 32 that Negative Affectivity has a significant effect on Health Related Depression (F=6.937, p<0.01).The mean and standard deviation of Negative Affectivity has already discussed in the table 25.2.

**Two-way Interaction**

In the two-way interaction, analysis was done among the three different variables Perceived Stress, Fasting Blood Sugar Level and Negative Affectivity.

Table 32 indicates that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Perceived Stress, Fasting Blood Sugar Level and Negative Affectivity. From the Table 32 it can be found that the three way interaction between levels of Perceived Stress, Fasting Blood Sugar level and Negative Affectivity is not significant on Health Related Depression.

**Perceived Stress, Negative Affectivity and Social Inhibition on Health Related Depression**

To identify the role of three levels of (Low, Moderate, and High) Perceived Stress, Negative Affectivity and Social Inhibition on Health Related Depression, a three-way ANOVA has been conducted.

*Table 33: Perceived Stress, Negative Affectivity and Social Inhibition on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Stress | B Negative Affectivity | C Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 6.994** | 6.856** | 7.285** | 1.040 | 1.608 | 1.853 | 1.931 |

**p<0.01 *p<0.05

From the Table 33 one-way, two-way and three-way interaction among the variables Perceived Stress, Negative Affectivity and Social inhibition on Health Related Depression can be found. From the results it can be found that there are significant F-values for main effects of Perceived Stress, Negative Affectivity and

Social Inhibition on Health Related Depression. There is no significant two-way and three way interactions found among those variables on Health Related Depression.

**Main effects**

   a)   Perceived Stress on Health Related Depression.

In this section the participants have been classified on the basis of perceived stress in to three groups viz., low, moderate and high and the three groups have been tested for their mean values on Health Related Depression. The result indicates that significantly higher mean value for groups having high Perceived Stress.  It could be found from the table 33 that Perceived Stress has a significant role on health related depression (F= 6.994; $p<0.01$). The results have already have been discussed in earlier sections (table 22.2)

   b)   Negative Affectivity on Health Related Depression.

Negative Affectivity is set in to three groups, viz (Low, Moderate, high) and they were tested for their mean values on Health Related Depression. The results indicate higher mean value for high groups of Negative Affectivity. Table 33 indicates the significant F-value (F=6.856; $p<0.01$) for Negative Affectivity on Health Related Depression. The mean and standard deviation of Negative Affectivity has already discussed in the table 25.2.

   c)   Social inhibition on Health Related Depression.

In this section the participants have been classified on the basis of Social Inhibition in to three groups viz., low, moderate and high and the three groups have been tested for their mean values on Health Related Depression. The results indicate significantly higher mean value for moderate groups of Social Inhibition. It could be found from the table 33 that Social Inhibition has a significant role on health related depression (F= 7.285; $p<0.01$). The results have already have been discussed in earlier sections (table 26.1).

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Perceived Stress, Negative Affectivity and Social Inhibition from the table 33 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Perceived Stress, Negative Affectivity and Social Inhibition. From the Table 33 it can be found that the three way interaction between levels of Perceived Stress, Negative Affectivity and Social Inhibition is not significant on Health Related Depression.

**Diabetes Self Care, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression**

To identify the role of three levels of (Low, Moderate, and High) Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression, a three-way ANOVA has been conducted.

*Table 34: Diabetes Self Care, Fasting Blood Sugar Level and     Negative Affectivity and On Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A Diabetes Self Care | B Fasting Blood Sugar Level | C Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 5.407** | 1.141 | 13.311** | .082 | 2.013 | 1.636 | .639 |

**p<0.01 *p<0.05

From the Table 34 one-way, two-way and three-way interaction among the variables Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression have found. From the results it can be found that there have significant F-values for main effects of Diabetes Self-Care and, Negative Affectivity on Health Related Depression and the main effect of Fasting Blood Sugar level on Health Related Depression is not significant. There is no significant two-way and three way interactions found among those variables on Health Related Depression.

**Main effects**

a) Diabetes Self-care on Health Related Depression.

In this section the participants have been classified on the basis of Diabetes Self-care in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for low groups of Diabetes Self-care. It can be noticed from table 34 that Diabetes Self-Care has significant role on health related depression (F= 5.407; p<0.01). The results have already been discussed in earlier sections (table 23.1).

b) Fasting Blood Sugar level on Health Related Depression.

Table 34 indicates the F-value of Fasting Blood Sugar level is not significant on Health Related Depression.

c) Negative Affectivity on Health Related Depression.

Negative Affectivity is categorized in to three groups, viz (Low, Moderate, high) and they were tested for their mean values on Health Related Depression. The results indicate significantly higher mean value for high groups of Negative Affectivity. Table 34 indicates the significant F-value (F=13.31; p<0.01) for Negative Affectivity on Health Related Depression. The mean and standard deviation of Negative Affectivity has already discussed in the table 25.2.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Self-care, Fasting Blood Sugar level and Negative Affectivity from the table 34 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

Results of three-way ANOVA among the three levels of Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression. From the Table 34 it can be found that the three way interaction between levels of Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity is not significant on Health Related Depression.

**Diabetes Self Care, Negative Affectivity and Social Inhibition on Health Related Depression**

In order to find out the role of three levels of (Low, Moderate, and High) Diabetes Self-Care, Negative Affectivity and Social Inhibition on Health Related Depression, a three-way ANOVA has been carried out.

*Table 35: Diabetes Self Care, Negative Affectivity and Social Inhibition on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Diabetes Self Care | B Negative Affectivity | C Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 10.633** | 10.716** | 2.248 | 1.785 | .946 | .451 | .615 |

**p<0.01 *p<0.05

From Table 35 one-way, two-way and three-way interaction among the variables Diabetes Self-Care, Negative Affectivity and Social Inhibition on Health Related Depression could be found. Main effects indicate significant F-values for Diabetes self-care and Negative Affectivity on Health Related Depression. There is no significant interaction seen among Social Inhibition on Health Related Depression. There has also no significant two-way and three way interactions found among Diabetes Self-Care, Negative Affectivity and Social Inhibition on Health Related Depression.

**Main effects**

a) Diabetes Self-care on Health Related Depression.

On the basis of Diabetes Self-Care participants had been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values on Health Related Depression. The result indicates that significantly higher mean value for low groups of Diabetes Self-care. It can be found from table 35 that Diabetes Self-Care has significant role on health related depression (F= 10.633; p<0.01). The results have already been discussed in earlier sections ( table 23.1).

b) Negative Affectivity on Health Related Depression.

Based on the scores obtained in negative affectivity, the participants were classified in to three groups, viz (Low, Moderate, high) and they were tested for their mean values for Health Related Depression. The results indicate significantly higher mean value for high groups of Negative Affectivity. Table 35 indicates the significant F-value (F=10.716;p<0.01) for Negative Affectivity on Health Related Depression. The mean and standard deviation of Negative Affectivity has already discussed in the table 25.2.

c) Social inhibition on Health Related Depression.

From the table 35 it can be noticed that Social Inhibition has no significant effect on health related depression.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Self-Care, Negative Affectivity and Social Inhibition from the table 35 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of three levels of Diabetes Self Care, Negative Affectivity and Social Inhibition. From the Table 35 it can be found that the three way interaction between levels of these three variables is not significant on Health Related Depression.

**Positive Factors**

**Negative Factors**

Low Diabetes Related
Quality of Life

High Perceived
Stress

Low Perceived
Social Support

Increased Fasting
Blood Sugar Level

**Increased Health Related
Depression**

Low Diabetes
Self Care

High Negative
Affectivity

High Social Inhibition
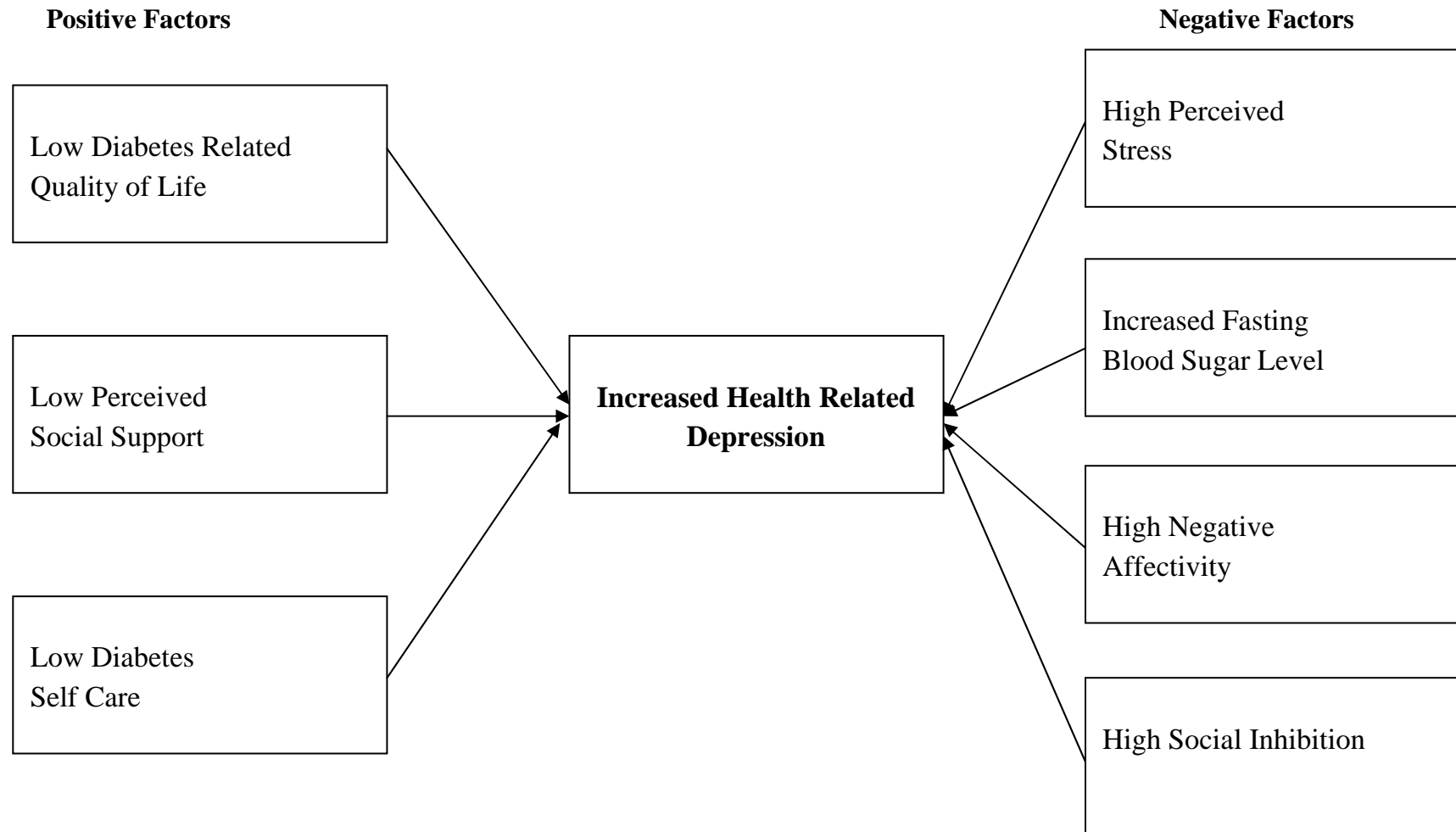
*Figure 4: Effect of different psychological factors / variables on Health Related Depression of Diabetic Patients*

**Role of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar Level, Negative Affectivity And Social Inhibition on Subjective Well Being.**

Subjective Well Being is the individual's satisfaction on their own life status. Incidents which occurs day to day life will affect an individual's Subjective Well Being. If those things are raising happiness for example, getting promotion in job, buying a new house etc. will automatically increase individual's level of life satisfaction. If the incidents are raising negative attitude towards life, for example, unable to achieve professional expectations or becoming ill have negative affect on their satisfaction of life and will reduce their subjective well being.

Diabetes is a condition which adversely affect individual's subjective Well Being, because diabetes requires many changes in lifestyle and making compromises in dining favorite food items. Adherence to diabetes diet, practicing recommended physical exercises and regular blood sugar checkups and timely intake of medicines are unhappy for most of the type 2 diabetic patients, these adversely affects their Subjective Well Being.

The present study intended to analyze the  role of diabetes related quality of life, perceived social support, diabetes self care, perceived stress, fasting blood sugar level, negative affectivity and social inhibition on subjective well being. To study the role of these factors on subjective well-being a number of hypotheses were formed. Based on these hypotheses following three-way analysis of variance were carried out and their results are as following;

**Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Subjective Well Being**

The Health Related Quality of Life of an individual is depends on the level of subjective well being. Diabetic specific domains of Health Related Quality of Life relate how the diabetes is compromising individual's sense of well being psychologically, physically and socially.

Social support is a free exchange of resources between at least two people that increases the well-being of the receiver (Van Dam et al., 2004). Perceived stress is stress originating from perceived inability to cope with diabetes related demands in type 2 diabetic people.

Psychological well being is the combination of feeling good and functioning effectively. Sustainable well being does not require individuals to feel good all the time; the experience of painful emotions (e g., disappointment, failure, grief) is a normal part of life, and being able to manage these painful or negative emotions is essential for long term well-being (Huppert, 2009).

In order to find out the role of Diabetes Related Quality of Life (Low, Moderate, and High), Perceived Social Support and Perceived Stress on Subjective Well-Being, a three-way ANOVA has been used and the important observations are presented below.

*Table 36: Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Subjective Well Being*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A Diabetes Related Quality Of Life | B Perceived Social Support | C Perceived Stress | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 13.020** | 15.441** | 17.736** | .410 | 1.167 | .486 | .910 |

**p<0.01 *p<0.05

From the Table 36 one-way, two-way and three-way interaction among the variables Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Subjective Well-Being could be found. From the results it can be found that there are significant F-values for main effects of Diabetes Related Quality of

Life, Perceived Social Support and Perceived Stress on Subjective Well-Being. There is no significant two-way and three way interactions found among these three variables on Subjective Well-Being.

**Main effects**

a) Diabetes Related Quality of Life on Subjective Well-Being.

On the basis of Diabetes related Quality of Life the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes related Quality of Life. It can be noticed from table 36 that Diabetes related Quality of Life has significant role on Subjective Well-Being ($F=13.020; P<0.01$), which means, while the type 2 diabetic patient experiences healthy subjective well being his diabetes related quality of life will automatically increase.

*Table 36.1: Mean and Standard Deviation on Diabetes Related Quality of Life and Subjective Well-Being*

| Diabetes Related Quality Of Life | DRQOL (Low) N=72 | | DRQOL(Moderate) N=84 | | DRQOL(High) N=100 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well-Being | 78.65 | 12.695 | 92.46 | 11.416 | 99.50 | 10.924 |

Based on the mean scores, it can be reported that the subjects who have high level of Diabetes Related Quality of Life have higher mean scores in Subjective Well-Being (M=99.50; S.D=10.924). Those with low levels of Diabetes Related Quality of Life have low Subjective Well-Being (M=78.65; S.D=12.695). Those have moderate level of Diabetes Related Quality of Life have low level of Subjective Well-Being compared to high level group (M=92.46; S.D=11.416). From this results it can be found that subjective well being and diabetes related quality of

life are dependent each other, if one increases the other will also increase or if one decreases the other will also decrease. This result has supported by the study conducted by Borrot & Bush, (2008), which states that diabetes specific domains of health related quality of life of diabetes relate how the disease is compromising on individual's sense of well–being psychologically, physically and socially. The impact generated by diabetes on the individual can be assessed by patients concern about anticipated effects of the disease, and the level of satisfaction the patient with themselves and how much they can enjoy their food. (Bradely et al.,1999., Jacobson, Barofsky, Clearly & Rand,1988).

There are changes in all domains of health related quality of life after receiving diabetes education, diabetes decreases levels of both physical and emotional well-being in patients, diabetes education will help to improve quality of life and well being (Riaz et al., 2013). By enhancing the diabetic patients sense of satisfaction and meaningfulness of life by using intervention techniques will help to improve the subjective well being in them.

b) Perceived Social Support on Subjective well-being.

The total participants were divided in to 3 groups on the basis of their scores on perceived social support, (namely low, moderate and high). The significance of difference among these three groups, on their scores on subjective well being has studied using analysis of variance. The result indicates that significantly higher mean value for high groups of Perceived Social Support. Table 36 indicates the significant F-value (F=15.44; p<0.01). If diabetic patients felt that they are receiving a good support from the family and society that will have more chances to reduce his negative emotions and will increase the positive emotions and subjective well being. In a study conducted by Cohen &MC Kay, (1984) states that if there is little or no social support, health related stressors will have harmful effects on the well-being, with stronger support these effects will be eliminated. Thus, the role of social support as a buffering agent is important in individuals facing stressful life events. This indicates that the human beings are in need of a society around them to have an effective subjective well being.

*Table 36.2: Mean and Standard Deviation of Perceived Social Support on Health Related Depression*

| Perceived Social Support | SS (Low) N=85 | | SS (Moderate) N=70 | | SS (High) N=101 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well-Being | 80.29 | 13.989 | 93.46 | 9.792 | 99.14 | 11.202 |

Based on the mean scores, it can be reported that the subjects who have high level of Perceived Social Support have higher mean scores in Subjective Well-Being (M=99.14; S.D=11.202). Those with low levels of Perceived Social Support have low Subjective Well-Being (M=80.29; S.D=13.989). Those have moderate level of Perceived Social Support have low level of Subjective Well-Being compared to high level group (M=93.46; S.D=9.792).

c) Perceived Stress on Subjective Well-Being.

In this section the participants have been classified on the basis of Perceived Stress in to three groups viz., low, moderate and high and the three groups have been tested for significance of difference in their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Perceived Stress. It can be noticed from table 36 that Perceived Social Support has significant role on Subjective Well-Being (F= 17.736; p<0.01). This result also indicates that in type 2 diabetic people, experience of stress and well being depends on each other. If the person experiencing high stress due to the inability to cope with diabetes self care demands his/ her subjective well being or overall feeling of life in positive manner will decrease.

***Table 36.3 Mean and Standard Deviation of Perceived Stress and Health Related Depression***

| Perceived Stress | PSS (Low) N=90 | | PSS(Moderate) N=83 | | PSS(High) N=83 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well-Being | 101.73 | 9.216 | 89.06 | 13.008 | 82.31 | 13.103 |

Based on the mean scores, it can be reported that the participants who have low levels of perceived stress have higher mean scores in Subjective Well Being (M=101.73; S.D=9.216). Those with high levels of perceived stress have low Subjective Well Being (M=82.31; S.D=13.103). Those having moderate level of perceived stress have moderate level of Subjective Well-Being (M=89.06; S.D=13.008). Perceived stress in diabetics is a significant factor influencing their experience of subjective well being. Diabetes related stress is known as person – environment relationship (Karlsen et al., 2004) in which the perceived diabetes related demands like self management treatment like diet and regular exercise tax or exceed perceived coping resources. Social support have the capacity to lower the stressful experiences by acts as a buffer against stress, support satisfaction and number of supports significantly moderated the relationship between diabetes burden and distress. If there is little or no social support, health related stressors will have harmful effects on the well being, if the individual receiving stronger support will increase the experience of well being in them (Cohen & McKay, 1984). These supports the present result, and which suggests that with the intervention techniques to control the perceived stress in diabetics also have the chance to increase their subjective well being.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on

Subjective Well Being from table 36 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Related Quality of Life, Perceived Social Support and Perceived Stress on Subjective Well-Being a three way ANOVA had conducted. From table 36 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Diabetes Related Quality of Life, Perceived Stress and Diabetes Self Care on Subjective Well-Being**

In order to find out the role of diabetes related quality of life (Low, Moderate, High), Perceived Social Support and Diabetes Self-Care on Subjective Well-Being, a three-way ANOVA has been used and the important observations are presented below.

*Table 37: Diabetes Related Quality of Life, Perceived Stress and Diabetes Self Care on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A Diabetes Related Quality Of Life | B Perceived Stress | C Diabetes Self-Care | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 14.708** | 21.184** | 3.652** | .336 | .202 | 1.021 | .621 |

**p<0.01 *p<0.05

From the Table 37 one-way, two-way and three-way interaction among the variables Diabetes Related Quality of Life, Perceived Social Support and Diabetes Self-care on Subjective Well-Being can be found. From the results it can be found that there are significant F-values for main effects of Diabetes Related Quality of Life, Perceived Social Support and Diabetes Self-Care on Subjective Well-Being. There is no significant two-way and three way interactions found among these three variables on Subjective Well-Being.

**Main effects**

a) Diabetes Related Quality of Life on Subjective Well-Being.

On the basis of Diabetes related Quality of Life the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes related Quality of Life. It can be noticed from table 37 that Diabetes related Quality of Life has significant role on Subjective Well-Being (F= 14.708; p<0.01). The results have already have been discussed in earlier sections ( table 36.1).

b) Perceived Stress on Subjective well-being.

Perceived Stress is categorized into three groups, viz (Low, Moderate, high) and they are tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Perceived Stress. Table 37 indicates the significant F-value (F=21.184; p<0.01) for Perceived Social Support on Subjective Well-Being. The mean and standard deviation of Perceived Social Support have already been discussed in the table 36.3.

c) Diabetes Self-Care on Subjective Well-Being.

In this section the participants have been classified on the basis of Diabetes Self-Care in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Self Care. It can be

noticed from table 37 that Diabetes Self-care has a significant role on Subjective Well-Being (F=3.652; p<0.01). This result evidenced that the patients satisfaction with adherence to diabetic self care activities will enhance the patient's positive perspective of life and well being. Self care theory developed by Orem (1979) indicates the importance of self care activities in type 2 diabetes mellitus. The theory states that therapeutic self-care is a summation of the measure of one's ability to perform the demands of self-care in relation to his/her life condition. Self-care agency is an individual's ability to perform self-care activities, or health endorsing behaviours on one's own behalf to maintain healthy life style. When Patients are able to produce effective self-care, they have awareness about themselves and their disease condition. This shows that they have the motivation to do the effective self care, and by increasing the self care management using intervention techniques the diabetic patient's subjective well being also will be enhanced.

**Table 37.1: Mean and Standard Deviation for Diabetes Self-Care and Health Related Depression**

| Diabetes Self-Care (DSC) | DSC (Low) N=88 | | DSC (Moderate) N=125 | | DSC (High) N=43 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well-Being | 87.53 | 15.30 | 91.64 | 13.603 | 98.19 | 11.766 |

Based on the mean scores, it can be reported that the subjects who have high levels of Diabetes Self-Care have higher mean scores in Subjective Well Being (M=98.19; S.D=11.766). Those with low levels of Diabetes Self-care have low Subjective Well Being (M=87.53; S.D=15.30). And those having moderate level of diabetes Self-Care have decreased health related depression compared to high group (M=91.64; S.D=13.603).

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables namely, Diabetes Related Quality of Life, Perceived Stress and Diabetes Self-Care on Subjective Well Being from the table 37 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Related Quality of Life, Perceived Social Support, Perceived Stress and Diabetes Self Care on Subjective Well-Being a three way ANOVA had been conducted. From the Table 37 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Diabetes Related Quality of Life, Diabetes Self Care and Fasting Blood Sugar Level on Subjective Well-Being**

Health related Quality of Life and diabetes self care behaviours are factors that individually influence blood sugar control. Identifying and managing influencing are important in diabetes care (Huang et al., 2010).   If the patient's glucose levels will increases the patient will begin to experience more negative emotions and this will reduces the subjective well being.

A three way ANOVA had carried out to find out the role of three levels of (Low, Moderate, and High) Diabetes Related Quality of Life, Diabetes Self Care and Fasting Blood Sugar Level on Subjective Well-Being, and the important observations are presented below.

*Table 38: Diabetes Related Quality of Life, Diabetes Self Care and Fasting Blood Sugar Level on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br>Diabetes Related Quality Of Life | B<br>Diabetes Self-Care | C<br>Fasting Blood Sugar level | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 28.356** | 2.273 | 2.068 | 1.357 | .755 | .926 | 2.026 |

**p<0.01 *p<0.05

From the Table 38 one-way, two-way and three-way interaction among the variables Diabetes Related Quality of Life, Diabetes Self-care and Fasting Blood Sugar level on Subjective Well-Being can be found. The results states that there are significant F-values for main effects of Diabetes Related Quality of Life on Subjective Well-Being. And the main effects also indicate that the Diabetes Self-Care and Fasting Blood Sugar level have no significant interaction with subjective well being.  There is also no significant two-way and three way interactions found among these three variables on Subjective Well-Being.

**Main effects**

a)  Diabetes Related Quality of Life on Subjective Well-Being.

On the basis of Diabetes related Quality of Life the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Related Quality of Life. It can be noticed from table 38 that Diabetes Related Quality of Life has significant role on Subjective Well-Being (F=28.356; P<0.01). The mean and

standard deviation of Diabetes related Quality of Life on Subjective Well Being is already discussed in table 36.1.

    b)  Diabetes Self Care on Subjective Well Being

Three way ANOVA results indicate that Diabetes Self Care has no significant interaction on Subjective Well Being.

    c)  Fasting Blood Sugar level on Subjective Well Being

From table 38 it can be found that there has no significant interaction between Fasting Blood Sugar level and Subjective Well Being.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Related Quality of Life, Diabetes Self-Care and Fasting Blood Sugar level on Subjective Well Being from the table 38 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Related Quality of Life, Diabetes Self Care and Fasting Blood Sugar level on Subjective Well-Being a three way ANOVA had been conducted. From the table 38 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Diabetes Related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being**

An individual's sense of well being or quality of life is related to self-perception and relationship with others (Trento et al., 2004), Quality of life may also be determined by pleasant and unpleasant evaluation of life events and satisfaction with life. Personality has been found to be a strong and constant predictor of subjective well being and life satisfaction (Bornstein, 1998; Diener et al., 1999). If

the patient go through negative affectivity or experiencing negative emotions have tendency to perceive more negative factors of life.

A three way ANOVA had carried out to find out the role of levels of (Low, Moderate, and High) Diabetes Related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being, and the important observations are presented below.

*Table 39: Diabetes Related Quality Of Life, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | 2-way | | | 3-way |
| | A<br>Diabetes Related Quality Of Life | B<br>Fasting Blood Sugar Level | C<br>Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| SUBJECTIVE WEL-BEING | 29.991** | 4.869** | 30.083** | 1.288 | 2.417** | .297 | 1.155 |

**p<0.01 *p<0.05

Table 39 shows one-way, two-way and three-way interaction among the variables Diabetes related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. Main effects indicate significant F-values for Diabetes related Quality of Life, and Negative Affectivity on Subjective Well Being There is significant two-way interaction found among Diabetes Related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. No significant three way interactions have found among Diabetes related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression.

a) Diabetes Related Quality of Life on Subjective Well-Being.

On the basis of Diabetes Related Quality of Life the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Related Quality of Life. It can be noticed from table 39 that Diabetes related Quality of Life has significant role on Subjective Well-Being (F= 29.991; p<0.01). The results have already been discussed in earlier sections (36.1).

b) Fasting Blood Sugar level on Subjective well-being.

Based on the Fasting Blood Sugar level the participants were classified in to three groups, viz (Low, Moderate, high) and they are tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for groups with low fasting blood sugar level. Table 39 indicates the significant F-value (F=4.869; p<0.01) for Perceived Social Support on Subjective Well-Being. This result states that increase in blood sugar level will decrease patient ability to experience positive aspects of life; this will reduce subjective well being in them. A study was conducted by Naess, Eriksen, Midthjell, & Tambs. (2004) supports this result, which states that that people with diabetes report lower psychological well-being than do people with no reported disease,

*Table 39.1: Mean and Standard Deviation forFasting Blood Sugar level and Subjective Well Being*

| Fasting Blood Sugar Level (FBS) | FBS (Low) N=94 | | FBS (Moderate) N=101 | | FBS (High) N=61 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well-Being | 96.45 | 12.793 | 91.04 | 14.234 | 83.92 | 13.618 |

Based on the mean scores, it can be reported that the subjects who have low Fasting Blood Sugar Level have higher mean scores in Subjective Well Being

(M=96.45; S.D=12.793). Those with high levels of Fasting Blood Sugar Level have low Subjective Well-Being (M=83.92; S.D=13.618). And those with moderate level of fasting blood sugar experience low Subjective Well-being compared to high group (M=91.04; S.D=14.234). From this result it can be found that the increase in glucose level will decrease subjective well being. There is an evidence based on the neurochemical effects on subjective well being by stress, while experiencing stress the levels of cortisol secretion will be increased, these hormones cause the body to release stored glucose and fat for the extra energy that is required to deal with the stress, but they can only be used providing the body has enough insulin. This sudden extra production of glucose in people with diabetes causes the rise in blood sugar level. This increase in blood sugar level not only affects the physiological state but that will affect subjective well being of the individual. Therefore the control of blood glucose level is important to enhance positive psychological well being.

c)    Negative Affectivity on Subjective Well-Being.

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 39 that negative affectivity has significant role on Subjective Well-Being (F=30.083; p<0.01), that means while the type 2 diabetic patients negative affectivity or experience of negative emotions will increase the subjective well being will decrease accordingly. Personality affects one's sense of well-being, adaptation and coping in the event of a new life-changing situation. Based on one's personality a person has a tendency to be happy or unhappy, inherent traits of optimism and pessimism, and the influence of life circumstances affects one's sense of well-being  Diener et al. (1999).

*Table 39.2: Mean and Standard Deviation of Negative Affectivity on Subjective Well Being*

| Negative Affectivity (NA) | NA (Low) N=99 | | NA(Moderate) N=81 | | NA(High) N=76 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well-Being | 101.69 | 10.011 | 89.21 | 9.898 | 91.33 | 14.339 |

Based on the mean scores, it can be reported that the subjects who have low Negative Affectivity have higher mean scores in Subjective Well Being (M=101.69; S.D =10.011). Those with high levels of Negative Affectivity have low Subjective Well Being (M=91.33; S.D=14.339). Those having moderate level of Negative Affectivity have low level of Subjective Well Being compared to high group (M=89.21; S.D=9.898). From this result it can be found that with the help of intervention techniques to enhance individual's feelings and experience of positive emotions their subjective well being could be improved.

**Two-Way Interaction**

a) Diabetes Related Quality of Life and Negative Affectivity on Subjective Well Being

In this step the analysis carried out to examine the difference in the scores of Subjective Well Being among type 2 diabetic patients as a result of their Diabetes Related Quality of Life and Negative Affectivity. From the table 39 the two way interaction between the levels of Diabetes Related Quality of Life and Negative Affectivity yields a significant F-ratio on Subjective Well Being (F=2.417, p<0.01). This result states that the diabetes related quality of life and negative affectivity jointly influences the subjective well being of type 2 diabetics. As earlier results indicate experiencing negative affectivity lower the diabetes related quality of life and this will decrease the positive life experiences. Negative affectivity was negatively associated with the majority of the health related quality of life scales.

Therefore, individuals higher in negative affectivity are more likely to complain about their health concerns or are more sensitive to them. While planning intervention for individuals based on Health related quality of life is important to consider level of Negative Affectivity because specific interventions may differ depending on the individual's degree of Negative Affectivity (Kressin, Spiro III, & Skinner (2000).

*Table 39.3: Mean and Standard Deviation of Diabetes Related Quality of Life and Negative Affectivity on Subjective Well Being*

| Variables | | Diabetes Related Quality Of Life | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Low (N=72) | | | Moderate(N=84) | | | High(N=100) | | |
| | | Negative Affectivity | | | Negative Affectivity | | | Negative Affectivity | | |
| | | Low N=9 | Moderate N=24 | High N=39 | Low N=35 | Moderate N=28 | High N=21 | Low N=55 | Moderate N=29 | High N=16 |
| Subjective Well-Being | Mean | 87.44 | 83.88 | 73.41 | 100.80 | 88.71 | 83.57 | 104.58 | 94.10 | 91.81 |
| | S.D | 12.650 | 9.857 | 12.037 | 7.881 | 7.793 | 11.356 | 8.730 | 9.597 | 11.285 |

Based on the mean scores, it can be obtained from table 39.3, that low negative affectivity belonging to high diabetes related quality of life group experiencing high level of subjective well being (M=104.58;S.D=8.73). and high negative affectivity group belongs to low diabetes related quality of life group experiencing low level of subjective well being (M=73.41; S.D=12.037). From this result it is very clear that the increased quality of life and decreased negative affectivity increases subjective well being in type 2 diabetic population and decreased diabetes related quality of life and increased negative affectivity will decrease subjective well being.

Negative affectivity is found to be have an effect of subjective well being. This is directly opposing to diabetes related quality of life. But while combining the effect a linear relation couldn't be identified. In each group of sub sample, as the negative affectivity increases, the group's mean on subjective well being also decreases. A similar pattern as per the influence diabetes related quality of life

couldn't be found in the sub samples. It may have the role of other underlying factors. More explanation of other psychosocial factors is needed in this area, especially to the effect on subjective well being of diabetics.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Related Quality of Life, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being a three way ANOVA had conducted. From the Table 39 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Subjective Well-Being**

In order to find out the role of diabetes related quality of life (Low, Moderate, High), Negative Affectivity and Social Inhibition on Subjective Well-Being, a three-way ANOVA has been used and the important observations are presented below.

*Table 40: Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A | B | C | A-B | A-C | B-C | A-B-C |
| | Diabetes Related Quality Of Life | Negative Affectivity | Social Inhibition | | | | |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 21.576** | 27.824** | .991 | 1.661 | .901 | 1.097 | 1.921 |

**p<0.01 *p<0.05

From the Table 40 one-way, two-way and three-way interaction among the variables Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Subjective Well-Being have found. Results indicate that there are significant F-values for main effects of Diabetes Related Quality of Life and Negative Affectivity on Subjective Well-Being. And also indicate that the Social Inhibition has no significant interaction with subjective well being.  There is also no significant two-way and three way interactions found among these three variables on Subjective Well-Being.

**Main effects**

a)  Diabetes Related Quality of Life on Subjective Well-Being.

On the basis of Diabetes related Quality of Life the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes related Quality of Life. It can be noticed from table 40 that Diabetes related Quality of Life has significant role on Subjective Well-Being (F=21.576; P<0.01). The results have already been tested in earlier sections (table 36.1).

b)  Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 40 that Diabetes Self-care has a significant role on Subjective Well-Being (F=27.824; p<0.01). The results have already been discussed in earlier sections (table 39.2).

c)  Social Inhibition on Subjective Well Being

From table 40 it can be found that there is no significant interaction between Social Inhibition on Subjective Well Being.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Subjective Well Being from the table 40 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Subjective Well-Being a three way ANOVA had been conducted. From the Table 40 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Perceived Social Support, Perceived Stress and Diabetes Self-Care on Subjective Well-Being**

A three way ANOVA had carried out to find out the role of Perceived Social Support (Low, Moderate, and High), Perceived Stress and Diabetes Self-Care on Subjective Well-Being, and the important observations are presented below.

*Table 41: Perceived Social Support, Perceived Stress and Diabetes Self-Care on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Social Support | B Perceived Stress | C Diabetes Self-Care | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 27.301** | 23.598** | 7.344** | .758 | .280 | 1.165 | .554 |

**p<0.01 *p<0.05

From the Table 41 one-way, two-way and three-way interaction among the variables   Perceived Social Support, Perceived Stress and Diabetes Self-care on Subjective Well-Being. From the results it can be found that there are significant F-values for main effects of Perceived Social Support, Perceived Stress and Diabetes Self-Care on Subjective Well-Being. There is no significant two-way and three way interactions found among these three variables on Subjective Well-Being.

**Main effects**

a) Perceived Social Support on Subjective well-being.

Perceived Social Support is set in to three groups, viz (Low, Moderate, high) and they are tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Perceived Social Support. Table 41 indicates the significant F-value (F=27.301; p<0.01) for Perceived Social Support on Subjective Well-Being. The mean and standard deviation of Perceived Social Support has already discussed in the table 36.2.

b) Perceived Stress on Subjective well-being.

Perceived Stress is categorized in to three groups, viz (Low, Moderate, high) and they are tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Perceived Stress. Table 41 indicates the significant F-value (F=27.301; p<0.01) for perceived Stress on Subjective Well-Being. The mean and standard deviation of Perceived Stress has already discussed in the table 36.3.

c) Diabetes Self-Care on Subjective Well-Being.

In this section the participants have been classified on the basis of Diabetes Self-Care in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Self Care. It can be noticed from table 41 that Diabetes Self-care has significant role on Subjective

Well-Being (F=7.344; p<0.01). The mean and standard deviation of Diabetes Self care has already discussed in the table 37.1.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Perceived Social Support, Perceived Stress and Diabetes Self-Care on Subjective Well Being from the table 41 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Social Support, Perceived Stress and Diabetes Self Care on Subjective Well-Being a three way ANOVA had been conducted. From the Table 41 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar Level on Subjective Well-Being**

A three way ANOVA had carried out to find out the role of Perceived Social Support (Low, Moderate, and High), Diabetes Self-Care and Fasting Blood Sugar level on Subjective Well-Being, and the important observations are presented below.

*Table 42: Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar Level on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A<br>Perceived Social Support | B<br>Diabetes Self- Care | C<br>Fasting Blood Sugar Level | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 29.258** | 6.332** | 1.789 | 2.139 | .438 | .467 | 1.5 |

**p<0.01 *p<0.05

The one-way, two-way and three-way interaction among the variables Perceived Social Support, Diabetes Self-care and Fasting Blood Sugar level on Subjective Well-Being has given in table 42. From the results it can be found that there are significant F-values for main effects of Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar level on Subjective Well-Being. And there is no significant interaction among Fasting Blood Sugar level on Subjective Well Being. There is no significant two-way and three way interactions found among these three variables on Subjective Well-Being.

**Main effects**

a) Perceived Social Support on Subjective well-being.

Based on the scores on Perceived Social Support inventory, the participants were categorized in to three groups, viz (Low, Moderate, high) and they are tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Perceived Social Support. Table 42 indicates the significant F-value (F=29.258; p<0.01) Perceived Social Support on

Subjective Well-Being. The mean and standard deviation of Perceived Social Support has already discussed in the table 36.2.

b) Diabetes Self-Care on Subjective Well-Being.

In this section the participants have been classified on the basis of Diabetes Self-Care in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Self Care. It can be noticed from table 42 that Diabetes Self-care has significant role on Subjective Well-Being (F=6.332; p<0.01). The mean ad standard deviation of Diabetes Self Care has already discussed in previous sections (Table 37.1)

c) Fasting Blood Sugar level on Subjective Well Being

From table 42 it can be found that there is no significant main effect for Fasting Blood Sugar level on Subjective Well Being.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Perceived Social Support, Diabetes Self-Care and Fasting Blood Sugar level on Subjective Well Being from the table 42 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Social Support, Diabetes Self Care and Fasting Blood Sugar level on Subjective Well-Being a three way ANOVA had been conducted. From the Table 42 it can be found that the three way interaction between levels of these three variables has no significant effect on Subjective Well-Being.

**Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being**

A three way ANOVA had been conducted to find out the role of Perceived Social Support (Low, Moderate, and High), Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being, and the important observations are presented below.

*Table 43: Perceived Social Support, Fasting Blood Sugar Level and Negative Affectivity on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | 2-way | | | 3-way |
| | A Perceived Social Support | B Fasting Blood Sugar Level | C Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 21.749** | 5.624** | 25.322** | 1.286 | 7.085** | 1.225 | 1.831 |

**p<0.01 *p<0.05

Table 43 shows one-way, two-way and three-way interaction among the variables Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. Main effects indicate significant F-values for Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. There is significant two-way interaction found among Perceived Social Support and Negative Affectivity on Subjective Well Being. No significant three way interactions found among Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity on Health Related Depression.

a)  Perceived Social Support on Subjective Well-Being.

On the basis of Perceived Social Support the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Perceived Social Support. It can be noticed from table 43 that Perceived Social Support has significant role on Subjective Well-Being (F= 21.749; p<0.01). The results have already been discussed in earlier sections (Table 36.2)

b)  Fasting Blood Sugar level on Subjective well-being.

Fasting Blood Sugar level is set in to three groups, viz (Low, Moderate, high) and they are tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low glucose level groups. Table 43 indicates the significant F-value (F=5.624; p<0.01) Perceived Social Support on Subjective Well-Being. The results have already been discussed in earlier sections (Table 39.1).

c)  Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 43 that Diabetes Self-care has significant role on Subjective Well-Being (F=25.322; p<0.01). The results have already been discussed in earlier sections (Table 39.2)

**Two-Way Interaction**

a)  Perceived Social Support And Negative Affectivity on Subjective Well Being

In this step the analysis carried out to examine the difference in the cores in Subjective Well Being among type 2 diabetic people as a result of their Perceived

Social Support and Negative Affectivity. From the table 43 the two way interaction between the levels of  Perceived Social Support and Negative Affectivity yields a significant F-ratio on Subjective Well Being (F=7.085, p<0.01).  Social support is significantly influencing the patient's experience of emotions. If the patient has a healthy social support from the family and society he can experience more positive emotions, otherwise the patient receiving less support have experienced negative emotions and this will decrease positive well being in them.

**Table 43.1: Mean and Standard Deviation of Perceived Social Support and Negative Affectivity on Health Related Depression**

| Variables | | Perceived Social Support | | | | | | | | |
| | | Low(N=85) | | | Moderate(N=70) | | | High(N=101) | | |
| | | Negative Affectivity | | | Negative Affectivity | | | Negative Affectivity | | |
| | | Low N=15 | Moderate N=27 | High N=43 | Low N=26 | Moderate N=26 | High N=18 | Low N=58 | Moderate N=28 | High N=15 |
| Subjective Well Being | Mean | 91.67 | 85.70 | 72.93 | 98.62 | 91.31 | 89.11 | 105.66 | 90.64 | 89.80 |
| | S.D | 12.938 | 9.710 | 12.517 | 9.704 | 8.512 | 8.737 | 6.568 | 10.664 | 9.359 |

Based on the mean scores, it can be obtained from table 43.1, that  low Negative Affectivity belonging to high Perceived Social Support group experiencing high level of Subjective Well Being (M=105.66;S.D=6.568). And high Negative Affectivity group belongs to low Perceived Social Support group experiencing low level of Subjective Well Being (M=72.93; S.D=12.517). This result indicates that type 2 diabetic patient receiving satisfactory social support and experiencing less negative emotions have high subjective well being.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Social Support, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being a three way ANOVA had conducted From the Table 43 it can be found that the three way interaction between levels of these three variables was not significant on Subjective Well-Being.

**Perceived Social Support, Negative Affectivity and Social Inhibition on Subjective Well-Being**

A three way ANOVA had carried out to find out the role of levels of (Low, Moderate, and High) Perceived Social Support, Negative Affectivity and Social Inhibition on Subjective Well-Being, and the important observations are presented below.

*Table 44: Perceived Social Support, Negative Affectivity and Social Inhibition on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Social Support | B Negative Affectivity | C Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 24.119** | 30.842** | .943 | 3.367** | .458 | 1.078 | .631 |

**p<0.01 *p<0.05

Table 44 shows one-way, two-way and three-way interaction among the variables Perceived Social Support, Negative Affectivity and Social Inhibition on Subjective Well Being. Main effects indicate significant F-values for Perceived Social Support, and Negative Affectivity on Subjective Well Being. Social Inhibition has no significant interaction on Subjective Well Being. There is significant two-way interaction found among Perceived Social Support and Negative Affectivity on Subjective Well Being. No significant three way interactions found among Perceived Social Support, Negative Affectivity and Social Inhibition on Subjective Well Being.

a)  Perceived Social Support on Subjective Well-Being.

On the basis of Perceived Social Support the participants have been classified in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Perceived Social Support. It can be noticed from table 44 that Perceived Social Support has significant role on Subjective Well-Being (F= 24.119; p<0.01). The results have already have been discussed in earlier sections (table 36.2)

b)  Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 44 that Negative Affectivity has significant role on Subjective Well-Being (F=30.842; p<0.01). The results have already been discussed in earlier sections (Table 39.2)

c)  Social Inhibition on Subjective Well Being

From the table 44 it can be found that there is no significant interaction between Social Inhibition on Subjective Well Being.

**Two-Way Interaction**

a)  Perceived Social Support and Negative Affectivity on Subjective Well Being

In this step the analysis was carried out to assess the difference in the scores of Subjective Well Being among type 2 diabetic people as a result of their Perceived Social Support and Negative Affectivity. From the table 44 the two way interaction between the levels of  Perceived Social Support and Negative Affectivity yields a significant F-ratio on Subjective Well Being (F=3.367, p<0.01). The results have already been discussed in earlier sections (Table 43.1).

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Social Support, Negative Affectivity and Social Inhibition on Subjective Well-Being a three way ANOVA had been conducted. From the Table 44 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Perceived Stress, Diabetes Self Care and Fasting Blood Sugar level on Subjective Well-Being**

A three way ANOVA had carried out to find out the role of Perceived Stress (Low, Moderate, and High), Diabetes Self-Care and Fasting Blood Sugar level on Subjective Well-Being, and the important observations are presented below.

*Table 45: Perceived Stress, Diabetes Self Care and Fasting Blood Sugar level on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br><br>Perceived Stress | B<br><br>Diabetes Self-Care | C<br><br>Fasting Blood Sugar Level | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 43.893** | 6.392** | 2.809 | 2.442** | .394 | 1.035 | 1.736 |

**p<0.01 *p<0.05

From the table 45 one-way, two-way and three-way interaction among the variables Perceived Social Stress, Diabetes Self-Care and Fasting Blood Sugar level on Subjective Well Being have been found. Main effects indicate significant F-values for Perceived Stress, and Diabetes Self-Care on Subjective Well Being.

Fasting Blood Sugar level has no significant interaction on Subjective Well Being. There is significant two-way interaction found among Perceived Stress and Diabetes Self-Care on Subjective Well Being. No significant three way interaction found among Perceived Stress, Diabetes Self-Care and Fasting Blood Sugar level.

a) Perceived Stress on Subjective well-being.

Perceived Stress is categorized into three groups, viz (Low, Moderate, high) and they were tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Perceived Stress. Table 45 indicates the significant F-value (F=43.893; p<0.01) for perceived Stress on Subjective Well-Being. The mean and standard deviation of Perceived Stress has already discussed in table 36.3.

b) Diabetes Self-Care on Subjective Well-Being.

In this section the participants have been classified on the basis of Diabetes Self-Care in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Self Care. It can be noticed from table 45 that Diabetes Self-care has significant role on Subjective Well-Being (F=6.392; p<0.01). The mean and standard deviation of Diabetes Self-care has already discussed in the table (37.1).

c) Fasting Blood Sugar level on Subjective Well-Being

From the table 45 it can be found that there is no significant interaction among Fasting Blood Sugar level on Subjective Well Being.

**Two-Way Interaction**

a) Perceived Stress and Diabetes Self Care on Subjective Well Being

In this step the analysis carried out to examine the difference in the in the scores in Subjective Well Being among type 2 diabetic people as a result of their Perceived Stress and Diabetes Self Care. From the table 45 the two way interaction

between the levels of Perceived Stress and Diabetes Self Care yields a significant F-ratio on Subjective Well Being (F=2.442, p<0.01). From the results it can be found that perceived stress in diabetics which originating from perceived inability to cope with diabetes related demands in type 2 diabetic people and diabetes self care adherence together influence the subjective well being.

A research study states that diabetes-related stress as a person-environment relationship in which perceived diabetes-related demands (e.g., self-management treatment like diet and regular exercise) tax or perceived coping resources Karlsen et al. (2004). Stress originating from a perceived inability to cope with diabetes-related demands has been shown to adversely alter glucose control in Type 2 Diabetes Mellitus (Nozaki et al. 2009).

*Table 45.1: Mean and Standard Deviation of Perceived Stress and Diabetes Self-Care on Subjective Well-Being*

| Variables | | Perceived Stress | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Low(N=90) | | | Moderate(N=83) | | | High(N=83) | | |
| | | Diabetes Self-Care | | | Diabetes Self-Care | | | Diabetes Self-Care | | |
| | | Low N=33 | Moderate N=34 | High N=23 | Low N=27 | Moderate N=44 | High N=12 | Low N=28 | Moderate N=47 | High N=8 |
| Subjective Well-Being | Mean | 99.97 | 103 | 102.39 | 85 | 89.34 | 97.17 | 75.32 | 85.57 | 87.62 |
| | S.D | 8.644 | 9.188 | 10.035 | 12.487 | 12.719 | 12.164 | 12.864 | 12.208 | 9.709 |

Based on the mean scores, it can be obtained from table 44.1, that moderate Diabetes Self Care Belonging to low Perceived Stress group experiencing high Subjective Well Being (M=103;S.D=9.188). And low Diabetes Self Care group belongs to high Perceived Stress experiencing low of Subjective Well Being (M=75.32; S.D=12.864). This result indicates that adequate self care adherence and low level of perceived stress will enhance subjective well being in type 2 diabetic patient.

The scores of the participants in the present study for subjective well being is not very low. If their pattern is studied, it could have an effect of the subject's self

care as well as perceived stress. The effect of both the factors are contradictory, rather the effect of high stress and moderate stress along with self care are different each other. The moderate stress, along with diabetes self care to an extent, help in effective self care management. But the low stress, high self care / moderate self care group scored the highest. Compared to high stress group, effective subjective well being could be scored by the moderate stress group and the pattern is almost linear from low self care high stress group to low self care high stress group in subjective well being.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Stress, Diabetes Self Care and Fasting Blood Sugar level on Subjective Well-Being a three way ANOVA had conducted. From the Table 45 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being**

A three way ANOVA had been carried out to find the role of Perceived Stress (Low, Moderate, and High), Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being, and the important observations are presented below.

*Table 46: Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Stress | B Fasting Blood Sugar Level | C Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 18.652** | 3.573** | 14.069** | .793 | 1.862 | .211 | 1.028 |

**p<0.01 *p<0.05

From the table 46 one-way, two-way and three-way interaction among the variables Perceived Social Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being have found. Main effects indicate significant F-values for Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. There is no significant two-way interaction found among Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. No significant three way interactions found among these variables on Subjective Well-being.

a) Perceived Stress on Subjective Well-Being.

Perceived Stress is categorized in to three groups, viz (Low, Moderate, high) and they were tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Perceived Stress. Table 46 indicates the significant F-value (F=18.652; p<0.01) for perceived Stress on Subjective Well-Being. The mean and standard deviation of Perceived Stress has already discussed in the table 36.3.

b) Fasting Blood Sugar level on Subjective Well-Being.

In this section the participants have been classified on the basis of Fasting Blood Sugar level in to three groups viz., Low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low glucose level groups. It can be noticed from table 46 that Fasting Blood Sugar level has significant role on Subjective Well-Being (F=3.573; p<0.01). The mean and standard deviation of Fasting Blood Sugar level have already been discussed in the table (39.1).

c) Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., Low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 46 that Negative Affectivity has significant role on Subjective Well-Being (F=14.069; p<0.01). The results have already been tested in earlier sections (Table 39.2)

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being from the table 46 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Stress, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being a three way ANOVA had been conducted. From the Table 46 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well-Being**

A three way ANOVA had been carried out to find out the role of Perceived Stress (Low, Moderate, and High), Negative Affectivity and Social Inhibition on Subjective Well-Being, and the important observations are presented below.

*Table 47: Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well-Being.*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Perceived Stress | B Negative Affectivity | C Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 14.203** | 17.217** | 1.522 | .332 | .219 | .888 | 1.086 |

**p<0.01 *p<0.05

From the table 47 one-way, two-way and three-way interaction among the variables Perceived Social Stress, Negative Affectivity and Social Inhibition on Subjective Well Being have found. Main effects indicate significant F-values for Perceived Stress, and Negative Affectivity on Subjective Well Being and Social Inhibition has no significant interaction on Subjective Well Being. There is no significant two-way interaction found among Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being. And there is also no significant three way interactions found among these variables on Subjective Well being.

a) Perceived Stress on Subjective well-being.

Perceived Stress has been categorized into three groups, viz (Low, Moderate, high) and they were tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Perceived

Stress. Table 47 indicates the significant F-value (F=114.203; p<0.01) for perceived Stress on Subjective Well-Being. The mean and standard deviation of Perceived Stress has already discussed in the table 36.3.

b) Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 47 that Negative Affectivity has significant role on Subjective Well-Being (F=17.217; p<0.01). The results have already been discussed in earlier sections (table 39.2)

c) Social Inhibition on Subjective Well Being

From table 47 it can be found that Social Inhibition has no significant interaction on Subjective Well Being.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being from the table 47 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being a three way ANOVA had been conducted. From the table 47 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being**

In order to find out the role of Diabetes Self Care (Low, Moderate, and High), Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being, a three-way ANOVA has been used and the important observations are presented below.

*Table 48: Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Diabetes Self-Care | B Fasting Blood Sugar Level | C Negative Affectivity | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 1.636 | 2.863 | 40.024** | .142 | .506 | .384 | .566 |

**p<0.01 *p<0.05

From the table 48 one-way, two-way and three-way interaction among the variables Diabetes Self Care, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being have been found. Main effects indicate significant F-value for Negative Affectivity on Subjective Well Being, Diabetes Self Care and Fasting Blood Sugar level have no significant interaction on Subjective Well Being. There is no significant two-way interaction found among Diabetes Self Care, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being. And there is also no significant three way interaction found among these variables on Subjective Well being.

a) Diabetes Self Care on Subjective well-being.

From table 48 it can be found that Diabetes Self Care has no significant interaction on Subjective Well Being.

b) Fasting Blood Sugar level On Subjective Well Being

Results indicates from table 48 Glucose level has no significant interaction on subjective Well Being.

c) Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 48 that Negative Affectivity has significant role on Subjective Well-Being (F=40.024; p<0.01). The results have already been discussed in earlier sections (table 39.2)

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Self Care, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being from the table 48 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Self-Care, Fasting Blood Sugar level and Negative Affectivity on Subjective Well Being a three way ANOVA had been conducted. From the Table 48 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Diabetes Self-Care, Negative Affectivity and Social Inhibition on Subjective Well-Being**

In order to find out the role of Diabetes Self Care (Low, Moderate, and High), Negative Affectivity and Social Inhibition on Subjective Well-Being, a three-way ANOVA has been carried out and the important observations are presented below.

*Table 49: Diabetes Self-Care, Negative Affectivity and Social Inhibition on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Diabetes Self-Care | B Negative Affectivity | C Social Inhibition | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 5.763** | 39.359** | .436 | .430 | .594 | .417 | 1.021 |

**p<0.01 *p<0.05

From the table 49 one-way, two-way and three-way interaction among the variables Diabetes Self Care, Negative Affectivity and Social Inhibition on Subjective Well Being have been found. Main effects indicate significant F-values for Diabetes Self Care and Negative Affectivity on Subjective Well Being, Social Inhibition have no significant interaction on Subjective Well Being. There is no significant two-way interaction found among Diabetes Self Care, Negative Affectivity and Social Inhibition on Subjective Well Being. And there is also no significant three way interactions found among these variables on Subjective Well being.

a) Diabetes Self-Care on Subjective Well-Being.

In this section the participants have been classified on the basis of Diabetes Self-Care in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for high groups of Diabetes Self Care. It can be noticed from table 49 that Diabetes Self-care has significant role on Subjective Well-Being (F=5.763; p<0.01). The mean and standard deviation of Diabetes Self-care has already discussed in the table (37.1).

b) Negative Affectivity on Subjective Well Being

In this section the participants have been classified on the basis of Negative Affectivity in to three groups viz., low, moderate and high and the three groups have been tested for their mean values for Subjective Well-Being. The result indicates that significantly higher mean value for low groups of Negative Affectivity. It can be noticed from table 49 that Negative Affectivity has significant role on Subjective Well-Being (F=39.359; p<0.01). The results have already been discussed in the table 39.2.

c) Social Inhibition on Subjective Well Being

Table 49 indicates that social inhibition has no significant interaction on subjective well being.

**Two-way Interaction**

Results of two-way interaction analysis among the three different variables Diabetes Self Care, Negative Affectivity and Social Inhibition on Subjective Well Being from the table 49 indicate that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Diabetes Self-Care, Negative Affectivity and Social Inhibition on Subjective Well Being a three way ANOVA had conducted. From the Table 49 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Positive Factors**

**Negative Factors**
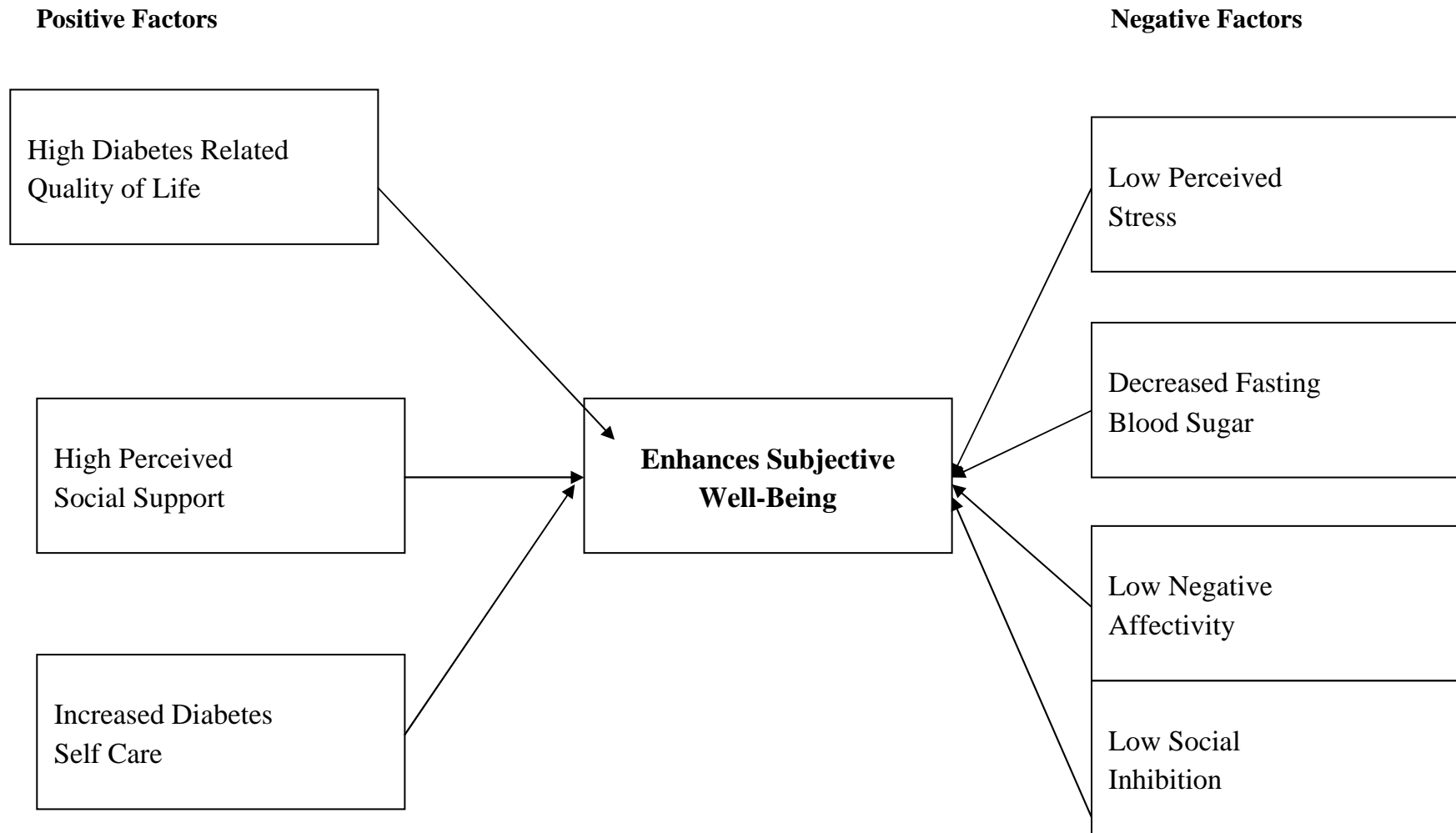


*Figure 5: Effect of different psychological factors on Subjective Well Being in Type 2 Diabetic Patients*

**SECTION 5**

**Role of Locality of Living and Independent Variables (Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition) on Health Related Depression and Subjective Well Being.**

As the part of third objective in the present study attempted to find out the interaction among the variables of diabetes related quality of life, perceived social support, diabetes self care, perceived stress, negative affectivity and social inhibition on subjective well being and health related depression on the basis of locality of living. Here specifically, type 2 diabetic participants those who are living in their own hometown (Kerala) and those who migrated to a distant place from their hometown (United Arab Emirates) for job purposes for more than 10 years. To find out the influence of these variables based on two localities of living on subjective well being and health related depression, two way analysis of variances were carried out.

**Locality of Living and Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being.**

Diabetes is a fastest growing chronic disease, there are many life style factors influencing the incidence and management of diabetes. Individual's living locality and culture defines their life to an extent. Today's increasing diabetic population in Kerala is assumed to be due to the adaptation of western life style. In the present study the data were collected from both those who were living in Kerala and those who were migrated to different places in United Arab Emirates for job purposes. And the investigator was interested to recognize the difference in type 2 diabetics subjective well being caused by the locality of living and psychological variables together. To analyze this two-way analysis of variances were carried out on these variables. The results are as following.

*Table 50: Results of two way ANOVA of Locality of Living and Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being.*

| Variables | Main Effects | | Two-Way Interaction |
|---|---|---|---|
| Subjective Well Being | Locality (A) | Diabetes Related Quality of Life (B) | A-B |
| | F-Value 2.552 | F-Value 17.56** | F-Value 0.70 |
| | Locality (A) | Perceived Social Support (B) | A-B |
| | F-Value 3.87* | F-Value 21.13** | F-Value 0.98 |
| | Locality (A) | Diabetes Self Care (B) | A-B |
| | F-Value 0.92 | F-Value 0.42 | F-Value 2.83 |
| | Locality (A) | Perceived Stress (B) | A-B |
| | F-value 10.84** | F-value 29.32** | F-value 0.712 |
| | Locality (A) | Negative Affectivity (B) | A-B |
| | F-value 0.32 | F-value 24.39** | F-value 0.57 |
| | Locality (A) | Social Inhibition (B) | A-B |
| | F-value 0.92 | F-value 5.74** | F-value 4.96** |

**p<0.01 *p<0.05

Table 50 shows one-way and two-way interaction among the variables of locality of living and Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self-Care, Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well-Being. From the table it can be found that there is significant two-way interaction found among locality of living and social inhibition of type 2 diabetics on subjective well being. That means locality of living and social inhibition together have the capacity to influence subjective well being of type 2 diabetics. Main effects indicate significant F-values for Locality of Living, Diabetes Related Quality of Life, Perceived Social Support, Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well-Being. This states that these variables have independent influence and interactions with subjective well- being.

**Main Effects**

  a)  Diabetes Related Quality of Life on Subjective Well being

Diabetes related quality of life is categorized in to three groups as low, moderate and high, and these three groups were tested for their mean values for Subjective well being. The result indicates that significantly higher mean value for high groups of diabetes related quality of life. It can be noticed from table 50 that diabetes related quality of life has a significant role in subjective well being of type 2 diabetics (F= 17.56; p<0.01). The mean and Standard deviation of Diabetes related quality of life on Subjective Well Being has already discussed in earlier sections (Table 36.1).

  b)  Locality of living on Subjective well being

In this section participants have been classified on the basis of the Locality / country of living in to two groups' viz., people migrated to United Arab Emirates and people living in Kerala. The mean values indicate that the high subjective well being for those who are living in their own home town (Kerala). Form the table 50 it can be found that the Locality of living has significant role on Subjective well being (F= 3.87; p<0.05).

*Table 50.1: Mean and Standard Deviation of Locality of living on Subjective Well Being*

| Locality | Locality (UAE) N= 30 | | Locality (Kerala) N= 226 | |
|---|---|---|---|---|
| | Mean | S.D | Mean | S.D |
| Subjective Well Being | 90.17 | 13.42 | 91.48 | 14.48 |

Mean scores indicates that subjective well being is higher for those who are living in their own home town (Kerala) (M=91.48; S.D= 14.48) than those who were migrated to a distant place of their home town for job purposes (United Arab Emirates) (M=90.17; S.D= 13.42). This can be attributed to the influence of cultural change, tight work schedule and negative feelings caused by separation of close family members and relatives for migrated people.

c) Perceived Social Support on Subjective well being

Perceived social support is categorized in to three groups, viz., low, moderate and high, and they were tested for their mean values for Subjective well being. Result indicates higher subjective well being for type 2 diabetics receiving high social support. From the table 50 it can be found that perceived social support is significant on subjective well being (F= 21.13; p<0.01). Mean and Standard Deviation of Perceived Social Support on subjective well being have already discussed in the table 36.2.

d) Perceived Stress on Subjective well being

Based on the perceived stress the participants were classified in to three groups viz., low, moderate and high, and these three groups have been tested for their mean values for subjective well being. The result indicates that higher subjective well being for those with low perceived stress. It can be noticed from the

table 50 perceived stress has significant effect on subjective well being (F= 29.32; p<0.01). The results have already been discussed in the table 36.3.

e) Negative Affectivity on Subjective Well being.

In this section, the participants have been classified in to three groups, viz., low, moderate and high based on negative affectivity. These three groups were tested for their mean values for subjective well being. The result shows that high subjective well being for those experiencing low negative affectivity. It can be noticed fro table 50 that negative affectivity has significant effect on subjective well being (F= 24.39; p<0.01). The mean and standard deviation of negative affectivity on subjective well being have already been discussed in earlier sections (Table 39.2).

f) Social Inhibition on Subjective Well being

In this section, the participants have been classified on the basis of social inhibition in to three groups viz., low, moderate, and high and the three groups have been tested for their mean values for subjective well being. The result indicates significantly higher mean value group with low level of social inhibition. Table 50 indicates that social inhibition has significant effect on subjective well being (F= 5.74; p<0.01).

*Table 50.2: Mean and Standard Deviation of Social Inhibition on Subjective Well Being*

| Social Inhibition (SI) | SI (Low) N= 112 | | SI (Moderate) N= 69 | | SI ( High) N= 75 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well Being | 95.83 | 13.34 | 87.12 | 14.78 | 88.48 | 13.61 |

Mean scores indicate that the subjects having low level of Social Inhibition have higher mean scores for subjective well being (M=95.83; S.D= 13.34). And those having moderate level of social inhibition had low subjective well being (M=87.12; S.D= 14.78) compared to the group with high social inhibition.

**Two way Interaction:**

a) Locality of living and Social Inhibition on Subjective well being

The two way analysis has been carried out to assess the difference in the scores of Subjective well being among type 2 diabetic people on the basis of locality of living and social inhibition. From the table 50 the two way interaction between the categories of social inhibition and locality of living yields a significant F-ratio on Subjective well being (F= 4.96; P<0.01). This result indicates that the social inhibition and locality of living together affect the subjective well being of type 2 diabetics.

*Table 50.3: Mean and Standard Deviation of Locality of living and Social Inhibition on Subjective well being*

| Variables | | Locality | | | | | |
|---|---|---|---|---|---|---|---|
| | | UAE N=30 | | | Kerala N=226 | | |
| | | Social Inhibition | | | | | |
| | | SI(Low) N= 13 | SI (Moderate) N=11 | SI (High) N=6 | SI (Low) N=99 | SI (Moderate) N=58 | SI (High) N=69 |
| Subjective Well Being | Mean | 93.08 | 94.55 | 75.83 | 96.19 | 85.71 | 89.58 |
| | S.D | 13.42 | 8.10 | 13.04 | 13.36 | 15.37 | 13.18 |

In table 50.3 the mean scores have been given, that indicates high subjective well being for people in Kerala and low level of Social Inhibition (M=96.19; S.D= 13.36). And those migrated to UAE and having high Social inhibition experiencing low subjective well being (M=75.83; S.D= 13.04). This result signifies that diabetic

people living in Kerala with low social inhibition or those who have good social contacts and participation in social events experiences high subjective well being. Most of the people migrated to UAE for job purposes are demanding to be very active both in their professional and social lives; compared to Kerala, UAE has a culture of partying and get together and celebrations, therefore most of the people either automatically or forcefully become socially active. There are only a few cases of socially inactive people, this can be the reason of their subjective well being is decreasing while they are highly socially inhibited.

**Role of Locality of Living and Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition on Health Related Depression.**

Health related depression in type 2 diabetics were determined by many factors, and to find out the influence of locality of living and diabetes related quality of life, perceived social support, diabetes self care, perceived stress, negative affectivity and social inhibition two-way analysis of variance were carried out. The results are as following;

*Table 51: Results of two way ANOVA of Locality of Living and Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition on Health Related Depression.*

| Variables | Main Effects | | Two-Way Interaction |
|---|---|---|---|
| | Locality (A) | Diabetes Related Quality of Life (B) | A-B |
| | F-value .000 | F-value 13.16** | F-value 1.443 |
| | Locality (A) | Perceived Social Support (B) | A-B |
| | F-value 0.01 | F-value 5.86** | F-value .009 |
| | Locality (A) | Diabetes Self Care (B) | A-B |
| | F-value 0.24 | F-value 0.42 | F-value 2.67 |
| Health Related Depression | Locality (A) | Perceived Stress (B) | A-B |
| | F-value .32 | F-value 6.5** | F-value .09 |
| | Locality (A) | Negative Affectivity (B) | A-B |
| | F-value 1.996 | F-value 8.74** | F-value 2.15 |
| | Locality (A) | Social Inhibition (B) | A-B |
| | F-value .089 | F-value 5.85** | F-value 1.202 |

**p<0.01 *p<0.05

Table 51 shows one-way and two-way interaction among the variables of locality of living and diabetes related quality of life, perceived social support, diabetes self-care, perceived stress, negative affectivity and social inhibition on health related depression. From the table 51 it can be found that there is no significant two-way interaction found among locality of living and all other variables on health related depression. That means locality of living doesn't make any differences in the influence of these variables on health related depression. Main effects indicate significant F-values for diabetes related quality of life, perceived social support, perceived stress, negative affectivity and social inhibition on health related depression. This states that these variables have independent influence and interactions with subjective well- being.

From the results it can also be found that the locality of living have no significant independent interaction on  health related depression, therefore the type 2 diabetics living in Kerala or migrated to United Arab Emirates have no significant difference in experiencing health related depression.

**Main Effects**

a) Diabetes Related Quality of Life on Health related depression

Participants were categorized in to three groups based on the diabetes related quality of life viz., low, medium and high. These three groups have been tested for their mean values for health related depression. Results indicate that high health related depression for people with low diabetes related quality of life. It can be found from the table 51 that diabetes related quality of life has significant effect on health related depression (F= 13.16; p<0.01). The mean and standard deviation of diabetes related quality of life has already discussed been in table 22.1.

b) Perceived Social Support on Health Related Depression

In this section the participants have been classified in to three groups viz., low, moderate and high, and the three groups have been tested for their mean values for health related depression. The result indicates that high level of health related depression was experienced by type 2 diabetic patients with low perceived social

support. From the table 51 it can be observed that the perceived social support has significant effect on health related depression (F=5.86; p<0.01). The mean and standard deviation of perceived social support on health related depression have already been discussed in earlier sections (table 27.1)

c) Perceived stress on Health Related Depression

Based on the perceived stress level, participants were classified in to three groups viz., low, moderate and high. These three groups were tested their mean values on health related depression. From the results it can be found that high perceived stress group experiences high level of health related depression. From the table 51 can be found that perceived stress has significant role on health related depression (F= 6.5; p<0.01). The results have already been discussed in previous sections (table 22.2)

d) Negative Affectivity on Health Related Depression

Negative affectivity is classified in to three groups viz., low, moderate and high and they were tested for their mean values for health related depression. The result indicates those with high negative affectivity experiences high level of health related depression. From the table 51 significant effect of negative affectivity on health related depression has been found (F= 8.74; p<0.01). The mean and standard deviation of negative affectivity on health related depression have already been discussed in the earlier sections (table 25.2)

e) Social Inhibition on Health Related Depression

In this section social inhibition is categorized in to three groups' viz., low, moderate and high and they are tested for their mean values on health related depression. The result indicates that high health related depression is experienced by the group with moderate level of social inhibition. From the table 51 found that social inhibition is significant effect on health related depression (F=5.85; p<0.01). The results have already been discussed in earlier sections (table 26.1).

**SECTION 6**

**Role of Socio Demographic Variables (Age, Sex, Marital Status, Education and Socio Economic Status) on Health Related Depression and Subjective Well Being of Type 2 Diabetic Populations**

Socio demographic factors are the factors which are the personality characteristics acquired by the individual through birth, in every psychological study these variables should be silently influencing the study variables. The socio-economic status of a community may determine the educational, employment, and income opportunities of individuals and may also directly influence the social environment, although it is subject to the 'ecological fallacy' of assuming that all individuals in an area have similar characteristics (Robert, s. 1998) In present study the different levels of socio demographic factors Age (below 40 years, 40-50 year, 50-60 year and 60-70 years), Sex (male and female), Marital Status (Unmarried, Married, Separated and Widowed), Education (Primary, Higher Secondary, Degree and Technical Education) and Socio Economic Status (Upper class, Middle class and Lower class) were studied in different combinations to know their influence on subjective well being and health related depression in type 2 diabetic people.

To test the hypothesis that there will be significant interaction between the classificatory factors of age, sex, marital status, education and socio economic status on subjective well being, different sub hypotheses were formed and tested separately. To test those sub hypotheses the following three-way Analysis of Variance were carried out.

**Age, Sex and Marital Status on Subjective Well-Being**

This analysis carried out on the assumption that the subjective well being have been influenced by the levels of age (below 40 years, 40-50 year, 50-60 year and 60-70 years), sex and marital status, because type 2 diabetes is an adult onset chronic disease and the age of occurrence is very important determinant to see how the patient can face the physical and psychological problems caused by the disease. There should be differences in the experience of those who diagnose diabetes in

early forties and those who diagnose in late sixties, because the diagnosis of diabetes in most productive age especially in profession will lead more negative acceptance of the disease.

Gender differences are not a clear evidence for changes in well being, some studies in type 2 diabetic populations indicates increased well being for men and some other studies shows increased well being for women. Most of large surveys showed little evidence of gender differences (e g., Donovan & Halpern, 2002; Helliwell, 2003) some showed higher scores for men (e g., Stephens, Dulberg & Joubert,1999), while others showed higher scores for women on some sub scales such as those assessing social functioning (e g., Huppert, Walters, Day & Elliot, 1989; Ryff & Singer, 1998b).

Marriage is the most important institution to exchange of social support between partners. In the type 2 diabetic population the amount of social support receiving is an important factor determining the positive perception of life.

Being married is usually associated with higher life satisfaction and lower rates of psychological ill health (review by Dolan, Peasgood & White, 2008). But the direction of causation is not clear, since individuals with high levels of psychological well being are more likely to get married (Diener, 2000). Some longitudinal studies have found that, while getting married is good for one's psychological well being (e g., Zimmermann & Easterlin, 2006).

To find out the effect of socio demographic variables Age, Sex and Marital Status on Subjective Well Being, a three-way ANOVA has been carried out and the important observations are presented below.

*Table 52: Three Way ANOVA of Age, Sex and Marital Status on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Age | B Sex | C Marital Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | .596 | 3.270 | 11.034** | 4.570** | 1.486 | 1.460 | 8.988** |

**p<0.01 *p<0.05

Table 52 shows one-way, two-way and three-way interaction among the socio demographic variables Age, Sex and Marital Status on Subjective Well Being. Main effects indicate significant F-values for Marital Status on Subjective Well Being. There is Significant two way interaction between Age and Sex on Subjective Well Being and from the table 52 it can be found that there is significant three way interaction between Age, Sex and Marital Status on Subjective Well Being.

**Main Effects**

c) Marital Status on Subjective Well being.

Marital status is categorized in to four groups, viz., unmarried, married (living with spouse and children), separated and widowed; and the four groups have been tested for their mean values for the dependent variable (Subjective Well Being). The result indicates that significantly higher mean value for subjective well being for married people compared to other three groups. It can be noticed from table 52 that marital Status has a significant effect on Subjective Well Being of patients with type 2 diabetes (F= 11.034; p<0.01).

***Table 52.1: Mean and Standard Deviation of subgroups with different Marital Status on Subjective Well Being***

| Marital Status | Unmarried N=11 | | Married N=213 | | Separated N=3 | | Widowed N=29 | |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well Being | 89.45 | 18.73 | 92.76 | 13.44 | 62.33 | 11.37 | 84.55 | 14.698 |

From the table 52.1 indicate mean and standard deviations of marital status on subjective well being. Based on the mean scores, it can be found that the subjects who are married are higher mean scores in Subjective Well Being (M=92.76; S.D=13.44). Those who are living separated with partner have low subjective well being (M=62.33; S.D=11.37). From the results it can be found that being separated in Kerala population will lower the experience of subjective well diabetics.

**Two-way interaction**

  a) Age and Sex on Subjective Well Being

In this step the analysis was carried out to assess the difference in the scores in Subjective Well Being among type 2 diabetic people as an effect of levels their Age and Sex. From the table 52 the two way interaction between the levels of Age (below 40 years, 40-50 year, 50-60 year and 60-70 years) and Sex (male and female) yields a significant F-ratio on Subjective Well Being (F=4.570, $p<0.01$). Interactions between age and sex of the patients have also been reported: data from British Health and Lifestyle survey show that, compared to middle aged and younger men, older men have lowest scores on a measure of positive psychological well being. Compared to other age groups, older women have the lowest scores on positive well being (Huppert & Whittington, 2003).

*Table 52.2: Mean and Standard Deviation of Age and Sex on Subjective Well Being*

| Variables | | Age | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Below 40 (N=22) | | 40-50 (N=59) | | 50-60 (N=87) | | 60-70 (N=88) | |
| | | Sex | | | | | | | |
| | | Male N=13 | Female N=9 | Male N=27 | Female N=32 | Male N=43 | Female N=44 | Male N=39 | Female N=49 |
| Subjective Well Being | Mean | 86 | 94.67 | 94.56 | 90.22 | 90.56 | 94.39 | 89.87 | 90.16 |
| | S.D | 15.23 | 15.83 | 11.74 | 14.11 | 16.38 | 13.11 | 17 | 11.96 |

Based on the mean scores in 52.2, females belonging to below 40 years age group has high level of Subjective Well Being (M=94.67; S.D=15.83). And males belonging below 40 years age group are having low level of Subjective Well Being (M=86; S.D=15.23). This result indicates that the experience of positive subjective well being is different in different age levels for males and females.

**Three-way interaction**

Three-way analysis was done among Age, Sex and Marital Status of type 2 diabetic patients on Subjective Well Being. For the present three-way interaction among four levels of Age, two categories of Sex and four categories of marital status had been considered. From table 52, it has seen that independent interaction is significantly evident for Marital Status on subjective Well Being, two-way interaction has significant for Age and Sex on Subjective Well Being. On three-way analysis the F value shows the significant interaction (F=8.988, p<0.01) among Age, Sex and Marital Status on Subjective Well Being, which indicates that these three variables have strong association with Subjective Well Being, which means these three variables together will influence the experience of subjective well being of type 2 diabetic population.

**Sex, Education and Marital Status on Subjective Well-Being**

Education, as socio demographic variable influences the psycho social factors of any person, so in diabetics, those who are highly educated will have increased expectation in job so is job related stress, and expectation to life achievements is also found to be high among educated class.

To find out the effect of Socio Demographic variables Sex, Education and Marital Status on Subjective Well Being, a three-way ANOVA has been used and the important observations are presented below.

*Table 53: Results of Three Way ANOVA of Sex, Education and Marital Status on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Sex | B Education | C Marital Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 4.065* | 6.029** | 4.810** | .936 | 2.182 | 3.005* | .603 |

**p<0.01 *p<0.05

Table 53 shows one-way, two-way and three-way interaction effects of the socio demographic variables namely, Sex, Education and Marital Status on Subjective Well Being. Main effects indicate significant F-values for Sex, Education and Marital Status on Subjective Well Being. There is Significant two way interaction between Education and Marital Status on Subjective Well Being and from the table 53 it can be found that there is no significant three way interaction between Sex, Education and Marital Status on Subjective Well Being.

**Main Effects**

a) Sex on Subjective Well being.

Sex of the sample is categorized in to two groups, viz., male and female and the two groups have been tested for their mean values for the dependent variable (Subjective Well Being). The result indicates that significantly higher mean value for female group compared to male group, which means in type 2 diabetic population females have more positive feeling about life than males. It can be noticed from table 53 that Sex has significant role in Subjective Well Being of people with type 2 diabetes (F= 4.065; p<0.05).

*Table 53.1: Mean and Standard Deviation of Sex on Subjective Well Being*

| Sex | Male N=122 | | Female N=134 | |
|---|---|---|---|---|
| | Mean | S.D | Mean | S.D |
| Subjective Well Being | 90.74 | 15.57 | 91.87 | 13.16 |

From the table 53.1 mean and standard deviations on subjective well being based on sex have been found, based on the mean scores, it can be reported that females have higher mean scores in Subjective Well Being (M=91.87; S.D=13.16) compared to males.

b) Education on Subjective Well being.

Education status of the sample is categorized in to four groups, viz., below higher secondary, higher secondary, degree and technical education and these four groups have been tested for their mean values for the dependent variable (Subjective Well Being). The result indicates that significantly higher mean value for degree level education group compared to other groups. It can be noticed from table 53 that

Education has significant role on Subjective Well Being of people with type 2 diabetes (F= 6.029; p<0.01).

*Table 53.2: Mean and Standard Deviation of Education on Subjective Well Being*

| Education | Primary N=146 | | Higher Secondary N=36 | | Degree N=66 | | Technical Education N=8 | |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Subjective Well Being | 89.03 | 15.19 | 91.78 | 14 | 96.83 | 11.68 | 85.75 | 5.92 |

From the table 53.2 mean and standard deviations of Education status of the sample on subjective well being have been found. Based on the mean scores, it can be reported that the subjects with degree level education have higher mean scores on Subjective Well Being (M=96.83; S.D=11.68). Those who are in Technical education category have low subjective well being (M=62.33; S.D=11.37).

c) Marital Status on Subjective Well Being

In this section the participants have been classified on the basis of Marital Status in to four groups viz., unmarried, married, separated and widowed and the four groups have been tested for their mean values on Subjective Well Being. The result indicates that significantly higher mean value for married group. It can be noticed from table 53 that Marital Status has significant role on Subjective Well Being (F= 4.810; p<0.01). The results have already have been discussed in earlier sections (Table 52.1).

**Two-way interaction**

a) Education and Marital Status on Subjective Well Being

In this step the analysis were carried out to examine the difference in the scores on Subjective Well Being among type 2 diabetic people based on the

interaction of their Education and Marital Status. From the table 53 the two way interaction between the levels of Education and Marital Status yields a significant F-ratio on Subjective Well Being (F=3.005, p<0.05). From the analysis of mean and standard deviation for the combinations of variables of education and marital status, it has been found missing cells for most of the groups, therefore further analysis has been avoided.

**Three-way Interaction**

To find out independent and interaction effects of Sex, Education and Marital Status on Subjective Well-Being a three way ANOVA had conducted. From the Table 53 it can be found that the three way interaction between levels of these three variables is not significant on Subjective Well-Being.

**Education, Marital Status and Socio Economic Status on Subjective Well-Being**

In order to find out the role of Education, Marital Status and Socio Economic Status on Subjective Well Being a three-way ANOVA has been carried out.

*Table 54: Results of Three Way ANOVA of Education, Marital Status and Socio Economic Status on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Education | B Marital Status | C Socio Economic Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 3.945** | 4.49** | .218 | 1.929 | .998 | 1.344 | .980 |

**p<0.01 *p<0.05

From Table 54 one-way, two-way and three-way interaction among the sub categories of variables namely, Education, Marital Status and Socio Economic

Status on Subjective Well Being can be found. Main effects indicate significant F-values for Education and Marital Status on Subjective Well Being. And there is no significant two-way and three way interactions found among Education, Marital Status and Socio Economic Status on Subjective Well Being.

**Main effects**

a)  Education on Subjective Well Being.

In this section the participants have been classified on the basis of levels of Education in to four groups as, below higher secondary, higher secondary, degree education and technical education and the four groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for people with Degree level of education. It can be noticed from table 54 that Education has significant role on Subjective Well Being (F= 3.945; p<0.01). The mean and standard deviation of Education on Subjective Well Being has already discussed in the table 53.2.

b)  Marital Status on Subjective Well Being

In this section the participants have been classified on the basis of Marital Status in to four groups viz., unmarried, married (living with spouse and children), separated and widowed and the four groups have been tested for their mean values for Subjective Well Being. The result indicates that significantly higher mean value for married group on Subjective Well Being. It can be noticed from table 54 that Marital Status has significant role on Subjective Well Being (F= 4.49; p<0.01). The mean and standard deviation of marital status on subjective well being have already been discussed in earlier sections (Table 52.1).

**Two-way Interaction**

In the two-way interaction, analysis was done among the three different variables namely, Education, Marital Status and Socio Economic Status on Subjective Well Being. Table 54 indicates that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of the levels of Education, Marital Status and Socio Economic Status. From the Table 54 it can be found that the three way interaction between levels of Education, Marital Status and Socio Economic Status are not significant on Subjective Well Being.

**Education, Marital Status and Age on Subjective Well-Being**

In order to find out the role of Education, Marital Status and Age on Subjective Well Being a three-way ANOVA has been carried out.

*Table 55: Results of Three Way ANOVA of Education, Marital Status and Age on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Education | B Marital Status | C Age | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 3.767** | 4.688** | .626 | 2.765* | 1.277 | 1.188 | .868 |

**p<0.01 *p<0.05

From Table 55 one-way, two-way and three-way interaction among the three variables specifically, Education, Marital Status and Age on Subjective Well Being can be found. Main effects show significant F-values for Education and Marital Status on Subjective Well Being. There is significant two-way interaction between Education and Marital Status on Subjective Well Being and there is no significant three way interactions found among Education, Marital Status and Age on Subjective Well Being.

**Main effects**

a) Education on Subjective Well Being.

In this section the participants have been classified on the basis of levels of Education in to four groups viz., below higher secondary, higher Secondary education, degree and technical education and the four groups have been tested for their mean values for Health Related Depression. The result indicates that significantly higher mean value for people with degree level of education. It can be noticed from table 55 that Education has significant role on Subjective Well Being (F= 3.767; p<0.01). The mean and standard deviation of Education on Subjective Well Being has already discussed in the table 52.2.

b) Marital Status on Subjective Well Being

In this section the participants have been classified on the basis of Marital Status in to four groups viz., unmarried, married, separated and widowed and the four groups have been tested for their mean values for Subjective Well Being. The result indicates that significantly higher mean value for married group on Subjective Well Being. It can be noticed from table 55 that Marital Status has significant role on Subjective Well Being (F= 4.688; p<0.01). The mean and standard deviation have already been discussed in earlier sections (Table 52.1).

**Two-way Interaction**

a) Education and Marital Status on Subjective Well Being

In this step the analysis carried out to examine the difference in the in the scores in Subjective Well Being among type 2 diabetic people as a result of their Education and Marital Status. From the table 55 the two way interaction between the levels of Education and Marital Status yields a significant F-ratio on Subjective Well Being (F=2.765; P<0.05). From the analysis of mean and standard deviation of the combinations of variables of education and marital status it can be found that there is no sample representation for most of the groups, so these two way interactions could

not be considered as significant for the present study and further analysis could not be carried out.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of the levels of Education, Marital Status and Age. From the Table 55 it can be found that the three way interaction between levels of Education, Marital Status and Age is not significant on Subjective Well Being.

**Marital Status, Age and Socio Economic Status on Subjective Well-Being**

To find out the role of Socio Demographic variables Marital Status, Age and Socio Economic Status on Subjective Well-Being, a three-way ANOVA has been carried out and the important observations are presented below.

*Table 56: Results of Three Way ANOVA of Marital Status, Age and Socio Economic Status on Subjective Well-Being*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br>Marital Status | B<br>Age | C<br>Socio Economic Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Subjective Well-Being | 9.052** | 1.712 | .801 | 2.287* | 2.309 | 2.507* | .190 |

**p<0.01 *p<0.05

Table 56 indicates one-way, two-way and three-way interaction among the variables Marital Status, Age and Socio Economic Status on Subjective Well Being. Main effects indicate significant F-values for marital status on subjective well being. There is significant two-way interaction between marital status and age, and also

between age and socio economic status on subjective well being and there is no significant three way interactions found among Marital Status, Age and Socio Economic Status on Subjective Well Being.

**Main effects**

a) Marital Status on Subjective Well Being

In this section the participants have been classified on the basis of Marital Status in to four groups viz., unmarried, married, separated and widowed and the four groups have been tested for their mean values for Subjective Well Being. The result shows that significantly higher mean value for Subjective Well Being to married group. It can found from table 56 that Marital Status has significant role on Subjective Well Being (F= 9.052; p<0.01). The mean and standard deviation of marital status on subjective well being already discussed in earlier sections (Table 52.1).

**Two-Way Interaction**

a) Marital Status And Age On Subjective Well Being

The two way interaction analysis was carried out to assess the differences in the scores on Subjective well being of type 2 diabetic people based on their marital status and age. Table 56 indicates the two way interaction between the marital status and age yields a significant F-ratio on Subjective Well Being (F=2.287; P<0.05). From the descriptive analysis of levels of age and marital status indicates that some of the combinations of the sub categories of marital status and age have no sample representations, and also found missing cells for most of the groups, therefore further analysis has been avoided.

b) Age and Socio Economic Status on Subjective Well Being

This part of analysis is carried out to examine the difference in the scores in Subjective Well Being among type 2 diabetic people as a result of their Socio Economic Status and Age. Table 56 shows that the two way interaction between the levels of Age and Socio Economic Status have a significant F-ratio on Subjective

Well Being (F=2.507, p<0.05). This result states that the type 2 diabetic patients' subjective well being would be determined by their age and socio economic status to an extent.

*Table 56.1: Two Way ANOVA of Age and Socio Economic Status on Subjective Well Being*

| Variables | | Socio Economic Status | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | High (N=57) | | | | Middle (N=150) | | | | Low (N=49) | | | |
| | | AGE | | | | | | | | | | |
| | | Below 40 (N=6) | 40-50 (N=14) | 50-60 (N=15) | 60-70 (N=22) | Below 40 (N=11) | 40-50 (N=33) | 50-60 (N=58) | 60-70 (N=48) | Below 40 (N=5) | 40-50 (N=12) | 50-60 (N=14) | 60-70 (N=18) |
| Subjective Well Being | Mean | 87.83 | 94.36 | 100.27 | 95.64 | 87 | 93.76 | 92.76 | 91.13 | 97.20 | 85.42 | 83.07 | 80.28 |
| | S.D | 15.497 | 11.686 | 9.2 | 14.895 | 15.06 | 13.224 | 13.768 | 12.488 | 18.267 | 13.358 | 19.285 | 14.15 |

Based on the mean scores, it can be obtained from table 56.1, that the diabetics in the age group of 50-60 years, and in High Socio Economic Status experiencing high level of Subjective Well Being (M=100.27;S.D=9.2). And the group belongs to age group 60-70 years who are in the low Socio Economic status experiencing low level of Subjective Well Being (M=80.28; S.D=14.15). This results indicates that in present study type 2 diabetic patient's level of life satisfaction is based on their life achievement both personal and professional; that will increase the positive perception on life and also increases subjective well being, if the person was a poor achiever or a failure in both professional and personal life will experience poor life satisfaction in older age, and also this will decrease their subjective well being.

**Three-way Interaction**

To find out independent and interaction effects of three levels of Marital Status, Age and Socio Economic Status on Subjective Well-Being a three way

ANOVA had been carried out. The table 56 indicates that there is no significant three way interaction found among the levels of these three variables on Subjective Well-Being.

To test the hypothesis that there will be significant interaction between the classificatory factors of Age, Sex, Marital Status, Education and Socio Economic Status on Health Related Depression, different sub hypotheses were formed and tested separately. To test these sub hypotheses the following three-way Analysis of Variances were carried out.

**Age, Sex and Marital Status on Health Related Depression**

Health related depression of type 2 diabetic patients affected by their Age (below 40 years, 40-50 year, 50-60 year and 60-70 years), Sex (male and female) and Marital status (Unmarried, Married, Separated and widowed) because the perspective of life is different to those belonging to different levels of these socio demographic statuses. To find out the effect of levels of Socio Demographic variables of Age, Sex and Marital Status on Health related Depression, a three-way ANOVA has been used and the important observations are presented below.

*Table 57: Results of Three Way ANOVA of Age, Sex and Marital Status on Health Related Depression*

| | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| Variable | A<br>Age | B<br>Sex | C<br>Marital Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | .919 | 8.326** | 5.654** | 2.082 | .721 | 2.902 | 3.626 |

**p<0.01 *p<0.05

From the table 57 one-way, two-way and three-way interactions among the socio demographic variables Age, Sex and Marital Status on Health Related Depression have been found. Main effects indicate significant F-values for Sex and Marital Status on Health Related Depression. There is no Significant two way and three way interaction found among different levels of Age, Sex and Marital Status on Health Related Depression.

**Main Effects**

    a)  Sex on Health Related Depression

Sex is categorized in to Male and Female and the two groups have been tested for their mean values for Health Related Depression (dependent variable). The result indicates that significantly higher mean value for males comparing with female group. It can be noticed from table 57 that Sex has significant effect on Health Related Depression of people with type 2 diabetes (F= 8.326; p<0.01). This result shows that in type 2 diabetic populations males are experiencing more health related depression than females.

*Table 57.1: Mean and Standard Deviation of Health Related Depression for different sub groups*

| Sex | Male N=122 | | Female N=134 | |
|---|---|---|---|---|
| | Mean | S.D | Mean | S.D |
| Health Related Depression | 7.06 | 9.317 | 6.63 | 7.457 |

From the table 57.1 mean and standard deviations of Sex on Health Related Depression have found. Mean scores shows that male subjects have higher mean scores in Health Related Depression (M=7.06; S.D=9.317) compared to females, which means in the present study the female participants are more satisfied with self

management of diabetes and experience lesser worry due to their illness, this may be attributed due to the differences in the capability to self care management of both sex particularly based on culture of Kerala. In this society females are doing their own self care activities like cleaning their clothes, cooking foods and cleaning their home but the majority of males were depend others for all these, therefore make adaptive changes in lifestyle for diabetes management is more difficult to them.

b) Marital Status on Health Related Depression

Marital status is categorized in to four groups, viz., unmarried, married (living with spouse and children), separated and widowed and the four groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher health related depression for widowed group compared to other three groups. It can be noticed from table 57 that marital Status is significant role in Health Related Depression of people with type 2 diabetes (F= 5.654; p<0.01). From the result it can be found that the widowed people experiencing more negative feelings and they have negative perspective on life, and they are not satisfied with the self management for type 2 diabetes. Social support is the most important thing to develop positive attitude towards life especially from husband, wife or other family members (Siddiqui., Khan., & Carline., 2013). The increased health related depression in widowed diabetics can be assumed due to the lack of healthy social support and negative perspective towards life due to the loss of a close person in life.

*Table 57.2: Mean and Standard Deviation of Marital Status on Health Related Depression*

| Marital Status | Unmarried N=11 | | Married N=213 | | Separated N=3 | | Widowed N=29 | |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 7.18 | 11.29 | 6.10 | 7.863 | 10 | 6.083 | 11.72 | 9.662 |

Mean and standard deviations of marital status on Health Related Depression have given in the table 57.2. Based on the mean scores, it can be reported that the subjects who are widowed have higher mean scores in Health Related Depression (M=11.72; S.D=9.662). Those who are married have low level of Health Related Depression (M=6.10; S.D=7.863).

**Two-way Interaction**

In the two-way interaction, analysis was done among the three different variables Age, Sex, Marital Status on Health related Depression. Table 57 indicates that there is no significant two-way interaction between these three variables.

**Three-way Interaction**

A three-way ANOVA was carried out to find out independent and interaction effects of the levels of Age, Sex and Marital Status. From the Table 57 it can be found that the three way interaction between levels of Age, Sex and Marital Status is not significant on Health Related Depression.

**Age, Sex and Socio Economic Status on Health Related Depression**

The socio-economic status of a community may determine the educational, employment, and income opportunities of individuals and may also directly influence the social environment. Based on the educational level, type of job and income individuals' viewpoint to life will be different. To find out the role of levels of Socio Demographic variables Age (below 40, 40-50, 50-60 and 60-70), Sex (male and female) and Socio Economic Status (upper class, middle class and lower class) on Health related Depression, a three-way ANOVA has been carried out and the important observations are presented below.

*Table 58: Results of Three Way ANOVA of Age, Sex and Socio Economic Status on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br>Age | B<br>Sex | C<br>Socio Economic Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | .525 | 1.543 | 6.673** | 2.304 | .577 | .726 | 1.621 |

**p<0.01 *p<0.05

From the table 58 one-way, two-way and three-way interactions among the socio demographic variables Age, Sex and Socio Economic Status on Health Related Depression can be found. Main effects show significant F-values for Socio Economic Status on Health Related depression. There is no significant two way and three way interaction found among the different sub groups of Age, Sex and Socio Economic Status on Health Related Depression.

**Main Effects**

a) Socio Economic Status on Health Related Depression

Socio Economic status is categorized in to three groups, viz., upper, middle and lower class and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result shows that significantly higher mean value for people belong to lower socio economic status comparing other two groups. It can be noticed from table 58 that Socio Economic Status is significant role in Health Related Depression of people with type 2 diabetes (F= 6.673; p<0.01). From this result it is clear that the type 2 diabetic people working with low salary and economically backward are experiencing increased

health related depression due to the inability to cope with self care management expected to type 2 diabetics.

*Table 58.1: Mean and Standard Deviation of Socio Economic Status*

| Socio Economic Status (SES) | Upper N=57 | | Middle N=150 | | Low N=49 | |
|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 4.84 | 6.792 | 6.25 | 7.086 | 10.92 | 11.858 |

From the table 58.1 mean and standard deviations of socio economic status on Health Related Depression have found. Mean scores from the table shows that the subjects who belongs to low socio economic status have higher mean scores in Health Related Depression (M=10.92; S.D=11.858). Those who belongs to upper socio economic status have low level of Health Related Depression (M=4.84; S.D=6.792). Which states that the diabetic self management like diabetic diet and food on time and following medications on time will be difficult for those who are in low socio economic class, the expenses for medications are beyond to meet by them. This will lead to increased depression in them.

**Two-way Interaction**

In the two-way interaction, analysis was done among sub groups of three variables namely, Age, Sex, Socio Status on Health related Depression. Table 58 shows that there is no significant two-way interaction found among these three variables.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of the levels of Age, Sex and Socio Economic Status. Table 58 shows that the

three way interaction between levels of Age, Sex and Socio Economic Status is not significant on Health Related Depression.

**Sex, Education and Marital Status on Health Related Depression**

To find out the role of Socio Demographic variables namely, Sex, Education and Marital Status on Health related Depression, a three-way ANOVA has been used and the important observations are presented below.

*Table 59: Results of Three Way ANOVA of Sex, Education and Marital Status on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A<br>Sex | B<br>Education | C<br>Marital Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 8.019** | 5.309** | 4.300** | 1.316 | 5.476** | 1.559 | 1.76 |

**p<0.01 *p<0.05

From table 59 one-way, two-way and three-way interactions among the socio demographic variables specifically, Sex, Education and Marital Status on Health Related Depression can be found. Main effects indicate significant F-values for Sex, Education and Marital Status on Health Related Depression. There is Significant two way interaction between Sex and Marital Status and there is no significant three way interaction found between Sex, Education and Marital Status on Health Related Depression.

**Main Effects**

a) Sex on Health Related Depression.

Sex is categorized in to two groups, viz., (male and female) and the two groups have been tested for their mean values for the dependent variable Health Related Depression. The result shows that significantly higher mean value for male group comparing female group. It can be noticed from table 59 that Sex has significant role in Subjective Well Being of people with type 2 diabetes (F= 8.019; p<0.01). The mean and standard deviation of Marital Status on Health Related depression has already discussed in the table 57.1.

b) Education on Health Related Depression.

Education is categorized in to four sub groups, viz., below secondary education, higher secondary, degree and technical education and these four groups have been tested for their mean values on the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for primary level education group compared to other groups. It can be noticed from table 59 that Education has significant role in Health Related Depression of people with type 2 diabetes (F= 5.309; p<0.01).   This result shows that the education has an important effect in the health related depression in type 2 diabetic individuals. This result was supported by studies conducted in China (Yang., Li & Zheng, 2009; Copeland., Checkoway, & McMichael, 1977) found that there is a significant association between low levels of education and depression. This may be due to the diabetes self care education and monitoring will be more difficult to those with low level of education compared to those with higher education.

*Table 59.1: Mean and Standard Deviation of Education on Health Related Depression*

| Education | Primary (N=146) | | Higher Secondary (N=36) | | Degree (N=66) | | Technical Education (N=8) | |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Health Related Depression | 8.9 | 9.46 | 4.08 | 5.369 | 3.67 | 5.82 | 7.62 | 4.78 |

Table 59.1 shows mean and standard deviations of Education on Health Related Depression. Based on the mean scores, it can be reported that the participants with primary education have higher Health Related Depression (M=8.9; S.D=9.46). Those with degree level education have low Health Related Depression (M=3.67; S.D=5.82).

c) Marital Status on Health Related Depression

Marital status is categorized in to four sub groups, viz., unmarried, married, separated and widowed and the four sub groups have been tested for their mean values for the dependent variable (Health Related Depression). The result shows that significantly higher health related depression for widowed group compared to other three groups. It can be noticed from table 59 that marital Status has a significant role in Health Related Depression of people with type 2 diabetes (F= 4.3; p<0.01). The mean and standard deviation of Marital Status on Health Related depression has already discussed in the table 57.2.

**Two Way Interactions**

a) Sex and Marital Status on Health Related Depression

In this step the analysis carried out to assess the difference in the scores in Health Related Depression among type 2 diabetic people as a result of their Sex and

Marital Status. From the table 59 the two way interaction between the sub groups of Sex and Marital Status yields a significant F-ratio on Health Related Depression (F=5.476, p<0.01). From the descriptive analysis of sub groups of sex and marital status shows that some of the combinations of the levels of variables have no sample representations, and also found missing cells for some of the groups, therefore further analysis has been avoided.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of sub groups of Sex, Education and Marital Status. The Table 59 shows that the three way interaction between levels of Sex, Education and Marital Status is not significant on Health Related Depression.

**Education, Socio Economic Status and Marital Status on Health Related Depression**

To find out the effect of Socio Demographic variables Education, Socio Economic Status and Marital status on Health related Depression, a three-way ANOVA has been used and the important observations are presented below.

*Table 60: Results of Three Way ANOVA of Education, Socio Economic Status and Marital status on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Education | B Socio Economic Status | C Marital Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 3.347* | 3.404* | 2.432 | 3.379** | .527 | 2.874* | 3.259* |

**p<0.01 *p<0.05

Table 60 shows one-way, two-way and three-way interaction among the socio demographic variables Education, Socio Economic Status and Marital Status on Health Related Depression. Main effects indicate significant F-values for Education and Socio Economic Status on Health Related Depression. There is Significant two way interactions between Education and Socio Economic Status and Socio Economic Status and Marital Status. There is also significant three- way interaction found among Education, Socio Economic Status and Marital Status on Health Related Depression.

**Main Effects**

a) Education on Health Related Depression.

Education is categorized in to four groups, viz., (below secondary education, higher secondary, degree and technical education) and these four sub groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for below secondary level of education group compared to other groups. It can be noticed from table 60 that Education has significant role in Subjective Well Being of people with type 2 diabetes (F= 3.347; p<0.05). The mean and standard deviation of Education on Health Related Depression has already discussed in the table 59.1.

b) Socio Economic Status on Health Related Depression

Socio Economic status is categorized in to three sub groups, viz., upper, middle and lower class and the three sub groups have been tested for their mean values for the dependent variable (Health Related Depression). The result shows that significantly higher mean value for people belong to lower socio economic status for Health Related Depression compared to other two groups. It can be noticed from table 60 that Socio Economic Status has significant role on Health Related Depression of people with type 2 diabetes (F= 3.404; p<0.05).  The mean and standard deviation of Socio Economic Status on Health Related Depression has already discussed in previous sections (table 58.1).

**Two Way Interaction**

a) Education and Socio Economic Status on Health Related Depression

This step of analysis carried out to assess the difference in the in the scores in Health Related Depression among type 2 diabetic people as a result of levels of their Education and Socio Economic Status. From the table 60 the two way interaction between the levels of Education and Socio Economic Status yields a significant F-ratio on Health Related Depression (F=3.379, $p<0.01$).

*Table 60.1: Mean and Standard Deviation of Education and Socio Economic Status on Health Related Depression*

| Variables | | Education | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Primary (N=146) | | | Higher Secondary (N=36) | | | Degree (N=66) | | | (Technical Education) N=8 | | |
| | | Socio Economic Status | | | | | | | | | | |
| | | Upper N=16 | Middle N=90 | Low N=40 | Upper N=9 | Middle N=21 | Low N=6 | Upper N=28 | Middle N=36 | Low N=2 | Upper N=4 | Middle N=3 | Low N=1 |
| Health Related Depression | Mean | 4.44 | 8.22 | 12.20 | 5.67 | 3.71 | 3 | 4.43 | 2.61 | 12 | 7.5 | 8.67 | 5 |
| | S.D | 4.604 | 8.142 | 12.37 | 9.124 | 3.523 | 3.521 | 7.275 | 3.092 | 15.556 | 6.56 | 3.215 | 0 |

Based on the mean scores, it can be obtained from table 60.1, that the group belonging in the Primary level of education and low Socio Economic Status experiencing High Level of Health Related Depression (M=12.20; S.D=12.37). And the group belongs to Higher Secondary Education and Low Socio Economic Status experiencing low level of Health Related Depression (M=3; S.D=3.521).

b) Socio economic Status and Marital Status on Health related Depression.

This step of analysis carried out to analyze the difference in the scores in Health Related Depression among type 2 diabetic people as a result of levels of their Socio Economic Status and Marital Status. From the table 60 the two way interaction between the levels of Socio Economic Status and Marital Status yields a significant F-ratio on Health Related Depression (F=2.874, $p<0.05$). From the

descriptive analysis of levels of socio economic status and marital status indicates that some of the combinations of the levels of variables have no sample representations, and also found missing cells for most of the groups. Therefore further analysis has been avoided.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of the levels of Education, Socio Economic Status and Marital Status. From the Table 60 it can be found that the there is significant three way interaction between levels of Education, Socio Economic Status and Marital Status on Health Related Depression.

**Marital Status, Age and Socio Economic Status on Health Related Depression**

To find out the role of Socio Demographic variables Marital Status, Age and Socio Economic Status on Health related Depression, a three-way ANOVA has been used and the important observations are presented below.

*Table 61: Results of Three Way ANOVA of Marital Status, Age and Socio Economic Status on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
|---|---|---|---|---|---|---|---|
| | | | | 2-way | | | 3-way |
| | A Marital Status | B Age | C Socio Economic Status | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 5.134** | .919 | 4.745** | 1.238 | 2.155 | 1.175 | .383 |

**p<0.01 *p<0.05

Table 61 shows one-way, two-way and three-way interaction among the Marital Status, Age and Socio Economic Status on Health Related Depression. Main

effects indicate significant F-values for Marital Status and Socio Economic Status on Health Related Depression. There is no Significant two way and three way interactions found among Marital Status, Age and Socio Economic Status on Health Related Depression

**Main Effects**

a) Marital Status on Health Related Depression

Marital status is categorized in to four sub groups, viz., unmarried, married, separated and widowed and the four groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for widowed group comparing other three groups. It can be noticed from table 61 that marital Status has significant effect on Health Related Depression of people with type 2 diabetes in Kerala population (F= 5.134; p<0.01). The mean and standard deviation of marital status on health related depression has already discussed in table 57.2.

b) Socio Economic Status on Health Related Depression

Socio Economic status is categorized in to three sub groups, viz., upper, middle and lower class and the three groups have been tested for their mean values for the dependent variable (Health Related Depression). The result shows that significantly higher mean value for people belong to lower socio economic status compared to other two groups. It can be noticed from table 61 that Socio Economic Status has significant effect on Health Related Depression of people with type 2 diabetes (F= 4.745; p<0.01). The mean and standard deviation of Socio Economic status on Health Related depression has already discussed in table 58.1.

**Two-way Interaction**

In the two-way interaction, analysis was done among the three different variables Marital Status, Age and Socio Economic Status on Health related Depression. Table 61 indicates that there is no significant two-way interaction between these three variables on Health Related Depression.

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of the levels of Marital Status, Age and Socio Economic Status. From the Table 61 it can be found that the three way interaction between levels of Marital Status, Age, and Socio Economic Status is not significant on Health Related Depression.

**Marital Status, Socio Economic Status and Sex on Health Related Depression**

To find out the effect of Socio Demographic variables specifically, Marital Status, Socio Economic Status and Sex on Health related Depression, a three-way ANOVA has been used and the important observations are presented below.

*Table 62: Results of Three Way ANOVA of Marital Status, Socio Economic Status and Sex on Health Related Depression*

| Variable | Main effects | | | Interactions | | | |
| | | | | 2-way | | | 3-way |
| | A Marital Status | B Socio Economic Status | C Sex | A-B | A-C | B-C | A-B-C |
| | F-value | F-value | F-value | F-value | F-value | F-value | F-value |
| Health Related Depression | 2.656* | 4.145* | 3.301 | 1.610 | 2.785 | 4.629** | 3.173* |

**p<0.01 *p<0.05

Table 62 shows one-way, two-way and three-way interactions among the sub groups of Marital Status, Socio Economic Status and Sex on Health Related Depression. Main effects indicate significant F-values for Marital Status and Socio Economic Status on Health Related Depression. There is significant two way interaction between Socio Economic Status and Sex on Health Related depression.

There is also Significant three way interaction found among sub groups of Marital Status, and Socio Economic Status and Sex on Health Related Depression

**Main Effects**

   a) Marital Status on Health Related Depression

Marital status is categorized in to four sub groups, viz., unmarried, married, separated and widowed and the four groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for widowed group compared to other three groups. It can be found from table 62 that marital Status has significant effect on Health Related Depression of people with type 2 diabetes (F= 2.656; $p<0.05$).   The mean and standard deviation of marital status on health related depression has already discussed in table 57.2.

   b) Socio Economic Status on Health Related Depression

Socio Economic status is categorized in to three sub groups, viz., upper, middle and lower class and the three sub groups have been tested for their mean values for the dependent variable (Health Related Depression). The result indicates that significantly higher mean value for people belong to lower socio economic status comparing other two groups. From table 62, it can be found that Socio Economic Status has significant role on Health Related Depression of people with type 2 diabetes (F= 4.145; $p<0.01$).   The mean and standard deviation of Socio Economic status on Health Related depression has already discussed in table 58.1.

**Two way interaction**

   a) Socio economic Status and Sex on Health related Depression.

This step of analysis was carried out to examine the difference in the scores in Health Related Depression among type 2 diabetic people as a result of levels of their Socio Economic Status and Sex. From the table 62 the two way interaction between the levels of Socio Economic Status and Sex yields a significant F-ratio on Health Related Depression (F=4.629, $p<0.01$).

*Table 62.1: Mean and Standard Deviation of Socio Economic Status and Sex on Health Related Depression*

| Variables | | Socio Economic Status | | | | | |
|---|---|---|---|---|---|---|---|
| | | Upper N=57 | | Middle N=150 | | Lower N=49 | |
| | | Sex | | | | | |
| | | Male N=29 | Female N=28 | Male N=66 | Female N=84 | Male N=27 | Female N=22 |
| Health Related Depression | Mean | 5.9 | 3.75 | 6.05 | 6.42 | 10.78 | 11.09 |
| | S.D | 8.77 | 3.68 | 7.098 | 7.12 | 13.29 | 10.13 |

Mean scores obtained from the table 62.1, shows females belonging to low Socio Economic Status experiencing high level of Health Related Depression (M=11.09;S.D=10.13). And the group belongs to middle Socio Economic Status and married experiencing low level of Health Related Depression (M=2.5; S.D=2.33).

**Three-way Interaction**

A three-way ANOVA was conducted to find out independent and interaction effects of the levels of Marital Status, Socio Economic Status and Sex. From the table 62 it can be found that there is significant three way interaction between levels of Marital Status, Socio Economic Status and Sex on Health Related Depression that means these three variables together have an effect on health related depression of type 2 diabetic patients.

## Chapter V

# DESIGNING INTERVENTION

❖ Self Care

❖ Social Skills

❖ Cognitive Behaviour Therapy

❖ Relaxation

Diabetes is the fastest growing chronic illness. Diabetes Mellitus and its associated complications impose a huge problem in the area of health care worldwide. Many factors have contributed to the occurrence of Diabetes Mellitus. There are important physical factors like uncontrolled diet and lack of exercise which play a significant role in the raise of the diabetic population in India. Apart from these physical factors recent researches in this area have identified many psychological factors which are also related to diabetes. Numerous studies existed in the related area. Those studies described the relationship between type 2 diabetes and psychological factors in two different aspects. One set of studies were described as type 2 diabetes was caused due to many psychological factors like perceived stress or lack of subjective well being etc. and the other set of studies illustrates the correlation between the psychological factors and type 2 diabetes. Whatever it may be, either correlated factor or causal factor, the present study has given importance that is being existed with the type 2 diabetes, while addressing them, for the purpose of the study. And the assessment of psychological factors related to diabetes would be very important in the treatment of type 2 diabetes. The present research explores psychological factors influencing type 2 diabetes and designed a psychological intervention package to modify those factors. From the data collected from the type 2 diabetic patients the researcher identified the following psychological factors related to diabetes, and they are: Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, Perceived Stress, Diabetic Self-Care, Health related depression, and type D personality.

Diabetes Mellitus and its associated complications impose a huge health care burden worldwide, this burden is expected to increase further with the International Diabetes Federation's prediction of an increase in the number of individuals with diabetes from 240million in 2007 to 380 million in 2025, with 80% of the disease burden in lower-and middle-income countries (Diabetes Atlas,5th ed 2011). In these expectations more than 60% of this population with Diabetes Mellitus will come from Asia, implying substantial increases in prevalence in each

country in the coming decades especially in developing countries like India and China (Diabetes Atlas 3rd ed.).  Results show that Diabetes Mellitus would have claimed 1,008,000 lives in India, 575,000 in China and 231,000 in the US in 2010. (Roglic., & Unwin , 2010).  Diabetes is growing alarmingly in India, home to more than 65.1 million people with the disease, compared to 50.8 million in 2010 (International Diabetes Federation, Diabetes Atlas, 6th ed 2013).

There is a strong link between the worlds of Clinical Health Psychology and Endocrinology. First, the most endocrine disorders have affective and behavioural features, some of which can be fairly dramatic. Second, the medical management of the most prevalent endocrine disorder (diabetes) depends heavily upon the patient behavior. Even though "psychological status" is the fifth leading predictor of mortality in diabetes (Davis, Hess, &Hiss, 1988), psychological variables tend to receive a reduced amount of emphasis than biological assays that are actually less predictive of outcomes. Third, the personal burden of some endocrine disorders (e.g., diabetes) and endocrine treatments (e.g., steroid medications, replacement hormones) can create marked psychological effects which psychologists often need to anticipate, explain, and/or treat. Finally, there is an increasing evidence for a genetic predisposition to the most prevalent type of diabetes. For the practicing psychologist, this can be expected to give more importance to family issues, ethical concerns surrounding testing and disclosure of results, and practice issues related to modification of behavioural risk.

In the present study the intervention package designed by the researcher was based on the 'tertiary prevention model' (McMurry 2007), which can be implemented when the disease could not be cured or the illness process is prolonged. Its aim is to assist individuals (and their family and careers) to cope with a change in their health status, to limit disability from the health problem and to promote health and quality of life. Interventions include treatment programs for chronic illnesses; rehabilitation and recovery programs for conditions like mental illnesses are followed in this technique. Recovery is the goal of tertiary prevention (Rickwood, 2006). Recovery for the client refers to living well with a chronic illness or

disability. It may include learning about the conditions and what triggers episodes, creating awareness on related conditions and making lifestyle changes. For the health professional it means not only working with the client to manage the symptoms of the health problem, but also to work with the client to manage a life lived with disability. The approach acknowledges that the lifestyle can positively or negatively influence the chronic illness. A recovery approach also includes recognition of and attention to social economic and political aspects of people's lives as well as their illness or disability. In this model of intervention the health professional and the client work together in partnership to maximize the quality of life for the person living with chronic illness or disability.

To ensure recovery for the type 2 diabetic patients, to enable them to live well with their chronic illness, in the present research the researcher designed a psychological intervention package. As an initial phase of the designing of intervention package the researcher identified the psychological techniques with theoretical base, which will be effective to modify the common psychological factors identified in type 2 diabetics. The researcher found that, diabetes self care management had a direct positive association with good glyceamic control, which indicated that self- efficacy and glyceamic control are significantly related (Nakahara et al., 2006). And diabetes requires continuous self-management by controlling diet, maintaining regular exercise, taking medication, and monitoring blood glucose (American Diabetes Association, 2011).

Enhancing the patient's quality of life is also important in diabetes care, which states that a patient's quality of metabolic control and overall Quality of Life can be predicted by perceived ability to control his or her diabetes and the anticipated benefits of this control which predict adherence to diet and other treatments. Patients having major physical complications due to diabetes show worse health related quality of life, knowledge of health burden of diabetes and introducing alternative intervention strategies for preventing health burden will be helpful in diabetes treatment (Coffey, et al., 2002). Psychological and physiological well being of patients with diabetes is influenced not only by metabolic control, but

also influenced by how the patients perceive treatment efficacy and how they feel. This states that, Quality of life has a stronger association with hyperglycemic and hypoglycemic symptoms, than with HbA1c levels (Kleefstra et al., 2005).

Experiencing health related depression is common in type 2 diabetics. The causes behind the experience of depression state that depression and glycemic control in diabetes have been linked with the behavioural mechanisms, such as impaired compliance with routine monitoring and treatment, and reduced adherence to diet (De Groot et al., 1999).

Psychological well being is an important factor what will be affected by the experience of stress in diabetics. There is a direct neurochemical experience, which states neurochemical effects on subjective well being by stressors: Experiencing stressors activates the hypothalamic-pituitary adrenal (HPA) axis, as evidenced by increased secretion of the stress hormone called cortisol. However, individual differences in psychological well being (including self-esteem and emotional style) can modulate stress - induced elevations in cortisol. Therefore, by reducing stress experience with psychological intervention techniques the psychological well being can be improved.

Based on the earlier studies demonstrating the effective psychological intervention for different psychological factors, the researcher designed particular intervention strategies useful for the modification of identified psychological factors affecting type 2 diabetics. And with the professional help from clinical psychologists the intervention strategies were designed based on the observed psychological needs for emotional, cognitive and behavioral functioning including treatment adherence to diabetic population.

The intervention strategy designed for the present study has been classified in to four major clusters based on the uniqueness in techniques used and the targeted psychological factors. They are:

- Self Care
- Social Skills

- Cognitive Behavior Therapy, and
- Relaxation

**Sample**

For the purpose of intervention a small sample of 50 participants were selected from the main study. They were provided with different techniques of intervention designed by the researcher either single or in combinations based on their nature of psychological factor which need to be modified, for a short duration of 8 weeks.

The first cluster of intervention techniques were designed to improve diabetes self care, that had identified significant effects on glycemic control in patients identified as type 2 diabetics. The intervention techniques to improve self care had been given to participants those with poor adherence to Diet, Exercise and Glucose Level monitoring (Those who had low scores in Self Care Inventory).

**Self-Care**

Diabetes mellitus is a physical condition caused by the excessive amount of glucose in blood; therefore the importance has been given into techniques which are effective to control blood glucose level, in designing intervention strategies. Diabetes can be controlled by enhancing self care activities. Diabetes self care intervention recommended three basic areas for modification in type 2 diabetics, they are following;

1. **Diet**: Adherence to the diabetic diet is the most important factor in controlling fasting blood sugar level in type 2 diabetic patients. International diabetes federation (2005) has general nutrition recommendations for patients with type 2 diabetes. Of the total energy intake 50-55% should come from carbohydrates and 30% or less from fat. Fruits, vegetables, legumes and whole grain products are an important part of the carbohydrate intake as they have beneficial effects on blood fats and blood sugar control (Nishida, Martinez & Mann, 2007). The protein intake should be 15-20% of the total intake and the salt intake should be less than 6g per

day. Those who are able to follow these recommendations can easily get their fasting blood sugar level under control.

An accurate food planning will help the diabetes patients to maintain a stable blood glucose level, reduce the cardiovascular risk factors and help the patient to get a well balanced diet. Monitoring of metabolic parameters as HbA1c, blood glucose, control of blood pressure, body weight as well as quality of life are also essential to asess the need for changes in diet therapy (International Diabetes Federation, 2005).

The researcher instructed the participants to divide their diet into 6 small meals based on the proportions of the total energy intake that should come from each food category. They were provided with a diet chart for diabetics (Appended as appendix 9) prepared by the dietitian based on the energy requirements of type 2 diabetics, the researcher gave freedom to participants to select the alternative food items of the recommended items in the diet chart based on their own taste preference, that ensuring the same content and energy level (for example, instead of oats the patient can chose whole wheat).

The researcher also gave awareness of the importance to eat the right amount of carbohydrate without increasing blood glucose or triglycerides by eating low Glycemic Index (GI), high-fiber carbohydrate. Foods that are both low GI and high fiber include oats, legumes and fruits. The participants were instructed to follow the diet for continuous eight weeks. They were also provided with recording sheets (Appended as Appendix 10) on which the fixed time for having food was to be written, and marking space for recording the compliance of diet for every day basis. Participants were required to continue the same for a period of eight weeks.

At the end of eighth weeks they were instructed to hand over the schedule in which the diet adherence has been recorded. From this the researcher could analyze the participant's pattern of diabetes diet adherence. Among the total participants selected for the intervention, 6 participants were provided with diet chart and among these only 3 participants were followed the diet chart as recommended by the investigator. Others discontinued due to the lack of opportunities in the family.

2.     **Exercise**: The self care intervention also gave importance to the modification of physical activity in type 2 diabetic individuals. Physical activity is a key element in the type 2 diabetes, as it can help the patient to lose weight, and then also improve the body's insulin sensitivity and glycemic control. Reduction of body weight will make the diabetes patient's insulin production sufficient again and the blood sugar levels will become closer to normal (Guerci et al., 2003; Svenska diabetesorbundet, 2006). When performing physical activity it is still though important for diabetes patients to adjust their food intake and medications to avoid hypoglycemia (International Diabetes Federation, 2005).

With exercise, insulin levels in non-diabetics and people with type 2 diabetes decline because insulin acts to store and not be release glucose and fat. Levels of glucagon, adrenaline, cortisol and growth hormone increase to provide more glucose. Studies have shown that glucagon is responsible for 60 percent of the glucose, and adrenaline and cortisol are responsible for the other 40 percent. If insulin doesn't fall, glucagon can't stimulate the liver to make glucose. (Rubin & Jarvis, 2011).

The common health goal is to achieve at least 150 minutes of physical activity every week, and it has been shown that people who have diabetes and exercise regularly have considerably lower mortality rates over 12-14 years. Strength developing activities should therefore be performed at least twice a week, and it is important to adopt other healthy lifestyle habits as well, for example, using the stairs instead of the elevator or walking to the shop instead of driving (International Diabetes Institute, 2005). The instructions were given to the participants to be physically active minimum of an hour every day, also instructed to brisk walk for at least 30 minutes or half of the total time they have to spend for exercise. The participants who were unable to practice physical activities on single session continuously for an hour, were instructed to break up the total required time of one hour into two 30 minutes sessions in morning and evening based on the patients' convenience.  These participants have been provided with recording sheets which consisted of the space for marking the physical activity on every day basis for

continuous eight week period (Exercise recording sheet is appended as appendix 11).

Benefits of exercise on daily basis for in type 2 diabetes (Rubin & Jarvis, 2011):

- Exercise helps with weight loss in type 2 diabetes.
- Exercise lowers bad cholesterol and triglycerides, and raise good cholesterol.
- Exercise lowers blood pressure
- Exercise lowers stress levels
- Exercise reduces need for insulin or drugs
- Exercise helps maintain muscle mass and reduces fat

Among the total 6 participants provided with the exercise recording sheets, 4 followed schedule for eight weeks without fail the remaining participants had discontinued due to physical problems (like muscle pain and joint pain) and due to some distractions or other engagements. These eight weeks were monitored by the researcher either through direct home visit or through phone calls. Among the total participants who were provided with this intervention more than half strictly followed the schedule and reported slight decrease in fasting blood sugar level.

3.   **Health Monitoring & Record keeping**: Those who have poor adherence to diabetes self care management, the therapist has educated them the importance of regular checkups of Fasting Blood Sugar along with the diet and exercise modification. Regular checkups of blood glucose level were very important in type 2 diabetics. Keeping blood glucose level under tight control undoubtedly reduces the chance of developing complications of diabetes. If the patient is taking insulin, he can adjust insulin dose depending on the blood glucose levels. Keeping a 'glucose profile' carry out a random selection of blood glucose tests at different times of the day, can be very useful to analyze the variation of blood glucose levels within the patient in different times. So the participants were instructed to check Fasting Blood Sugar and blood sugar level after having food on Weekly basis for continuous eight weeks and keep it as a record. To record the results they were provided with a diary,

and they were instructed to bring that diary to the researcher after the period of eight weeks. Rationale of self care in  management of type 2 diabetes is given in the following figure;
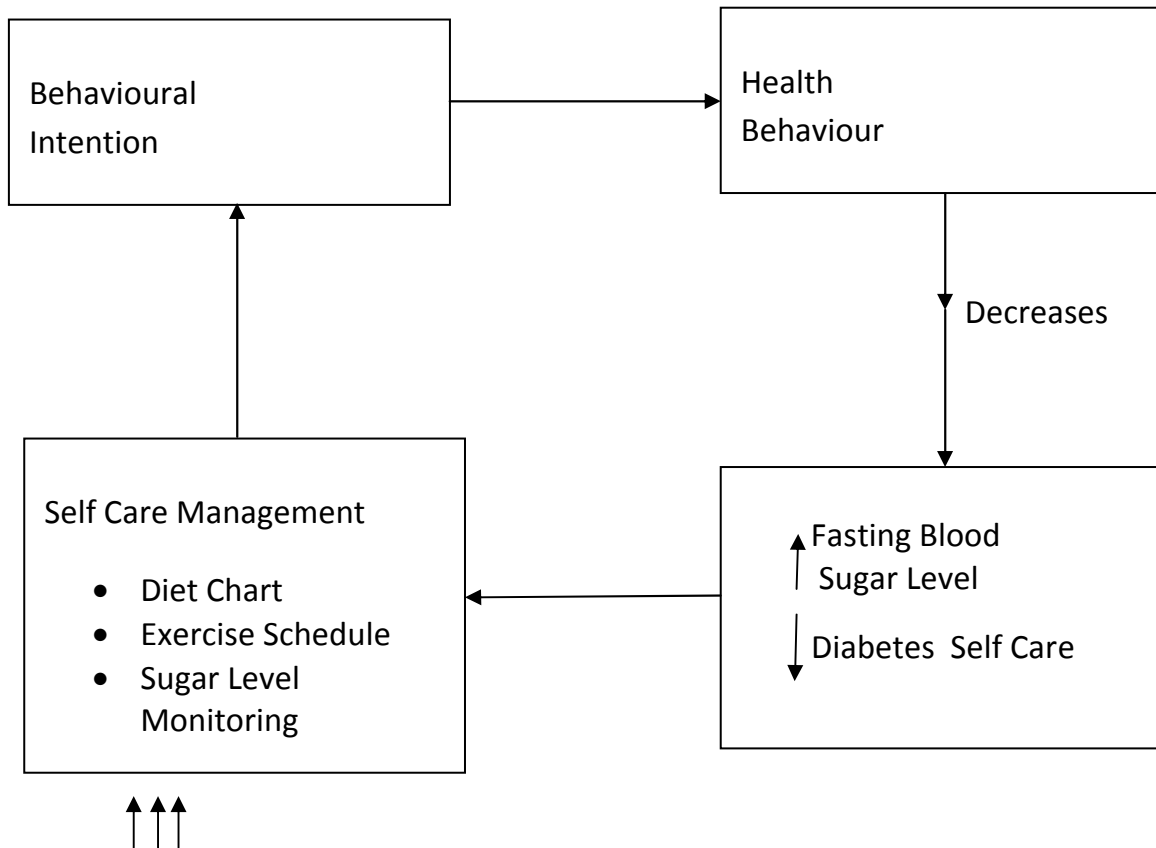


*Figure 6: Rationale of Self- Care in Diabetes Management*

**Social Skill Training**

"Life skills are abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life" (WHO). Adaptive means that a person should have the flexibility to adjust according to the situation. For positive behavior, a person needs to have positive thinking look at opportunities even in difficult situations, in order to cope with the situation.

Life skills are a group of psycho-social competencies and interpersonal skills that help people make informed decisions, communicate effectively, and develop coping and self-management skills to lead a healthy and productive life. In the

present study life skill /social skill training interventions had given to those having low scores in Perceived Social Support or Diabetes Related Quality of Life or Subjective Well Being. Enhancing perceived social support was the major goal of this intervention technique in the present study. Because perceived social support affects almost all areas of life of an individual, which is very essential factor to determine the meaningfulness and satisfaction of life and the positive perspective of life, which positively effects the self care management of type 2 diabetics.

Social support is one of the most important factor which helps to cope with perceived stress experiencing type 2 diabetics, studies state that, perceived social support is more important than actual social support; and perceived social support related to one's diabetes routine was most strongly related to compliance with diet and management. Subjects with better social supports are significantly better controlled than subjects with low supports in high life stress conditions. Decreased perceived social support predicts deterioration of control (Schwarz et al., 1991). Emotional support to patients significantly increases the active coping for the disease, and influence controllability of health, and also reduces helplessness. Controllability of health is affected by behavioral support. Self-efficacy reduces stress response of patients. It was also found that higher perceived availability of social support have observed in subjects who received support from their children, compared to those who are not receiving support from their children (Kanbra, 2008). Type 2 diabetics' positive perspective toward life and satisfaction can be improved by making them active in the social setting, have interpersonal relationships in family or society and they are active involvement in different activities based on their age which can help them to be engaged, which will in turn decrease the stress due to the diabetes and the feeling of meaninglessness in life.

The researcher designed this cluster of intervention to improve social functioning of type 2 diabetic individuals by modifying four areas that enhancing individuals social functioning.

1.     **Self awareness**: Self awareness is recognition of 'self', our character, our strengths and weaknesses, desires, likes and dislikes and skills. To improve self

awareness the participants has been given short term counseling. In this counseling session the researcher made them aware of their strengths and weaknesses which require improvement. Self awareness is very important to the management of type 2 diabetes, because the patients have to be aware of the importance of their efforts to manage self care to save them from the long term complications of diabetes. If the patient is ready to accept the type 2 diabetes as a comparatively curable lifestyle disease with some changes in lifestyle, will enhance the patient's life satisfaction and well being.

2.      **Effective communication**: Effective communication is the ability to express, verbally through spoken or written language and non-verbally through gestures and body movements, in ways that are culturally acceptable. The next area of the intervention was to enhance social functioning is effective communication, which is one of the most powerful techniques to reduce stress. Most of individuals who had reported reduced social support are due to lack of healthy communication. Effective communication not only enhances social support but it makes the individuals do a self assessment compared to the other persons in the society, this will help the patients to think in more positive manner about their illness and also they can reduce their inner stress through communicating with others. If the patient is telling about the problems faced by him due to the diabetes to others and is sharing experiences with others having diabetes, it will help to decrease over concern and to become motivated to do the self care activities. For improving effective communication the therapist recommends the participants to follow the tasks for continuous eight week period.

The participants were instructed to follow the recommendations which help to enhance communication, they are;

➢      Talk to at least one person every day ,other than the family members

➢      Actively participate in social activities or ceremonies,

➢      Go to the nearest supermarkets or shops to purchase  house hold items and try to talk to the  people there,

➢ Start telling 'no' to things what are not pleasing to them to do, hear, eat, see etc.

➢ Take initiative to make all family members sit together at the end of the day and discuss things that happened in the whole day.

3.    **Empathy**: Empathy as an emotional response that stems from another's emotional state or condition and that is congruent with the other's emotional state or condition. (Eisenberg, 2000). Empathic understanding of surrounding others was helpful to individuals to generalize their illnesses and discomforts due to the illness. The researcher made the participants aware of being empathic while living in a society, and the effect of empathic understanding on others will help to reduce the negative perspectives of life due to physical conditions associated with type 2 diabetes. If the patient has empathic understanding he/she will be able to think about the difficulties of people living in worse physical conditions, handicapped, differently able and people with severe illness or those who are confined to bed; and compare it with their own illnesses connected to diabetes. This will also help to enhance the self care management because of knowledge that their illness can be controlled to an extent by themselves, which was impossible for the illnesses that made permanent damage to the person.

4.    **Interpersonal relationship**: An interpersonal relationship is an association between two or more people; this may be based on inference, love, solidarity, regular business interaction or some other type of social commitment. Interpersonal relationship is the ability to establish positive relationship and it helps us to relate in positive ways with the people we interact with. This means being able to make and maintain friendly relationships, which can be of great importance to our mental and social well being. Interpersonal relationships are formed in the context of social, cultural and other influences. Interpersonal relationship is very important to improve subjective well being in individuals suffering from chronic illnesses. In the present intervention technique to improve social functioning in type 2 diabetics the participants were instructed to practice following tasks to improve interpersonal communication.

Participants in this group have been provided with an 'activity schedule'/ time table; which is generally given to those who are in poor activity level, based on the decreased score in Perceived Social Support and reduced Subjective Well Being in the present study.

The investigator designed an activity schedule suitable for type 2 diabetic patients based on their physical condition, age and family setting. The schedule consists of the activities from immediately after wake up in the morning till night, e g., 'between 7 am and 9 am walk for a minimum of one kilometer or walk to the nearest junction of home and try to wish maximum people those who are come across the road' (A model of activity schedule is appended as appendix 12). The schedule consists of the spaces for recording each activity on every day basis. The respective family members were instructed to monitor the activities and to assist the participant to mark on the space provided in the schedule.

The investigator recommended them to hand over the marked schedules after continuous eight weeks, among the 4 participants only 2 had successfully followed the activity schedule the remaining 2 had discontinued after 3 to 5 weeks due to their personal difficulties. The participants, who were successfully completed, have reported a noted improvement in subjective well being. And their family members had reported a notable change in their activity level and motivation to be engaged. Rationale for using social skill training in the management of type 2 diabetes has given in the following figure;
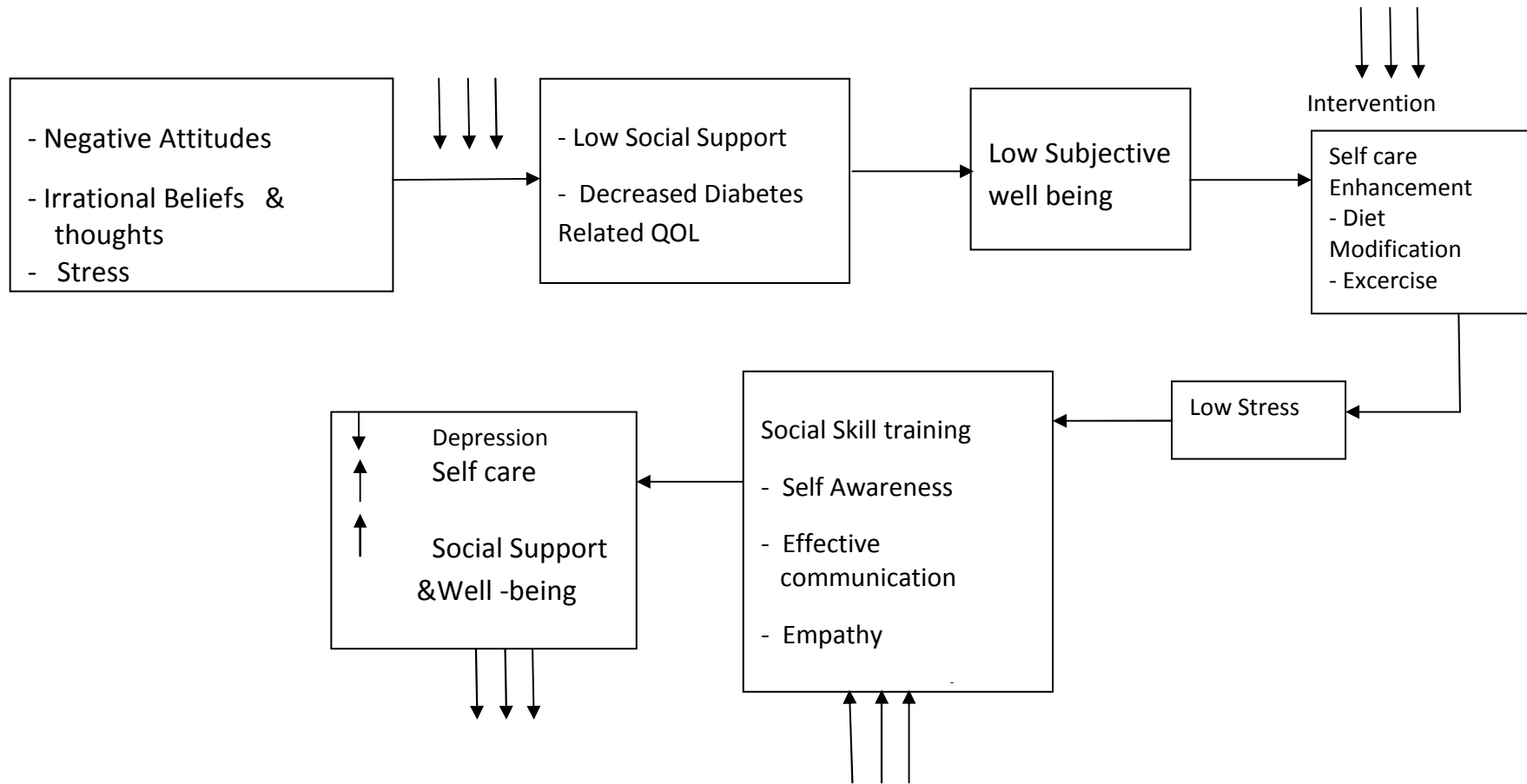
*Figure 7: Rationale of Social Skills in Diabetes Management*

**Cognitive Behavioural Therapy (CBT)**

Cognitive Behaviour Therapy is a combined form of cognitive and behavioural approaches. Cognitive behavior therapy tries to change and restructure patients' distorted and or irrational thoughts. To implement Cognitive Behaviour Therapy techniques the investigator adapted the Motivational Interviewing approach developed by Miller & Rollnick, (2002). Motivational interviewing as a therapeutic intervention, that aims to encourage the individual to recognize the need for change and then to take action to bring about change. This model stresses the importance of the individual taking responsibility for initiating and implementing the behavior change.

In motivational interview the individual is encouraged to explore all the beliefs and values they hold for and against a behavior which requires change- to thereby create a state of cognitive dissonance (conflict) for the person. In this approach, the therapist resists telling the person what they should or should not do and does not lead the person to a decision by coercion as this can lead to resistance (Palmer, 2008). Rather the role of therapist is to assist the person to come to his/ her own decision and to assist them in developing and implementing an action plan. For example, by eliciting statements like 'I enjoy eating chocolates and ice cream' and 'my fasting blood sugar level worsens because of this habit' the person is then encouraged to make a decision regarding whether they wish to stop eating chocolates and ice creams or not. If the person decides to make the behavioral change, that is case of eating chocolates, the therapist then assists the person to develop and implement a plan to facilitate the behavior change.

In the present study the researcher administered a combined form of Beck's cognitive therapy for depression and Albert Ellis's Rational Emotive Therapy (RET) based on motivational interview technique. In Beck's cognitive therapy, the client was asked to write down negative thoughts about themselves to find out why they are unjustified and why they have more destructive and unrealistic cognitions.  The basic assumption of Ellis's Rational Emotive Therapy is that people develop irrational ways of thinking. Therefore the therapist might challenge an irrational

belief that the client has, helping him or her to recognize these beliefs and changing them to more rational ones. (GRE, 2010). Cognitive Behaviour Therapy techniques had been given to those who had high scores in Perceived Stress or Health Related Depression or Type D personality.

For this cluster of intervention a group of 5 participants were selected .The therapist focuses the attention to modify three areas to improve individual's rational thinking instead of irrational thoughts by following techniques:

1.    **Attitude change**: Changing attitude is the most important factor to change behavior. The basis of attitude change is  Kelly's (Kelly, 1995) concept of constructs, Kelly's constructs were based on the idea that each individual looks at the world through his  or her own unique set of preconceived notions about it (I e., constructs). In the present intervention the participants' were instructed to write down their concerns regarding the occurrence of the type 2 diabetes.   The participants had written their difficulties like 'my life is useless because I couldn't consume food items what I wished to eat', 'I feel ashamed to disclose I am a diabetic patient to the public' etc.  instead of these thoughts the researcher trained them to restructure the thoughts as 'Diabetes is a lifestyle disorder, milder adjustments in lifestyle can regulate even without medicines' and  'nowadays diabetes is the common lifestyle disease which affects a huge number of people'  respectively. This basically enhances the patient's confidence to be diabetic and to change their own negative thoughts and health concerns. This will in turn decrease the perceived stress and negative affectivity in diabetic patients.

2.    **Irrational thinking:** In this cognitive therapy technique, the researcher mainly focused on the thoughts. Most common irrational thoughts experienced by diabetic patients were regarding the long term complications of type 2 diabetes. Examples of irrational thoughts in type 2 diabetics identified by the researcher are following; "diabetes will lead to damage of my Kidneys and I will die due to kidney failure", "doctor instructed me on last visit to take care of my eyes, and my eye sight is getting decreased day by day, I will become blind very soon", "I have a wound  on my leg, and doctor instructed me to clean that regularly and take medicines without

fail, this wound will spread to my leg and the solution is cutting my leg off". There are seen a number of such thoughts which make them very stressful and depressive.

In this session of intervention these identified irrational thoughts were noted down in a diary and the researcher helped the patients to take alternate thinking instead of irrational thoughts. And helped them to be courageous to think that early identification and treatment would reduce the complications caused by type 2 diabetes. Instead of 'I will die due to kidney failure' they were encouraged to think that 'the knowledge of the risk of kidney damage due to uncontrolled diabetes helps to improve diabetes self care to avoid that risk'. And instead of thinking 'my leg will be cut off as a permanent solution to cure spreading wound' the patient started thinking 'I have the responsibility to control diabetes to avoid the spreading of wound because of uncontrolled diabetes' that will motivate them to improve their self care management. These alternate thoughts also were noted in the dairy opposite to the irrational thoughts; and they were instructed to read the alternate thoughts whenever the irrational thoughts appear. And they required recording the frequency of irrational thoughts for the total duration of eight weeks. From the records handed over by the patients the researcher identified that the frequency of getting irrational became lowered in the first week itself. This will enhance the diabetes related quality of life and experience of life satisfaction in them and decreases health related depression.

3.      **Positive thinking & cognitive restructuring**: In this step the researcher enhances patients positive thinking related not only to their illness but also to their overall life. The most common negative thoughts seen in type 2 diabetics were based on their concern regarding they were diagnosed as diabetes, which is the disease what restricts to have the food items based on the patient's wish. Most of the patients believe that 'I am unlucky, that's why this deadly disease entered in to me', the researcher assisted them to identify the causal factors and scientific basis of diabetes occurrence and helped them to give importance to the management of illness other than the meaningless thoughts like unlucky. This helped them to take decisions regarding self care management and positive approach to illness.  This

decision making change their thinking pattern not only regarding illness but also their total life. Researcher identified negative thoughts of all the participants for this technique and wrote it down into a diary along with the positive thoughts, and instructed them to read positive statements when negative thoughts are in mind. This also continued for 8 weeks and the researcher followed up through the phone calls to them. Most of the participants in this group reported changes in thinking pattern by the end of first month itself.  Pictorial representation of rationale behind Cognitive Behaviour Therapy given in the following figure;
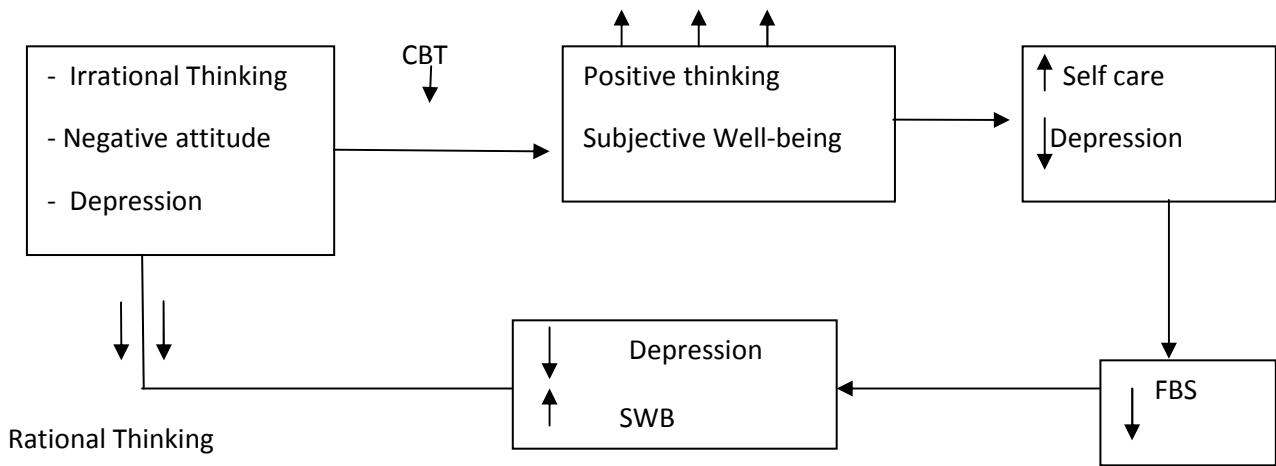


*Figure 8: Rationale of Cognitive Behaviour Therapy in Diabetes Management*

**Relaxation**

The fourth cluster of intervention was focused on the modification of the behavior in type 2 diabetics with relaxation techniques. Relaxation techniques were provided to those who are having high perceived stress and uncontrolled Fasting Blood Sugar; in the present study 5 participants were selected. The researcher used two relaxation techniques for the participants; they are

1. **Pranayama / Breathing exercise:** Pranayama is the breathing exercise, which is the simplest technique to reduce distress the researcher have demonstrated this breathing exercise to the participants. The participants were trained with simple breathing exercise. The steps of the breathing exercise  are following;

- Sit on the ground with legs crossed position (Padmasana)

- Breathe normally and concentrate mind on slowly inhaling breath in a maximum levelthe person can, hold the breath as long as possible and exhale very slowly.

- While practicing this, think about the happiest things in life that may be the image of a person, God or any other thing.

- Practice this exercise for at least minimum of 10 minutes a day preferably early morning with an empty stomach and in a calm and quite setting.

Health benefits of pranayama:

- Giving energy
- Relief from stress
- Strengthen mind
- Providing meditation effect
- Increases concentration

2.    **Progressive muscle relaxation**: The fundamental objective of relaxation training is to induce the relaxation response to overcome situational stress experiencing type 2 diabetics. For this, the researcher trained them to practice Progressive Muscle Relaxation. The short form of Jacobson's progressive muscle relaxation is used for the present study. This relaxation starts with the muscles of the left arm and proceeds to the right arm, left and right legs, abdomen, back, chest and shoulder muscles. The starting position is with the learner lying on his or her back, with the arms by the side.  The researcher administered relaxation technique once to the subject, and gave an audio CD to them to practice in their own home twice a day preferably early morning and evening in a calm and cool place. They were also given a schedule for marking how strictly they have practiced those techniques. These groups were monitored by the researcher through phone calls for eight week period.  Among the total of 5 participants both techniques only 3 were practiced these 2 techniques for eight weeks the remaining 2 were practiced only

berating exercise. After eight weeks they reported decreased stress and increased subjective well being, and fasting blood sugar level lessen comparatively as of before these training.  Rationale behind Relaxation training in management of type 2 diabetes has illustrated in the following figure;
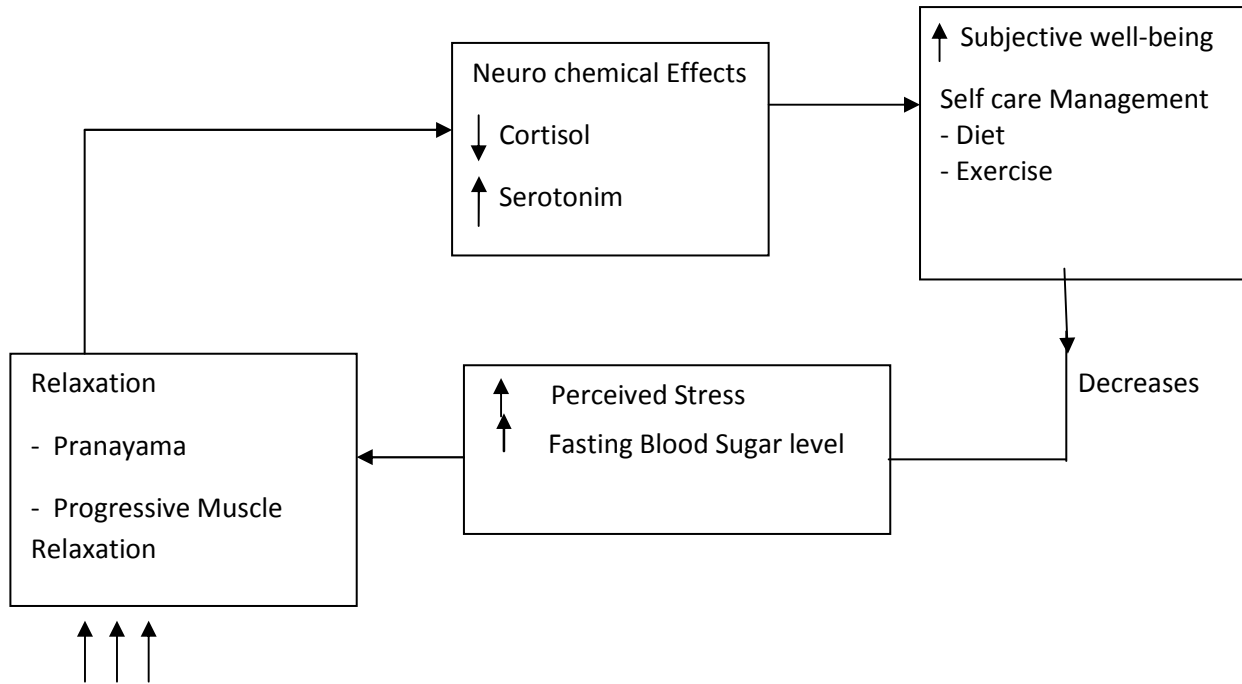


*Figure 9: Rationale behind Relaxation Training in Diabetes Management*

The participants have also been assigned into the combination of above mentioned intervention techniques of two or three based on the specific problem area which recognized from the participant's response to questionnaires. Detailed description of the combined intervention techniques is as follows;

**Self Care & Social Skill Training:**  A combination of these two techniques were given to those who obtained lower score in diabetes self care inventory or having poor adherence to diabetes self care and low perceived social support, decreased health related quality of life and low subjective well being. 3 participants were selected for this group. These participants were provided with diet charts and exercise schedules and also they were given training to improve social skills.

**Self Care & Cognitive Behaviour Therapy**: A combined technique of self care and cognitive behavior therapy has been recommended to those who have poor diabetes

self care and increased stress, experiencing health related depression or type D personality. For this combination of intervention 4 participants were selected, and they were provided with diet charts and exercise schedules and they were also given training in the areas of attitude change, changing irrational thoughts and negative thoughts by using above mentioned techniques.

**Self Care & Relaxation:** These two techniques together provided to those with poor adherence to diabetes self care, increased stress and uncontrolled fasting blood sugar level. In the present study these two techniques together given to 2 participants. They have given diet charts, exercise schedules for self care improvement and they were  trained to practice relaxation techniques as mentioned above.

**Social Skills & Cognitive Behaviour Therapy**: A combination of social skill training and cognitive behavior therapy techniques were recommended to those have difficulties with poor perceived social support, decreased health related quality of life and low subjective well being and high scores in health related depression and type D personality. 2 participants were chosen in to this group. The investigator trained them the techniques to modify social skills and to make changes in their thought process by using techniques of cognitive restructuring.

**Social Skills & Relaxation:** In the present study the investigator recommended  a combination of social skills and relaxation to diabetes patients with low perceived social support, decreased health related quality of life and subjective well being; and high scores in perceived stress and uncontrolled Fasting Blood Sugar level. 2 participants were selected to this group they were educated the techniques to improve social skills and above mentioned relaxation techniques.

**CBT & Relaxation** : A group of 5 participants were chosen to the combination of cognitive behavior therapy and relaxation, those having  increased perceived stress, health related depression and type D personality and with uncontrolled fasting blood sugar level. They were provided with the training in the areas of cognitive restructuring and instructed them to practice relaxation for a period of continuous eight weeks.

**Self Care & Relaxation:** A combination of self care and relaxation had given to 2 participants those with poor diabetes self care and those with increased stress and uncontrolled fasting blood sugar level. The investigator provided diet charts and exercise schedules to improve their self care and trained them to practice relaxation techniques.

**Self Care, Social Skills & Cognitive Behaviour Therapy**: These three intervention techniques together were recommended to 2 type 2 diabetic patients in the present study. They were acquired low scores in diabetes self care inventory, and reported poor social support and low health related quality of life and subjective well being and high scores in health related depression and type D personality. The investigator provided them the diet charts and exercise schedules to modify their self care behavior, and educated them to improve social skills and to restructure their thought process with cognitive behavior therapy techniques.

**Self Care, Social Skills & Relaxation:** The combination of these techniques were given to the participants with reduced diabetes self care, poor perceived social support and decreased health related quality of life and increased stress and uncontrolled fasting blood sugar level. 2 participants were included in this group and they were trained to lessen their difficulties by providing intervention techniques to improve self care, social skills and by practicing relaxation techniques.

**Self Care, Cognitive Behaviour Therapy & Relaxation:** These three interventions together were given to those with poor adherence to diabetes self care that may be caused by health related depression or perceived stress due to the occurrence of type 2 diabetes and also uncontrolled fasting blood sugar level.  2 participants were included in this group. They were provided with diet chart exercise schedules, diary which has to be written with positive thoughts as alternative for negative thoughts they were disclosed. They were also trained to do the relaxation techniques of pranayama/ breathing exercise and muscle relaxation.

**Social Skills, Cognitive Behaviour Therapy & Relaxation**: The combination of these three techniques were given to those who are having low scores in perceived social support, subjective well being and health related depression  and increased

perceived stress and health related depression and uncontrolled fasting blood sugar level. In the present study only 2 participants were given training in these combinations. The techniques to improve social skills and change irrational thinking were educated by the trainer and they were also trained to practice relaxation techniques.

**Self Care, Social Skills, Cognitive Behaviour Therapy & Relaxation:** Four clusters of intervention designed for the present study have together given to 2 participants, those who have attained low scores for all the positive variables of the study and high scores for the negative variables. And they also had uncontrolled fasting glucose level and poor self care. The investigator administered all the four clusters of intervention techniques to them for the continuous eight week period, and recommended regular follow up of every 2 weeks. After the period of eight weeks they have reported increase quality of life and well being and slight decrease in perceived stress and health related depression.

While designing four components and its classification, the present study would like to highlight in the influence of psychological assessments in health issues. Moreover, they uniqueness of an individual patients also is specified before giving intervention. The casual or correlated psychological background of a person has got its on effect on health and it could be addressed effectively in intervention. This also attempts to bring out the scope of a health psychologist.

# Chapter VI

# SUMMARY AND CONCLUSION

In this chapter summary of the study and includes problem and purpose of the study, important aspects of the entire research method and design, the major findings, the practical implications, researcher's observations, and suggestions for the further research are briefly presented.

In recent years the number of people diagnosed with life style illnesses are increased all over the world, so is in India and in Kerala. One of the most common lifestyle illnesses seen in Kerala is type 2 diabetes, and the recent statistics indicates that India is having the second largest diabetic population in the world. This may be attributed due to the adaptation of a sedentary life style, especially with increased use of junk foods, and jobs which do not require physical effort. After getting diangosed, most of the people have type 2 diabetes and immediately started taking medication to bring their blood sugar level under control. In usual terms, not only the patients but also the physicians are not thinking beyond the physiological causal factors of diabetes. With proper medication and adequate physical exercises the type 2 diabetes can be put under control, but in most of the cases the patients were unable to follow the expected self care adherence to diabetes and they were troubled with long term complications of type 2 diabetes like diabetic retinopathy, diabetic nephropathy and other complications. This was the underlying situation to the health psychologists to think about the psychological factors related to type 2 diabetes.

A number of studies were conducted among diabetics and specifically in their psychological arena, whereas the similar studies were found to be rare in India. Therefore the researcher conducted the present research in Kerala population. The present study was an exploration and the researcher identified the psychological factors related to the type 2 diabetes, which reduces the patients' motivation to adhere self care management, and factors which increase the blood sugar level with the physiological arousal caused by them, like perceived stress and health related depression. Moreover there were certain other factors that was helpful to increase patients' life satisfaction, like health related quality of life. Intervention        studies

attempted at many places in the world to address many psychological factors like relaxation, Cognitive Behaviour Therapy techniques and life skill modification. There had no such intervention strategies developed for controlling the identified psychological factors, here in the study, in type 2 diabetics, especially in individual and together, as per the need of the hour. Hence the researcher designed an intervention strategy specifically to the psychological factors identified in the diabetic people in Kerala, and tried to get a scientific justification behind it, with a due importance for the psychological assessment related.

The intervention strategy consisted of techniques to enhance life satisfaction, positive perspectives of life and subjective well being like life skills training and self care management techniques; and also the techniques to reduce the experience of perceived stress and health related depression, like relaxation training and cognitive restructuring. By means of feedback analysis of participants in intervention, the researcher identified the effectiveness of psychological intervention together with medication in type 2 diabetic patient's motivation to adhere the expected self care management techniques that helped to control blood sugar level and to prevent long term complications due to diabetes, ( though it was not a major aim of the study).

The present study identified psychological factors correlated with type 2 diabetics in Kerala. This will be very useful to the future researchers in the related areas and to the diabetes management in Kerala. The intervention strategy designed by the researcher can be utilized for the management of psychological factors in type 2 diabetics.

**Statement of the Problem**

In order to explore the psychological and psychosocial factors influencing type 2 diabetes mellitus, the investigation was planned for examine the variables of Diabetes Self-Care, Diabetes Specific Quality of Life, Perceived Social Support, Subjective Well Being, Perceived Stress, Health Related Depression, and Type D personality in people living in their own hometown (Kerala) and those who were migrated to a distant place from hometown for job purposes and to design an intervention package for the psychological factors influencing type 2 diabetics. So

the problem be focused in this study is entitled as **"An Exploratory Study of Psychological Correlates of Type 2 Diabetes".**

**Variables of the Study**

The study focused on the exploration of psychological variables of Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related Depression and Type D personality. The variables can be divided in to positive and negative based on the nature of influence on diabetics. The positive variables of the study were; Subjective Well Being (general well being-positive effect, expectation-achievement congruence, confidence in coping, transcendence, family group support, social support, primary group concern, inadequate mental mastery, perceived ill health, deficiency in social contacts, general well being- negative effect), Diabetes Related Quality of Life (Role limitation due to physical health, Physical endurance, General health, Treatment satisfaction, Symptom botherness, Financial worries, Emotional/mental health and Diet advise tolerance), Perceived Social Support (Support from Others, Support from Family and Support from Friends) , and Diabetes Self Care. And negative variables identified for the study were; Perceived Stress, Health Related Depression, and Type D personality (Negative Affectivity & Social Inhibition). A personal data sheet to collect personal details (Age, Sex, Marital Status, Socio Economic Status etc) was also administered to the participants.

**Objectives of the Study**

1. To explore psychological correlates of type 2 diabetes.

2. To design a psychological intervention package to manage the psychological correlates that influence type 2 diabetes mellitus.

3. To study the disparities in psychological factors influencing type 2 diabetes among two groups based on their locality of living (those who are living in their own home town and those who were migrated to another country for job purposes).

4. To study the relationship among different psychological factors in type 2 diabetics; namely, positive factors like Diabetes Related Quality of Life, Subjective Well Being, Perceived Social Support, and Diabetes self care and negative factors like Health Related Depression, Perceived Stress and Type D personality.

5. To study the interaction effect of Diabetes Related Quality of Life, Perceived Social Support, Perceived Stress, Diabetes Self Care, and Type D Personality on Subjective Well Being and Health Related Depression in type 2 diabetics.

6. To study the predictability of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, and Type D Personality on Subjective Well Being and Health Related Depression in type 2 diabetics.

7. To study the role of different demographic factors (Age, Sex, Marital Status, Education and Socio Economic Status) on Subjective Well Being and Health Related Depression in type 2 diabetics.

**Hypotheses of the Study**

For the present research the following hypotheses were formed.

1. There will be significant relationship between variables of Diabetes Self-Care, Diabetes Specific Quality of Life, Perceived Social Support, Subjective Well Being, Perceived Stress, Health Related Depression, and Type D personality.

2. There will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, and Type D Personality on Subjective Well Being.

3. There will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Type D personality on Health Related Depression.

4.      There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar level, Negative Affectivity and Social Inhibition on Health Related Depression.

5.      There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Fasting Blood Sugar level, Negative Affectivity and Social Inhibition on Subjective Well being.

6.      There will be significant interaction between the Locality of living/ Country of living and the psychological variables of Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being and Health Related Depression.

7.      There will be significant interaction between the classificatory factors of Age, Sex, Marital Status, Education and Socio Economic Status on Subjective Well being.

8.      There will be significant interaction between the classificatory factors of Age, Sex, Marital Status, Education and Socio Economic Status on Subjective Well being.

**Method**

**Participants of the study**

Participants included 256 type 2 diabetics of both males and females in the age group between 30-70 years. The sample was selected using purposive / judgmental sampling techniques. They were undergoing treatment of an Endocrinologist for more than six months in general hospitals or attending diabetic clinics. Diabetic patients from almost all the districts of Kerala were included in the sample. For the purpose of comparing the influence of living locality, some data

were also collected from those who migrated to a distant place of their home town (data collected from those who migrated to United Arab Emirates).

**Instruments**

- 'Quality of Life Instrument for Indian Diabetes Patients' by Nagpal , J et.,al (2009).

- 'The Subjective Well Being Inventory' (SUBI) (Sell et al., 1992).

- 'Perceived Stress Scale' (PSS) (Cohen et al., 1983).

- 'Multidimensional Scale of Perceived Social Support' by Zimet G, D et.,al (1988).

- 'Self care Inventory for Diabetes' by La Greca M A (2004)

- 'DS-14' by Johan Denollet (2010)

- 'Patient Health Questionnaire' (PHQ-9) by Kroenke, K et al(2001).

**Procedure**

Data collection began as soon as the approval from both the institutions and the consultant endocrinology department from where data was collected. After getting approval the researcher could win the support of endocrinologist to refer those patients who were fulfilling inclusion- exclusion criteria. The endocrinologist also helped to communicate about the relevance of the study, and also regarding the therapeutic techniques they had provided as a part of intervention. Then the researcher gave a description of the purpose the study, after getting consent from patients. Initially the interview was informal to identify the psychological factors related with the diabetes. The same face to face interview method was repeated to collect data by using scientific instruments for assessing the identified psychological variables, as per the related instructions. Based on the scores they obtained for each variable, later it was scored separately, and the researcher assessed the psychological variable related to type 2 diabetes specific to the participant. Here, they were administered the specific intervention technique.

**Analysis of the data**

The analyses were carried out by using SPSS (Statistical Package for Social Sciences) version 16, to test the hypotheses formulated for the research. The Statistical analysis used were Descriptive analysis, Correlation analysis, Regression analysis and Analysis of Variance (ANOVA)

**Designing of Intervention**

In the present study the researcher designed and implemented the psychological intervention to a small group of participants to decrease the psychological factors which were found to be negatively related and enhance psychological factors positively related to type 2 diabetes.

In the initial phase the researcher identified common psychological problems reported by type 2 diabetic patients and discussed with trained clinical psychologists to design psychological intervention techniques which were assumed to be effective for the identified psychological problems based on earlier research and psychological theories. Intervention had designed on the basis of observed psychological needs for emotional, cognitive and behavioral functioning including treatment adherence to diabetic population.

**These intervention techniques have been classified in to four major clusters, they are:**

- Self care

- Social Skills

- Cognitive Behavior Therapy, and

- Relaxation

For the purpose of intervention a small sample of 50 participants were selected. They had provided four clusters of intervention developed by the researcher either single or combinations based on their need for a period of 8 weeks.

**Researchers Impression on Intervention**

- Psychologists should be cautious of the need based intervention: - the intervention should be given to the participants based on their particular area of problem.

- Psychologists should be multi skilled:- so as to conduct diagnosis on the basis of casual factors and to design individual based intervention package

- In present research, the participants were provided intervention techniques based on their area of problem either single or in combination.

- The participants were reported positive changes in problem whether they had given single or combined method; from this the investigator get an inference that the identifying problem is the most important factor in intervention

**Tenability of the Hypothesis**

Eight main hypothesis and its sub-hypotheses were formulated for the present study. On the basis of the analysis results the acceptability of these hypotheses is tested.

**The first hypothesis states that: There will be significant relationship between variables of Diabetes Self-Care, Health Related Quality of Life / Diabetes Specific Quality of Life, Perceived Social Support, Subjective Well Being, Perceived Stress, Health Related Depression, and Type D personality.**

To test this hypothesis sub hypotheses were formed, and from analyzing the following sub hypotheses the acceptability of the hypothesis can be established.

**1.1 There will be significant relationship between Diabetes Related Quality Of Life (DQOL) and Subjective Well Being (SWB)**

The overall diabetes related quality of life and subjective well being of individuals with type 2 diabetes mellitus shows high positive correlation. Among the eight sub factors of the diabetes related quality of life and eleven sub factors of subjective well being shows high positive correlation except several sub factors. So this hypothesis is confirmed.

**1.2 There will be significant relationship between Diabetes Related Quality of Life (DQOL), Perceived Social Support, Diabetes Self Care, Perceived Stress, Health related depression and Type D personality.**

Overall perceived social support and overall diabetes related quality of life are significantly positively correlated. Correlation matrix indicates that the diabetes self care and diabetes related quality of life are positively correlated; perceived stress is significantly negatively correlated with overall diabetes related quality of life; diabetes related quality of life and health related depression are negatively correlated and type D personality factors negative affectivity and social inhibition are negatively correlated with diabetes related quality of life. Therefore this hypothesis is accepted.

**1.3 There will be significant relationship between Subjective Well Being (SWB), Perceived Social Support, Diabetes Self Care, Perceived Stress, Health Related Depression and Type D Personality.**

Subjective well being and social support are highly positively correlated. Diabetes self care is positively correlated with overall subjective well-being. Correlation indicates that the perceived stress and health related depression on overall subjective well being have negative relation. And also type D personality factors negative affectivity and social inhibition have negative correlation with overall subjective well being in diabetics. Thus the hypothesis is completely established.

**1.4 There will be significant relationship between perceived social support, Diabetes Self care, Perceived Stress, Health Related Depression and Type D personality.**

Correlation indicates Perceived social support and diabetes self care have no relation. Diabetes self care is negatively related with type D personality factors negative affectivity and social inhibition, and health related depression. Perceived stress in diabetics is significantly negatively correlated with overall perceived social support; Perceived stress on health related depression and Perceived stress on

negative affectivity and social inhibition have positive relation. Health related depression is negatively related with perceived social support and diabetes self care. So this hypothesis is completely substantiated.

**The second hypothesis states that: There will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, Perceived Stress, and Type D Personality on Subjective Well Being.**

From the final regression equation, it can be found that from the predictor variables negative affectivity, perceived stress and fasting blood sugar level have negative impact on subjective well being. And the predictor variables diabetes related quality of life and perceived social support have the positive impact on the Subjective Well Being. For this reason the second hypothesis is accepted.

**The third hypothesis states that: There will be significant predicator relationship between Diabetes Related Quality of Life, Perceived Social Support, Diabetes Self Care, perceived stress, Type D personality on Health Related Depression.**

The predictive relationships among the variables on health related depression have been found from the final regression equation. From the predictor variables diabetes related quality of life have a negative influence on health related depression and negative affectivity and fasting blood sugar level have positive effect on health related depression. Therefore the hypothesis is confirmed.

**The fourth hypothesis states that: There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, diabetes self care, Perceived Stress, Fasting blood sugar level, negative affectivity and social inhibition on health related depression.**

To test this hypothesis following sub hypotheses were formed and based on these the three way analyses of variance were conducted.

**The 4.1 hypothesis states: There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, and Perceived Stress on Health Related Depression.**

There is no three way and two interaction found among diabetes related quality of life, perceived social support and perceived stress on health related depression. Main effects indicate there is independent effect among diabetes related quality of life and perceived stress on health related depression. Mean scores indicates that those with high level of diabetes related quality of life have low health related depression and high level of perceived stress have increased health related depression. Thus the hypothesis is not completely accepted.

**The 4.2 hypothesis states: There will be significant interaction between Diabetes Related Quality of Life, perceived stress, and Diabetes Self Care on Health Related Depression.**

There is no significant three way and two way interactions found among diabetes related quality of life, perceived stress and diabetes self-care on health related depression. Diabetes related quality of life and diabetes self care have independent effect on health related depression. Among the three groups of diabetes Self-care viz., (Low, moderate and high) higher mean value for low groups of diabetes self-care, which states that those with poor diabetes self care have increased health related depression. So the hypothesis is only partially confirmed.

**The 4.3 hypothesis states: There will be significant interaction between Diabetes Related Quality of Life, Diabetes Self Care, and Fasting Blood Sugar Level on Health Related depression.**

No significant three way interaction found among diabetes related quality of life, diabetes self-care and glucose level on health related depression. Two-way interaction found among diabetes related quality of life and diabetes self-care on health related depression, mean scores indicates that type 2 diabetics with low diabetic self-care and low diabetes related quality of life experiencing high level of health related depression. Main effects indicate diabetes related quality of life and

diabetes self care have independent effect on health related depression. So the hypothesis is partially confirmed.

**The 4.4 hypothesis states: There will be significant interaction between Diabetes Related Quality of Life, Fasting Blood Sugar Level and Negative Affectivity on Health Related Depression.**

Main effects indicate significant F-values for diabetes related quality of life, glucose level and negative affectivity on health related depression. Mean values indicates that among three levels of fasting blood sugar (low, moderate, high) significantly higher mean value for high groups of fasting blood sugar level. Among the three groups negative affectivity (low, moderate, high) higher mean value for high groups of negative affectivity. There is significant two-way interaction found among diabetes related quality of life and negative affectivity on health related depression. Mean scores indicate that high negative affectivity belonging to low diabetes related quality of life group experiencing high level of health related depression.  No significant three way interactions found among diabetes related quality of life, fasting blood sugar level and negative affectivity on health related depression. Therefore the hypothesis is confirmed.

**The 4.5 hypothesis states: There will be significant interaction between Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Health Related depression.**

Significant three-way interaction found among levels of diabetes related quality of life, negative affectivity and social inhibition on health related depression. Main effects indicate independent interactions for diabetes related quality of life, negative affectivity and social inhibition on health related depression.  Among the three levels of social inhibition, viz (low, moderate, high) indicate significantly higher mean value for moderate groups of social inhibition on health related depression. There is no significant two-way interaction found among these variables on health related depression.  So this hypothesis is accepted.

**The 4.6 hypothesis states: There will be significant interaction between Perceived Social Support, Perceived Stress and Diabetes Self- Care on Health Related Depression**

Main effects indicate independent interactions among perceived social support, perceived stress and diabetes self care on health related depression. Mean scores exhibits that the subjects who have low level of perceived social support have higher mean scores in health related depression There is no significant two-way and three way interactions found among perceived social support, perceived stress and diabetes self-care on health related depression. Thus the hypothesis is fairly accepted.

**The 4.7 hypothesis states: There will be significant interaction between Perceived Social Support, Diabetes self Care and Fasting Blood Sugar Level on Health Related Depression.**

There is no three way and two way interactions found among perceived social support, diabetes self-care and fasting blood sugar level on health related depression. Main effects indicate significant perceived social support, and diabetes self care independently effect on health related depression. Therefore the hypothesis is somewhat established.

**The 4.8 hypothesis states: There will be significant interaction between Perceived Social Support, Fasting Blood Sugar level, and Negative Affectivity on Health Related Depression.**

Main effects indicate perceived social support, fasting blood suagr level and negative affectivity can makes significant difference in the health related depression. There is no significant two-way and three-way interaction found among perceived social support, glucose level and negative affectivity on health related depression. So the hypothesis is only slightly confirmed.

**The 4.9 hypothesis states: There will be significant interaction between Perceived Social Support, Negative Affectivity, and Social Inhibition on Health Related depression.**

There is no three way interactions found among perceived social support, negative affectivity and social inhibition on health related depression. The perceived social support, negative affectivity and social inhibition are independently effect on health related depression. Therefore the hypothesis is fairly accepted.

**The 4.10 hypothesis states: There will be significant interaction between Perceived Stress, Diabetes Self care and Fasting Blood Sugar level on Health Related Depression.**

Perceived stress and diabetes self-care makes changes in health related depression. The three-way analysis results indicate there is no interaction among perceived stress, diabetes self-care and fasting blood sugar level on health related depression. So the hypothesis is only moderately accepted.

**The 4.11 hypothesis states: There will be significant interaction between Perceived Stress, Fasting Blood Sugar level, and Negative Affectivity on Health related depression.**

There is no two-way and three way interactions found among the variables of perceived stress, fasting blood sugar level and negative affectivity on health related depression, which means these three variables together, have no interaction on health related depression. Significant independent interactions found among perceived stress, fasting blood sugar level and negative affectivity on health related depression. Hence the hypothesis is somewhat established.

**The 4.12 hypothesis states: There will be significant interaction between Perceived Stress, Negative Affectivity and Social Inhibition on Health related Depression.**

There is no three way and two way interactions found among those variables on health related depression. There are main effects of perceived stress, negative affectivity and social inhibition on health related depression. So the hypothesis is only slightly confirmed.

**The 4.13 hypothesis states: There will be significant interaction between Diabetes Self Care, Fasting Blood Sugar level, and Negative Affectivity on Health relate d Depression.**

Results show that diabetes self-care and, negative affectivity affect health related depression. There is no two-way and three way interactions found among those variables on health related depression, which means these variables together cannot effect the health related depression. Thus the hypothesis is somewhat established

**The 4.14 hypothesis states: There will be significant interaction between Diabetes Self Care, Negative Affectivity and Social Inhibition on Health Related Depression.**

Here is no two-way and three way interactions found among diabetes self-care, negative affectivity and social inhibition on health related depression. Main effects indicate diabetes self-care and negative affectivity have the ability to make difference in health related depression.  So the hypothesis is fairly confirmed.

**The fifth hypothesis states that :There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, diabetes self care, Perceived Stress, Fasting blood sugar level, negative affectivity and social inhibition on subjective well being.**

To test this hypothesis following sub hypotheses were formed and based on these the three way analysis of variance was conducted.

**The 5.1 hypothesis states that: There will be significant interaction between Diabetes Related Quality of Life, Perceived Social Support, and Perceived Stress on Subjective Well Being.**

No three-way interactions found among these three variables on subjective well-being. Main effects indicate the independent interaction among the diabetes related quality of life, perceived social support and perceived stress on subjective well-being. Among the three groups viz., low, moderate and high of diabetes related quality of life indicates high subjective well being for those with high diabetes related quality of life. Among the three groups of Perceived Social Support, viz (Low, Moderate, high); higher subjective well being for high groups of Perceived Social Support. The participants have been classified on the basis of Perceived Stress in to three groups viz., Low, moderate and high, among this higher mean value for low groups of Perceived Stress.  So the hypothesis is fairly accepted.

**The 5.2 hypothesis states that There will be significant interaction between Diabetes Related Quality of Life, perceived stress, and Diabetes Self Care on Subjective Well Being**

From the results it can be found that there are independent interactions among diabetes related quality of life, perceived social support and diabetes self-care on subjective well-being. There is no two-way and three way interactions found among these three variables on subjective well-being.  The mean value shows that higher subjective well being for high groups of diabetes self care. So the hypothesis is partially accepted.

**The 5.3 hypothesis states that There will be significant interaction between Diabetes Related Quality of Life, Diabetes Self Care, and Fasting Blood Sugar Level on Subjective Well Being.**

There is no two-way and three way interactions found among diabetes related quality of life, diabetes self care, and fasting blood sugar level on subjective well-being. Main effects indicate the diabetes related quality of life have interaction on subjective well-being. Therefore this hypothesis not completely accepted

**The 5.4 hypothesis states that There will be significant interaction between Diabetes Related Quality of Life, Fasting Blood Sugar Level and Negative Affectivity on Subjective Well Being.**

There is independent interaction among diabetes related quality of life, fasting blood sugar level and negative affectivity on subjective well being. It can be reported that the subjects who have low fasting blood sugar level have higher subjective well being. Subjects who have low negative affectivity have higher subjective well being. There is two-way interaction found among diabetes related quality of life and negative affectivity on subjective well being. People belonging low negative affectivity and high diabetes related quality of life group experiencing high level of subjective well being. No significant three way interactions found among diabetes related quality of life, fasting blood sugar level and negative affectivity on health related depression. Subsequently the hypothesis is established to a large extent.

**The 5.5 hypothesis states that There will be significant interaction between Diabetes Related Quality of Life, Negative Affectivity and Social Inhibition on Subjective Well Being.**

No three way interactions found among diabetes related quality of life, negative affectivity and social inhibition on subjective well-being. Main effects indicate that diabetes related quality of life and negative affectivity have independent interactions on subjective well-being. So the hypothesis is fairly accepted.

**The 5.6 hypothesis states that: There will be significant interaction between Perceived Social support, Perceived stress and Diabetes self care on Subjective Well Being.**

There is no three way interactions found among perceived social support, perceived stress and diabetes self care on subjective well-being. Main effects show that perceived social support, perceived stress and diabetes self-care have independent interactions on subjective well-being. So this hypothesis is partially confirmed.

**The 5.7 hypothesis states that: There will be significant interaction between Perceived Social support, Diabetes Self Care and Fasting Blood Sugar Level on Subjective Well Being**

Main effects indicate that perceived social support, perceived stress and diabetes self-care have the capability to interact on subjective well-being. There is no two-way and three way interactions found among perceived social support, diabetes self care and fasting blood sugar level on subjective well-being. Therefore the hypothesis is somewhat accepted.

**The 5.8 hypothesis states that: There will be significant interaction between Perceived Social support, Fasting Blood Sugar Level and Negative Affectivity on Subjective Well Being.**

Main effects indicate independent interactions among perceived social support, fasting blood sugar level and negative affectivity on subjective well being. There is two-way interaction found among perceived social support and negative affectivity on subjective well being, the mean scores indicates that those having low negative affectivity and high perceived social support experiencing high level of subjective well being. No significant three way interactions found among perceived social support, glucose level and negative affectivity on health related depression. Thus the hypothesis is established.

**The 5.9 hypothesis states that: There will be significant interaction between Perceived Social support, Negative Affectivity and Social Inhibition on Subjective Well Being.**

No three way interactions found among perceived social support, negative affectivity and social inhibition on subjective well being. Independent interactions found among perceived social support and negative affectivity on subjective well being. Two-way interaction found among perceived social support and negative affectivity on subjective well being. Therefore the hypothesis is moderately accepted.

**The 5.10 hypothesis states that:  There will be significant interaction between Perceived Stress, Diabetes self care and Fasting Blood Sugar level on Subjective Well Being.**

Main effects indicate independent interactions among perceived stress, and diabetes self-care on subjective well being. There is two-way interaction found among perceived stress and diabetes self-care on subjective well being, mean values states that those having moderate diabetes self care and low perceived stress experiencing high level of subjective well being. No significant three way interactions found among perceived stress, diabetes self-care and fasting blood sugar level.  Thus the hypothesis is fairly substantiated.

**The 5.11 hypothesis states that:  There will be significant interaction between Perceived Stress, Fasting Blood Sugar level, and Negative Affectivity on Subjective Well Being.**

Perceived stress, fasting blood sugar level and negative affectivity have independent interactions on subjective well being. There is no three-way and two-way interactions found among perceived stress, fasting blood sugar level and negative affectivity on subjective well being. Hence the hypothesis is somewhat established.

**The 5.12 hypothesis states that: There will be significant interaction between Perceived Stress, Negative Affectivity and Social Inhibition on Subjective Well Being.**

Main effects indicate perceived stress, and negative affectivity has independent interactions on subjective well being. There is no three- way and two-way interaction found among perceived stress, negative affectivity and social inhibition on subjective well being. Hence the hypothesis is somewhat established.

**The 5.13 hypothesis states that There will be significant interaction between Diabetes Self Care, Fasting Blood Sugar level, and Negative Affectivity on Subjective Well Being.**

Main effects indicate only negative affectivity has independent interaction on subjective well being. There is no three-way and two-way interaction found among diabetes self care, fasting blood sugar level and negative affectivity on subjective well being. Therefore this hypothesis is not accepted.

**The 5.14 hypothesis states that There will be significant interaction between Diabetes Self Care, Negative Affectivity and Social Inhibition on Subjective Well Being.**

Main effects indicate diabetes self care and negative affectivity has interactions on subjective well being. There is no two-way and three-way interaction found among diabetes self care, negative affectivity and social inhibition on subjective well- being. So the hypothesis is somewhat established.

**The sixth hypothesis states that: There will be significant interactions between locality of living (UAE and Kerala) and the psychological variables of Diabetes Related Quality of Life, Perceived social support, diabetes self care, perceived stress, negative affectivity and social inhibition on subjective well being and health related depression.**

To examine the acceptability of the hypothesis, the following sub factors were formulated, and based on these statistical analysis was carried out.

**The 6.1 hypothesis states that: there will be significant interaction between the locality of living (UAE and KERALA) and the psychological variables of diabetes related quality of life, perceived social support, diabetes self care, perceived stress, negative affectivity and social inhibition on subjective well being.**

To test the hypothesis separate two way analysis of variance have been carried out between the locality of living and all the psychological variables. Main effects indicate locality of living have significant effect on subjective well being. And also diabetes related quality of life, perceived social support, perceived stress, negative affectivity and social inhibition also significant effects on subjective well being. There is significant two way interaction found among locality of living and social inhibition. Mean values indicates that type 2 diabetic people living in Kerala and having low level of social inhibition experiences increased subjective well being. There is no significant two way interaction found among the locality of living and other psychological variables of the study. Therefore the hypothesis is only moderately accepted.

**The 6.2 hypothesis states that: there will be significant interaction between the locality of living (UAE and KERALA) and the psychological variables of diabetes related quality of life, perceived social support, diabetes self care, perceived stress, negative affectivity and social inhibition on health related depression.**

Two way analysis of variance results indicate that the diabetes related quality of life, perceived social support, perceived stress, negative affectivity and social inhibition have significant effects on health related depression. There is no significant two way interaction found among the locality of living and all other factors of the study on health related depression. So the hypothesis is somewhat established.

**The seventh hypothesis states that: There will be significant interaction between the classificatory factors of age, sex, marital status, education and economic status on subjective well being.**

To test the acceptability of the hypothesis there are following sub hypotheses were formulated, and based on these hypotheses statistical analysis were carried out

**The 7.1 hypothesis states that: There will be significant interaction between the classificatory factors of Age, Sex and Marital Status on Subjective Well Being.**

There is significant three way interaction between age, sex and marital status on subjective well being. Main effects indicate marital status has significant influence on subjective well being. Among the four categories of marital status viz., unmarried, married, separated and widowed, higher subjective well being for married people comparing other three groups. Two- way interaction shows that Age and Sex together influence subjective well being. Based on the mean scores, it can be obtained that females belonging to below 40 years age group high level of subjective well being. Thus this hypothesis is accepted.

**The 7.2 hypothesis states that: There will be significant interaction between the classificatory factors of Sex, Education, and Marital Status on Subjective Well Being.**

There is no significant three way interaction between sex, education and marital status on subjective well being. Main effects indicate independent interactions among sex, education and marital status on subjective well being. Among the two categories of sex (viz., male and female) higher subjective well being for female group compared to male group. Among the four categories of education, (viz., primary, higher secondary, degree and technical education) higher subjective well being for degree education group compared to other groups. There is Significant two- way interaction between Education and Marital Status on Subjective Well Being. So the hypothesis is moderately accepted.

**The 7.3 hypothesis states that: There will be significant interaction between the classificatory factors of Education, Marital Status and Socio Economic Status on Subjective Well Being**

Main effects indicate education and marital status influences subjective well being. There is also no significant two-way and three way interactions found among education, marital status and socio economic status on subjective well being. Thus the hypothesis is partially established.

**The 7.4 hypothesis states that: There will be significant interaction between the classificatory factors of Education, Marital Status, and Age on Subjective Well Being.**

There is no significant three way interactions found among education, marital status and age on subjective well being. Main effects indicate education and marital status have independent effects on subjective well being. There is significant two-way interaction between education and marital status on subjective well being. So the hypothesis is somewhat established.

**The 7.5 hypothesis states that: There will be significant interaction between the classificatory factors of Marital Status, Age and Socio Economic Status on Subjective Well Being.**

There is no significant three way interactions found among marital status, age and socio economic status on subjective well being.  Main effects indicate marital status has significant effect on subjective well being. There is significant two-way interaction between marital status and age, and also between age and socio economic status on subjective well being. From the mean scores it can be found that the participants in the age group 50-60 who are in high socio economic status experiencing high level of subjective well being.

**The eighth hypothesis states that: There will be significant interaction between the classificatory factors of age, sex, marital status, education and economic status on Health Related Depression.**

To test the acceptability of this hypothesis there are following sub hypotheses were formulated, and based on these hypotheses three-way analysis of variance were carried out

**The hypothesis 8.1 states that: There will be significant interaction between the classificatory factors of Age, Sex and Marital Status on Health Related Depression.**

There is no Significant three way and two way interaction found among age, sex and marital status on health related depression. Main effects indicate sex and marital status have independent interaction on health related depression. The mean values indicate that significantly higher health related depression for males comparing other female group. Marital status is categorized in to four groups, viz., unmarried, married, separated and widowed and the four groups, among these groups significantly higher depression for widowed group comparing other three groups. Therefore the hypothesis is partially established

**The hypothesis 8.2 There will be significant interaction between the classificatory factors of Age, Sex, and Socio Economic Status on Health Related Depression.**

Main effects indicate socio economic status has significant interaction on health related depression. It can be found that the subjects who belong to low socio economic status experiences higher health related depression. There is no significant two way and three way interaction found between age, sex and socio economic status on health related depression. Hence the hypothesis is moderately accepted.

**The hypothesis 8.3 There will be significant interaction between the classificatory factors of Sex, Education and Marital Status on Health Related Depression.**

Main effects indicate independent interactions among sex, education and marital status on health related depression. The result indicates that higher health related depression for primary level of education group comparing other groups. There is significant two way interaction between sex and marital status. There is no significant three way interaction found between sex, education and marital status on health related depression. So the hypothesis is somewhat established.

**The hypothesis 8.4 There will be significant interaction between the classificatory factors of Education, Socio Economic Status and Marital Status on Health Related Depression.**

There is significant three- way interaction found among education, socio economic status and marital status on health related depression. Main effects indicate significant independent interactions among education and socio economic status on health related depression. There is Significant two way interactions between education and socio economic status and socio economic status and marital status. Based on the mean scores, it can be found that the group belonging in the primary level of education and low socio economic status experiencing high level of health related depression. So this hypothesis is completely accepted.

**The hypothesis 8.5 There will be significant interaction between the classificatory factors of Marital Status, Age, and Socio Economic Status on Health Related Depression.**

Main effects indicate independent interactions among marital status and socio economic status on health related depression. There is no Significant two way and three way interactions found among marital status, age and socio economic status on health related depression. Therefore the hypothesis is somewhat established.

**The hypothesis 8.6 There will be significant interaction between the classificatory factors of Marital Status, Socio Economic Status and sex on Health Related Depression.**

Significant three way interaction found between marital status, and socio economic status and sex on health related depression. Main effects indicate significant interactions among marital status and socio economic status on health related depression. There is significant two-way interaction between socio economic status and sex on health related depression, mean scores indicates that females belonging to low socio economic status experiencing high level of health related depression. So the hypothesis is completely accepted.

**Major Findings of the Study**

1. Strong relationship was seen among the diabetes related quality of life and its sub variables on subjective well-being and its sub variables in type 2 diabetics.

2. Increased diabetes related quality of life leads to increase in perceived social support.

3. Enhanced diabetes related quality of life increases diabetes self care.

4. High perceived stress decreases diabetes related quality of life.

5. Decreased diabetes related quality of life enhances occurrence of health related depression in type 2 diabetes people.

6. Increased diabetes related quality of life decreases the experience of Negative affectivity and social inhibition.

7. High perceived social support enhances the experience of subjective well being.

8. Better subjective well being improves the diabetes self-care adherence.

9. Perceived stress declines subjective well being.

10. Health related depression decreases the experience of subjective well being.

11. The experience of negative affectivity and social inhibition negatively affect the experience of subjective well being.

12. Healthy social support enhances the diabetes self care adherence.

13. Health related depression declines diabetes self care adherence.

14. Negative affectivity decreases the diabetes self care activities.

15. Unhealthy social support leads to perceived stress in type 2 diabetic people.

16. When perceived stress increases health related depression will increase in type 2 diabetics.

17. Negative affectivity and social inhibition leads to higher perceived stress in type 2 diabetics.

18. Decrease in perceived social support leads to increased health related depression.

19. Health related depression worsen the diabetes self care activities.

20. Negative affectivity and social inhibition raise the experience of health related depression in type 2 diabetics.

21. Higher perceived social support worsen the experience of negative affectivity and social inhibition.

22. The best predictors of subjective well being are ( in order of the predictive strength) negative affectivity, diabetes related quality of life, perceived social support, perceived stress, and Fasting Blood Sugar level. All these variables together predicted 69.2% of overall subjective well being.

23. The health related depression was predicted by (in order of the predictive strength) Diabetes Related Quality of life, Negative Affectivity, and Fasting Blood Sugar level. These variables together predicated 5.6% of health related depression.

24. Type 2 diabetics with low diabetes related quality of life experiences higher health related depression.

25. Type 2 diabetics experiences higher perceived stress have greater health related depression.

26. Low level of self care leads to the occurrence of health related depression in type 2 diabetics.

27. Experiencing low diabetes related quality of life and low diabetes self care raise the health related depression in type 2 diabetics.

28. People with high level of Fasting Blood Sugar have found to be experience higher health related depression.

29. Tendency to experience Negative Affectivity raises the experience of health related depression.

30. Worse diabetes related quality of life and higher negative affectivity elevates the health related depression in type 2 diabetics.

31. Experience of high social inhibition increases the health related depression in type 2 diabetics.

32. Low level of perceived social support leads to greater health related depression.

33. Experiencing high diabetes related quality of life increases the occurrence of subjective well being in type 2 diabetics.

34. High perceived social support leads to the higher subjective well being in type 2 diabetics.

35. Low level of perceived stress leads to increased subjective well being.

36. Higher level of diabetes self care found among the type 2 diabetic people with increased subjective well being.

37. Low level of Fasting Blood Sugar indicates increased subjective well being.

38. Reduced experience of negative affectivity increases the subjective well being in type 2 diabetic individuals.

39. Type 2 diabetics with increased diabetes related quality of life and low level of negative affectivity shows elevated subjective well being.

40. Upper level of perceived social support and low negative affectivity yield high subjective well being.

41. Moderated level of diabetes self care and low perceived stress leads to elevated subjective well being in type 2 diabetics.

42. People living in their own home town (Kerala) have high subjective well being compared to those people who migrated to a distant place (UAE) for job purposes.

43. Low social inhibition increases subjective well being in type 2 diabetics.

44. People living in their own hometown (Kerala) and having low social inhibition yield high subjective well being.

45. Marital status is an impact on subjective well being in type 2 diabetic people. Married people have increased subjective well being compared to unmarried, widowed and separated.

46. Females belonging in the age group of below 40 years have high subjective well being compared to males in the same age category, and females in the other age categories (40-50, 50-60, 60-70).

47. Females have elevated subjective well being compared to males.

48. Type 2 diabetics with degree level education have high subjective well being compared to other categories (primary education, higher secondary education and technical education).

49. Type 2 diabetics belonging in the age group of 50-60 years and with high socio economic status have elevated subjective well being.

50. Males with type 2 diabetics experiences higher health related depression compared to females.

51. Widowed people with type 2 diabetes mellitus have elevated health related depression than other groups.

52. Type 2 diabetic people belonging in low socio economic status have increased health related depression compared to those belonging to middle and upper socio economic classes.

53. Primary level education and low socio economic status yields increased depression in type 2 diabetic people.

54. Females belonging in the low socio economic status experiences increased health related depression compared to males with low socio economic status.

**Implications of the Study**

The factors which were identified in the present study were found to be correlated with type 2 diabetes. Their causal effect or the supportive effect was not directly attributed by the present study, but were mentioned on the basis of other scientific studies and evidences. The study implies the importance of psychological

assessment in the scientific interventions of diabetes and need for uniqueness in the treatment effectiveness. Therefore the similar therapeutic techniques would not be equally effective to all patients, the intervention techniques should be decided on the basis of the assessment of the particular need. Based on the need either single or a combination of two or three techniques could be used. Treatment adherence can be assured on the basis of self care and diabetes related quality of life. The subjective well being can be enhanced through social support, and the perceived familial support is the major factor to be concerned in diabetes treatment. Type of personality specific to diabetes is also reported to have a predictive value on diabetes.

**Limitations of the Study and Scope for Further Research**

The present study was mainly limited to Kerala and the culture wise comparison was done only to those who migrated to the UAE from Kerala. Those who had co morbid conditions were not taken into consideration in the study which might explored in further researches as different strata. Though an intervention package was designed, it was not tested out in terms of its effects on the variables under the study. Other than limiting to feed backs of the participants, a quantitative experimental study can be extensively planned further**.** Coping mechanism related to depression may be included in further study. If finacially supported sound, the study may be replicated with long term effects, to be extended to predicability of variables and its casual effects.

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# APPENDICES

# APPENDIX IA

## QUALITY OF LIFE INSTRUMENT FOR INDIAN DIABETES PATIENTS (QOILD)

Nagpal,J, Kumar, A, Kakar, S, & Bhartia, A.

The following assessment asks how you feel about the impact of diabetes on your quality of life.  If your are unsure about which response to give to question, please choose the one that appears to be the most appropriate.

1. How often do your miss your work because of your diabetes?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

2. A person with diabetes has the requirement of adhering to a schedule for eat and taking regular medication.  Now often does this affect your work?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

3. How often does diabetes affect your efficiency at work?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

4. How often do you find diabetes limiting your social life?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

5. To what extent do you avoid travelling (business tour, holiday, general outings) because of your diabetes?

   | A lot | Highly | Little | Very little | Not at all |
   |-------|--------|--------|-------------|-----------|
   | 1 | 2 | 3 | 4 | 5 |

6. Compared to others of your age are your social activities (visiting friends/parting) limiting because of your diabetes?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

7. How often in last three months has your overall health problems limited the kind of vigorous activities you can do like lifting heavy bags/objects, running, skipping, jumping?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

8. How often in last three months has your overall health problems limited the kind of moderate activities you can do like moving table, carrying groceries and utensils?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

9. How often in last three months has your overall health problems limited you from walking 1-2 km at a stretch?

   | Always | Frequently | Often | Sometimes | Never |
   |--------|-----------|-------|-----------|-------|
   | 1 | 2 | 3 | 4 | 5 |

10    How often in last three months has your overall health problems limited you from walking 1-2 km at a stretch?

|  Always  |  Frequently  |  Often  |  Sometimes  |  Never  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

11    How often in last three months has your overall health problems limited you from bending, squatting, or turning?

|  Always  |  Frequently  |  Often  |  Sometimes  |  Never  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

12    How often in last three months has your overall health problems limited you from eating, dressing, bathing or using the toilet?

|  Always  |  Frequently  |  Often  |  Sometimes  |  Never  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

13    n general would you say your health is:

|  Poor  |  Fair  |  Good  |  Very good  |  Excellent  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

14    How well are you able to concentrate in everything like working, driving, reading etc?

|  Not at all  |  A little  |  Moderate  |  Very much  |  An extreme amount  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

15    How many times in the past three months have you had fatigue/felt very tired ?

|  Always  |  Frequently  |  Often  |  Sometimes  |  Never  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

16    How satisfied are you with your current diabetes treatment?

|  Very dissatisfied  |  Moderately Dissatisfied  |  Neither satisfied Nor Dissatisfied  |  Moderately satisfied  |  Very satisfied  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

17    How satisfied are you with amount of time it takes to manage your diabetes?

|  Very dissatisfied  |  Moderately Dissatisfied  |  Neither satisfied Nor Dissatisfied  |  Moderately satisfied  |  Very satisfied  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

18    How satisfied are you with the amount of time you spend getting regular checkups (once in 3 months)?

|  Very dissatisfied  |  Moderately Dissatisfied  |  Neither satisfied Nor Dissatisfied  |  Moderately satisfied  |  Very satisfied  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

19    A person with diabetes needs to exercise for 35-45 min, 4 times a week. Keeping this in mind how satisfied are our with the time you spend excising?

|  Very dissatisfied  |  Moderately Dissatisfied  |  Neither satisfied Nor Dissatisfied  |  Moderately satisfied  |  Very satisfied  |
| --- | --- | --- | --- | --- |
|  1  |  2  |  3  |  4  |  5  |

20 How many times in the past three months have you had thirst/dry mouth?

| Always | Frequently | Often | Sometimes | Never |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

21 How many times in the past three months have you felt excessive hunger?

| Always | Frequently | Often | Sometimes | Never |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

22 How many times in the past three months have you had frequent urination related to diabetes management?

| Always | Frequently | Often | Sometimes | Never |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

23 What do you think about the cost involved in your management of diabetes?

| Very expensive | Little expensive | Reasonable | Not at all expensive | - |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

24 To what extent has your priority of expenditure shifted towards diabetes management?

| A lot | Highly | Little | Very little | Not at all |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

25 To what extent has your family budget got affected by the expenses related to the management of diabetes?

| A lot | Highly | Little | Very little | Not at all |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

26 To what extent has your diabetes limited your expenditure on other aspects of life (movies, outings, parties, etc)?

| A lot | Highly | Little | Very little | Not at all |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

27 How satisfied are you with yourself?

| Very dissatisfied | Moderately Dissatisfied | Neither satisfied Nor Dissatisfied | Moderately satisfied | Very satisfied |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

28 How satisfied are you with our personal relationships (family, friends, relatives and known tos)?

| Very dissatisfied | Moderately Dissatisfied | Neither satisfied Nor Dissatisfied | Moderately satisfied | Very satisfied |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

29 How satisfied are you with the emotional support you get from your friends and family?

| Very dissatisfied | Moderately Dissatisfied | Neither satisfied Nor Dissatisfied | Moderately satisfied | Very satisfied |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

30 How often are you discouraged by your health problems?

| Always | Frequently | Often | Sometimes | Never |
|--------|-----------|-------|-----------|-------|
| 1 | 2 | 3 | 4 | 5 |

31 All people want to fulfill certain roles and lead their lives in a purposeful manner. To what extent do you feel that you have been lead your life in the same way?

| Not at all | A little | Moderate | Very much | An extreme amount |
|------------|----------|----------|-----------|-------------------|
| 1 | 2 | 3 | 4 | 5 |

32 How often do you feel because of your diabetes a restriction in choosing your food when eating out?

| Always | Frequently | Often | Sometimes | Never |
|--------|-----------|-------|-----------|-------|
| 1 | 2 | 3 | 4 | 5 |

33 As you have diabetes how much choice do you feel you having eating your meals or snacks away from home e.g. if you go in a party and there is a buffet where there are also a lot of fried desserts would you be able to make enough choice?

| No choice | Very little | Little | Enough | A lot |
|-----------|-------------|--------|--------|-------|
| 1 | 2 | 3 | 4 | 5 |

34 How often do you eat the food items that you shouldn't, in order to hide the fact that your are having diabetes?

| Always | Frequently | Often | Sometimes | Never |
|--------|-----------|-------|-----------|-------|
| 1 | 2 | 3 | 4 | 5 |

# APPENDIX – IB

## QUALITY OF LIFE INSTRUMENT FOR INDIAN DIABETES PATIENTS (QOLID)

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**Patient Name :**                                                                 **Age :**

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താഴെ കൊടുത്തിരിക്കുന്ന ചോദ്യങ്ങൾ വായിച്ച് നിങ്ങൾക്ക് ഏറ്റവും അനുയോജ്യ മായി തോന്നുന്ന ഉത്തരത്തിന് ടിക് (✓) മാർക്ക് രേഖപ്പെടുത്തുക. നിങ്ങളുടെ ഉത്തരം ഗവേഷണ ആവശ്യങ്ങൾക്ക്‌വേണ്ടി മാത്രം ഉപയോഗിക്കുന്നതായിരിക്കും.

1. പ്രമേഹം മൂലം നിങ്ങൾക്ക് ജോലിചെയ്യാതിരിക്കേണ്ടി വരാറുണ്ടോ?

   (1)                (2)                (3)                (4)                (5)

   എല്ലായ്പ്പോഴും      പതിവായി        കൂടെകൂടെ      ചിലപ്പോഴെല്ലാം     ഒരിക്കലും ഇല്ല

2. പ്രമേഹം മൂലം ഇപ്പോൾ ഭക്ഷണക്രമവും, കൃത്യമായ മരുന്നും ശീലിക്കേണ്ടി വരു ന്നത് എത്രത്തോളം നിങ്ങളുടെ ജോലിയെ ബാധിക്കുന്നു

   (1)                (2)                (3)                (4)                (5)

   എല്ലായ്പ്പോഴും      പതിവായി        കൂടെകൂടെ      ചിലപ്പോഴെല്ലാം     ഒരിക്കലും ഇല്ല

3. ജോലി ചെയ്യാനുള്ള നിങ്ങളുടെ കഴിവിനെ പ്രമേഹം എത്രത്തോളം തടസ്സപ്പെടു ത്തുന്നു?

   (1)                (2)                (3)                (4)                (5)

   എല്ലായ്പ്പോഴും      പതിവായി        കൂടെകൂടെ      ചിലപ്പോഴെല്ലാം     ഒരിക്കലും ഇല്ല

4. പ്രമേഹം നിങ്ങളുടെ സാമൂഹ്യ ജീവിതത്തെ ബാധിക്കുന്നതായി എത്രത്തോളം നിങ്ങൾ മനസ്സിലാക്കിയിട്ടുണ്ട്?

   (1)                (2)                (3)                (4)                (5)

   എല്ലായ്പ്പോഴും      പതിവായി        കൂടെകൂടെ      ചിലപ്പോഴെല്ലാം     ഒരിക്കലും ഇല്ല

5. പ്രമേഹം കാരണം നിങ്ങൾക്ക് യാത്രകൾ (ബിസിനസ് സംബന്ധമായ യാത്രകൾ, ഒഴിവ് ദിവസങ്ങളിലെ യാത്രകൾ എന്നിവ) ഒഴിവാക്കേണ്ടി വരാറുണ്ടോ?

   (1)                (2)                (3)                (4)                (5)

   എല്ലായ്പ്പോഴും      പതിവായി        കൂടെകൂടെ      ചിലപ്പോഴെല്ലാം     ഒരിക്കലും ഇല്ല

6. നിങ്ങളുടെ പ്രായത്തിലുള്ള മറ്റുള്ളവരുമായി താരതമ്യപ്പെടുത്തി നോക്കുമ്പോൾ നിങ്ങളുടെ സമൂഹത്തിലെ ഇടപെടൽ (കൂട്ടുകാരെ കാണുന്നത്, കൂട്ടുകാരോടൊപ്പം പാർട്ടികളിൽ പങ്കെടുക്കുന്നത്) പ്രമേഹം കാരണം വളരെ ചുരുക്കേണ്ടി വരു ന്നുണ്ടോ?

   (1)                (2)                (3)                (4)                (5)

   എല്ലായ്പ്പോഴും      പതിവായി        കൂടെകൂടെ      ചിലപ്പോഴെല്ലാം     ഒരിക്കലും ഇല്ല

7. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ ശാരീരികാധ്യാനം ഉള്ള പണികൾ (ഭാരമുള്ള ബോഗോ, വസ്തുക്കളോ ഉയർത്തുക, ഓടുക, ചാടുക മുതലായ പ്രവർത്തികൾ) ചെയ്യുന്നതിന് നിങ്ങളുടെ ആരോഗ്യപ്രശ്നങ്ങൾ എത്രത്തോളം തടസ്സപ്പെടുത്തുന്നുണ്ട്?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

8. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ കുറച്ച് ശക്തി ഉപയോഗിച്ച് ചെയ്യേണ്ട പ്രവർത്തികളെ (മേശനീക്കി ഇടുക, പലചരക്ക് സാധനങ്ങൾ കൈ പിടിച്ച് കൊണ്ട് വരുക, മുതലായ വ) നിങ്ങളുടെ ശാരീരിക പ്രശ്നങ്ങൾ എത്രത്തോളം തടസ്സപ്പെടുത്തുന്നുണ്ട്?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

9. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ നിങ്ങളുടെ ശാരീരിക പ്രശ്നങ്ങൾ നിങ്ങൾ ഉയരത്തി ലേക്ക് നടന്ന് കയറുന്നതിനും ഒന്നോ രണ്ടോ നിലകളിലേക്ക് കോണിപ്പടികൾ കയ റുന്നതിനും എത്രത്തോളം തടസ്സം ഉണ്ടാകുന്നുണ്ട്?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

10. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളായി ഒന്നോ രണ്ടോ കിലോമീറ്റർ തുടർച്ചയായി നടക്കുന്ന തിന് നിങ്ങളുടെ ശാരീരിക പ്രശ്നങ്ങൾ എത്രമാത്രം തടസ്സം നിൽക്കുന്നുണ്ട്?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

11. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളായി നിങ്ങളുടെ ഇഷ്ടത്തിനനുസരിച്ച് താഴെ ഇരിക്കുന്നതി ന്, കുനിയുന്നതിന്, ശരീരം വളക്കുന്നതിന് എത്രമാത്രം ബുദ്ധിമുട്ട് അനുഭവപ്പെടു ന്നുണ്ട്?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

12. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളായി ദൈനംദിന ജീവിതത്തെ (കുളിക്കുന്നതിന്, ഭക്ഷണം കഴിക്കുന്നതിന്, വസ്ത്രം ധരിക്കുന്നതിന്) പ്രമേഹം പരിമിതപ്പെടുത്തുന്നുണ്ടോ?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

13. നിങ്ങളുടെ ഇപ്പോഴത്തെ ആരോഗ്യത്തെ എങ്ങനെ വിലയിരുത്തുന്നു?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| മോശം | തൃപ്തികരം | നല്ലത് | വളരെ നല്ലത് | ഏറ്റവും നല്ലത് |

14. നിങ്ങൾക്ക് ജോലി ചെയ്യുക, വാഹനം ഓടിക്കുക, വായിക്കുക മുതലായ കാര്യങ്ങ ളിൽ എത്ര നന്നായി ശ്രദ്ധചെലുത്താൻ സാധിക്കുന്നു?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| ഒട്ടും പറ്റുന്നില്ല | കുറച്ച് | ഒരു പരിധി വരെ | വളരെ നന്നായി | ഏറ്റവും നന്നായി |

15. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ നിങ്ങൾക്ക് ക്ഷീണം – തളർച്ച എന്നിവ അനുഭവപ്പെടാ റുണ്ടോ?

|  (1)  | (2)  | (3)  | (4)  | (5)  |
|-------|------|------|------|------|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

16. ഇപ്പോൾ നിങ്ങൾ അവലംബിക്കുന്ന പ്രമേഹ ചികിത്സയിൽ നിങ്ങൾക്ക് തൃപ്തി യുണ്ടോ?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| വളരെ അതൃ പ്തിയുണ്ട് | അതൃപ്തി യുണ്ട് | തൃപ്തിയോ അതൃപ്തിയോ ഇല്ല | തൃപ്തിയുണ്ട് | വളരെ തൃപ്തി യുണ്ട് |

17. നിങ്ങളുടെ പ്രമേഹം നിയന്ത്രിക്കുന്നതിന് വേണ്ടി ചെലവഴിക്കുന്ന സമയത്തിൽ നിങ്ങൾക്ക് എത്രത്തോളം തൃപ്തിയുണ്ട്?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| വളരെ അതൃ പ്തിയുണ്ട് | അതൃപ്തി യുണ്ട് | തൃപ്തിയോ അതൃപ്തിയോ ഇല്ല | തൃപ്തിയുണ്ട് | വളരെ തൃപ്തി യുണ്ട് |

18. നിങ്ങൾ തുടർച്ചയായ പരിശോധനക്ക് (3 മാസത്തിൽ ഒരിക്കൽ എങ്കിലും) ചെലവഴി ക്കുന്ന സമയത്തിൽ നിങ്ങൾക്ക് എത്രത്തോളം തൃപ്തിയുണ്ട്?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| പൂർണ്ണതൃപ്തി യാണ് | അതൃപ്തി യുണ്ട് | തൃപ്തിയോ അതൃ പ്തിയോ ഇല്ല | കുറച്ച് തൃപ്തി യുണ്ട് | പൂർണ്ണ തൃപ്തിയുണ്ട് |

19. ''പ്രമേഹരോഗം ഉള്ള ഒരു വ്യക്തി ആഴ്ചയിൽ നാല് ദിവസം 35 – 45 മിനിറ്റ് വ്യായാമം ചെയ്യേണ്ടത് ആവശ്യമാണ്'' ഇത് മനസിൽവച്ച്കൊണ്ട് നിങ്ങൾ ഇപ്പോൾ വ്യായാമത്തിനായി ചെലവഴിക്കുന്ന സമയത്തിൽ എത്രത്തോളം തൃപ്തിയുണ്ട്?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| പൂർണ്ണ അതൃ പ്തിയാണ് | അതൃപ്തി യുണ്ട് | തൃപ്തിയോ അതൃ പ്തിയോ ഇല്ല | കുറച്ച് തൃപ്തി യുണ്ട് | പൂർണ്ണ തൃപ്തിയുണ്ട് |

20. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ നിങ്ങൾക്ക് അതിയായ ദാഹം തൊണ്ട വരൾച്ച അനുഭ വപ്പെടാറുണ്ടോ?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോ ഴല്ലാം | ഒരിക്കലും ഇല്ല |

21. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ നിങ്ങൾക്ക് ക്രമാതീതമായി വിശപ്പ് അനുഭവപ്പെടാ റുണ്ടോ?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോ ഴല്ലാം | ഒരിക്കലും ഇല്ല |

22. കഴിഞ്ഞ മൂന്ന് മാസങ്ങളിൽ പ്രമേഹത്തിന്റെ ഭാഗമായി തുടർച്ചയായ മൂത്രശങ്ക ഉണ്ടാകാറുണ്ടോ?

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോ ഴല്ലാം | ഒരിക്കലും ഇല്ല |

23. നിങ്ങളുടെ പ്രമേഹരോഗം നിയന്ത്രിക്കുന്നതിനുള്ള മുൻഗണന എത്രത്തോളം പ്രമേഹ ചികിത്സയിലേക്ക് മാറിയിരിക്കുന്നു?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| വളരെ കൂടുതൽ | കൂടുതൽ | കുറച്ച് | വളരെ കുറച്ച് | ഒട്ടും ഇല്ല |

24. നിങ്ങളുടെ പണം ചെലവഴിക്കുന്നതിനുള്ള മുൻഗണന എത്രത്തോളം പ്രമേഹ ചികിത്സയിലേക്ക് മാറിയിരിക്കുന്നു?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| വളരെ കൂടുതൽ | കൂടുതൽ | കുറച്ച് | വളരെ കുറച്ച് | ഒട്ടും ഇല്ല |

25 നിങ്ങളുടെ പ്രമേഹം നിയന്ത്രിക്കുന്നതിന് ആവശ്യമായ ചെലവ് നിങ്ങളുടെ കുടുംബ ബജറ്റിനെ ബാധിച്ചിട്ടുണ്ടോ?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| വളരെ കൂടുതൽ | കൂടുതൽ | കുറച്ച് | വളരെ കുറച്ച് | ഒട്ടും ഇല്ല |

26. നിങ്ങളുടെ പ്രമേഹം എത്രത്തോളം നിങ്ങളുടെ വിനോദങ്ങളെ (സിനിമ, വിനോദയാത്ര, പാർട്ടികൾക്ക് പോകുക) നിയന്ത്രിക്കുന്നു?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| വളരെ കൂടുതൽ | കൂടുതൽ | കുറച്ച് | വളരെ കുറച്ച് | ഒട്ടും ഇല്ല |

27. നിങ്ങൾക്ക് എത്രത്തോളം ആത്മസംതൃപ്തി തോന്നുന്നു?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| പൂർണ്ണ അതൃപ്തിയാണ് | അതൃപ്തിയുണ്ട് | തൃപ്തിയോ അതൃപ്തിയോ ഇല്ല | തൃപ്തിയുണ്ട് | പൂർണ്ണ തൃപ്തിയുണ്ട് |

28. നിങ്ങളുടെ വ്യക്തി ബന്ധങ്ങളിൽ (കുടുംബം, സുഹൃത്തുക്കൾ, ബന്ധുക്കൾ) നിങ്ങൾക്ക് എത്രത്തോളം തൃപ്തിയുണ്ട്?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| പൂർണ്ണ അതൃപ്തിയാണ് | അതൃപ്തിയുണ്ട് | തൃപ്തിയോ അതൃപ്തിയോ ഇല്ല | കുറച്ച് തൃപ്തിയുണ്ട് | പൂർണ്ണ തൃപ്തിയുണ്ട് |

29. നിങ്ങളുടെ കുടുംബത്തിൽനിന്നും, സുഹൃത്തുക്കളിൽനിന്നും ലഭിക്കുന്ന വൈകാരിക പിൻതുണയിൽ നിങ്ങൾക്ക് എത്രത്തോളം തൃപ്തി തോന്നുന്നു?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| പൂർണ്ണ അതൃപ്തിയാണ് | കുറച്ച് അതൃപ്തിയുണ്ട് | തൃപ്തിയോ അതൃപ്തിയോ ഇല്ല | കുറച്ച് തൃപ്തിയുണ്ട് | പൂർണ്ണ തൃപ്തിയുണ്ട് |

30 നിങ്ങളുടെ ശാരീരിക പ്രശ്നങ്ങൾ എത്രത്തോളം തുടർച്ചയായി നിങ്ങളെ നിരുത്സാഹപ്പെടുത്താറുണ്ടോ?

| (1) | (2) | (3) | (4) | (5) |
|-----|-----|-----|-----|-----|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

31. ജീവിതത്തിൽ എല്ലാവർക്കും ചില ലക്ഷ്യങ്ങൾ ഉണ്ടാകുമല്ലോ: നിങ്ങളുടെ സംബ ന്ധിച്ച് ജീവിതം നിങ്ങളുടെ ഇഷ്ടപ്രകാരം മുന്നോട്ട് പോകുന്നുണ്ടോ?

|  (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| ഒട്ടും ഇല്ല | കുറച്ച് | ഒരു പരിധി വരെ | വളരെ കൂടു തൽ | വളരെ വളരെ കൂടുതൽ |

32. പുറത്ത്നിന്ന് ഭക്ഷണം കഴിക്കേണ്ടിവരുമ്പോൾ പ്രമേഹം നിയന്ത്രണം ഏർപ്പെടുത്തു ന്നതായി തോന്നുന്നു?

|  (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോ ഴെല്ലാം | ഒരിക്കലും ഇല്ല |

33. ധാരാളം ഭക്ഷണങ്ങൾ ലഭ്യമാകുന്ന പാർട്ടികളിൽ പ്രമേഹം നിങ്ങൾക്ക് വ്യത്യസ്ത മായ ഭക്ഷണം തെരെഞ്ഞെടുക്കുന്നതിന് അവസരം തരാറുണ്ടോ?

|  (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| ഒട്ടും അവസരം ഉണ്ടാകാറില്ല | കുറച്ച് | വളരെ കുറച്ച് | ധാരാളം | വളരെ കൂടു തൽ |

34. നിങ്ങൾക്ക് പ്രമേഹം ഉണ്ട് എന്ന വാസ്തവം മറ്റുള്ളവരിൽനിന്നും മറച്ച് പിടിക്കുന്ന തിനായി നിങ്ങൾക്ക് കഴിക്കാൻ പാടില്ലാത്ത ഭക്ഷണം കഴിക്കാറുണ്ടോ?

|  (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| എല്ലായ്പ്പോഴും | പതിവായി | കൂടെകൂടെ | ചിലപ്പോഴെല്ലാം | ഒരിക്കലും ഇല്ല |

**APPENDIX - IIA**

**Perceived Stress Scale (PSS)**

**Name :**                                                     **Age :**

**Instructions:**

1.      Read each question

2.      After reading each question consider how often you felt or thought that way  over the past month (Never, Alost Never, Sometimes, Fairly Often, or Very Often).

3.      Place whichever of the following letter grades [N (Never), AN (Almost Never), S (Sometimes), FO (Fairly Often), or VO (Very Often)] which best describes how often you felt or thought that way, in the box to the right of the question,  labeled "Rating".

| | **Question** | **Rating** | **Score** |
|---|---|---|---|
| 1. | How often have you been upset because of something that happened unexpectedly? | | |
| 2. | How often have you felt that you were unable to control the important things in your life? | | |
| 3. | How often have you felt nervous and "stressed"? | | |
| 4. | How often have you felt confident about your ability to handle your personal problems? | | |
| 5. | How often have you felt that things were going your way? | | |
| 6. | How often have you found that you could not cope with all the things that you had to do? | | |
| 7. | How often have you been able to control irritations in your life? | | |
| 8. | How often have you felt that you were on top of things? | | |
| 9. | How often have you been angered because of thing that were outside of your control? | | |
| 10. | How often have you felt difficulties were piling up so high that you could not overcome them? | | |

| Total Perceived Stress Scale Score |
|---|

# APPENDIX – II B

## PERCEIVED STRESS SCALE (PSS)

Cohen, S., Kamarck, T., & Mermelstein, R

Translated to Malayalam - By Sarika.K K. & Baby Shari. P A.

DEPARTMENT OF PSYCHOLOGY

UNIVERSITY OF CALICUT

Name:

Age:

താഴെ കൊടുത്തിരിക്കുന്ന വസ്തുതകൾ പലരുടേയും ജീവിതത്തിൽ കണ്ടുവരുന്നതാണ്. ഇത് ശ്രദ്ധാപൂർവ്വം വായിച്ച് അവ ഓരോന്നും നിങ്ങൾക്ക് " കഴിഞ്ഞ മാസങ്ങളിൽ" എത്രമാത്രം പിരിമുറുക്കം ഉണ്ടാക്കുന്നു എന്ന് വിലയിരുത്തി. തന്നിരിക്കുന്ന കോളത്തിൽ ഉത്തരങ്ങൾ രേഖപ്പെടുത്തുക.

നിങ്ങളുടെ ഉത്തരം " **ഒരിക്കലും ഉണ്ടാകാറില്ല**" എന്നാണെങ്കിൽ "**1**" എന്നും, **മിക്കപ്പോഴും ഉണ്ടാകാറില്ല** എന്നാണെങ്കിൽ "**2**" എന്നും, "**വല്ലപ്പോഴും ഉണ്ടാകാറുണ്ട്**" എന്നാണെങ്കിൽ "**3**" എന്നും, "**കൂടെക്കൂടെ ഉണ്ടാകാറുണ്ട്**" എന്നാണെങ്കിൽ "**4**" എന്നും, "**എല്ലായ്പ്പോഴും ഉണ്ടാകാറുണ്ട്**" എന്നാണെങ്കിൽ "**5**" എന്നും രേഖപ്പെടുത്തുക.

നിങ്ങളുടെ പ്രതികരണങ്ങൾ ഗവേഷണ ആവശ്യങ്ങൾക്ക് വേണ്ടി മാത്രം ഉപയോഗിക്കുന്നതും രഹസ്യമായി സൂക്ഷിക്കുന്നതും ആണ്.

| NO | ചോദ്യങ്ങൾ | ഉത്തരം |
|----|-----------|--------|
| 1 | അപ്രതീക്ഷിതമായി എന്തെങ്കിലും സംഭവിച്ചാൽ നിങ്ങൾ അസ്വസ്ഥനാകാറുണ്ടോ ? | |
| 2 | ജീവിതത്തിലെ പ്രധാനപ്പെട്ട കാര്യങ്ങൾ നിയന്ത്രിക്കുവാൻ നിങ്ങൾക്ക് സാധിക്കില്ല എന്ന് തോന്നാറുണ്ടോ ? | |
| 3 | നിങ്ങൾക്ക് പിരിമുറുക്കം അനുഭവപ്പെടാറുണ്ടോ ? | |
| 4 | നിങ്ങൾക്ക് നിങ്ങളുടെ വ്യക്തിപരമായ പ്രശ്നങ്ങൾ കൈകാര്യം ചെയ്യുന്നതിൽ ആത്മവിശ്വാസം തോന്നാറുണ്ടോ ? | |
| 5 | നിങ്ങൾ വിചാരിക്കുന്ന രീതിയിൽ കാര്യങ്ങൾ നടക്കുന്നതായി തോന്നാറുണ്ടോ ? | |
| 6 | പ്രശ്നങ്ങൾ ഉണ്ടാകുമ്പോൾ പരിഹരിക്കാൻ കഴിയാത്തതായി തോന്നാറുണ്ടോ ? | |
| 7 | ജീവിതത്തിൽ ഉണ്ടാകുന്ന പ്രകോപനമായ കാര്യങ്ങൾ (അസ്വസ്ഥതകൾ) നിയന്ത്രിക്കാൻ നിങ്ങൾക്ക് കഴിയാറുണ്ടോ ? | |
| 8 | എല്ലാത്തിനും അതീതനാണ് നിങ്ങൾ എന്ന തോന്നൽ നിങ്ങൾക്ക് ഉണ്ടാവാറുണ്ടോ ? | |
| 9 | കാര്യങ്ങൾ നിങ്ങളുടെ നിയന്ത്രണത്തിൽ അല്ലാതെ വരുമ്പോൾ നിങ്ങൾ ദേഷ്യപ്പെടാറുണ്ടോ ? | |
| 10 | ബുദ്ധിമുട്ടുകൾ ഒരേ സമയം ഉണ്ടാകുമ്പോൾ അവയൊന്നും തരണം ചെയ്യാൻ സാധിക്കില്ല എന്ന് നിങ്ങൾക്ക് തോന്നാറുണ്ടോ ? | |

TOTAL PSS:

**APPENDIX - III**

**SELF CARE INVENTORY**

**Name :**                                                    **Age :**

Each of the items according to how well you Followed your Prescribed Regimen for Diabetes Care in the *past month.* Use the following scale:

> 1 = Never do it
> 2 = Sometimes follow recommendations; mostly not
> 3 = Follow recommendations about 50% of the time
> 4 = usually do this as recommended; occasional lapses
> 5 = Always do this as recommended without fail
> NA = cannot rate this item/Not applicable

In the past month, how well have you followed recommendations for:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | Glucose testing | 1 | 2 | 3 | 4 | 5 | NA |
| 2. | Glucose recording | 1 | 2 | 3 | 4 | 5 | NA |
| 3. | Ketone testing | 1 | 2 | 3 | 4 | 5 | NA |
| 4. | Administering correct insulin dose | 1 | 2 | 3 | 4 | 5 | NA |
| 5. | Administering insulin at right time | 1 | 2 | 3 | 4 | 5 | NA |
| 6. | Adjusting insulin intake based on blood glucose values | 1 | 2 | 3 | 4 | 5 | NA |
| 7. | Eating the proper foods; sticking to meal plan | 1 | 2 | 3 | 4 | 5 | NA |
| 8. | Eating meals on time | 1 | 2 | 3 | 4 | 5 | NA |
| 9. | Eating regular snacks | 1 | 2 | 3 | 4 | 5 | NA |
| 10. | Carrying quick-acting sugar to treat reactions | 1 | 2 | 3 | 4 | 5 | NA |
| 11. | Coming in for appointments | 1 | 2 | 3 | 4 | 5 | NA |
| 12. | Wearing a medic alert ID | 1 | 2 | 3 | 4 | 5 | NA |
| 13. | Exercising regularly | 1 | 2 | 3 | 4 | 5 | NA |
| 14. | Exercising strenuously | 1 | 2 | 3 | 4 | 5 | NA |

## APPENDIX - IVA

## SUBJECT WELL-BEING INVENTORY (SUBI)

**Name :**                                                    **Age :**

---

This is a questionnaire on how you feel about some aspects of your life. Each question may be answered by any one of the given categories by putting a circle around the number which seems to represent your feeling best. For example, in the first question, if you feel that your life is very interesting, please put a circle around the response '1'. At times you may find that your feeling is not represented perfectly by any of the given response categories. In such cases, just choose the one closest to what you think.

1. Do you feel your life is interesting?

|                   |   |
|-------------------|---|
| Very much         | 1 |
| To some extent    | 2 |
| Not so much       | 3 |

2. Do you think you have achieved the standard of living and the social status that you had expected?

|                   |   |
|-------------------|---|
| Very much         | 1 |
| To some extent    | 2 |
| Not so much       | 3 |

3. How do you feel about the extent to which you have achieved success and are getting ahead?

|                   |   |
|-------------------|---|
| Very good         | 1 |
| Quite good        | 2 |
| Not so good       | 3 |

4. Do you normally accomplish what you want to?

|                   |   |
|-------------------|---|
| Most of the time  | 1 |
| Sometimes         | 2 |
| Hardly ever       | 3 |

5.    Compared with the past, do you feel your present life is:

|                       |   |
|-----------------------|---|
| Very happy            | 1 |
| Quite happy           | 2 |
| Not so happy          | 3 |

6.    On the whole, how happy are you with the things you have been doing in recent years?

|                       |   |
|-----------------------|---|
| Very happy            | 1 |
| Quite happy           | 2 |
| Not so happy          | 3 |

7.    Do you feel you can manage situations even when they do not turn out as expected?

|                       |   |
|-----------------------|---|
| Most of the time      | 1 |
| Sometimes             | 2 |
| Hardly ever           | 3 |

8.    Do you feel confident that in the case of a crisis (anything which substantially upsets your life situation) you will be able to cope with it/face it boldly?

|                       |   |
|-----------------------|---|
| Very much             | 1 |
| To some extent        | 2 |
| Not so much           | 3 |

9.    The way things are going now do you feel confident in confident in coping with the future?

|                       |   |
|-----------------------|---|
| Very much             | 1 |
| To some extent        | 2 |
| Not so much           | 3 |

10.   Do you sometimes feel that you and the things around you belong very much together and are integral parts of a common force?

|                       |   |
|-----------------------|---|
| Very much             | 1 |
| To some extent        | 2 |
| Not so much           | 3 |

11. Do you sometimes experience moments of intense happiness almost like a kind of ecstasy or bliss?

|                |   |
|----------------|---|
| Quite often    | 1 |
| Sometimes      | 2 |
| Hardly ever    | 3 |

12. Do you sometimes experience a joyful feeling of being part of mankind as of one large family?

|                |   |
|----------------|---|
| Quite often    | 1 |
| Sometimes      | 2 |
| Hardly ever    | 3 |

13. Do you feel confident that relatives and/or friends will help you out if there is an emergency, e.g. if you lose what you have by fire or theft?

|                |   |
|----------------|---|
| Very much      | 1 |
| To some extent | 2 |
| Not so much    | 3 |

14. How do you feel about the relationship you and your children have?

|                |   |
|----------------|---|
| Very good      | 1 |
| Quite good     | 2 |
| Not so good    | 3 |
| Not applicable | 4 |

15. Do you feel confident that relatives and/or friends will look after you if you are severely ill or meet with an accident?

|                |   |
|----------------|---|
| Very much      | 1 |
| To some extent | 2 |
| Not so much    | 3 |

16. Do you get easily upset if things don't turn out as expected?

|                |   |
|----------------|---|
| Very much      | 1 |
| To some extent | 2 |
| Not so much    | 3 |

17. Do you sometimes feel sad without reason?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

18. Do you feel too easily irritated, too sensitive?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

19. Do you feel disturbed by feeling of anxiety and tension?

|  |  |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

20. Do you consider it a problem for you that you sometimes lose your temper over minor things?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

21. Do you consider your family a source of help to you in finding solutions to most of the problems you have?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

22. Do you think that most of the members of your family feel closely attached to one another?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

23. Do you think you would be looked after well by your family in case you were seriously ill?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

24. Do you feel your life is boring/uninteresting?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

25. Do you worry about your future?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

26. Do you feel your life is useless?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

27. Do you sometimes worry about the relationship you and your wife/husband have?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |
| Not applicable | 4 |

28. Do you feel your friends/relatives would help you out if you were in need?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

29. Do you sometimes worry about the relationship you and your children have?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |
| Not applicable | 4 |

30. Do you feel that minor things upset you more than necessary?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

31. Do you get easily upset if you are criticized?

| | |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

32. Would you wish to have more friends than you actually have?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

33. Do you sometimes feel that you miss a real close friend?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

34. Do you sometimes worry about your health?

| | |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

35. Do you suffer from pains in various parts of your body?

| | |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

36. Are you disturbed by palpitations/a thumping heart?

| | |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

37.  Are you disturbed by a feeling of giddiness?

|  |  |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

38.  Do you feel you get tired too easily?

|  |  |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

39.  Are you troubled by disturbed by disturbed sleep?

|  |  |
|---|---|
| Most of the time | 1 |
| Sometimes | 2 |
| Hardly ever | 3 |

40.  Do you sometimes worry that you do not have close personal relationship with other people?

|  |  |
|---|---|
| Very much | 1 |
| To some extent | 2 |
| Not so much | 3 |

# APPENDIX- IV B

# THE SUBJECTIVE WELL-BEING INVENTORY

# (SUBI)

Sell, H, & Nagpal, R.

Translated to Malayalam - By Sarika.K K. & Baby Shari. P A.

DEPARTMENT OF PSYCHOLOGY

UNIVERSITY OF CALICUT

NAME:                                                                                    AGE:

1.  നിങ്ങളുടെ ജീവിതം രസകരമാണെന്ന് നിങ്ങൾക്ക് തോന്നുന്നുണ്ടോ ?

    a) വളരെ അധികം    b) ഒരു പരിധി വരെ   c) അധികം തോന്നുന്നില്ല

2.  നിങ്ങൾ നേടുവാൻ ആഗ്രഹിച്ചിരുന്ന ജീവിത നിലവാരവും, സമൂഹത്തിലെ പദവിയും നേടി എന്ന് നിങ്ങൾ കരുതുന്നുണ്ടോ ?

    a) വളരെ അധികം     b) ഒരു പരിധി വരെ   c) അധികം തോന്നുന്നില്ല

3.  നിങ്ങൾ ഇതുവരെ നേടിയ വിജയങ്ങളെക്കുറിച്ചും ഇനി നേടാൻ പോകുന്നതിനെക്കുറിച്ചും എന്ത് തോന്നുന്നു ?

    a) വളരെ നല്ലത്        b) തികച്ചും നല്ലത്      c) അത്ര അധികം നല്ലതല്ല

4.  നിങ്ങൾ സാധാരണ ആഗ്രഹിക്കുന്നതെല്ലാം നേടിയെടുക്കാറുണ്ടോ ?

    a) എല്ലായ്ഷോഴും      b) ചിലപ്പോഴെല്ലാം       c) ഒരിക്കലും ഇല്ല

5.  മുൻപത്തേതിനെ അപേക്ഷിച്ച് നിങ്ങളുടെ ഇപ്പോഴത്തെ ജീവിതം ?

    a) വളരെ സന്തോഷം ഉള്ളതാണ് b) ഒരു വിധം സന്തോഷം ഉള്ളതാണ് c)അധികം സന്തോഷം ഉള്ളതല്ല

6.  പൊതുവെ, ഈ അടുത്ത വർഷങ്ങളിൽ ചെയ്തുപോന്ന കാര്യങ്ങൾകൊണ്ട് നിങ്ങൾ എത്രത്തോളം സന്തോഷവാനാണ് ?

    a) വളരെ സന്തോഷവാനാണ് b) ഒരു വിധം സന്തോഷവാനാണ് c) അത്ര അധികം സന്തോഷവാനല്ല

7.  സാഹചര്യങ്ങൾ നിങ്ങളുടെ പ്രതീക്ഷയിൽ നിന്നും വ്യത്യസ്തമായി വന്നാലും നിങ്ങൾക്ക് മുന്നേറാൻ സാധിക്കും എന്ന് തോന്നാറുണ്ടോ ?

    a) എല്ലായ്ഷോഴും      b) ചിലപ്പോഴെല്ലാം       c) ഒരിക്കലും ഇല്ല

8. നിങ്ങളുടെ ജീവിത സാഹചര്യങ്ങളെ തകിടം മറിക്കുന്ന രീതിയിൽ പ്രതിസന്ധിഘട്ടങ്ങൾ ഉണ്ടായാലും അതിനെ ആത്മവിശ്വാസത്തോടെ നേരിടാം എന്ന് നിങ്ങൾ വിശ്വസിക്കുന്നുവോ ?

a) വളരെ നന്നായി    b) ഒരു പരിധി വരെ    c) അത്ര അധികം തോന്നാറില്ല

9. ഇപ്പോഴത്തെ രീതിയിൽ കാര്യങ്ങൾ പോയാൽ ഭാവിയിൽ എല്ലാം നേരിടാം എന്ന ധൈര്യം നിങ്ങൾക്ക് ഉണ്ടോ ?

a) വളരെ നന്നായി    b) കുറച്ച്    c) അത്ര അധികം ഇല്ല

10. നിങ്ങളും നിങ്ങളുടെ ചുറ്റുപാടുമുള്ള കാര്യങ്ങളും ഒരു പൊതുശക്തിയുടെ അവിഭാജ്യ ഘടകങ്ങളായി മുന്നോട്ടു പോകുന്നതാണെന്ന് തോന്നാറുണ്ടോ?

a) വളരെ അധികം    b) ഒരു പരിധി വരെ    c) അത്ര അധികം തോന്നാറില്ല

11. നിങ്ങൾക്ക് ആനന്ദം അല്ലെങ്കിൽ നിർവൃതി അനുഭവപ്പെടാറുണ്ടോ?

a) മിക്കപ്പോഴും            b)ചിലപ്പോഴെല്ലാം            c) ഒരിക്കലും ഇല്ല

12. നിങ്ങൾക്ക് ഒരു 'വിശ്വമാനവൻ' (സമൂഹത്തിലെ എല്ലാവരെയും ഒരേ തരത്തിൽ മനുഷ്യവർഗ്ഗം എന്നു വിളിക്കാനുള്ള കാഴ്ചപ്പാട്) എന്നതിൽ സന്തോഷം തോന്നാറുണ്ടോ?

a) മിക്കപ്പോഴും            b)ചിലപ്പോഴെല്ലാം            c)ഒരിക്കലും ഇല്ല

13. നിങ്ങൾക്ക് ഏതെങ്കിലും തരത്തിൽ ഒരു അത്യാവശ്യം ഉണ്ടായാൽ നിങ്ങളുടെ ബന്ധുക്കൾ അല്ലെങ്കിൽ സുഹൃത്തുകൾ നിങ്ങളെ സഹായിക്കും എന്ന ഉറപ്പ് ഉണ്ടോ ?

a) വളരെ അധികം            b)ഒരു പരിധി വരെ    c)അത്ര അധികം ഇല്ല

14. നിങ്ങളും നിങ്ങളുടെ കുട്ടികളും തമ്മിൽ ഉള്ള ബന്ധത്തെക്കുറിച്ച് എന്ത് തോന്നുന്നു ?

a) വളരെ നല്ലത്        b)തരക്കേടില്ല  c)അത്ര നല്ലതല്ല  d)അഭിപ്രായം ഇല്ല

15. നിങ്ങൾക്ക് എന്തെങ്കിലും മാരകമായ അസുഖങ്ങളോ അപകടമോ ഉണ്ടായാൽ ബന്ധുക്കളും സുഹൃത്തുക്കളും നിങ്ങളെ സംരക്ഷിക്കും എന്ന് നിങ്ങൾക്ക് ഉറപ്പ് ഉണ്ടോ ?

a) വളരെ അധികം    b)ഒരു പരിധി വരെ            c)അത്ര അധികം ഇല്ല

16. കാര്യങ്ങൾ നിങ്ങൾ വിചാരിച്ച രീതിയിൽ നടന്നില്ലെങ്കിൽ നിങ്ങൾ പെട്ടെന്ന് അസ്വസ്ഥനാകാറുണ്ടോ ?

a) വളരെ കൂടുതൽ  b)ഒരു പരിധി വരെ    c)അത്ര അധികം തോന്നാറില്ല

17. പ്രത്യേകിച്ച് കാരണങ്ങൾ ഇല്ലാതെ തന്നെ ചിലപ്പോൾ നിങ്ങൾക്ക് ദുഃഖം തോന്നാറുണ്ടോ?

a) വളരെ കൂടുതൽ  b)ഒരു പരിധി വരെ    c)തോന്നാറില്ല

18. നിങ്ങൾക്ക് വളരെ പെട്ടെന്ന് ദേഷ്യം വരുന്നു എന്ന് തോന്നാറുണ്ടോ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)തോന്നാറില്ല

19. നിങ്ങളെ ഉത്കണ്ഠ/ആകാംക്ഷ അലട്ടുന്നുണ്ടോ?

   a) എല്ലായ്പ്പോഴും    b)വല്ലപ്പോഴും        c)ഒരിക്കലും ഇല്ല

20. വളരെ ചെറിയ കാര്യങ്ങൾക്ക്പോലും നിങ്ങൾക്ക് ദേഷ്യം അടക്കാൻ പറ്റാതിരിക്കുന്നതായി തോന്നാറുണ്ടോ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ    c)അധികം തോന്നുന്നില്ല

21. നിങ്ങളുടെ ഒട്ടുമിക്ക പ്രശ്നങ്ങൾക്കും പരിഹാരം കാണുന്നതിന് നിങ്ങളുടെ കുടുംബം ഒരു ഉറവിടമായി കണക്കാക്കുന്നുണ്ടോ?

   a) വളരെ അധികം    b)ഒരു പരിധി വരെ    c)അധികം തോന്നുന്നില്ല

22. നിങ്ങളുടെ വീട്ടിലെ എല്ലാ അംഗങ്ങളും അന്യോന്യം അടുത്ത ബന്ധം പുലർത്തുന്നുണ്ട് എന്ന് തോന്നുന്നുണ്ടോ ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ    c)അധികം തോന്നുന്നില്ല

23. നിങ്ങൾക്ക് എന്തെങ്കിലും ഗുരുതരമായ അസുഖം വന്നാൽ കുടുംബാംഗങ്ങൾ നിങ്ങളെ സംരക്ഷിക്കും എന്ന് ചിന്തിക്കുന്നുണ്ടോ ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ    c)അധികം തോന്നുന്നില്ല

24. നിങ്ങളുടെ ജീവിതം മടുപ്പ് ഉളവാക്കുന്നതാണ്/താൽപര്യം തോന്നാത്തതാണ് എന്ന് തോന്നാറുണ്ടോ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ    c)അധികം തോന്നാറില്ല

25. നിങ്ങളുടെ ഭാവിയെക്കുറിച്ച് ആലോചിച്ച് നിങ്ങൾ ആകുലപ്പെടാറുണ്ടോ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)അധികം തോന്നാറില്ല

26. നിങ്ങളുടെ ജീവിതം ഉപയോഗശൂന്യമാണ് എന്ന് തോന്നാറുണ്ടോ?

   a) വളരെ അധികം    b)ഒരു പരിധി വരെ    c)അത്ര അധികം തോന്നാറില്ല

27. ജീവിതപങ്കാളിയോടൊത്തുള്ള നിങ്ങളുടെ ബന്ധത്തെക്കുറിച്ച് ഓർത്ത് ചിലപ്പോഴെല്ലാം വിഷമിക്കാറുണ്ടോ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ    c)അത്ര അധികം ഇല്ല
   d)അഭിപ്രായം ഇല്ല

28. ഒരു ആവശ്യം ഉണ്ടായാൽ നിങ്ങളുടെ സുഹൃത്തുകൾ/ബന്ധുക്കൾ നിങ്ങളെ സഹായിക്കും എന്ന് തോന്നാറുണ്ടോ?

   a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)അധികം തോന്നാറില്ല

29. ചിലപ്പോഴെല്ലാം നിങ്ങൾ നിങ്ങളുടെ മക്കളുമായുള്ള ബന്ധത്തെക്കുറിച്ച് ഓർത്ത് വിഷമിക്കാറുണ്ടോ?

    a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ   c)അധികം തോന്നാറില്ല
    d) അഭിപ്രായം ഇല്ല

30. വളരെ ചെറിയ കാര്യങ്ങൾ ആവശ്യത്തിൽ കൂടുതൽ നിങ്ങളെ അലട്ടുന്നതായി തോന്നാറുണ്ടോ?

    a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)അധികം തോന്നാറില്ല

31. വിമർശിക്കപ്പെടുമ്പോൾ നിങ്ങൾ വളരെ പെട്ടെന്ന് ആശങ്കകുലനാകാറു ണ്ടോ ?

    a) എല്ലായ്പ്പോഴും      b)ചിലപ്പോഴെല്ലാം        c)ഒരിക്കലും ഇല്ല

32. നിങ്ങൾക്ക് ഇപ്പോൾ ഉള്ളതിനേക്കാൾ സുഹൃത്തുകൾ വേണം എന്ന് നിങ്ങൾ ആഗ്രഹിക്കാറുണ്ടോ ?

    a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)അധികം
    ആഗ്രഹിക്കുന്നില്ല

33. നിങ്ങൾക്ക് ചിലപ്പോൾ ഒരു ആത്മാർത്ഥ സുഹൃത്തിന്റെ അഭാവം തോന്നാറുണ്ടോ?

    a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)തോന്നാറില്ല

34. നിങ്ങൾ ചിലപ്പോഴല്ലാം നിങ്ങളുടെ ആരോഗ്യത്തെക്കുറിച്ച് ഓർത്ത് വിഷമിക്കാറുണ്ടോ?

    a) വളരെ കൂടുതൽ   b)ഒരു പരിധി വരെ        c)വിഷമിക്കാറില്ല

35. ശരീരത്തിന്റെ വിവിധഭാഗങ്ങളിൽ ഉണ്ടാകുന്ന വേദനകൊണ്ട് കഷ്ടപ്പെടുന്നുണ്ടോ ?

    a) എല്ലായ്പ്പോഴും      b)ചിലപ്പോഴല്ലാം        c)ഒരിക്കലും ഇല്ല

36. നിങ്ങളുടെ ഹൃദയമിടിപ്പ് ക്രമാതീതമായി വർദ്ധിക്കുന്നത് മൂലം അസ്വസ്ഥത അനുഭവപ്പെടാറുണ്ടോ ?

    a) എല്ലായ്പ്പോഴും      b)ചിലപ്പോഴെല്ലാം        c)ഒരിക്കലും ഇല്ല

37. നിങ്ങൾക്ക് തലചുറ്റൽ മൂലം ബുദ്ധിമുട്ടുകൾ അനുഭവപ്പെടാറുണ്ടോ ?

    a) എല്ലായ്പ്പോഴും      b)ചിലപ്പോഴെല്ലാം        c)ഒരിക്കലും ഇല്ല

38. നിങ്ങൾ പെട്ടെന്ന് ക്ഷീണിതനാകാറുണ്ടോ/ ക്ഷീണിതയാകാറുണ്ടോ ?

    a) എല്ലായ്പ്പോഴും      b)ചിലപ്പോഴെല്ലാം        c)ഒരിക്കലും ഇല്ല

39. നിങ്ങൾക്ക് ശാന്തമായ ഉറക്കം ലഭിക്കാതിരിക്കാറുണ്ടോ ?

    a) എല്ലായ്പ്പോഴും      b)ചിലപ്പോഴെല്ലാം        c)ഒരിക്കലും ഇല്ല

40. ശക്തമായ വ്യക്തി ബന്ധങ്ങൾ ഇല്ലാത്തതിനാൽ ഇടയ്ക്കാക്കെ നിങ്ങൾ പ്രയാസപ്പെടുന്നുണ്ടോ ?

    a) വളരെ കൂടുതൽ  b)ഒരു പരിധി വരെ   c)അധികം അനുഭവപ്പെടാറില്ല

**APPENDIX - V**

**DS14: TYPE D PERSONALITY ASSESSMENT**

**Denollet.J**

Name:
Age:

Below are a number of statements that people often use to describe themselves. Please read each statement and then *circle* (O) the appropriate number next to that statement to indicate your answer. There is no right or wrong answers: your own impression is the only thing that matters.

**0=False    1=Rather False    2=Neutral    3=Rather true    4=True**

1. I make contact easily when I meet people……… **0   1   2   3   4**

2. I often make a fuss about unimportant things…. **0   1   2   3   4**

3. I often talk to strangers………………………….. **0   1   2   3   4**

4. I often feel unhappy……………………………… **0   1   2   3   4**

5. I am often irritated……………………………... **0   1   2   3   4**

6. I often feel inhibited in social interactions………. **0   1   2   3   4**

7. I take a gloomy view of things…………………… **0   1   2   3   4**

8. I find it hard to start a conversation……………… **0   1   2   3   4**

9. I am often in a bad mood………………………. **0   1   2   3   4**

10. I am a closed kind of person…………………….. **0   1   2   3   4**

11. I would rather keep other people at a distance….. **0   1   2   3   4**

12. I often find myself worrying about something….. **0   1   2   3   4**

13. I am often down in the dumps…………………… **0   1   2   3   4**

14. When socializing, I don't find the right things to

    talk about…………………………………….. **0   1   2   3   4**

## APPENDIX – VI A

## PERCEIVED SOCIAL SUPPORT ASSESSMENT

**Name :**                                                                                              **Age :**

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**Instructions:** Read each statement carefully.  Indicate how you feel about each          statement

| Very Strongly Disagree | Strongly Disagree | Mildly Disagree | Neutral | Mildly Agree | Strongly Agree | Very Strongly Agree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

|  | Statement | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1. | There is a special person who is around when I am in need | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | There is a special person with whom I can share my joys and sorrows | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | My family really tries to help me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | I get the emotional help and support I need from my family | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | I have a special person who is a real source of comfort to me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | My friends really try to help me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | I can count on my friends when things go wrong | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | I can talk about my problems with my family | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | I have friends with whom I can share my joys and sorrows | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | There is a special person in my life who cares about my feelings | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | My family is willing to help me make decisions | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. | I can talk about my problems with my friends | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

I

ll

# APPENDIX – VI - B

## PERCEIVED SOCIAL SUPPORT ASSESSMENT (PSSA)

Zimet, G.D., Dahlem, M.W., Zimet, S.G., & Farley, G.K.
Translated to Malayalam - By Sarika.K.K. & Baby Shari. P.A
DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF CALICU**T**

Patient Name :                                                                                    Age :

താഴെ കൊടുത്തിരിക്കുന്നത് നിങ്ങളുടെ ചുറ്റുപാടുമുള്ളവരുമായി നിങ്ങൾക്ക് ഉള്ള ബന്ധത്തെ പ്രതിപാദിക്കുന്ന ചില പ്രസ്താവനകൾ ആണ്. അവ ശ്രദ്ധാപൂർവ്വം വായിച്ച് നിങ്ങൾക്ക് ഏറ്റവും അനുയോജ്യമായി തോന്നുന്ന ഉത്തരം രേഖപ്പെടുത്തുക.

നിങ്ങളുടെ ഉത്തരം ''വളരെ ശക്തമായി വിയോജിക്കുന്നു'' എന്നാണെങ്കിൽ ''1'' എന്നും ''ശക്തമായി വിയോജിക്കുന്നു'' എന്നാണെങ്കിൽ ''2'' എന്നും, ''വിയോജിക്കുന്നു'' എന്നാണെങ്കിൽ ''3'' എന്നും, ''അഭിപ്രായമില്ല'' എന്നാണെങ്കിൽ ''4'' എന്നും ''യോജിക്കുന്നു'' എന്നാണെങ്കിൽ ''5'' എന്നും ''ശക്തമായി യോജിക്കുന്നു'' എന്നാണെങ്കിൽ ''6'' എന്നും ''വളരെ ശക്തമായി യോജിക്കുന്നു'' എന്നാണെങ്കിൽ ''7'' എന്നും രേഖപ്പെടുത്തുക.

നിങ്ങളുടെ പ്രതികരണങ്ങൾ ഗവേഷണ ആവശ്യങ്ങൾക്ക് വേണ്ടിമാത്രം ഉപയോഗിക്കുന്നതും രഹസ്യമായി സൂക്ഷിക്കുന്നതും ആണ്.

| നമ്പർ | ചോദ്യങ്ങൾ | ഉത്തരം |
|---|---|---|
| 1 | ആവശ്യഘട്ടങ്ങളിൽ എന്നെ സഹായിക്കാൻ ആരെങ്കിലും ഉണ്ടാകാറുണ്ട് | |
| 2. | സന്തോഷവും സങ്കടവും പങ്കുവയ്ക്കുവാൻ എനിക്ക് വേണ്ടപ്പെട്ട ഒരാൾ ഉണ്ട് | |
| 3. | എന്റെ കുടുംബം യാഥാർത്ഥത്തിൽ എന്നെ സഹായിക്കുവാൻ ശ്രമിക്കുന്നുണ്ട് | |
| 4. | ആവശ്യമായ മാനസിക പിൻതുണ എന്റെ കുടുംബാംഗങ്ങളിൽനിന്നും എനിക്ക് ലഭിക്കാറുണ്ട് | |
| 5. | എപ്പോഴും ആശ്വാസമാകുന്ന പ്രിയപ്പെട്ട ഒരു വ്യക്തി എനിക്കുണ്ട് | |
| 6. | എന്റെ സുഹൃത്തുക്കൾ എന്നെ എല്ലായ്പ്പോഴും സഹായിക്കാറുണ്ട് | |
| 7. | പ്രശ്നങ്ങൾ നേരിടേണ്ടി വരുമ്പോൾ പോലും സഹായിക്കുന്ന സുഹൃത്തുക്കൾ എനിക്കുണ്ട് | |

| 8. | എന്റെ പ്രശ്നങ്ങൾ കുടുംബാംഗങ്ങളുമായി പങ്കുവയ്ക്കാൻ എനിക്ക് കഴിയാറുണ്ട് | |
|----|----|----|
| 9. | എന്റെ സന്തോഷങ്ങളും സങ്കടങ്ങളും പങ്കുവയ്ക്കാൻ കഴിയുന്ന സുഹൃത്തുക്കൾ എനിക്കുണ്ട്. | |
| 10. | എന്റെ (മാനസിക) വികാരങ്ങളെ മനസിലാക്കുന്ന ഒരു വ്യക്തി എന്റെ ജീവിതത്തിൽ ഉണ്ട്. | |
| 11. | തീരുമാനങ്ങൾ എടുക്കാൻ എന്റെ കുടുംബം എന്നെ സഹായി ക്കാറുണ്ട് | |
| 12. | എനിക്ക് എന്റെ പ്രശ്നങ്ങളെപ്പറ്റി സുഹൃത്തുക്കളോട് സംസാരി ക്കാൻ കഴിയാറുണ്ട്. | |

## APPENDIX - VII

### Patient Health Questionnaire (PHQ-9)

Patient Name :                                        Age :

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Read carefully the statements given below and put a tick mark (✓) against the most appropriate statement pertaining to yourself.

| | Not at all | Several days | More than half the days | Nearly every day |
|---|---|---|---|---|
| 1. Over the last 2 weeks, how often have you been bothered by any of the following problems? | ☐ | ☐ | ☐ | ☐ |
| a. Little interest or pleasure in doing things | ☐ | ☐ | ☐ | ☐ |
| b. Feeling down, depressed, or hopeless | ☐ | ☐ | ☐ | ☐ |
| c. Trouble failing/staying asleep, sleeping too much | ☐ | ☐ | ☐ | ☐ |
| d. Feeling tired or having little energy | ☐ | ☐ | ☐ | ☐ |
| e. Poor appetite or overeating q | ☐ | ☐ | ☐ | ☐ |
| f. Feeling bad about yourself or that you are a failure or have let yourself or your family down | ☐ | ☐ | ☐ | ☐ |
| g. Trouble concentrating on things, such as reading the newspaper or watching television | ☐ | ☐ | ☐ | ☐ |
| h. Moving or speaking so slowly that other people could have noticed. Or the opposite; being so fidgety or restless that you have been moving around a lot more than usual | ☐ | ☐ | ☐ | ☐ |

i. Thoughts that you would be better off dead or of hurting yourself in some way

☐ ☐ ☐ ☐

2. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

| Not difficult at all | Some what difficult | Very difficult | Extremely difficult |
|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ |

## APPENDIX - VIII

## PERSONAL DATA SHEET

Name (not compulsory) :

Age                      :

Sex                      :

Religion                 :

Education                : School final/Intermediate/Degree/Technical
education.

Age of onset             :

Diabetic family history  : Yes/No.

Marital status           : Unmarried/Married/Separated/Divorced

Socio Economic

Status                   : High/Middle/Low

Living locality          : Urban/Semi-urban/Rural

Are you diagnosed as having Diabetes: Yes/No

DOI                      :

Treatment followed       : Allopathy/Ayurveda/Homeopathy/others:

Life style control followed:

Food habits:             Regular and Systematic/as per hunger/old
food habits:

Are you insulin dependent:

Practicing Exercise      :

Glucose level (last tested) :

**APPENDIX- IX**

**SAMPLE MENU FOR DIABETICS IN KERALA**

| Meal/Time | Meal Plan | | Menu Ideas For the Vegetarian | Menu Ideas For the N0n-Vegetarian Indian |
|---|---|---|---|---|
| | Number of Choices | Food Group | | |
| Breakfast 8am | 1-2 As desired 1 As desired | Protein Vegetables Starch Fat | 2 Wheat Dosa/ 1 cup oats/ Cut wheat upma/ 2 chapati | 1 egg omelet I cup non starchy vegetables 1 roti or chapati |
| Snack 11am | 1 1 As desired As desired | Protein Starch Vegetables Fat | 2 non-sweet biscuits ½ cut moong beans sprout | Whole wheat crackers. Vegetable salads or one medium sized fruit |
| Lunch 1pm | 3-4 As desired 2 1 As desired | Protein Vegetables Starch Milk Fat | 2 cup rice or 3 chapattis Vegetable curry Cauliflower cabbage | 2 cup rice or 3 chapattis Spinach Soy curry Fish curry |
| Snack 4pm | 1 1 1 As desired | Protein Starch Fruit Fat | Mixed nuts 10 nos 1 small mango | 20 small peanuts I small pear Popcorn |
| Dinner 7pm | 3-4 As desired 3 As desired | Protein Vegetables Starch Fat | Chapatti/ Roti Raw vegetable salad ½ cup dhal | 3 rotis /chapatti Cut Wheat Ragi dishes |
| Snack 10pm | 1 1 1 | Milk Fruit or Starch Protein | I cup skimmed milk 1 small apple or a portion of pomegranate | 1 cup plain lassi (no sugar added) 1 ¼ cup of strawberries |

# APPENDIX - X

## DIET RECORDING CHART FOR ONE WEEK

**NAME:**                    **WEEK:**          **MONTH:**

|  | SUNDAY | MONDAY | TUESDAY | WEDENSDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|---|
| BREAKFAST 8 am |  |  |  |  |  |  |  |
| SNACK 11 am |  |  |  |  |  |  |  |
| LUNCH 1 pm |  |  |  |  |  |  |  |
| SNACK 4 pm |  |  |  |  |  |  |  |
| DINNER 7 pm |  |  |  |  |  |  |  |
| SNACK 10 pm |  |  |  |  |  |  |  |

# APPENDIX - XI

## EXERCISE RECORDING SHEET

**NAME:**                    **WEEK:**                    **MONTH:**

|  | MONDAY | TUESDAY | WEDENSDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|---|
| WEEK 1 |  |  |  |  |  |  |  |
| WEEK 2 |  |  |  |  |  |  |  |
| WEEK 3 |  |  |  |  |  |  |  |
| WEEK 4 |  |  |  |  |  |  |  |

**APPENDIX - XII**

**ACTIVITY SCHEDULE**

| Time | Activity | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|------|----------|-----|-----|-----|-----|-----|-----|-----|
| 6 am-9 am | | | | | | | | |
| 9 am-12pm | | | | | | | | |
| 12pm-2pm | | | | | | | | |
| 2pm-4pm | | | | | | | | |
| 4pm-7pm | | | | | | | | |
| 7pm-10pm | | | | | | | | |

# APPENDIX - XIII

## സമ്മതപത്രം

പ്രമേഹരോഗം ബാധിച്ചവരുടെ മാനസിക പ്രശ്നങ്ങളെയും അതിനെ കൈകാര്യം ചെയ്യുന്ന രീതിയേയും കുറിച്ചുള്ള ഒരു ഗവേഷണത്തിനായി താങ്കളിൽ നിന്നും കുറച്ച് വിവരങ്ങൾ ശേഖരിക്കുവാൻ ആഗ്രഹിക്കുന്നു. താങ്കൾ സമ്മതിക്കുന്ന പക്ഷം താങ്കളുടെ ഇപ്പോഴത്തെ മാനസിക ആരോഗ്യനില വിലയിരുത്തുകയും ആവശ്യമെന്ന് കണ്ടാൽ നിങ്ങൾക്ക് ഇന്റർവെൻഷൻ നൽകുകയും ചെയ്യും.

താങ്കളെക്കുറിച്ചുള്ള വിവരങ്ങൾ രഹസ്യമായി സൂക്ഷിക്കുന്നതും, ഈ ഗവേഷണ പഠനത്തിന് വേണ്ടിയല്ലാതെ മറ്റൊന്നിനും ഉപയോഗിക്കുന്നതും അല്ല. ഈ ഗവേഷണ ത്തിൽ പങ്കെടുക്കുവാൻ സമ്മതിച്ചതിന് ശേഷം ഏത് ഘട്ടത്തിൽ വേണമെങ്കിലും പിൻമാ റുന്നതിന് നിങ്ങൾക്ക് സ്വാതന്ത്ര്യം ഉണ്ടായിരിക്കും.

എന്ന്,

വിശ്വസ്തതയോടെ,

ശാരിക. കെ.കെ.
ഗവേഷണ വിദ്യാർത്ഥി
മന:ശാസ്ത്രവിഭാഗം
കാലിക്കറ്റ് സർവ്വകലാശാല

ഈ ഗവേഷണത്തെക്കുറിച്ച് എല്ലാ വിവരങ്ങളും എനിക്ക് കൃത്യമായി ബോധ്യപ്പെ ട്ടിട്ടുണ്ട്. ഈ ഗവേഷണത്തിൽ പങ്കെടുക്കുന്നതിന് എനിക്ക് പൂർണ്ണസമ്മതമാണ്.

പേര്:

തിയ്യതി                                                                          ഒപ്പ്: