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INFLUENCE OF GENDER ON GLYCEMIC CONTROL AND HEALTH RELATED QUALITY OF LIFE AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

The objectives of the study were to assess the glycemic level of male and female diabetic patients, assess the Health Related Quality of Life of male and female diabetic patients,compare the level of glycemic control among male and female diabetic patients,compare the HRQOL among male and female diabetic patients, find the association between glycemic control and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus,find the association between glycemic control and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus,find the association between HRQOL and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus and find the association between HRQOL and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus.The design was descriptive comparative. 180 diabetic patients (90 males and 90 females) were selected using convenience sampling. Tools used were structured questionnaires to collect socio demographic variables and clinical profile and QOLID was used to assess the HRQOL. The

glycemic control and HRQOL of male and female diabetic patients were compared. In the present study there was statistically significant association between glycemic control and selected sociodemographic variable such as age among male diabetic patients. There was statistically significant association between Health Related Quality of Life and selected sociodemographic variables such as marital status, hours of sleep, age of onset of DM, type of diabetic medications and diabetic complication among male diabetic patients and age, education, occupation, monthly income, hours of sleep, age of onset of DM, family history of DM, type of diabetic medications and diabetic complication among female patients. Based on the study findings the following conclusions were derived: Male diabetic patients had a better glycemic control and HRQOL when compared to female diabetic patients.

(Key words: Diabetes Mellitus; Glycemic control; Health Related Quality of Life)

CHAPTER 1

INTRODUCTION

“Life is not over because you have Diabetes. Make the most of what you have, be grateful.”

Dale Evans

Diabetes mellitus is a chronic metabolic disorder resulting in hyperglycemia and microvascular and macrovascular complications in individuals globally. Type 2 diabetes mellitus (T2DM) is highly prevalent and accounts for 90% of patients. Maintaining blood glucose concentration is essential to avoid severe complications[1]. Today, attention towards patient’s Quality of Life is increasing rather than patient’s longevity. Thus, quality of life of diabetic patients should be maintained because it can aggravate metabolic disorders. There is an increasing awareness suggesting that patient’s Quality of Life and treatment satisfaction were improved following good glycemic control. The blood sugar level of type 2 DM patient needs to be controlled to achieve a better quality of life[2].

The prevalence of diabetes mellitus is increasing at alarming proportions worldwide. The increased life span of people with type 2 diabetes mellitus resulted in complications due to poor glycemic control that harms these patients’ overall quality of life. Patients with poor glycemic control had lower quality of life and tight glycemic control is necessary to ensure the quality of life of these patients. Diabetes has been referred to as an emerging epidemic health problem. Poorly controlled diabetes mellitus affects the end organs and

complications have a tremendous impact on the quality of life and health costs of the individual and at a large society[3].

Background of the problem

Diabetes mellitus is a chronic multisystem disorder of glucose metabolism related to absent or insufficient insulin, impaired utilization of insulin, or both[4]. Diabetes is due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced. Diabetes, if left untreated, leads to many health complications. Untreated or poorly treated diabetes accounts for approximately 1.5 deaths per year[5].

Diabetes mellitus is taken from the Greek word diabetes, meaning siphon – "to pass through" and the Latin word mellitus meaning "sweet". A review of the history shows that the term "diabetes" was first used by Apollonius of Memphis around 250 to 300 BC. Ancient Greek, Indian, and Egyptian civilizations discovered the sweet nature of urine in this condition, and hence the propagation of the word Diabetes Mellitus came into being[6].

The burden of diabetes is high and increasing globally, and in developing economies like India mainly fueled by the increasing prevalence of overweight/obesity and unhealthy lifestyles[7].According to the International Diabetes Federation (IDF) Atlas 10th Edition there were about 537 million adults (20-79 years) living with diabetes (1 in 10) worldwide in 2021. This number is predicted to rise to 643 million by 2030 and 783 million by 2045. Over 3 in 4 adults with diabetes live in low- and middle-income countries. Diabetes is responsible for 6.7 million deaths in 2021(1 in every 5 seconds) and 541 million adults have Impaired Glucose Tolerance which places them at high risk of type 2 diabetes[8].

The International Diabetes Federation reported that 88 million people in South East Asia had diabetes and out of these 77 million individuals from India, which is expected to rise to over 134 million by 2045. Approximately 57% of these individuals remain undiagnosed. It is estimated that 1 in 11 Indians is formally diagnosed with diabetes, which makes it the second most affected country in the world, after China. Furthermore, 700,000 Indians died of diabetes, hyperglycemia, kidney disease, or other complications of diabetes in 2020. One in six people (17%) in the world with diabetes is from India. As per the International Diabetes Federation, the prevalence of diabetes in the population is 8.9%[9].

The federal state of Kerala in India is unique in that the health indicators of Kerala are on par with that of developed countries. However, T2DM is now highly visible across all sections of society within Kerala and that implies the existence of Asia paradox in Kerala State[10].

The prevalence of type 2 diabetes is also characterized by a sex difference. Overall, the global diabetes prevalence is higher in men, but there are more women with diabetes than men. The sex difference in the prevalence of diabetes is reversed depending upon the stage of reproductive life; that is, there are more diabetic men before the age of puberty, while there are more diabetic women after the age of menopause and in older age. It is due to the combined effect of a greater number of elderly women than men in most populations and the increasing prevalence of diabetes with age[11].

Insulin is a hormone secreted by beta cells, which are located within clusters of cells in the pancreas called the islets of Langerhans. Insulin's role in the body is to trigger cells to take up glucose so that the cells can use this energy-yielding sugar. Patients with diabetes may have dysfunctional beta cells, resulting in decreased insulin secretion, or their muscle and adipose cells may be resistant to the effects of insulin, resulting in a decreased ability of these cells to take up and metabolize glucose. In both cases, the levels of glucose in the blood increase, causing hyperglycemia. As glucose accumulates in the blood, excess levels of this sugar are excreted in the urine. Because of greater amounts of glucose in the urine, more water is excreted with it, causing an increase in urinary volume and frequency of urination as well as thirst [12].

There are three main types of diabetes: type 1, type 2, and gestational diabetes. Type 1 diabetes is caused by an autoimmune reaction which stops the pancreas from making insulin. Approximately 5-10% of the people who have diabetes, have type 1. Diabetes Mellitus is usually diagnosed in children, teens, and young adults. In type 2 diabetes, body does not use insulin well and cannot keep blood sugar at normal levels. About 90-95% of people with diabetes have type 2. Gestational diabetes develops in pregnant women who have never had diabetes. Gestational diabetes usually goes away after the baby is born. However, it increases the risk for type 2 diabetes later in life. Baby is more likely to have obesity as a child or teen and develop type 2 diabetes later in life[13].

The underlying characteristic common to all forms of diabetes is the dysfunction or destruction of pancreatic beta-cells. These cells are not replaced, as the human pancreas seems incapable of renewing beta-cells after the age of 30 years. Many mechanisms can lead to a decline in function or the complete destruction

of beta-cells. These mechanisms include genetic predisposition and abnormalities, epigenetic processes, insulin resistance, auto-immunity, concurrent illnesses, inflammation, and environmental factors. The most common type of diabetes mellitus is Type 2 Diabetes (T2DM). Risk factors for type 2 Diabetes are overweight/obesity, physical inactivity, age, Diabetes in first degree relatives, history of gestational diabetes, cardiovascular disease and its risk factors and ethnicity[14].

The classic symptoms of untreated diabetes are unintended weight loss, polyuria (increased urination), polydipsia (increased thirst), and polyphagia (increased hunger). Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes. Several other signs and symptoms can mark the onset of diabetes although they are not specific to the disease. In addition to the known symptoms, the other symptoms include blurred vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes[5].

Researchers and major diabetes organizations such as the American Diabetes Association and other National groups recommend glycosylated hemoglobin (HbA1C) as an objective measure of patient self-care. At present, HbA1C is considered the best index of metabolic control in individuals with diabetes. The Diabetes Control and Complications Trial and the UK Prospective Diabetes Study (UKPDS) have demonstrated that lowering HbA1C can reduce the risk of diabetes micro vascular complications. According to American Diabetes Association (ADA) guidelines, HbA1C level should be ≤6.5%, Fasting Plasma Glucose should be ≤126mg/dl,2-hour plasma glucose during 75 g Oral Glucose Tolerance Test (OGTT) should be ≤200 mg/dl and Random Plasma Glucose level should be ≤200mg/dl[15].

The major components of the treatment of diabetes are diet, drugs: oral hypoglycemic therapy and insulin treatment and exercise. Education of the person with diabetes is an essential component of management in every case. The person with diabetes should also be involved in setting therapeutic targets for weight, blood pressure and blood sugar control [16].

The long-term specific complications of diabetes mellitus include retinopathy, nephropathy, and neuropathy. People with diabetes are also at increased risk of other diseases, including cardiac, peripheral arterial, and cerebrovascular disease, cataracts, erectile dysfunction, and nonalcoholic fatty liver disease. They

are also at an increased risk of some infectious diseases such as tuberculosis, and are likely to experience poorer outcomes. Diabetes is found in every population in the world and in all regions, including rural parts of low- and middle-income countries[14]. People with diabetes are more likely to have poor outcomes for several infectious diseases including Covid 19[17].

In patients with diabetes mellitus, years of poorly controlled hyperglycemia led to multiple, primarily vascular, complications that affect small vessels (microvascular) and large vessels (macrovascular), or both. Microvascular disease underlies 3 common and devastating manifestations of diabetes mellitus: retinopathy, nephropathy, and neuropathy. Macrovascular disease involves atherosclerosis of large vessels, which can lead to angina pectoris and myocardial Infarction, Transient Ischemic Attacks and strokes, and peripheral arterial disease. Immune dysfunction is another major complication and develops from the direct effects of hyperglycemia on cellular immunity. Diabetic patients are particularly susceptible to bacterial and fungal infections. Nonalcoholic fatty liver disease (NAFLD) is increasingly common and represents an important comorbidity of type 2 diabetes. Certain musculoskeletal disorders are more common in patients with diabetes, including muscle infarction, carpal tunnel syndrome, adhesive capsulitis, and sclerodactyly[18].

Sex and gender can affect incidence, prevalence, symptoms, course, and response to drug therapy in many illnesses. Sex-gender differences are fundamental also in both type 1 and type 2 diabetes. In the prediabetes situation, impaired fasting glucose (expression of increased insulin resistance) is more common in men, while impaired glucose tolerance (expression of beta cell deficiency) is more common in females, indicating a possible different genesis of type 2 diabetes in the two sexes. Considering macrovascular complications, diabetic women have a 3.5-fold higher increased cardiovascular risk than non-diabetic women, against an observed increase of only 2.1-fold in males. Thus, it is clear, although not fully explained, sex-gender differences exist in diabetes[19].

Diabetes is a costly disease because of its chronic nature, the severity of its complications, and the means required to control them. Studies in India estimated that, for a low-income Indian family with an adult with diabetes, as much as 25% of family income may be devoted to diabetes care. The costs of diabetes affect everyone, everywhere, but they not only cause financial problems; but also cause pain, anxiety, inconvenience, and generally lower quality of life. It is predicted that total direct healthcare expenditure on diabetes worldwide for the year 2025 will be between 213-396 billion international dollars. In some countries, this will be as much

as 40% of their total healthcare budget. The studies conducted in India stated that the economic burden of diabetes care on families in developing countries is rising rapidly, even after accounting for inflation. In developing countries like India, which lacks a comprehensive health care system, the availability of information on the cost of treatment, is limited through both private and public health care systems. Government hospitals offer free treatment to the poor. Private hospitals are preferred by many, although it is more costly. The diabetes epidemic is growing rapidly as primary prevention is failing. Immediate action is required to control the tide of diabetes and to introduce cost-effective treatment strategies to reverse this trend[20].

Need and significance of the study

Diversities in biology, culture, lifestyle, environment, and socioeconomic status impact differences between males and females in predisposition, development, and clinical presentation of Diabetes Mellitus. Genetic effects and epigenetic mechanisms, nutritional factors, and sedentary lifestyle affect risk and complications differently in both sexes. Furthermore, sex hormones have a great impact on energy metabolism, body composition, vascular function, and inflammatory responses. Both biological and psychosocial factors are responsible for sex and gender differences in diabetes risk and outcome. Overall, psychosocial stress appears to have a greater impact on women rather than on men. In addition, women have greater increase in cardiovascular risk, myocardial infarction, and stroke mortality than men, compared with nondiabetic subjects. Diabetes appears to attenuate the protective effect of the female sex in the development of cardiac diseases and nephropathy. Endocrine and behavioral factors are involved in gender inequalities and affect the outcome[21].

Women with Type 2 Diabetes mellitus had worse glycemic control than men. Possible reasons for the different outcomes between men and women are differences in glucose and energy homeostasis (e.g., hormones and visceral adipose distribution), treatment response (e.g., side effects), and psychological factors (e.g., acceptance of disease). Sex hormones not only regulate sex characteristics and fertility but are essential in regulating glucose homeostasis and are responsible for fundamental biological differences between men and women. Testosterone in men stimulates lipolysis in adipose tissue, so low testosterone levels are associated with abdominal obesity and insulin resistance. In women, increased androgen levels were associated with insulin resistance and an increased risk of Type 2 Diabetes Mellitus. Estrogen is the primary

female hormone, synthesized in the ovaries in women before menopause and in adipose tissue in both men and women via conversion from testosterone. In women, the decrease in estrogen levels after menopause occurs concurrently with increased elevated blood glucose levels, whereas in men, elevated estrogen levels may be a risk factor for insulin resistance[22].

One's sex is a fundamental biological factor, which plays a key role in regulation of homeostasis in health and causes vulnerability to cardiometabolic risk factors, as well as manifestation, clinical picture, and management of T2DM. Severity of injury differs in a sex-specific way regarding various diabetes-related comorbidities, especially cardiovascular and renal disease. Psychosocial factors also impact development and progression of diabetes and coping in a gender-dimorphic way. Reproductive factors and sexual function have to be considered. The care of diabetic pregnancy demands special attention, because this vulnerable phase programs health of offspring even in a sex-specific way. Otherwise, hyperglycemic parents beget diabetic offspring, further contributing to pandemic increase of T2DM. Biomedical basic and clinical research in endocrinology should benefit both women and men in a balanced manner. Modern personalized treatment has to consider differences in biological factors, like genetic predisposition, sex hormones, and neurohumoral pathways, as well as behavioral and environmental differences between men and women[21].

A hospital-based cross-sectional study was conducted by Abera R G, Demesse E S and Boko W D (2021) in diabetic clinics at Tikur Anbessa Specialized Hospital, Ethiopia to evaluate the level and factors associated with glycaemic control among 325 Type 2 Diabetes patients. Sociodemographic and diabetes-related information were collected using questionnaire. HbA1c was used to assess glycaemic control. The study revealed that a significant number of diabetic patients (73.8%) had inadequate and poor glycaemic control levels. And this was associated with older age, longer duration of DM, insulin therapy, poor diet compliance, and failure to set control goals[23].

A cross-sectional study was conducted by Sahoo S, Sahoo J, Taywade M and Patro B K (2022) among 103 adult diabetic ambulatory patients in a Non-Communicable Disease (NCD) Clinic of a tertiary care hospital of Eastern India to evaluate the Quality of Life and factors affecting Quality of Life. The Quality of Life of patients were assessed by WHO-QoL BREF questionnaire. Study findings concluded that mean Quality of Life scores were higher in males than females. Better awareness and proper health seeking behaviour among males were the reasons of higher quality of life in males whereas in females, under reporting, delay in seeking

care, social disfavours, and lack of family support in rural areas and less compliance to routine testing and follow ups were the reasons for poor quality of life[24].

A community-based cross-sectional study was conducted by Najeeb S S, Joy T M, Sreedevi A, Vijayakumar K and Syama (2019-2020) in the Ernakulam district of Kerala to estimate glycemic control and its determinants among 364 type 2 diabetics who had the disease for at least 5 years duration. Participants HbA1c levels were assessed to determine glycemic control. Determinants such as female gender, body mass index >23 kg/m2, combined drug treatment with Oral Hypoglycemic agents (OHA) and insulin, and poor compliance with medications were found to be significantly associated with poor glycemic control. Women are particularly more vulnerable to uncontrolled hyperglycemia than males[25].

Women seem to assimilate or internalize the patriarchal subjectivity of the society. But this is a feature of most households in the country. The gender difference in self-care can be annihilated by stringent awareness and health education campaigns. NCD prevention strategies should include gender sensitive health promotion measures to achieve the WHO Global Strategy for the Prevention and Control of Noncommunicable Diseases[26].

In these circumstances, the investigator felt the need to conduct a study to assess the impact of gender on glycemic control and Health Related Quality of Life among patients with type 2 diabetes mellitus.

Statement of the problem

A study to assess the influence of gender on glycemic control and Health Related Quality of Life (HRQOL) of patients with type 2 Diabetes mellitus attending Non-Communicable Disease clinics of selected Health centres in Thiruvananthapuram.

Objectives

1. Assess the glycemic level of male diabetic patients.
2. Assess the glycemic level of female diabetic patients.
3. Assess the Health-Related Quality of Life of male diabetic patients.
4. Assess the Health-Related Quality of Life of female diabetic patients.
5. Compare the level of glycemic control between male and female diabetic patients.
6. Compare the Health-Related Quality of Life between male and female diabetic patients.

7. Find the association between glycemic control and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus.
8. Find the association between glycemic control and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus
9. Find the association between Health-Related Quality of Life and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus.
10. Find the association between Health-Related Quality of Life and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus.

Operational definitions

1. Influence of gender

In the present study influence of gender refers to the impact of male and female characteristics on the control of diabetes mellitus and Health Related Quality of life.

2. Glycemic control

In the present study glycemic control refers to maintaining euglycemic blood glucose levels as evidenced by Fasting blood sugar-<100mg%, post-prandial blood sugar-<140mg% and HbA1c - ≤6.5%.

3. Health Related Quality of life

In the present study health related quality of life refers to the level of satisfaction in life experienced and expressed by the individual in eight domains such as role limitation due to physical health, physical endurance, general health, treatment satisfaction, symptom botherness, financial worries, emotional/mental health and diet satisfaction which will be assessed by using QOLID.

4. Non-Communicable Disease clinic

In the present study Non-Communicable Disease clinic refers to a clinic that functions in Family Health Centers to render care for patients with non-communicable diseases like Diabetes mellitus, Hypertension, Cancer, Cardiovascular diseases, Stroke, and associated illnesses.

5. Health Centers

In the present study Health Centres refers to a community based and patient directed organization that provide affordable, accessible, high quality primary health care services to individuals and families.

6. Patients with Type 2 Diabetes Mellitus

In the present study patients with type 2 Diabetes Mellitus refers to male and female patients who have a medical diagnosis of type 2 Diabetes Mellitus not less than 1 year and belong to the age group of 35 to 75 years.

Hypotheses

H_1. There is significant difference in glycemic control among male and female diabetic patients.

H_2. There is significant difference in the Health-Related Quality of Life among male and female diabetic patients.

H_3. There is significant association between glycemic control and selected sociodemographic variables among male diabetic patients.

H_4. There is significant association between glycemic control and selected sociodemographic variables among female diabetic patients.

H_5. There is significant association between Health-Related Quality of Life and selected sociodemographic variables among male diabetic patients.

H_6. There is significant association between Health-Related Quality of Life and selected sociodemographic variables among female diabetic patients.

Conceptual/theoretical framework

A conceptual framework is a theoretical approach to study the problems that are scientifically based which emphasize the selection, arrangement and classification of its concepts[27].

The theoretical framework of the study is based on Sister Callista Roy's adaptation model developed in the year 1964.It is based on the great resiliency of individual and their ability to adapt in response to major physical and psychological changes. Major concepts of the model are input, throughput and output.

According to this model, the interaction between input, control process, effectors, output and feedback determines the behavior of the individual.

Input

Input are stimuli from the external and internal environment. There are three types of stimuli;

Focal stimuli: These are stimuli which immediately confront the person to precipitate the behavior.

Contextual stimuli: These are all other stimuli or surrounding stimuli which contribute to the effect of focal stimuli.

Residual stimuli: It refers to internal or external factors that may lead to focal stimuli.

Control process

It includes coping mechanism and internal process or subsystem (regulator and cognator)

Regulator respond automatically through neuro-endocrine chemical process. Cognator respond through complex process of perception and information processing, learning and judgement.

Effectors

The adaptive modes of the subsystem mean how the regulator and cognator mechanisms are manifested. They are the external expressions of the regulator and cognator and internal process. The four modes are physiological physical mode, self concept mode, role function mode and interdependence mode.

Output

Output refers to the persons behaviour. It is categorized into adaptive and ineffective responses.

Application of the model in this study

Input

In this study;

Focal stimuli are disease condition and uncontrolled blood sugar level.

Contextual stimuli are fatigue, ill health, worsened symptoms, financial problems, emotional disturbances and dietary dissatisfaction.

Residual stimuli are age, gender, religion. education, occupation, place of residence, monthly income, type of family, dietary pattern, hours of sleep, type of medication, and BMI.

Control process

In this study;

Regulator responds automatically through neuro-endocrine chemical process of diabetic patients.

Cognator consists of the emotions, perceptions and coping skills of the diabetic patients such as Dietary Modifications, Medication Adherence, Exercise and Positive attitude towards life.

Effectors

In this study;

Physilogical physical mode - The complex processes of this mode are linked with the, oxygenation, fluid and electrolytes, neurologic function, endocrine function and senses of diabetic patients.

Self concept mode - It consists of body image, self ideals, self consistency, moral and ethical self of diabetic patients.

Role function mode - It focuses on the primary, secondary and tertiary roles of diabetic patients that occupies in the society.

Interdependence mode - It focuses on interdependent relationships of diabetic patients with other individuals and groups.

Output

In this study adaptive response include good glycemic control and high quality of life among patients with Type 2 Diabetes.

Ineffective response includes poor glycemic control and poor quality of life.

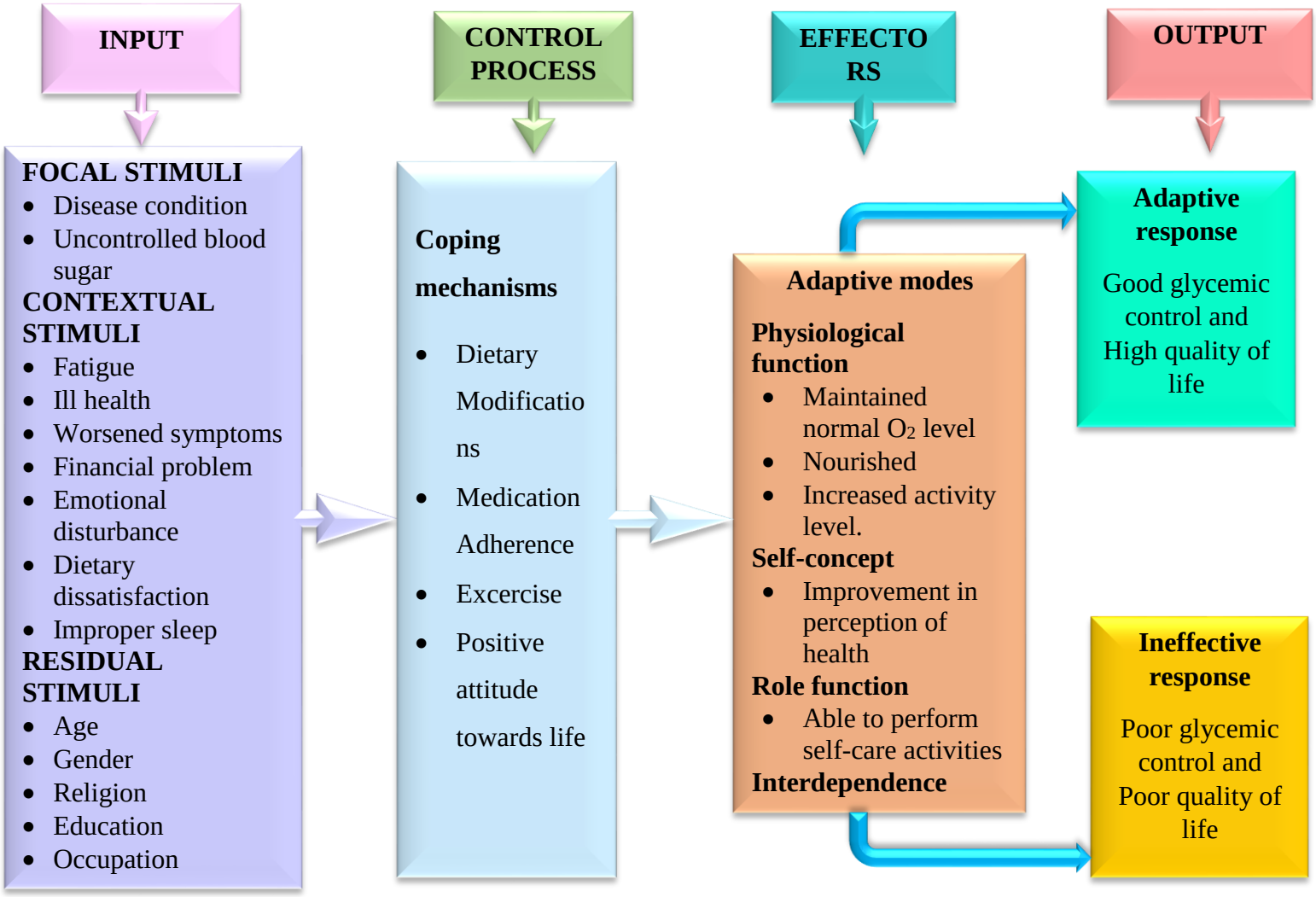

Figure1: Conceptual framework of the study based on Roy's adaptation model

CHAPTER 2

REVIEW OF LITERATURE

Review of literature is a key step in research process Literature review refers to the activities involved in searching for information on a topic and developing a comprehensive picture of the state of knowledge on the topic[28].

The investigator arranged the literature in a logical sequence under the following headings.

1. Glycemic control among Type 2 Diabetic patients
2. Health Related Quality of Life among Type 2 Diabetic patients
3. Gender influence on glycaemic control and Health Related Quality of Life among Type 2 Diabetic patients

1. Glycemic control among Type 2 Diabetic patients

Glycemic control is a medical term referring to the typical levels of blood sugar (glucose) in a person with diabetes mellitus. Evidence suggests that many of the long-term complications of diabetes, especially the microvascular complications, result from many years of hyperglycaemia. Good glycemic control has become an important goal of diabetic care. According to American Diabetes Association (ADA) guidelines, good glycemic control means HbA1C level should be≤ 6.5%, Fasting Plasma Glucose should be ≤126mg/dl, 2-hour plasma glucose during 75 g Oral Glucose Tolerance Test (OGTT) should be ≤ 200 mg/dl and Random Plasma Glucose level should be ≤ 200mg/dl. Poor glycaemic control refers to persistently elevated blood glucose (200-500 mg/dl) and glycated haemoglobin levels (9-15%) over months and years before severe complications occur[15].

A hospital-based cross-sectional study was conducted by Abera RG, Demesse ES and Boko WD (2021) in diabetic clinics at Tikur Anbessa Specialized Hospital, Ethiopia to evaluate the level and factors associated with glycaemic control among 325 Type 2 Diabetes patients. Sociodemographic and diabetes-related information were collected using questionnaire. HbA1c was used to assess glycaemic control. The study revealed that a significant number of diabetic patients (73.8%) had inadequate and poor glycaemic control levels. And this was associated with older age, longer duration of DM, insulin therapy, poor diet compliance, and failure to set control goals[23].

A cross sectional study was conducted by Ahmad Hafiz, Al-Kohji Sadriya, Al-Kuwari Mohamed, Mohamed makhlouf and Abduljaleeel Abdulalatif (2020) to explore factors associated with poor glycaemic control among 510 Type 2 Diabetic patients attending non-communicable disease clinics at nine primary health care centres in Qatar. Data were collected using a structured interviewing questionnaire and glycaemic Control was measured by HbA1c. Study findings showed that 63.7% of patients had poor glycaemic control. The study also revealed that duration of Type 2 Diabetes Mellitus, the strategy used in management and the self-monitoring of blood glucose are critical factors in glycaemic control[29].

A systematic review was done by Bin Rakhis S. A, AlDuwayhis N. M, Aleid N, AlBarrak A. N and Aloraini A. A (2020) to assess the glycaemic Control for Type 2 Diabetes Mellitus Patients by using 12 Published literatures from PubMed, Science Direct, and Google Scholar. The total number of Type 2 Diabetes Mellitus patients included in the studies under analysis was 5765(2257 males and 3508 females). The findings

of the study revealed that prevalence of poor glycaemic control was high and it ranged between 45.2% and 93% and females showed a high prevalence of poor glycaemic control. The factors associated with glycaemic control were stratified into four categories: personal or body-related, clinical, medication-related, and behavioural factors. There was a high prevalence of poor glycaemic control in all included studies. The study also showed that the glycaemic control was associated with various other factors like medical condition of the patient, behaviour of the patient and the medication administrated[1].

A retrospective study was conducted by Ghabban S J, Althobaiti B, Farouk I M, Al Hablany M, Ghabban A, Alghbban R et al (2020) at King Khaled Hospital in Tabuk, Saudi Arabia among 697 Diabetic patients to determine the poor glycaemic control and the factors associated with in diabetes population. Study findings revealed an overall prevalence of poor glycaemic control of 81.5%. Longer durations of diabetes and the combined use of insulin and oral drugs, was associated with poor glycaemic control[30].

A prospective observational study was conducted by Sheleme T, Mamo G, Melaku T and Sahilu T (2019) in an ambulatory clinic of Mettu Karl referral hospital Southwest Ethiopia among 330 diabetic patients to assess the glycaemic control level and its predictors. A structured questionnaire and the abstraction format were used to collect data. The study findings revealed that 72.7% of patients had poor glycaemic control. The predictors of poor glycaemic control were overweight, obesity, higher estimated glomerular filtration rate, type 1 diabetes, poor diet adherence and non-adherence to medications[31].

A retrospective review of patient records was conducted by David E A, Aderemi-Williams RI, Soremekun RO, Nasiru IY and Auta A (2018) at state specialist hospital, Northeast Nigeria to assess glycaemic control and its determinants among Type 2 Diabetes Mellitus patients. Total 385 patient's records were reviewed and the results showed that half of the population had poor glycaemic control which is associated with obesity, low education and activity levels[32].

A hospital-based cross-sectional study was conducted by Fekadu G, Bula K, Bayisa G, Turi E, Tolossa T and Kasaye H. K (2018) in diabetic clinic of Nekemte Referral Hospital, Western Ethiopia among 228 type 2 diabetic patients to identify challenges and factors associated with poor glycaemic control. Findings of the study concluded that majority (64.9%) of the patients had poor glycaemic control. Age, exercise, level of education, duration of treatment, and smoking were significantly associated with poor glycaemic control[33].

A hospital-based cross-sectional study was conducted by Jeby Jose Olickal, Palanivel Chinnakali, B S Suryanarayana, Ganesh Kumar Saya, Kalaiselvan Ganapathy and D K Subrahmanyam (2019-2020) among 1002 diabetic patients at a public tertiary care center, Puducherry to assess the medication adherence and glycaemic control status. The study found that approximately one-third of the diabetic patients did not adhere to medications, and three-fourths had unsatisfactory glycaemic control. Distance to the tertiary care center, female gender, working group, and tobacco use were the reasons for poor adherence[34].

A Descriptive cross-sectional study was carried out by Kakade Ashutosh, Mohanty Ipseeta and Rai Sandeep (2018) in the department of Medicine, MGM Medical College, Kamothe, Navi Mumbai among 220 Diabetic patients to assess the factors associated with poor glycaemic control. The findings of the study showed that Majority (91.8%) of Type II diabetic patients had poor glycaemic control. Factors affecting glycaemic control included BMI (≥30), central obesity, dyslipidaemia and diabetes self-care practices (glucose management and dietary control)[35].

A retrospective analysis of cross-sectional data by Borgharkar S and Das S S (2017) in the department of Medicine, MGM Medical College, Kamothe, Navi Mumbai from 3196 urban healthcare facilities across 26 states and union territories in India to determine glycaemic control in adult patients with type 2 diabetes receiving antidiabetic therapy. Private healthcare facilities were selected representing the north, south, east, west, and central regions. A total of 55639 eligible patient records were reviewed for data collection. Study findings revealed that there is a high burden (76.6%) of poor glycaemic control in the population. The findings also showed that nearly one-third of the study population had microvascular complications, predominantly neuropathy. Factors associated with uncontrolled glycemia were obesity, hypertension and duration of diabetes. Microvascular complication increased with duration of diabetes, hypertension and uncontrolled HbA1c[36].

A cross-sectional study was conducted by De P, Banu S and Muthukumar D (2017) in Ideal Diabetes Care Centre (IDCC), Bangalore among 76 type 2 diabetic patients to assess the patient's knowledge, expectations and attitudes with regards to glucose control, and to understand the barriers to achieving good glucose control. Study findings revealed that 63% of patients had poor glycaemic control and 67% had poor knowledge about glucose control. Longer duration of diabetes, younger age, obesity and not adherent to diabetes self-care management behaviours were associated with poor glycaemic control[37].

A hospital-based cross-sectional study was conducted by Eliz John.S. R, Gowri Parvathy, Himasanthosh, Gloris Mariam Chacko and Chitra C (2021) in NIMS Medicity, Kerala on 265 patients with diabetes for 6 months, to evaluate the complexity of medication regimens in patients diagnosed with diabetes mellitus and its impact on medication adherence and glycaemic control. The study concluded with the findings that 73.6% of patients included in the study were non adherent to medications and 66% showed poor glycaemic control. Increased medication regimen complexity in patients with diabetes is a major risk factor for nonadherence. Due to the increased drug complexity and burden, patients may choose to skip the medication[38].

An observational, cross-sectional study was conducted by Kavuparambil L, Pammi A. K, Kattil J. T, Kaliyaperumal S and Kollathodi S (2021) at MES Medical College Hospital, Perinthalmanna, Kerala among 113 Diabetic patients to analyse glycaemic control, lipid profile, BP and find the correlation of these parameters in the diabetic population. The study population was grouped in to two based on their glycaemic control (HbA1c≥7% and HbA1c<7%). The findings showed that among 113 diabetic patients 62% of them had increased Blood Pressure. Findings also showed highly significant correlation between triglycerides/high density lipoprotein and poor glycaemic control[39].

A cross-sectional study was conducted by Soman SK, Areekal B and Sukumaran ST,Puliyakkadi S and Ravi R K (2019) in the outpatient department of NCD clinic in a Primary health centre of Kerala among 250 diabetic patients to assess the prevalence and determinants of poor glycaemic control. Study findings revealed that 64.4 % of the participants had poor glycaemic control. Poor adherence to medication, fewer visits to doctor, lack of dietary modification, frequent junk food consumption, higher body mass index (≥25 kg/m2) and lack of exercise were found to be significantly associated with poor glycaemic control[40].

A randomized controlled trial was conducted by Rahul A, Chintha S, AnishT. S, Prajitha K. C, and Indu P. S (2018) in the NCD clinics of primary care settings of South Kerala, India among 132 adult patients (72 in intervention group and 60 in control group) with Diabetes Mellitus to find evidence for a standardized non-pharmacological strategy delivered through Junior Public Health Nurses (JPHNs) in achieving and maintaining glycaemic control. JPHNs of the intervention group received additional module-based training while standard management continued in the control group. Patients were followed up for 6 months with monthly monitoring of Fasting Blood Sugar, Post-Prandial Blood Sugar, blood pressure, Body Mass Index,

and health-related behaviours. The study findings revealed that achievement of glycaemic control was 1.5 times better with intervention and they showed a better trend of maintenance of glycaemic control[41].

A study conducted in North Kerala by Kumar SP and Sandhya AM (2017) among 1200 diabetes patients to detect the level of comprehensive diabetes control. The study findings revealed that majority of the patients had poor glycaemic control which indicates increased chance of developing macrovascular as well as microvascular complications in the near future. The findings concluded that the level of diabetes control in Kerala is unsatisfactory[42].

2. Health Related Quality of Life among Type 2 Diabetic patients

Quality of Life (QoL or QOL) is the perceived quality of an individual's daily life, that is, an assessment of their well-being or lack thereof. This includes all emotional, social and physical aspects of the individual's life. In health care, health-related quality of life (HRQoL) is an assessment of how the individual's well-being may be affected over time by a disease, disability or disorder[43].The disease leads to microvascular and macrovascular problems, thus substantially jeopardizing the quality of life of the people with diabetes[26].

A cross-sectional study was conducted by Mushabab Alghamdi, Lukman F. Owolabi, Bappa Adamu, Magaji G. Taura, Abubakar Jibo, Mohammed Almansour et al(2021) at King Abdullah Hospital (KAH), Bisha, Saudi Arabia among 306 participants to compare Health-Related Quality of Life (HRQoL) among patients with Diabetes Mellitus (DM) and diabetic neuropathy with patients with Diabetes Mellitus without Diabetic neuropathy and with healthy participants (102 each). The study findings revealed that participants who had diabetes with diabetic neuropathy had a worse Health Related Quality of Life compared with diabetic patients without diabetic neuropathy and healthy counterparts[44].

A cross-sectional survey was undertaken by Carter N, Li J, Xu M, Li L, Fan X, Zhu S et al (2020-21) in a tertiary care clinic in Ningbo, China among 406 people with Type 2 Diabetes Mellitus to determine the Health-Related Quality of Life and its associated factors. Study findings demonstrated that depression/anxiety and pain/discomfort are important areas of reduced Health Related Quality of Life for patients with Type 2 Diabetes Mellitus[45].

A face-to-face cross-sectional survey was conducted by Gebremariam G. T, Biratu S, Alemayehu M, Welie A G, Beyene K,Sander B et al (2019) at Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia among 360 patients with T2DM to assess health-related quality of life (HRQoL) and associated factors. Data were collected using 5 level Euro QoL5dimensions (EQ-5D-5L) questionnaire. The study findings concluded that patients with Type 2 Diabetes Mellitus reported problems with all the five dimensions ranging from 34.1% to 67.3%. Duration of diabetes, uncontrolled blood sugar level, insulin usage, obesity, and diabetes-related complications were negatively associated with Health-Related Quality of Life[46].

A hospital based cross-sectional study was conducted by Pham TB, Nguyen TT, Truong HT, Trinh CH, Du HNT, Ngo TT et al (2019) in the Outpatient Department of Traditional Medicine Hospital of the Ministry of Public Security, Hanoi, Vietnam among 214(83cases and 131controls) Type 2 Diabetes Mellitus patients to examine Health Related Quality of Life of Type 2 Diabetes Mellitus patients, as well as the effects of diabetic complications and comorbidities on Health-Related Quality of Life. The study findings concluded that patients with diabetic complications had significantly lower Health Related Quality of Life than individuals without complications. Heart diseases had the greatest magnitude of Health-Related Quality of Life reduction in physical and social functioning, while nephropathy had the largest adverse effect on social functioning and role emotional. Meanwhile, retinopathy showed a limited relationship with the reduction of Health-Related Quality of Life. Significant decrement of physical functioning, role physical, social functioning, role emotional, and mental health was found in patients having diabetes and heart diseases compared to those without diabetic complications[47].

A cross sectional study was conducted Thapa S, Pyakurel P,Baral D D and Jha N (2019) to assess the Health-Related Quality of Life among 102 Type 2 Diabetic Patients of rural area of Eastern Nepal.Data were collected using D-39 questionnaire administered through face-to-face interview. The result revealed various dimension of quality of life of the diabetic patient that is affected. Highest score of quality of life was found in social burden dimension. Diabetes control and sexual functioning were greatly affected in females[48].

A cross sectional study was conducted by Abdallah M A, Esmayel E M and Moussa M M (2018) in Internal Medicine department and diabetes outpatient clinic in Zagazig University hospital, Egypt among 100 type 2 diabetic patients to assess Health Related Quality of Life using SF-36 questionnaire. Study findings revealed that Type 2 diabetes mellitus in both the physical health and mental health domains is associated with

a lower quality of life. Advanced age, obesity and poor glycaemic control were factors related to lower quality of life. Study findings also revealed that there was highly significant negative correlation between Quality-of-Life components with age and Body Mass Index with duration of Diabetes Mellitus and HBA1c with fasting blood sugar in diabetic patients[49].

A systematic review was conducted by Le Nghiep, Turnbull Niruwan and Dam Cuong (2018) in the Association of Southeast Asian Nations (ASEAN) to ascertain the latest available knowledge about Health-Related Quality of Life, the principal methodological flaws on the Health-Related Quality of Life studies and the main factors associated with Health Related Quality of Life in diabetic people. A total of 36 studies were included in the review. The findings of this review showed that diabetic persons had a lower Health Related Quality of Life than healthy people. The findings also indicated that better socioeconomic status, better control of risk factors and complications were associated with a better Health Related Quality of Life among diabetic patients. Moreover, treatment adherence improved the Health-Related Quality of Life[50].

A cross-sectional study was conducted in North India by Azharuddin M, Kapur P, Adil M, Ghosh P, and Sharma M (2020) among 300 patients with Type 2 Diabetes Mellitus to assess the relationship between sleep quality and health-related quality of life (HRQOL). Data was collected with Pittsburgh Sleep Quality Index (PSQI) and European Quality of Life-5 Dimensions Questionnaire (EQ-5D). The study findings revealed that poor sleep quality is prevalent in Indian Type 2 Diabetes Mellitus population, and it imparts negative impact on several dimensions of EQ-5D that characterising the daily activities performance. Poor sleep quality was significantly associated with a lower Health Related Quality of Life[51].

A prospective, observational study was conducted by John R, Pise S, Chaudhari L, and Deshpande P. R (2018) in a tertiary care hospital in Pune for 6 months among 153 Type 2 Diabetes Mellitus patients to study the factors determining the Quality of Life in Type 2 Diabetes Mellitus patients. Findings of the study revealed that presence of diabetes-related complications have contributed to lower Quality of Life. Findings also showed that patients who received more intensive therapy with insulin or insulin combination with Oral Hypoglycaemic Agents were associated with more impaired Quality of Life in most of the domains[52].

A prospective descriptive study was conducted Prajapati VB, Blake R, Acharya LD and Seshadri S (2018) in the General Medicine units of Tertiary care hospital in South India among 250 patients with Type 2 Diabetes Mellitus, to assess the Quality of Life in Type II diabetes mellitus patients with and without

complications. The study was done for a total duration of six months. Findings of the study revealed that patients with Type II diabetes have a negative impact on their quality of life with or without complications. The study findings also showed that diabetes affects various domains such as physical functioning, emotional wellbeing, social functioning, economic status, and general health in a patient's life, thereby affecting the Quality of Life. The presence of complication and comorbidity had an adverse effect on the Quality of Life of diabetic patients, as the number of complications increased the Quality-of-Life decreased[53].

A cross-sectional survey was done by Mannethodi K, Sankar U V and Varma R P (2022) in Malappuram block panchayat of Kerala among 304 patients with type 2 diabetes to assess the dietary regimen applications and related elements among patients with type 2 diabetes. Good dietary practice is an important component in diabetes management. Study findings showed that prevalence of good dietary practices in patients with type 2 diabetes was found to be very low (20.4%). Diabetic patients with family assistance or with someone to look after their diet were following a healthy dietary application[54].

A community-based cross-sectional study was conducted Jose, Soji D, Mishra, Sapna and Mini G. K (2020) among 425 adult type-2 diabetic patients from rural Kerala to assess the health-related quality of life and its determinants among diabetic patients. The World Health Organization Quality of Life questionnaire was used to measure Health Related Quality of Life. Study findings revealed that more than one-third of the diabetic patients in rural Kerala reported poor Health Related Quality of Life. The study also identified age, socio-economic status, education, and occupation as the important predictors of Health-Related Quality of Life among diabetic patients[55].

3.Gender influence on glycaemic control and Health Related Quality of Life among Type 2 Diabetic patients

Gender differences describe the biological variability between women and men, which is, in turn, related to differences in the information contained in sex chromosomes, the specific gene expression of autosomes linked to sex, the different number and quality of sex hormones, and their different effects on systems and organs. Additionally, both genders undergo metabolic changes throughout their lives, and this is especially true for women who show more dramatic changes due to their role in reproduction. Gender differences are not only the result of our genetic makeup but are also mixed with socio-cultural habits, behaviours, and lifestyles, differences between women and men, exposure to specific environmental

influences, different food and lifestyle styles or stress, or different attitude in compliance with treatments and disease prevention campaigns[56] .Compared with men with the disease, women with diabetes are disproportionately affected by depression and anxiety and have a lower quality of life, which can negatively affect attitudes towards self-management and, in turn, disease outcomes. Indeed, women with type 1 diabetes have a 40% higher excess risk of premature death than men with the disease, and those individuals with type 2 diabetes have up to 27% higher excess risk of stroke and 44% higher excess risk of coronary heart disease[57].

A cross-sectional study was conducted by Chantzaras A and Yfantopoulos J (2021) among 518 Type 2 Diabetic patients in the outpatient departments of different general, public and private hospitals in Greece during the COVID-19 pandemic to evaluate the association between medication adherence and Health-Related Quality of Life. Health Related Quality of Life was assessed with the EQ-5D-5L instrument and medication adherence with the corresponding subscale of the Adherence Starts with Knowledge 20(ASK-20) questionnaire. The study results revealed that for more than half of the patients (57.3%) HbA1c reading was equal to or greater than 7% and 60.4% of the participants reported having at least one comorbidity. The study results revealed a modest negative correlation between medication non-adherence and Health Related Quality of Life and health status. Study results also concluded that female participants had lower both Health Related Quality of Life and health status compared with male patients. It has been suggested that men may cope better with the chronic character of the disease[58].

A cross-sectional study was conducted by AbuAlhommos A K, Alturaifi A H, Al-Bin Hamdhah A M, Al-Ramadhan H H ,Al Ali Z A and Al Nasser H J (2020-2021) in the Al-Ahsa region of Saudi Arabia among 321 patients with type 2 diabetes mellitus to assess the quality of life of type 2 diabetic patient. The EQ-5D-5L tool was used in this study to measure the quality of life. Study findings revealed that there was a significant difference between males and females in terms of their quality of life, specifically self-care, pain and discomfort, depression and anxiety. Young age(26-40years), being married, having a higher level of education, working outside the medical field, having insurance, having a family history of Type 2 Diabetes Mellitus, exercising regularly and adhering to prescribed medications were factors that positively influenced participants quality of life[59].

A cross sectional study was conducted by Feyisa B. R, Yilma M. T and Tolessa B E (2019) among 224 patients with diabetes mellitus to assess Health-Related Quality of Life (HRQoL) and its predictors among patients with diabetes on follow-up at one of the public hospitals in western Ethiopia. A structured questionnaire was used for data collection. The study findings revealed that overall, Health Related Quality of Life of patients with diabetes on follow-up at the study area was found to be moderate. General health, mental health, bodily pain and vitality were the most affected domains. Male patients with diabetes had higher Health Related Quality of Life when compared with the female patients. This discrepancy could be due to the gender impact as most of the time women are treated inferiorly. They are less autonomous in taking decision on behalf of their rights[60].

A community based cross-sectional study was conducted by Sapkota S, Poudyal J K, Shah R and Thapa K (2019) in Gaindakot municipality of Nawalpur, Nepal among 167 participants to assess Health-Related Quality of Life of diabetic and non-diabetic elderly. Health related QoL was assessed using World Health Organization QoL Instrument scale. Findings of the study showed that the mean scores of all Health-Related Quality of Life domains except social relationship domain were significantly lower among diabetic group as compared with non-diabetic. Physical health and environmental health domains were lower in females. Age, gender, education, marital status and employment were significantly associated with Health-Related Quality of Life in both diabetic and non-diabetic elderly[61].

A Cross-sectional study was conducted by Anillo Arrieta L A, Florez Lozano K C, Molina R T,Vergara T A, Acosta S R, Aschner P. et al (2019) in two Latin American cities among 1135 participants over 30 years of age who are at risk of developing Type 2 Diabetes Mellitus to estimate the health-related quality of life (HRQOL) according to glycaemic status, and its relationship with sociodemographic and clinical factors. Participants were divided into normoglycemic subjects (NGT), prediabetic and diabetics who do not know they have diabetes (UT2D). Participants glycaemic status was defined using an oral glucose tolerance test (OGTT) and HRQOL was assessed using the EQ-5D-3L questionnaire. Study findings concluded that participants reported problems most frequently on the dimensions of Pain/Discomfort and Anxiety/Depression in the different glycaemic groups. Female sex, older age, area of residence, lower education, receiving treatment for hypertension, and marital status were significantly associated with lower levels of Health-Related Quality of Life[62].

A cross-sectional study was conducted by Tefera Y G, Gebresillassie B M, Emiru Y K, Yilma R, Hafiz F, Akalu H. et al (2019) at the outpatient clinic of the University of Gondar Comprehensive Specialized Hospital Northwest Ethiopia among 400 patients with Type 2 Diabetes to assess the diabetic health literacy level and its association with glycaemic control among adult patients with type 2 diabetes mellitus. Findings of the study showed that adequate diabetic health literacy and better glycaemic control are highly correlated. The study findings also showed higher diabetic health literacy in males, as women usually do not have the same access to modern education and information as men do, this could affect the health literacy of women[63].

A hospital-based cross-sectional study was conducted by Demoz G T, Gebremariam A,Yifter H,Alebachew M,Niriayo Y L,Gebreslassie G et al (2018) to find out the predictors of poor glycemic control among 357 diabetic patients on a follow up care at a tertiary healthcare setting in Ethiopia. Data were collected through direct patients' interviews and medical chart review. The study findings showed that 44% male diabetic patients and 88.9% female diabetic patients had poor glycemic control. The prevalence of poor glycemic control was higher among females. Gender difference influences the liability to diabetes therapies; negatively affect accessing health services and amplify the impact of diabetes on females[64].

A hospital-based cross-sectional study was conducted by Abudawood M, Tabassum H, Ansar S, Almosa K, Sobki S, Ali M N et al (2017) among 3200 subjects in Riyadh, Saudi Arabia to study gender-based differences in cardiovascular risk factors of adult population with type-2 diabetes mellitus (T2DM) and to check the correlation between serum HbA1C, lipid profile and vitamin D levels in Type 2 Diabetes Mellitus patients.Participants were divided into two gender-based groups; normal male (800), diabetic male (800) and normal female (800) and diabetic females (800). Findings of the study showed that in Type 2 diabetic patients, low levels of vitamin-D are associated with prevalence of hypercholesterolemia, hypertriglyceridemia, high LDL-C and low HDL-C levels are exhibited significant change with respect to gender. Dyslipidaemia remains one of the major risk factors of CVD in type 2 diabetes mellitus. HbA1C differed significantly between male and female subjects. HbA1C, Triglycerides, HDL-C and LDL-C were found to be higher in females than male patients[65].

A cross-sectional study was conducted by Afroz A, Ali L, Karim M N, Alramadan M J, Alam K, Magliano D J et al (2017) in Bangladesh among 1253 adult patients with type 2 diabetes mellitus recruited from six hospitals to identify the determinants of glycaemic control among people with type 2 diabetes

mellitus. Study findings concluded that about 82% participants had inadequate glycaemic control. The prevalence of poor control was higher among females. Findings also showed that being female, a low level of education, area of residence, smokeless tobacco consumption, unhealthy eating habits, insulin use, history of coronary artery disease, and cognitive impairment were associated with inadequate glycaemic levels[66].

A cross-sectional study was conducted by Sahoo Soumya, Sahoo Jyotiranjan Taywade Manish and Patro Binod (2022) among 103 adult diabetic ambulatory patients in a Non-Communicable Disease (NCD) Clinic of a tertiary care hospital of Eastern India to evaluate the Quality of Life and factors affecting Quality of Life. The Quality of Life of patients were assessed by WHO-QoL BREF questionnaire. Study findings concluded that mean Quality of Life scores were higher in males than females. Better awareness and proper health seeking behaviour among males were the reasons of higher quality of life in males whereas in females, under reporting, delay in seeking care, social disfavours, and lack of family support in rural areas and less compliance to routine testing and follow ups were the reasons for poor quality of life. Diabetic individuals from urban areas reported higher total Quality of Life scores in all the domains[24].

A cross-sectional observational study was conducted by Haider M, Verma M, Hakim A, Kumar A, Sharma S and Gautam V (2021) among 100 diabetic patients to assess Health Related Quality of Life of diabetic patients in a tertiary care teaching hospital Western Rajasthan (2021). SF-36 scale was used to assess the Health-Related Quality of Life. The study findings concluded that Diabetic patients had lower Health Related Quality of Life in all the domains of quality of life. The most important predictors of impaired Health Related Quality of Life were female gender, presence of any diabetic complications, presence of non -diabetic comorbidity and longer duration of diabetes. Older age, lower education, unmarried, widow/widower, obesity, hypertension and hyperlipidaemia were also associated with impaired Health Related Quality of Life[67].

A cross-sectional study was conducted by Patil S, Patil Y and Patil SK (2021) among 520 Type 2 Diabetes Mellitus patients in a tertiary care hospital in Karad, Maharashtra to assess the Quality of Life. Data were collected using the World Health Organization (WHO) quality of life (QOL)-BREF questionnaire and disease-specific appraisal of diabetes scale (ADS). Findings of the study revealed that 67.5% participants had impaired glycaemic control and more than one-third of the diabetes patients had poor-to-average Health Related Quality of Life. The Quality of Life was more impaired in uncontrolled diabetics in comparison to controlled diabetics. Age, duration of diabetes, associated comorbidities, treatment, and HbA1c level of

patients were important predictors of QOL as they significantly affect the QOL of T2DM patients. The study also showed male predominance which indicates that the number of male patients visiting the outpatient clinics is still higher than females in India as the latter give less importance to their health[68].

A scoping review conducted by Aarthy R, Mikocka-Walus A,Pradeepa R,Anjana R M,Mohan V and Aston-Mourney K (2020) to explore the current state of knowledge on QoL and its various associated factors among people with diabetes in India. Three databases were searched (PubMed, Scopus, and Medline) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed. A total of 41 articles were included in the review. The studies showed that people with diabetes had poorer QoL than those without diabetes. It was observed that QoL is largely reported as being better among men as compared with women with diabetes[69].

A community-based cross-sectional study was conducted by Najeeb SS, Joy TM, Sreedevi A, Vijayakumar K and Syama (2019) among 364 type 2 diabetics who had the disease for at least 5 years duration in the Ernakulam district of Kerala to estimate glycaemic control and its determinants among type 2 diabetics .Research findings showed that poor compliance with medications and unhealthy lifestyle choices has resulted in a high proportion of diabetics with poor glycaemic control in the district. Women are particularly more vulnerable to uncontrolled hyperglycaemia than males. Determinants such as female gender, body mass index >23 kg/m2, combined drug treatment with Oral Hypoglycaemic agents (OHA) and insulin, and poor compliance with medications were found to be significantly associated with poor glycaemic control. Empowering women to practice self-care by promoting the formation of local women's diabetic groups is of paramount importance as women are the gatekeepers of health in a family; they need to be aware and healthy, for the benefit of themselves and others[25].

A cross-sectional study was conducted in rural Kerala by Morris M C and John M (2019) among 300(138 males and 162 females) Type 2 Diabetic patients to assess the gender difference in self-care. The findings showed that self-care activities varied greatly between males and females. The self-care activities of the females were very poor when compared with the males. The poor self-care activities of the females could be attributed to behavior conditioned by gender relations prevalent in the society[26].

A systematic review was done by Suresh N and Thankappan K R (2017) in Kerala to assess the gender differences and barriers women face in accessing type 2 diabetes care. The results showed that women face

personal, socio-cultural, health system, economic, psychological, and geographical barriers in accessing type 2 diabetes care. A lack of time due to the caregiving role by women and the associated work schedule, women giving less priority to their own health, lack of education and other health problems, lack of family and social support were identified as the personal barriers. Family members were reluctant to take women to health care centers and to buy medicines for them. Employers felt that women with diabetes would not be able to deliver productive work. Hence, women had to retire from work due to diabetes. Women who were financially dependent on their family members found it difficult to pay for their health care needs[70].

Summary

This chapter highlighted various review of literature related to glycemic control among type 2 diabetes patients, Health Related Quality of Life among type 2 diabetes patients and gender influence on glycemic control and Health Related Quality of Life among type 2 diabetes patients. It gave a deep insight into the problem and emphasized the need for this study.

CHAPTER 3

METHODOLOGY

This chapter discusses the methodology used in the study by the investigator which include details about research approach, research design, variables, schematic representation, setting of the study, population, sample and sampling technique, tool/instruments, content validity, reliability of the tool, pilot study, data collection process and plan for data analysis.

Research approach

The research approach used in this study was quantitative approach

Research design

The research design adopted for the study was descriptive comparative design.

Variables

Dependent variable

In this study dependent variables are glycemic control and Health Related Quality of Life of diabetic patients.

Independent variable

In this study independent variable is gender influence.

Sociodemographic variables: -

The variables used in the study were age, religion, education, occupation, monthly income, marital status, place of residence, type of family, dietary pattern, number of meals per day, hours of sleep, age of onset of DM and family history of DM.

Setting of the study

FHC Chemmaruthy and CHC Keshavapuram in Thiruvananthapuram district

Population

Male and female diabetic patients attending non-communicable disease clinic at health centres in Thiruvananthapuram.

Sampling technique

Convenience sampling technique

Sample size

180 type 2 diabetic patients (90 males and 90 females)

Tool

Socio demographic proforma, clinical profile of the patient, Quality of Life Instrument for Indian diabetic patients

Data collection process

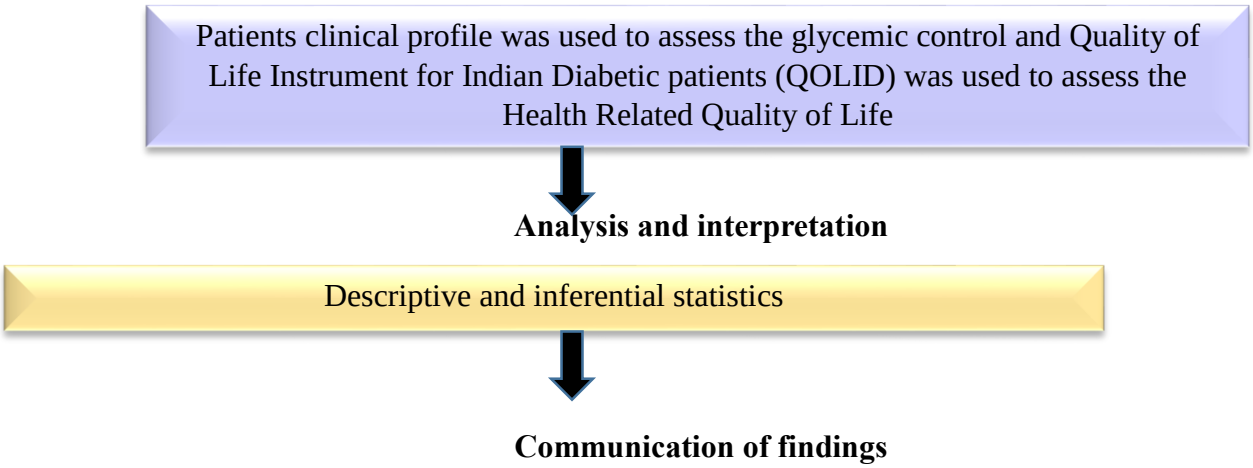

Figure 2. Schematic representation of the study

Setting of the study

The present study was conducted in selected Non-Communicable Disease clinics of Health Centers in Thiruvananthapuram district such as Family Health Centre Chemmaruthy and Community Health Centre Keshavapuram.

Family Health Centre Chemmaruthy is a Health Centre under Chemmaruthy grama panchayath and Varkala block panchayath. It is the first integrated family health centre in kerala. Chemmaruthy is the first health centre in the district to be awarded National Quality Assurance Certification. Total population under FHC Chemmaruthy is 38207, among them 18844 are males, 19363 are females and 3014 are diabetics. It handles an average of 300-350 outpatients a day which on some days go up to 600. Community Health Centre in Keshavapuram, Kilimanoor is a top player in the category of hospitals.The total population under CHC Keshavapuram is 1,90,467,among them 96461 are males and 94006 are females.This well-known establishment acts as a one top destination servicing customers both local and from other parts of Thiruvananthapuram.

Population

In the present study the population consists of male and female Type 2 diabetic patients attending Non-Communicable Disease clinics at Health Centers in Thiruvananthapuram.

Sample and sampling technique

The samples of the study were 180 Type 2 diabetic patients (90 males and 90 females) attending Non-Communicable Disease clinics of FHC Chemmaruthy and CHC Keshavapuram. Number of samples calculatd for each group is 82.

The sampling technique used for the present study was convenience sampling

Inclusion criteria

Male and female patients with medical diagnosis of Type2 Diabetes Mellitus not less than 1 year belonging to the age group of 35-75 years.

Exclusion criteria

Male and female Type 2 Diabetic patients who are not willing to participate in the study.

Tool/Instruments

Development/selection of the tool

The following steps were taken for the selection and preparation of the tool:

1. Review of research and non-research literature was made related to influence of gender on glycemic control and Health Related Quality of Life of patients with type 2 diabetes mellitus.
2. Formal discussions were made with subject experts from nursing and medical field and their valuable suggestions were utilized to select the tool.

Description of the tool

The tool used in the present study consists of three sections;

Section A: Socio-demographic variables

Section B: Clinical profile which includes BMI, fasting blood sugar, post-prandial blood sugar, HbA1c level, diabetic medications, treatment compliance and complications.

Section C: Quality of life instrument for Indian diabetic patients (QOLID).

Section A: Sociodemographic variables

It is designed to elicit general information of the sample. sociodemographic data consists of age, gender, education, occupation, monthly income, marital status, type of family, place of residence, dietary pattern, number of meals per day, hours of sleep, age of onset of DM and family history of DM.

Section B: Clinical profile of the patient

Clinical profile of patient includes BMI, HbA1c, fasting blood sugar value, postprandial blood sugar value, type of diabetic medications, drug compliance and complications.

Section C: Quality of Life Instrument for Indian Diabetic patients (QOLID).

Quality of Life Instrument for Indian Diabetic patients (QOLID) is used to assess the Health-Related Quality of Life of Diabetic patients. It consists of 34 questions in 8 domains. The domains are; Role limitation due to physical health (Scores ranges between 6-30), Physical endurance (6-30), General health (3-15), Treatment satisfaction (4-20), Symptom Botherness (3-15), Financial worries (4- 19), Emotional/Mental health (5-25), and Diet satisfaction (3-15). All items were rated on Likert scale from 1to 5, except 1 item under the domain financial worries. Score 1 the scale indicates poor quality of life and 5 indicates good quality of life.

The question in Section A and B were subjective and so no score was assigned. The questions in section C were 5-point likert scale except one question under the domain financial worries. Options such as always/ poor/ not at all/ very dissatisfied/ veryexpensive/ a lot and no choice was given score1.Option frequently/ highly/ poor/ a little/ moderately dissatisfied/ little expensive and very little was given score 2. Option often/ good/ moderate/ neither satisfied nor dissatisfied/ reasonable/ little/ moderate was given score 3. Option sometimes/ very little/ very good/ very much/ moderately satisfied/ not at all expensive and enough was given score 4. Option never/ not at all/ excellent/ an extreme amount/ very satisfied/ never/ not all expensive and a lot was given score 5. Each domain score is added together to find the total score of Health Related Quality of Life.The maximum score is 174.

The categorization of HRQOL score:

0-58 - Poor Health Related Quality of Life

59-117 - Average Health Related Quality of Life

118-174 - Good Health Related Quality of Life

Content validity

The prepared tool along with the objectives, hypotheses and operational definitions was given to 4 experts from community health nursing department and 2 medical experts.

Reliability of the tool

The reliability of the tool was determined by using Cronbach's Alpha method and the value was found to be 0.894 and good subscale reliability of 0.55 to 0.8. Hence, the tool is considered reliable.

Pilot study

Pilot study was conducted after obtaining ethical clearance from the Institutional Ethics Committee of Sivagiri Sree Narayana Medical Mission College of Nursing, Varkala and permission from District Medical Officer (Thiruvananthapuram) and informed consent was taken from the participants of the study. The pilot study was conducted among 18 Patients with Type 2 Diabetes Mellitus attending NCD clinic of FHC chemmaruthy. Data were collected from 16/03/2023 to 22/03/2023.The result of the pilot study was analyzed and discussed with experts. The study was found feasible and researchable.

Data collection process

Researcher obtained clearance from the Institutional Ethics Committee of Sivagiri Sree Narayana Medical Mission College of Nursing, Varkala and formal permission from District Medical Officer (Thiruvananthapuram).

The investigator introduced herself to the samples and explained about the purpose of the study. Confidentiality of the data were assured and informed consent was obtained from the samples. Data were collected from 180 patients with Type 2 Diabetes Mellitus attending NCD clinics of FHC Chemmaruthy and CHC Keshavapuram by convenience sampling. Data collection process was concluded by thanking the subjects. Data collection was done from 03/04/2023 to 08/05/2023.

Plan for data analysis

Data were analyzed using descriptive and inferential statistics. Frequency and percentage will be used to assess glycemic control and analyze the sociodemographic variables. The statistical significance of difference between mean Health Related Quality of Life score and glycemic control of male and female diabetic patients was tested by using independent t test. Association of Health Related Quality of Life and glycemic control with selected socio demographic variables were assessed using chi square.

CHAPTER 4

ANALYSIS AND INTERPRETATION

This chapter deals with the analysis of data and interpretation of results obtained. The present study was intended to assess the influence of gender on glycemic control and Health Related Quality of Life among patients with type 2 diabetes mellitus. Data were collected from 180 type 2 diabetes mellitus patients (90 males and 90 females) attending Non-Communicable Disease clinics of Health Centres in Thiruvananthapuram district. The collected data were coded, organized, tabulated, analysed and interpreted using descriptive and inferential statistics. The data were analysed according to the objective and hypothesis of the study.

Objectives

1. Assess the glycemic level of male diabetic patients.
2. Assess the glycemic level of female diabetic patients.
3. Assess the Health Related Quality of Life of male diabetic patients.
4. Assess the Health Related Quality of Life of female diabetic patients.
5. Compare the level of glycemic control between male and female diabetic patients.
6. Compare the Health Related Quality of Life between male and female diabetic patients.
7. Find the association between glycemic control and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus.
8. Find the association between glycemic control and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus.
9. Find the association between Health Related Quality of Life and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus.
10. Find the association between Health Related Quality of Life and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus

The findings were presented under the following major headings.

Section 1: Socio Demograophic Variables

Section 2: Clinical profile of the patients.

Section 3: Glycemic level of male diabetic patients.

Section 4: Glycemic level of female diabetic patients.

Section 5: Health Related Quality of Life of male diabetic patients

Section 6: Health Related Quality of Life of female diabetic patients.

Section 7: Comparison of glycemic control between male and female diabetic patients.

Section 8: Comparison of Health Related Quality of Life between male and female diabetic patients.

Section 9: Association between glycemic control and selected socio demographic variables among male diabetic patients.

Section 10: Association between glycemic control and selected socio demographic variables among female diabetic patients.

Section 11: Association between Health Related Quality of Life and selected socio demographic variables among male diabetic patients.

Section 12: Association between glycemic control and selected socio demographic variables among female diabetic patients.

Section 1

Socio demographic variables

Table1

Distribution of Type 2 diabetic patients based on age

(N=180)

Age(in years)	Male		Female	
	f	%	f	%
35-45	6	3.3	12	6.7
46-55	20	11.1	35	19.4
56-65	43	23.9	34	18.9
66-75	21	11.7	9	5

Table 1 shows that 23.9% of the male patients belonged to the age group 56-65 years and 19.4% female patients belonged to the age group 46-55 years.

(N=180)

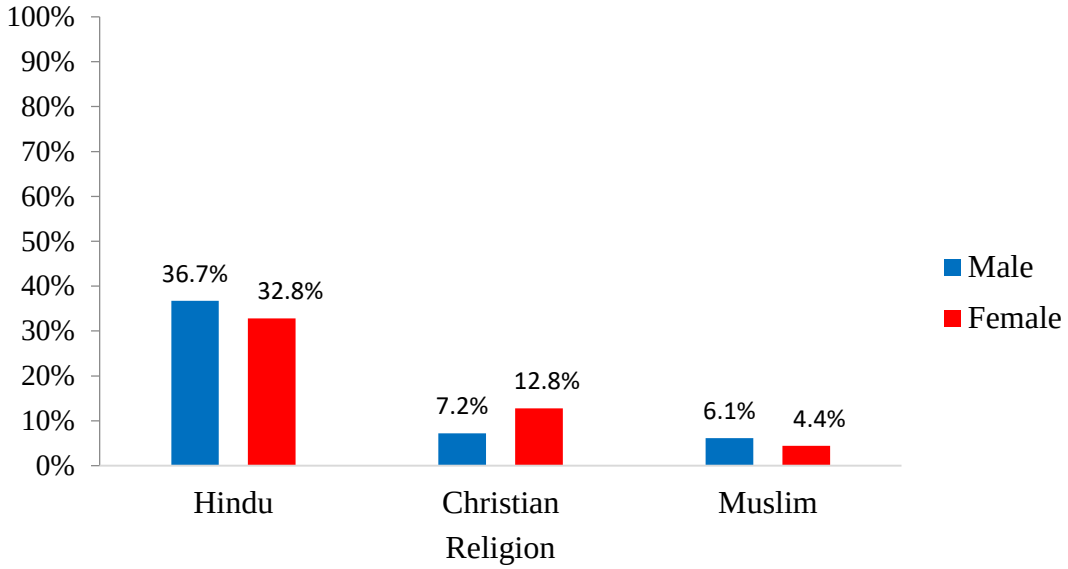

Figure 3: Distribution of Type 2 diabetic patients based on religion

Figure 3 shows that 36.7% of male patients and 32.8% of female patients were Hindus.

Table2

Distribution of Type 2 diabetic patients based on education and occupation

(N=180)

Education & Occupation	Male		Female	
	f	%	f	%
Education				
Primary education	19	10.6	21	11.7
SSLC	53	29.4	42	23.3
Higher Secondary	13	7.2	23	12.8
Graduate/Diploma	5	2.8	4	2.2
Post graduate	0	0	0	0
Occupation				

Unemployed	10	5.6	3	1.7
Private sector	32	17.7	34	18.8
Govt sector	0	0	0	0
Retired employee	28	15.6	1	0.6
Housewife	0	0	37	20.6
Coolie	20	11.1	15	8.3

Table 2 shows that of 29.4% of male patients and 23.3% of female patients were educated up to SSLC.Among male patients 17.7% were working in private sector and 20.6% of female patients were housewives.

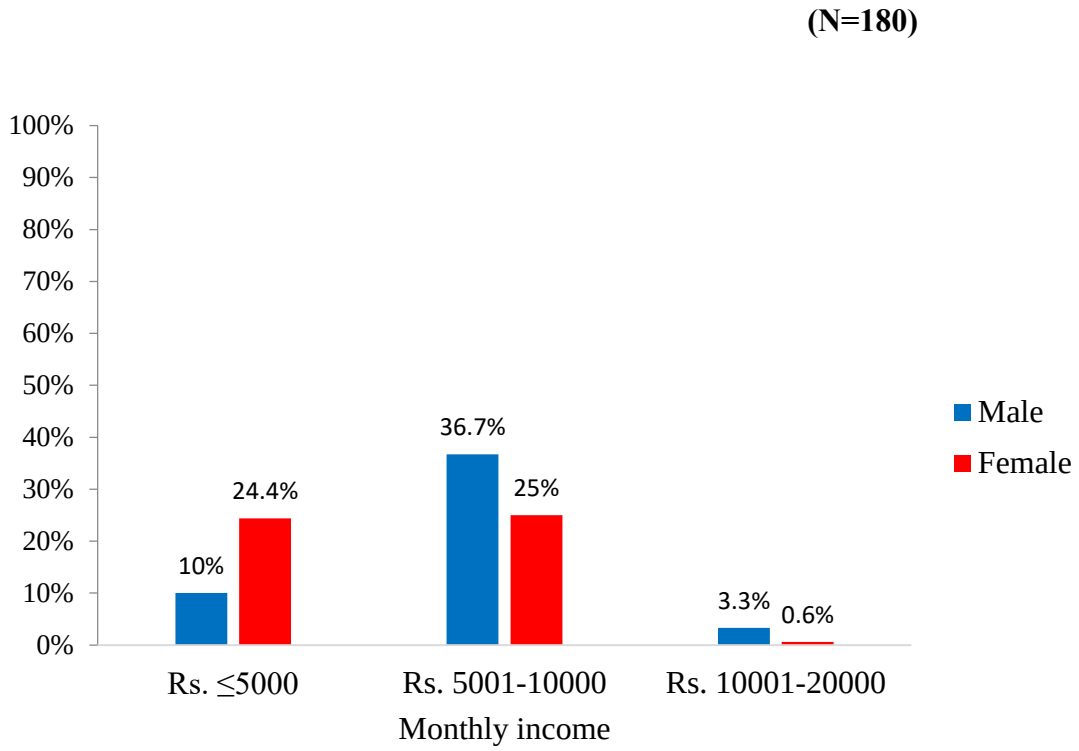

Figure 4: Distribution of Type 2 diabetic patients based on monthly income

Figure 4 shows that 36.7% of male and 25% female diabetic patients had monthly income between Rs. 5001-10000.

Table 3

Distribution of Type 2 diabetic patients based on marital status and area of residence

(N=180)

Marital Status & Area of residence	**Male**		**Female**	
	f	**%**	**f**	**%**
Marital status				
Married	76	42.2	78	43.3
Unmarried	0	0	0	0
Divorced/Separated	0	0	0	0
Widow/Widower	14	7.8	12	6.7
Area of residence				
Rural area	90	50%	90	50%
Urban area	0	0	0	0

Table 3 shows that 42.2% of the male and 43.3% of female patients were married. All male and female patients were from rural area.

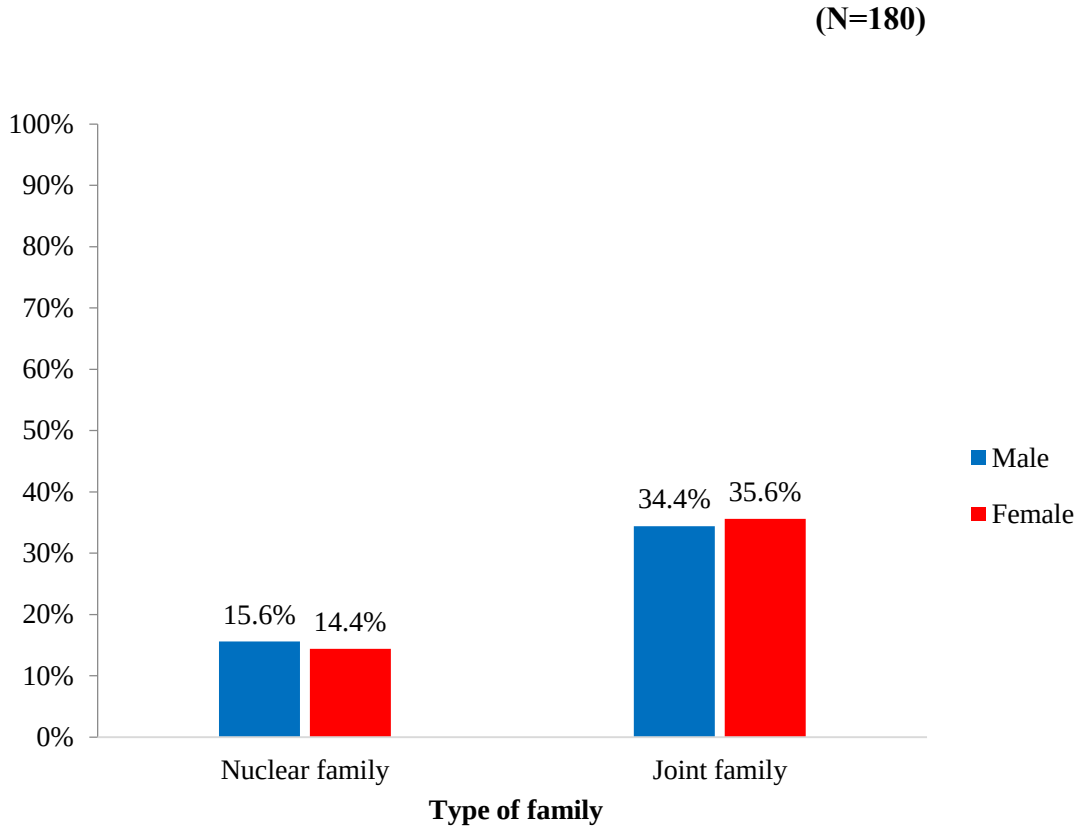

Figure 5: Distribution of Type 2 Diabetic patients based on type of family

Figure 5 shows that 34.4% of the male patients and 35.6% female patients belonged to joint family.

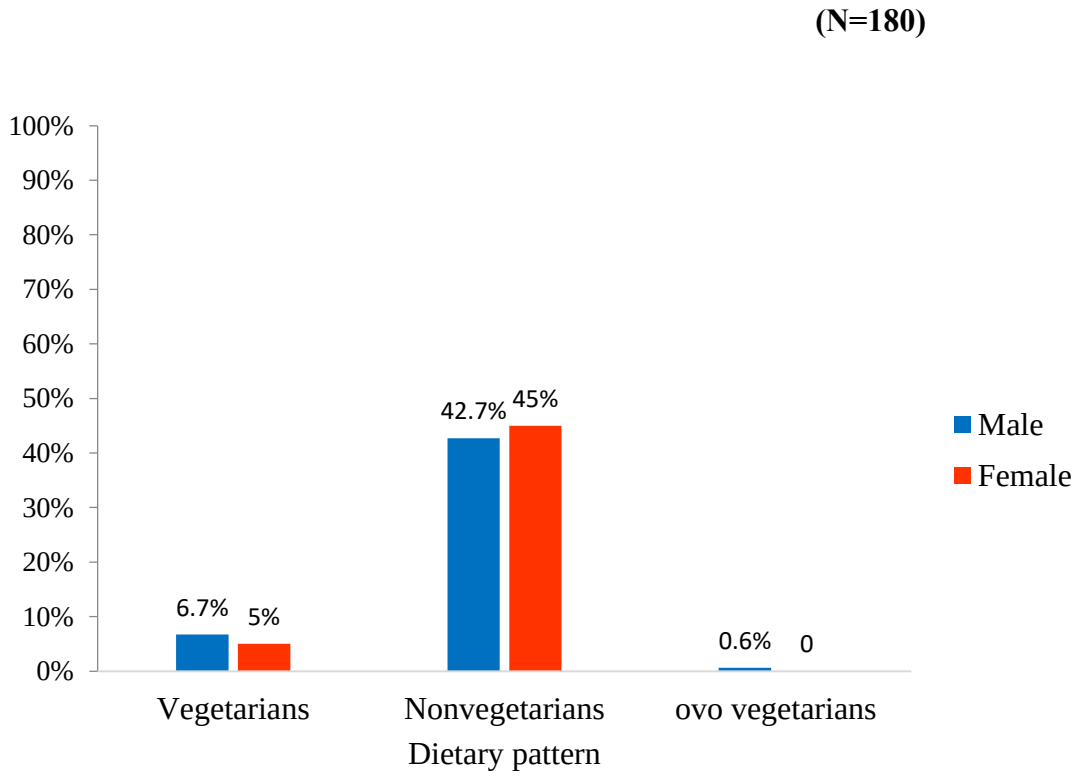

Figure 6: Distribution of Type 2 Diabetic patients based on dietary pattern

Figure 6 shows that 42.7% of the male patients and 45% female patients were non vegetarians.

Table 4

Distribution of Type 2 diabetic patients based on hours of sleep

(N=180)

Hours of sleep	Male		Female	
	f	%	f	%
<4	0	0	0	0
4	1	0.6	4	2.2
5	11	6.1	31	17.2
6	45	25	45	25
7	33	18.3	10	5.6
>7	0	0	0	0

Table 4 shows that among male patients 25% sleep for 6 hours and 25% of female patients sleep for 6 hours.

Table 5

Distribution of Type 2 diabetic patients based on age of onset of DM and family history of DM

(N=180)

Age of onset of DM & Family history of DM	Male		Female	
	f	%	f	%
Age of onset of DM				
≤40	10	5.6	18	10
41-50	45	25	43	23.9
>50	35	19.4	29	16.1
Family history of DM				

Yes	65	36.1	69	38.3
No	25	13.9	21	11.7

Table 5 shows that 25% of the male patients and 23.9% of female patients had onset of DM between 41-50 years of age. Among male patients, 36.1% had family history of diabetes and 38.3% of female patients had family history of diabetes.

Section II

Clinical profile of the patients

Table 6

Distribution of Type 2 diabetic patients based on BMI and HbA1c

(N=180)

BMI & HbA1c	**Male**		**Female**	
	f	**%**	**f**	**%**
BMI (kg/m^2)				
<18	0	0	0	0
18-24.9	80	44.4	64	35.6
25-29.9	10	5.6	26	14.4
>30	0	0	0	0
HbA1c				
<5.7	8	4.4	1	0.6
5.8-6.4	18	10	6	3.3
6.5-9.9	55	30.6	45	25
10.0-12.9	8	4.4	34	18.9
≥13	1	0.6	4	2.2

Table 6 shows that 44.4% of male patients and 35.6% of female patients had BMI between 18-24.9 kg/m^2.Among patitients, 30.6% of male patients and 25% of female patients had HbA1c between 6.5-9.9.

Table 7

Distribution of Type 2 diabetic patients based on Fasting Blood Sugar level and Post Prandial Blood Sugar level

(N=180)

FBS & PPBS	Male		Female	
	f	%	f	%
Fasting Blood Sugar(mg/dl)				
≤100	11	6.1	3	1.7
101-125	14	7.8	10	5.6
126-200	48	26.7	51	28.3
>200	17	9.4	26	14.4
Post Prandial Blood Sugar(mg/dl)				
≤ 140	11	6.2	5	2.8
141-200	33	18.3	18	10
201-300	33	18.3	39	21.6
>300	13	7.2	28	15.6

Table 7 shows that 26.7% of the male and 28.3% of female diabetic patients had fasting blood sugar level between 126-200 mg/dl. Among patients,18.3 % of male patients had post prandial blood sugar level between 141-200 mg/dl and 18.3 % had post prandial blood sugar level between 201-300 mg/dl and 21.6% of female diabetic patients had post prandial blood sugar level between 201-300 mg/dl.

Table 8

Distribution of Type 2 diabetic patients based on type of Diabetic medications and drug compliance

(N=180)

Type of diabetic medications & Drug compliance	**Male**		**Female**	
	f	%	f	%
Type of diabetic medications				
OHA	69	38.3	65	36.1
Insulin	0	0	0	0
OHA + Insulin	21	11.7	25	13.9
Drug compliance				
Yes	89	49.4	87	48.3
No	1	0 .6	3	1.7

Table 8 shows that 38.3% of the male patients 36.1% of female patients were on Oral Hypoglycemic Agents (OHA). Among patients, 49.4% of the male patients and 48.3% of female patients had drug compliance.

Table 9

Distribution of Type 2 diabetic patients based on diabetic complications

(N=180)

Diabetic complications	**Male**		**Female**	
	f	**%**	**f**	**%**
Yes	63	35	58	32.2
No	27	15	32	17.8

Table 9 shows that 35% of male and 32.2% of female patients had diabetic complications.

Section III

Glycemic level of male diabetic patients

(N=90)

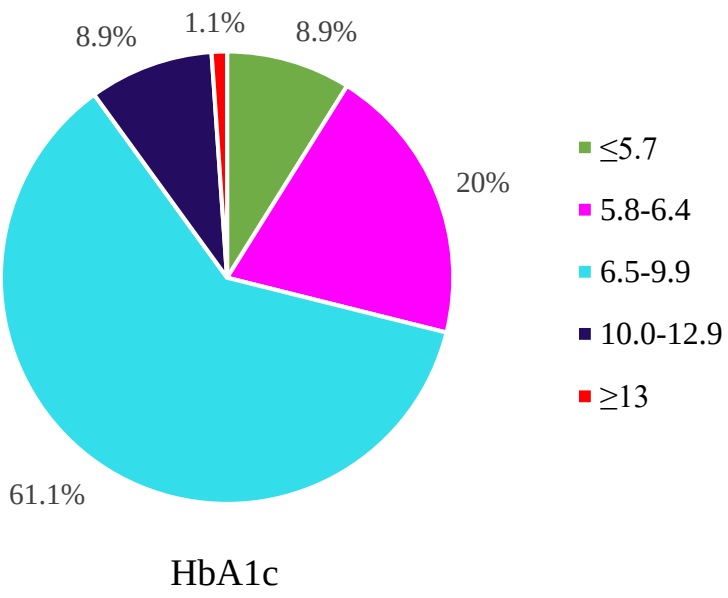

Fig 7: Glycemic level of male diabetic patients based on HbA1c

Fig:7 shows that 61.1% of male diabetic patients had HbA1c between 6.5-9.9, 20% had HbA1c between 5.8-6.4,8.9% had HbA1c between 10.0-12.9,8.9% had HbA1c ≤5.7 and 1.1% had HbA1c ≥13.

(N=90)

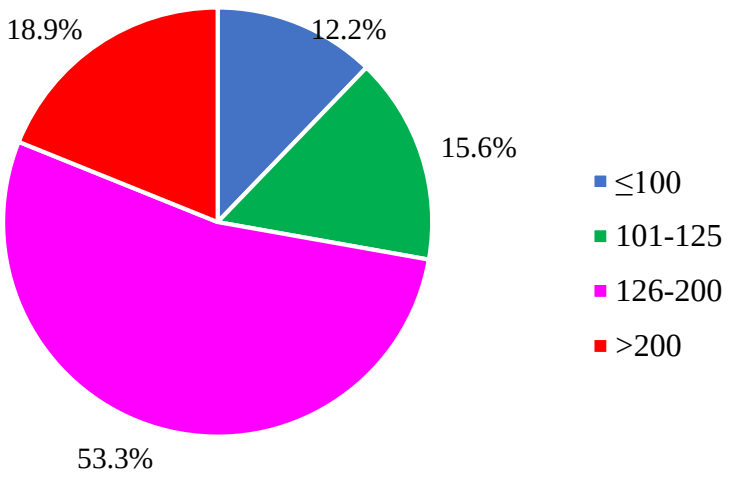

Fig 8: Glycemic level of male diabetic patients based on FBS

Fig:8 shows that 53.3% of male patients had Fasting Blood Sugar level between 126-200 mg/dl,18.9% had FBS >200mg/dl,15.6% had FBS between 101-125 mg/dl,12.2% had FBS ≤100 mg/dl.

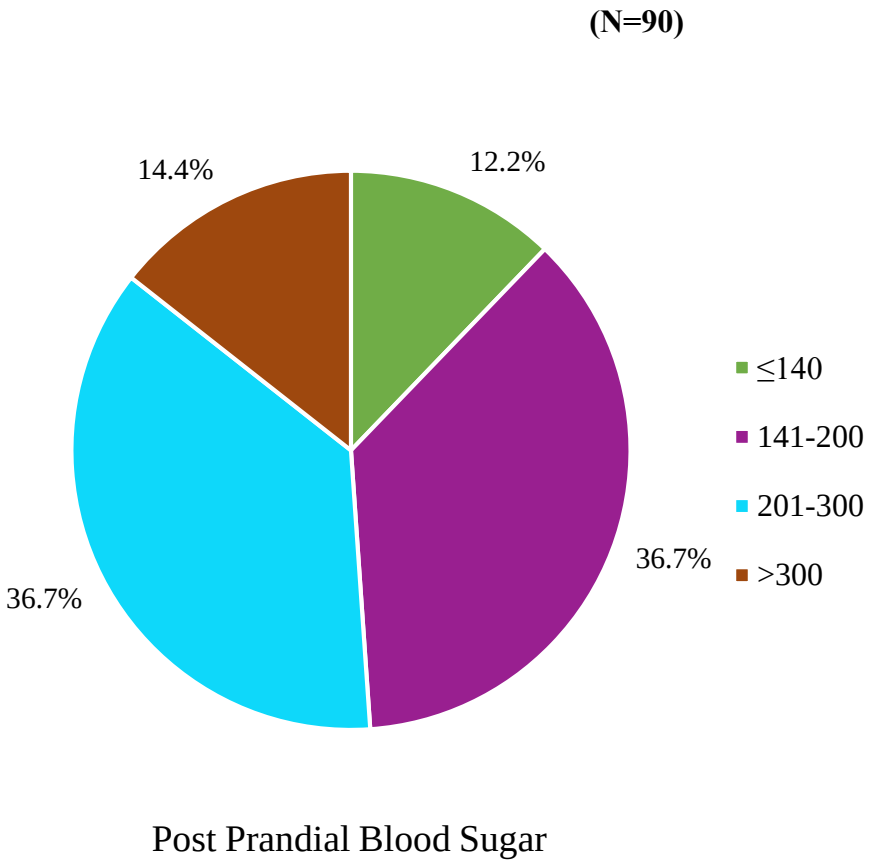

Fig 9: Glycemic level of male diabetic patients based on PPBS

Fig:9 shows that 36.7% of male diabetic patients had PPBS between 141-200mg/dl and 201-300,14.4% had PPBS >300mg/dl and 12.2% had PPBS ≤140 mg/dl.

Section IV

Glycemic level of female diabetic patients

(N=90)

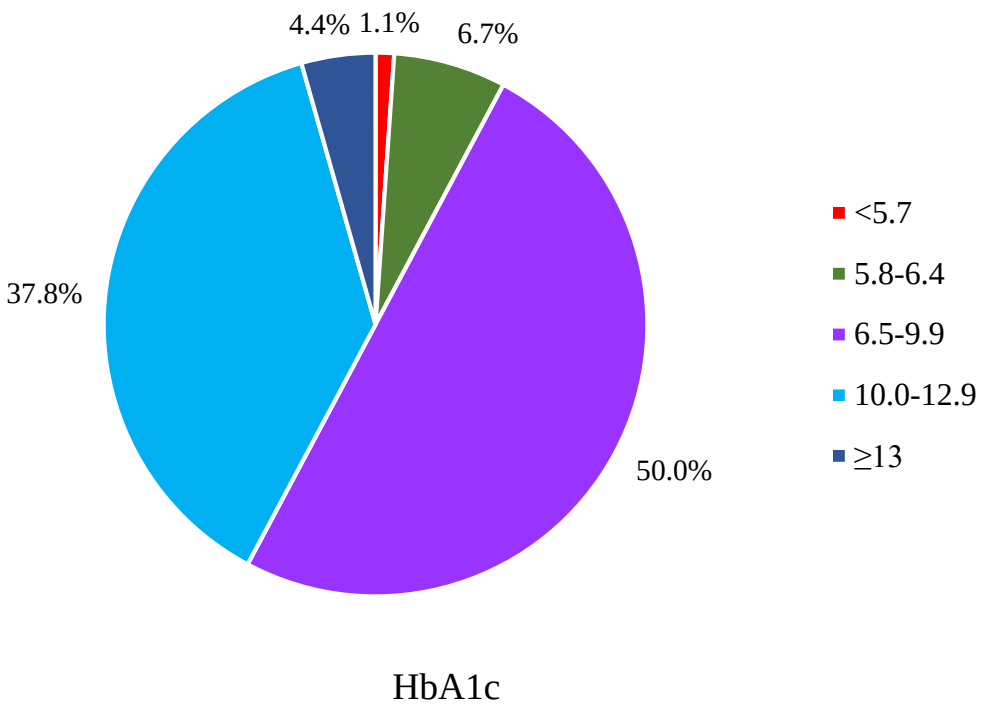

Fig 10: Glycemic level of female diabetic patients based on HbA1c

Fig10 shows that 50% of female diabetic patients had HbA1c between 6.5-9.9,37.8% had HbA1c between 10-12.9,6.7% had HbA1c between 5.8-6.4,4.4% had HbA1c ≥ 13 and 1.1% had HbA1c <5.7.

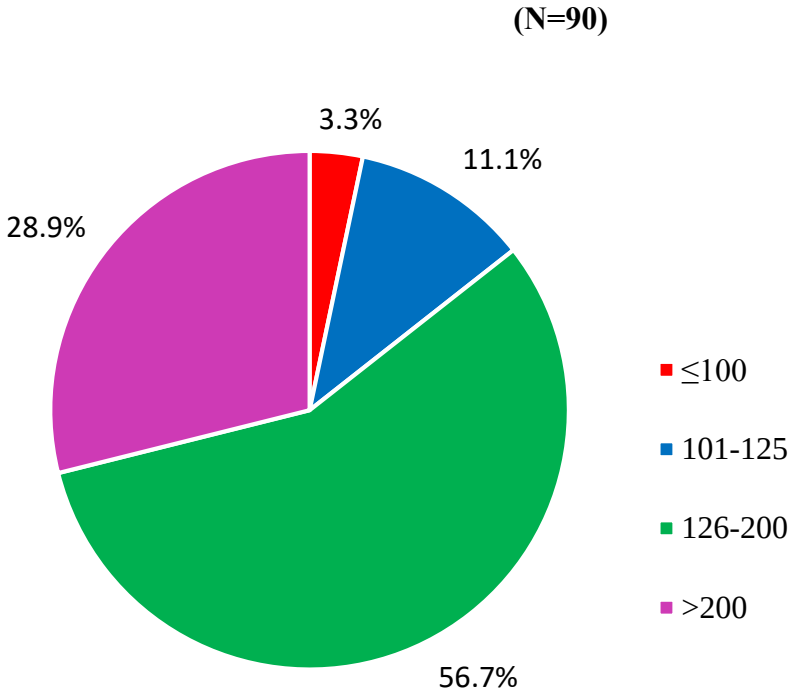

Fig11: Glycemic level of female diabetic patients based on FBS

Fig 11 shows that 56.7% of female diabetic patients had Fasting Blood Sugar level between 126-200 mg/dl,28.9% had FBS >200 mg/dl,11.1% had FBS between 101-125 mg/dl and only 3.3 % had FBS ≤100 mg/dl.

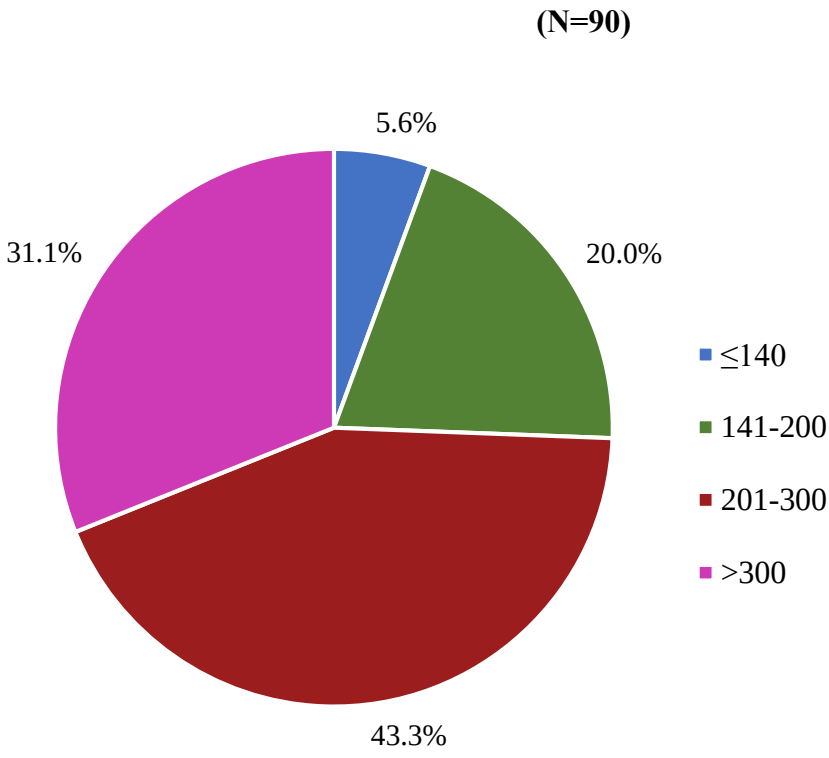

Fig12: Glycemic level of female diabetic patients based on PPBS

Fig 12 shows that 43.3% female diabetic patients had PPBS between 201-300mg/dl, 31.1% had PPBS >300 mg/dl,20% had PPBS between 141-200mg/dl and only 5.6% had PPBS ≤140 mg/dl.

SECTION V

Health Related Quality of Life of male diabetic patients

Table 10

Health Related Quality of Life of male diabetic patients

(N=90)

HRQOL score	f	%
Poor	0	0
Average	33	36.7%
Good	57	63.3%

Table 10 shows that Majority of the male diabetic patients (63.3%) had good Health Related Quality of Life and 36.7% had average Health Related Quality of Life.

SECTION VI

Health Related Quality of Life of female diabetic patients

Table 11

Health Related Quality of Life of female diabetic patients

(N=90)

HRQOL score	f	%
Poor	0	0
Average	66	73.3%
Good	24	26.7%

Table 11 shows that Majority (73.3%) of the female diabetic patients had average Health Related Quality of Life and 26.7% had good Health Related Quality of Life.

Section VII

Comparison of glycemic control between male and female diabetic patients

Table 12

Comparison of glycemic control between male and female diabetic patients

(N=180)

Blood sugar Level	Male		Female		t value
	Mean	SD	Mean	SD	
Fasting	152.96	54.58	188.10	48.1	4.567***
PPBS	219.16	75.20	257.93	73.16	3.505***
HbA1c	7.6	1.75	9.3	1.85	6.564***

***significant at 0.001 level (p<0.001)

Table 12 shows that male diabetic patients had better glycemic control (7.6± 1.75) compared to female diabetic patients (9.3±1.85).

Section VIII

Comparison of Health Related Quality of Life between male and female diabetic patients

Table 13

Comparison of Health Related Quality of Life between male and female diabetic patients

(N=180)

	Male		Female		t value
	Mean	SD	Mean	SD	
HRQOL	119.94	16.26	108.27	15.55	6.814***

***significant at 0.001 level (p<0.001)

Table 13 shows that male diabetic patients had better overall Health Related Quality of life (119.94±16.26) compared to female diabetic patients (108.27±15.55).

Section IX

Association between glycemic control and selected sociodemographic variables among male diabetic patients

Table 14

Association between glycemic control and age of male diabetic patients

(N=90)

Age (in years)	HbA1c				χ^2
	(≤6.5)		(>6.5)		
	f	%	f	%	
35-45	5	5.6	1	1.1	11.38**
46-55	4	4.4	16	17.8	
56-65	10	11.1	33	36.7	
66-75	9	10.0	12	13.3	

**Significant at 0.01 ($p<0.01$).

There was significant association between glycemic control and age of male patients.

Association between glycemic control and religion, education, occupation, monthly income, marital status, type of family, dietary pattern, hours of sleep, age of onset of DM, family history of DM, Diabetic medication, diabetic complications and drug compliance of male diabetic patients.

There was no significant association between glycemic control and religion, education, occupation, monthly income, marital status, type of family, dietary pattern, hours of sleep, age of onset of DM, family history of DM, Diabetic medication, diabetic complications and drug compliance ($p>0.05$) of male diabetic patients.

SECTION X

Association between glycemic control and selected sociodemographic variables among female diabetic patients

Association between glycemic control and age, religion, education, occupation, monthly income, marital status, type of family, dietary pattern, hours of sleep, age of onset of DM, family history of DM, Diabetic medication, diabetic complications and drug compliance of female diabetic patients.

There was no significant association between glycemic control and age, religion, education, occupation, monthly income, marital status, type of family, hours of sleep, dietary pattern, age of onset of DM, family history of DM, Diabetic medication, diabetic complications and drug compliance($p>0.05$) of female diabetic patients.

SECTION XI

Association between Health Related Quality of Life and selected sociodemographic variables among male diabetic patients

Table 15

Association between Health Related Quality of Life and marital status of male diabetic patients

(N=90)

Marital status	HRQOL score				$\chi 2$
	Average		Good		
	f	%	f	%	
Married	21	23.3	55	61.2	17.18***
Widower	12	13.3	2	2.2	

***Significant at 0.001 level ($p<0.001$).

There was significant association between Health Related Quality of Life and marital status of male diabetic patients.

Table 16

Association between Health Related Quality of Life and hours of sleep of male diabetic patients

(N=90)

Hours of sleep	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
4	1	1.1	0	0	9.27*
5	6	6.7	5	5.5	
6	20	22.2	25	27.8	
7	6	6.7	27	30.0	

*Significant at 0.05 level ($p<0.05$)

There was significant association between Health Related Quality of Life and hours of sleep of male diabetic patients.

Table 17

Association between Health Related Quality of Life and age of onset of DM among male diabetic patients

(N=90)

Age of Onset of DM	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
≤40	0	0	10	11.1	6.97*
41-50	20	22.3	25	27.8	
≥50	13	14.4	22	24.4	

*Significant at 0.05 level ($p<0.05$)

There was significant association between Health Related Quality of Life and age of onset of DM among male diabetic patients.

Table 18

Association between Health Related Quality of Life and type of diabetic medications of male diabetic patients

(N=90)

Type of Diabetic medication	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
OHA	20	22.2	49	54.5	7.51**
OHA + insulin	13	14.4	8	8.9	

**Significant at 0.01 level ($p<0.01$)

There was significant association between Health Related Quality of Life and type if diabetic medications of male diabetic patients.

Table 19

Association between Health Related Quality of Life and Diabetic complications of male diabetic patients.

(N=90)

Diabetic complications	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
Yes	29	32.2	34	37.8	7.93**
No	4	4.4	23	25.6	

**Significant at 0.01 level ($p<0.01$)

There was significant association between Health Related Quality of Life and diabetic complications of male diabetic patients.

Association between Health Related Quality of Life and age, religion, education, occupation, monthly income, type of family, diatary pattern, family history and drug compliance of male diabetic patients.

There was no significant association between Health Related Quality of Life and age, religion, education, occupation, monthly income, type of family, diatary pattern, family history of DM and drug compliance($p>0.05$) of male diabetic patients.

SECTION XII

Association Between Health-Related Quality of Life and selected sociodemographic variables among female diabetic patients

Table 20

Association between Health Related Quality of Life and age of female diabetic patients

(N=90)

Age(in years)	HRQOL score				$\chi 2$
	Average		Good		
	f	%	f	%	
35-45	1	1.1	11	12.2	30.04***
46-55	27	30.0	8	8.9	
56-65	28	31.1	6	6.7	
66-75	9	10	0	0	

***Significant at 0.001 level($p<0.001$).

There was significant association between Health Related Quality of Life and age of female diabetic patients

Table 21

Association between Health Related Quality of Life and education of female diabetic patients

(N=90)

Education	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
Primary	20	22.2	1	1.1	24.36***
SSLC	34	37.8	8	8.9	
H S	11	12.2	12	13.3	
Graduate/ Diploma	0	0	4	4.5	

***Significant at 0.001 level (p<0.001)

There was significant association between Health Related Quality of Life and education of female diabetic patients.

Table 22

Association between Health Related Quality of Life and occupation of female diabetic patients

(N=90)

Occupation	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
Unemployed	3	3.3	0	0	21.35***
Private	16	17.8	18	20.0	
Housewife	33	36.7	4	4.4	
Retired	0	0	1	1.1	
Coolie	13	14.5	2	2.2	

***Significant at 0.001 level (p<0.001)

There was significant association between Health Related Quality of Life and occupation of female diabetic patients.

Table 23

Association between Health Related Quality of Life and monthly income of female diabetic patients

(N=90)

Monthly income	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
Rs ≤5000	37	41.1	7	7.8	
Rs 5001-10000	28	31.1	17	18.9	7.93*
Rs10001-20000	0	0	1	1.1	

*Significant at 0.05 level ($p<0.05$)

There was significant association between Health Related Quality of Life and monthly income of female diabetic patients.

Table 24

Association between Health Related Quality of Life and hours of sleep of female diabetic patients

(N=90)

Hours of sleep	HRQOL score				χ^2
	Average		Good		
	f	%	f	%	
4	4	4.5	0	0	
5	29	32.2	2	2.2	
6	30	33.3	15	16.7	22.85***
7	2	2.2	8	8.9	

***Significant at 0.001 level ($p<0.001$)

There was significant association between Health Related Quality of Life and hours of sleep of female diabetic patients.

Table 25

Association between Health Related Quality of Life and age of onset of DM among female diabetic patients

(N=90)

Age of Onset of DM	HRQOL score				χ2
	Average		Good		
	f	%	f	%	
≤40	5	5.6	13	14.4	
41-50	35	38.9	8	8.9	22.35***
≥50	25	27.8	4	4.4	

***Significant at 0.001 level (p<0.001)

There was significant association between Health Related Quality of Life and age of onset of DM among female diabetic patients.

Table 26

Association between Health Related Quality of Life and family history of DM among female diabetic patients

(N=90)

Family history of DM	HRQOL score				χ2
	Average		Good		
	f	%	f	%	
Yes	46	51.1	23	25.6	4.55*
No	19	21.1	2	2.2	

*Significant at 0.05 level (p<0.05)

There was significant association between Health Related Quality of Life and family history of DM of female diabetic patients.

Table 27

Association between Health Related Quality of Life and type of diabetic medications of female diabetic patients

(N=90)

Type of diabetic medication	**HRQOL score**				**χ2**
	Average		Good		
	f	%	f	%	
OHA	41	45.5	24	26.7	9.76**
OHA+insulin	24	26.7	1	1.1	

**Significant at 0.01 ($p<0.01$)

There was significant association between Health Related Quality of Life and type of diabetic medications of female diabetic patients.

Table 28

Association between Health Related Quality of Life and diabetic complications of female diabetic patients

(N=90)

Diabetic Complications	**HRQOL score**				**χ2**
	Average		**Good**		
	f	**%**	**f**	**%**	
Yes	53	58.9	5	5.6	
No	12	13.3	20	22.2	29.84***

***Signicant at 0.001($p<0.001$).

There was significant association between Health Related Quality of Life and diabetic complications of female diabetic patients.

Association between Health Related Quality of Life and religion, marital status, type of family, diatary pattern and drug compliance of female diabetic patients.

There was no significant association between Health Related Quality of Life and religion, marital status, type of family, diatary pattern and drug compliance 00($p>0.05$) of female diabetic patients.

CHAPTER 5

RESULTS

RESULTS

This chapter dealt with statistical analysis and findings of the study based on objectives and hypothesis.

Objectives

1. Assess the glycemic level of male diabetic patients.
2. Assess the glycemic level of female diabetic patients.
3. Assess the Health Related Quality of Life of male diabetic patients.
4. Assess the Health Related Quality of Life of female diabetic patients.
5. Compare the level of glycemic control between male and female diabetic patients.
6. Compare the Health-Related Quality of life between male and female diabetic patients.
7. Find the association between glycemic control and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus.
8. Find the association between glycemic control and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus.
9. Find the association between Health-Related Quality of life and selected sociodemographic variables among male patients with Type 2 Diabetes Mellitus.
10. Find the association between Health-Related Quality of life and selected sociodemographic variables among female patients with Type 2 Diabetes Mellitus

Hypotheses

H_1. There is significant difference in glycemic control among male and female diabetic patients.

H_2. There is significant difference in the Health-Related Quality of life among male and female diabetic patients.

H_3. There is significant association between glycemic control and selected socio demographic variables among male diabetic patients.

H_4. There is significant association between glycemic control and selected socio demographic variables among female diabetic patients.

H_5. There is significant association between Health-Related Quality of Life and selected socio demographic variables among male diabetic patients.

H_6. There is significant association between Health-Related Quality of Life and selected socio demographic variables among female diabetic patients.

Results

Results of the present study were discussed under the following headings:

Section I: Socio demographic variables

Section II: Clinical profile of the patient.

Section III:Assess the glycemic level of male diabetic patients.

Section IV :Assess the glycemic level of female diabetic patients.

Section V :Assess the Health Related Quality of Life of male diabetic patients.

Section VI:Assess the Health Related Quality of Life of female diabetic patients.

Section VII: Compare the level of glycemic control between male and female diabetic patients.

Section VIII: Compare the Health-Related Quality of life between male and female diabetic patients.

SectionIX: Association between glycemic control and selected sociodemographic variables among male diabetic patients.

Section X: Association between glycemic control and selected sociodemographic variables among female diabetic patients.

Section XI: Association between Health Related Quality of Life and selected sociodemographic variables among male diabetic patients.

Section XII: Association between Health Related Quality of Life and selected sociodemographic variables among female diabetic patients.

Section I: Sociodemographic variables

1. Among the diabetic patients 23.9% of males belonged to the age group of 56-65 years,11.7% were in the age group of 66-75 years ,11.1% were belonged to the age group of 46-55years and 3.3% were belonged to 35-45 years, while 19.4% of females were belonged to the age group of 46-55 years,18.9% were in the age group of 56-65 years, 6.7% were belonged to the age group of 35-45 years and 5% were belonged to the age group 66-75 years.
2. Among diabetic patients 36.7% of males were Hindus, 7.2% were Christians and 6.1% were Muslims whereas 32.8% of female were Hindus, 12.8% were Christians and 4.4% were Muslims.
3. Based on education 29.4% of male diabetic patients were educated up to SSLC,10.6% had primary education,7.2% were educated up to higher secondary and only 2.8% were educated up to graduate/diploma while 23.3% of female diabetic patients were educated up to SSLC, 12.8% were educated up to higher secondary, 11.7% had primary education and only 2.2% were educated up to graduate/diploma.
4. Among diabetic patients 17.7% of males were in private sector,15.6% were retired employees,11.1% were coolies and 5.6% were unemployed. Among females 20.6% were house wives, 18.8% were in private sector,8.3% were coolies,1.7% were unemployed and 0.6% were retired employees.
5. Based on monthly income, 36.7% of male diabetic patients had monthly income between Rs 5001-10000,10.0% had monthly income ≤Rs5000 and only 3.3% had monthly income between Rs10001-20000, while in females 25.0% had monthly income between Rs5001-10000,24.4% had monthly income ≤Rs5000 and only 0.6% had monthly income between Rs10001-20000.
6. Among diabetic patients 42.2% of males were married and7.8%were widowers, while 43.3% of females were married and 6.7%were widows.

7. All male and female diabetic patients were from rural area.
8. Based on type of family 34.4% of male diabetic patients were belonged to joint family and 15.6% belonged to nuclear family while 35.6% of female diabetic patients belonged to joint family and 14.4% belonged to nuclear family.
9. While considering the dietary pattern 42.7% of male diabetic patients were non vegetarians,6.7% were vegetarians and only 0.6% were Ovo vegetarians whereas 45.0% of female diabetic patients were non vegetarians,5.0% were vegetarians and none of them were Ovo vegetarians.
10. All male and female diabetic patients had the habit of taking 3 meals per day.
11. Among the diabetic patients 25% of males slept for 6 hours,18.3% slept for 7 hours,6.1% slept for 5 hours and 0.6% slept for 4 hours whereas 25% of female diabetic patients slept for 6 hours, 17.2% slept for 5 hours, 5.6% slept for 7 hours, and 2.2% slept for 4 hours.
12. Based on age of onset of diabetes 25.0% of male diabetic patients had age of onset of diabetes between 41-50 years,19.4% had onset above 50 years and 5.6 % had onset below 40 years while in female diabetic patients 23.9% had age of onset of diabetes between 41-50 years,16.1% had onset above 50 years and 10.0% had onset below 40 years.
13. Among diabetic patients 36.1% of males had family history of diabetes and 13.9% had no family history of diabetes mellitus while in females 38.3% had family history of diabetes and 11.7% had no family history of diabetes mellitus.

Section II: Clinical profile of the patients

1. 1.Based on BMI 44.4 % of male diabetic patients had BMI between 18-24.9 kg/m^2 and 5.6% had BMI between 25-29.9 kg/m^2 while in female diabetic patients 35.6 % had BMI between 18-24.9 kg/m^2 and 14.4% had BMI between 25-29.9 kg/m^2.
2. While considering the HbA1c value 30.6 % of male diabetic patients had HbA1c between 6.5-9.9, 10.0% had HbA1c between 5.8-6.4, 4.4% had HbA1c ≤5.7,4.4% had HbA1c between 10-12.9 and 0.6% had HbA1c ≥13 whereas in female diabetic patients 25.0 % had HbA1c between 6.5-9.9,18.9% had HbA1c between 10-12.9,3.3% had HbA1c between 5.8-6.4,2.2% had HbA1c ≥ 13 and 0.6% had HbA1c ≤5.7.

3. Among diabetic patients 26.7% males had Fasting Blood Sugar between 126-200 mg/dl, 9.4% had FBS >200mg/dl,7.8% had FBS between 101-125 mg/dl and 6.1% had FBS ≤100 mg/dl while in female diabetic patients 28.3% had Fasting Blood Sugar level between 126-200 mg/dl,14.4% had FBS>200 mg/dl,5.6% had FBS between 101-125 mg/dl and only 1.7 % had FBS ≤100 mg/dl.
4. Based on Post Prandial Blood Sugar, 18.3% of male diabetic patients had PPBS between 141-200mg/dl,18.3% had PPBS between 201-300 mg/dl,7.2% had PPBS >300mg/dl and 6.2% had PPBS ≤140 mg/dl while in female diabetic patients 21.6 % had Post Prandial Blood Sugar between 201-300mg/dl,15.6 % had PPBS >300 mg/dl,10 % had PPBS between 141-200mg/dl and only 2.8% had PPBS ≤140 mg/dl.
5. Among diabetic patients 38.3% of males were on Oral Hypoglycemic Agents and 11.7% were on a combination of Oral Hypoglycemic Agents and insulin therapy whereas 36.1% of females were on Oral Hypoglycemic Agents and 13.9% were on a combination of Oral Hypoglycemic Agents and insulin therapy.
6. Based on drug compliance 49.4% of male diabetic patients had drug compliance and only 0.6% were non adherent to treatment whereas in female diabetic patients 48.3% had drug compliance and only 1.7 % were non adherent to treatment.
7. Among diabetic patients 35% of males had diabetic complications and 15% not had diabetic complications whereas in females 32.2% had diabetic complications and 17.8% not had diabetic complications.

Section III: Assess the glycemic level of male diabetic patients.

Among the male diabetic patients 61.1% of had HbA1c between 6.5-9.9,20% had HbA1c between 5.8-6.4,8.9% had HbA1c between 10.0-12.9 ,8.9% had HbA1c ≤ 5.7 and 1.1% had HbA1c ≥ 13.

Among the male diabetic patients 53.3% had FBS between 126-200 mg/dl, 18.9% had FBS >200mg/dl, 15.6% had FBS between 101-125, and 12.2% had FBS ≤ 100 mg/dl.

Among male diabetic patients,36.7% had PPBS between 141-200 mg/dl and 201-200 mg/dl ,14.4% had PPBS>300 mg/dl and 12.2% had PPBS ≤140 mg/dl

Section IV: Assess the glycemic level of female diabetic patients

Among female diabetic patients, 50% had HbA1c between 6.5-9.9,37.8% had HbA1c between 10.0-12.9,6.7% had HbA1c between 5.8-6.4,4.4% had HbA1c above 13 and 1.1% had HbA1c below 5.7.

Among female diabetic patients,56.7% had FBS between 126-200 mg/dl,28.9% had FBS > 200 mg/dl,11.1% had FBS between 101-125 mg/dl and 3.3% had FBS ≤ 100mg/dl.

Among female diabetic patients,43.3% had PPBS between 201-300 mg/dl,31.1% had PPBS > 300 mg/dl,20% had PPBS between 141-200 and 5.6% had PPBS≤ 140 mg/dl.

Section V: Assess the Health Related Quality of Life of male diabetic patients

Among male diabetic patients 63.3% had good Health Related Quality of Life and 36.7% had average Health Related Quality of Life and none of them had poor Health Related Quality of Life.

Section VI: Assess the Health Related Quality of Life of female diabetic patients

Among female diabetic patients 73.3% had average Health Related Quality of Life and 26.7% had good Health Related Quality of Life and none of them had poor Health Related Quality of Life.

Section VII:Compare the level of glycemic control between male and female diabetic patients.

The mean fasting blood sugar score among male diabetic patients was (152.96 ±54.58) lower than the female diabetic patients (188.10 ± 48.1) which was statistically significant (‘t’ value 4.567, $p<0.001$).

The mean post prandial blood sugar score among male diabetic patients was (219.16 ±75.20) lower than the female diabetic patients (257.93± 73.16) which was statistically significant (‘t’ value 3.505, $p<0.001$).

The mean HbA1c score among male diabetic patients was (7.6± 1.75) lower than the female diabetic patients (9.3 ±1.85) which was statistically significant (‘t’ value 6.564, $p<0.001$).

It is concluded that glycemic control among male diabetic patients was good when compared to female diabetic patients.

Section VIII: Compare the Health-Related Quality of life between male and female diabetic patients.

The mean score of 'Total Quality of life' among male diabetic patients was (119.94 ± 16.26) higher than the female diabetic patients (108.27 ± 15.55) which was statistically significant ('t' value 6.814, $p<0.001$). Hence it is inferred that male diabetic patients had good Health Related Quality of Life when compared to female diabetic patients.

Section IX: Association between glycemic control and selected sociodemographic variables among male diabetic patients.

The chi-square value shows that there was statistically significant association between glycemic control and age ($p<0.01$) among male diabetic patients.

The chi-square value shows that there was statistically no significant association between glycemic control and, religion, education, occupation, monthly income, marital status, dietary pattern, type of family, hours of sleep, age of onset of DM, family history, type of diabetic medications, drug compliance($p>0.05$) among male diabetic patients.

Section X: Association between glycemic control and selected sociodemographic variables among female diabetic patients.

Chi-square test value shows that there was statistically no significant association between glycemic control and selected sociodemographic variables such as age, religion, education, occupation, monthly income, marital status, dietary pattern, type of family, hours of sleep, age of onset of DM, family history, type of diabetic medications, drug compliance ($p>0.05$) of female diabetic patients.

Section XI: Association between Health-Related Quality of Life and selected sociodemographic variables among male diabetic patients.

The chi-square value shows that there was statistically significant association between Health-Related Quality of Life and marital status ($p<0.001$), hours of sleep ($p<0.05$), age of onset of DM ($p<0.05$), type of diabetic medications ($p<0.01$) and diabetic complications($p<0.01$) of male diabetic patients.

The chi-square value shows that there was statistically no significant association between Health-Related Quality of Life and age, religion, education, occupation, monthly income, type of family, dietary pattern, family history and drug compliance ($p>0.05$) of male diabetic patients.

SectionXII: Association between Health Related Quality of Life and selected sociodemographic variables among female diabetic patients.

The chi-square value shows that there was statistically significant association between Health-Related Quality of Life and age($p<0.001$), education($p<0.001$), occupation ($p<0.001$), monthly income($p<0.05$), hours of sleep($p<0.001$), age of onset of DM($P<0.001$). family history of DM($p<0.05$), type of diabetic medications($p<0.01$) and diabetic complications($p<0.001$) of female diabetic patients.

The chi-square value shows that there was statistically no significant association between Health-Related Quality of Life and religion, type of family, dietary pattern, hours of sleep and drug compliance($p>0.05$) of female diabetic patients.

CHAPTER 6

DISCUSSION, SUMMARY AND CONCLUSION

This chapter gives a brief account of the major findings of the present study and discussion in relation to the findings of the similar studies conducted by other researchers. It also consists of summary, conclusion, nursing implications, limitations and recommendations for further study.

Discussion

The present study was intended to assess the influence of gender on glycemic control and Health Related Quality of Life among patients with type 2 diabetes mellitus attending NCD clinics of selected Health Centres in Thiruvananthapuram district.

Objectives

1. Assess the glycemic level of male diabetic patients.
2. Assess the glycemic level of female diabetic patients.
3. Assess the Health Related Quality of Life of male diabetic patients.
4. Assess the Health Related Quality of Life of female diabetic patients.

5. Compare the level of glycemic control between male and female diabetic patients.
6. Compare the Health-Related Quality of life between male and female diabetic patients.
7. Find the association between glycemic control and selected demographic variables among male patients with Type 2 Diabetes Mellitus.
8. Find the association between glycemic control and selected demographic variables among female patients with Type 2 Diabetes Mellitus.
9. Find the association between Health-Related Quality of life and selected demographic variables among male patients with Type 2 Diabetes Mellitus.
10. Find the association between Health-Related Quality of life and selected demographic variables among female patients with Type 2 Diabetes Mellitus.

The major findings of the study are discussed with reference to the objectives and in relation to the findings of other research studies conducted on the same topic.

The first objective of the present study was to assess the glycemic level of male diabetic patients. Study findings revealed that among male diabetic patients 61.1% of had HbA1c between 6.5-9.9,20% had HbA1c between 5.8-6.4,8.9% had HbA1c between 10.0-12.9 ,8.9% had HbA1c ≤ 5.7 and 1.1% had HbA1c ≥ 13. Regarding Fasting Blood sugar level 53.3% had FBS between 126-200 mg/dl, 18.9% had FBS >200mg/dl, 15.6% had FBS between 101-125, and 12.2% had FBS ≤ 100 mg/dl.Among male diabetic patients,36.7% had PPBS between 141-200 mg/dl,36.7% had PPBS between 201-200 mg/dl ,14.4% had PPBS>300 mg/dl and 12.2% had PPBS ≤140 mg/dl.

The study finding is supported by a study conducted by Sheleme T, Mamo G, Melaku T and Sahilu T (2019) to assess glycemic control and its predictors among adult diabetic patients attending Mettu Karl Referral Hospital, Southwest Ethiopia. A total of 330 diabetic patients were included in the study. Almost three-quarters of the study population of diabetic patients had poorly controlled blood sugar. Overweight, obesity, higher eGFR, type 1 diabetes, poor adherence to diet recommendation and non-adherence to medications were independent predictors of poor glycemic control[31].

The second objective of the present study was to assess the glycemic level of female diabetic patients. Study findings revealed that, 50% had HbA1c between 6.5-9.9, 37.8% had HbA1c between 10.0-12.9, 6.7% had HbA1c between 5.8-6.4, 4.4% had HbA1c above 13 and 1.1% had HbA1c below 5.7. Among female

diabetic patients, 56.7% had FBS between 126-200 mg/dl, 28.9% had FBS > 200 mg/dl, 11.1% had FBS between 101-125 mg/dl and 3.3% had FBS ≤ 100mg/dl. Regarding Post Prandial Blood Sugar level, 43.3% had PPBS between 201-300 mg/dl, 31.1% had PPBS > 300 mg/dl, 20% had PPBS between 141 - 200 and 5.6% had PPBS≤ 140 mg/dl.

The study finding is supported by a community-based cross-sectional study conducted by Najeeb S S, Joy T M, Sreedevi A, Vijayakumar K and Syama (2019-2020) among 364 type 2 diabetics who had the disease for at least 5 years duration in the Ernakulam district of Kerala to estimate glycaemic control and its determinants among type 2 diabetics. Research findings showed that poor compliance with medications and unhealthy lifestyle choices has resulted in a high proportion of diabetics with poor glycaemic control in the district. Women are particularly more vulnerable to uncontrolled hyperglycaemia than males. Determinants such as female gender, body mass index >23 kg/m2, combined drug treatment with Oral Hypoglycaemic agents (OHA) and insulin, and poor compliance with medications were found to be significantly associated with poor glycaemic control[25].

The third objective of the study is to assess the Health Related Quality of Life of male diabetic patients. Present study findings showed that among male diabetic patients 63.3% had good Health Related Quality of Life and 36.7% had average Health Related Quality of Life and none of them had poor Health Related Quality of Life.

The finding was supported by a scoping review conducted by Aarthy R, Mikocka-Walus A, Pradeepa R, Anjana R M, Mohan V and Aston-Mourney K (2020). Aim of this scoping review was to explore the current state of knowledge on QoL and its various associated factors among people with diabetes in India. Three databases were searched (PubMed, Scopus, and Medline) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed. The studies showed that people with diabetes had poorer QoL than those without diabetes. It was observed that QoL is largely reported as being better among men as compared with women with diabetes[69].

The fourth objective of the study is to assess the Health Related Quality of Life of female diabetic patients. This study finding showed that, among female diabetic patients 73.3% had average Health Related Quality of Life and 26.7% had good Health Related Quality of Life and none of them had poor Health Related Quality of Life.

This finding is consistent with the findings of a cross-sectional study was conducted in rural Kerala by Morris M C and John M (2019) among 300(138 males and 162 females) Type 2 Diabetic patients to assess the gender difference in self-care. The findings showed that self-care activities varied greatly between males and females. The self-care activities of the females were very poor when compared with the males. The poor self-care activities of the females could be attributed to behaviour conditioned by gender relations prevalent in the society[26].

The fifth objective of the study is to compare the level of glycemic control among male and female diabetic patients. The present study findings showed that male diabetic patients had good glycemic control when compared to female diabetic patients.

The mean fasting blood sugar score among male diabetic patients was (152.96 ±54.58) lower than the female diabetic patients (188.10 ± 48.1) which was statistically significant ('t' value 4.567, $p<0.001$).

The mean post prandial blood sugar score among male diabetic patients was (219.16 ±75.20) lower than the female diabetic patients (257.93± 73.16) which was statistically significant ('t' value 3.505, $p<0.001$).

The mean HbA1c score among male diabetic patients was (7.6± 1.75) lower than the female diabetic patients (9.3 ±1.85) which was statistically significant ('t' value 6.564, $p<0.001$).

It is concluded that glycemic control among male diabetic patients was good when compared to female diabetic patients.

There by hypothesis H_1: there is significant difference in glycemic control among male and female diabetic patients is accepted.

The finding is supported by a study conducted by Demoz G T, Gebremariam A, Yifter H, Alebachew M, Niriayo Y L, Gebreslassie G et al (2018) to find out the predictors of poor glycemic control among 357 diabetic patients on a follow up care at a tertiary healthcare setting in Ethiopia. The study findings showed that 44% male diabetic patients and 88.9% female diabetic patients had poor glycemic control. The prevalence of poor glycemic control was higher among females. Gender difference influences the liability to diabetes therapies; negatively affect accessing health services and amplify the impact of diabetes on females[64].

The sixth objective of the study was to compare the Health-Related Quality of life among male and female diabetic patients. The present study findings showed that male diabetic patients had a good Health Related Quality of Life when compared to female diabetic patients. The mean score of 'Total Quality of life' among male diabetic patients was (119.94 ± 16.26) higher than the female diabetic patients (108.27 ± 15.55) which was statistically significant ('t' value 6.814, $p<0.001$). Hence it is inferred that male diabetic patients had good Health Related Quality of Life when compared to female diabetic patients.

Hence the hypothesis H_2: there is significant difference in the Health-Related Quality of life among male and female diabetic patients is accepted.

The above finding is supported by the findings of the study conducted by Sahoo S, Sahoo J, Taywade M and Patro B K (2022) among 103 diabetic patients to assess Quality of life and its determinants among ambulatory diabetic patients attending NCD clinic of a tertiary care hospital of eastern India. Study findings concluded that mean Quality of Life scores were higher in males than females. Better awareness and proper health seeking behaviour among males were the reasons of higher quality of life in males whereas in females, under reporting, delay in seeking care, social disfavours, and lack of family support in rural areas and less compliance to routine testing and follow ups were the reasons for poor quality of life[24].

The seventh objective of the study was to find the association between glycemic control and selected demographic variables among male patients with Type 2 Diabetes Mellitus.In the present study there was significant association between glycemic control and selected sociodemographic variable age($p<0.01$).

Hence the hypothesis H_3: there is significant association between glycemic control and selected socio demographic variables among male diabetic patients is accepted for variables such as age.

This finding is in accordance with the finding of a cross-sectional study conducted by Soman S K, Areekal B and Sukumaran S T, Puliyakkadi S and Ravi R K (2019) in the outpatient department of NCD clinic in a Primary health centre of Kerala among 250 diabetic patients to assess the prevalence and determinants of poor glycaemic control. Study findings revealed that 64.4 % of the participants had poor glycaemic control. Poor adherence to medication, fewer visits to doctor, lack of dietary modification, frequent junk food consumption, higher body mass index (≥25 kg/m2) and lack of exercise were found to be significantly associated with poor glycaemic control[40].

The eighth objective of the study was to find the association between glycemic control and selected demographic variables among female patients with Type 2 Diabetes Mellitus.In the present study there was no significant association between glycemic control and selected sociodemographic variable among female diabetic patients.

There by hypothesis H_4: there is significant association between glycemic control and selected socio demographic variables among female diabetic patients is rejected.

The nineth objective of the study was to find the association between Health-Related Quality of life and selected demographic variables among male patients with Type 2 Diabetes Mellitus. In the present study there was significant association between Health-Related Quality of life and selected sociodemographic variables such as marital status($p<0.001$), hours of sleep($p<0.05$), age of onset of DM($p<0.05$), type of diabetic medication($p<0.01$) and diabetic complication($p<0.01$) among male diabetic patients.

Thereby the hypothesis H_5: there is significant association between Health-Related Quality of Life and selected socio demographic variables among male diabetic patients is accepted for variables such as marital status, hours of sleep, age of onset of DM, type of diabetic medications and diabetic complications.

The above findings were supported by a Community-Based Cross-Sectional Study among 425 diabetic patients in Rural Kerala, India conducted by Jose, Soji D, Mishra, Sapna and Mini G K (2022) to assess the health-related quality of life and its determinants among diabetic patients. Findings of the study concluded that more than one-third of the diabetes patients in rural Kerala had poor HRQoL. The study also identified age, socio-economic status, education, and occupation as the important predictors of HRQoL among diabetes patients[55].

The tenth objective of the study was to find the association between Health-Related Quality of life and selected demographic variables among female patients with Type 2 Diabetes Mellitus. In the present study there was significant association between Health-Related Quality of life and selected sociodemographic variables such as age($p<0.001$), education($p<0.001$), occupation($p<0.001$), monthly income($p<0.05$), hours of sleep ($p<0.001$), age of onset of DM ($p<0.001$) family history of DM($p<0.05$), type of diabetic medications($p<0.01$) and diabetic complication($p<0.001$).

Hence the hypothesis H_6: there is significant association between Health-Related Quality of Life and selected socio demographic variables among female diabetic patients is accepted for varibles such as age, education, occupation, monthly income, hours of sleep, age of onset of DM, family history of DM, type of diabetic medications and diabetic complications.

The study findings are agreed with the findings of a study conducted by Abdallah M A, Esmayel E M and Moussa M M (2018) among 100 diabetic patients to assess health related quality of life in patients with type 2 diabetes attending Zagazig University hospital and also to find associations between HRQOL scores and some variables playing role in scenario of DM. Study findings showed that Type 2 diabetes mellitus in both the physical health and mental health domains is associated with a lower quality of life. Advanced age, obesity and poor glycemic control were factors related to lower quality of life[49].

Summary

The present study was intended to assess the influence of gender on glycemic control and Health Related Quality of Life among patients with type 2 diabetes mellitus.

The investigator adopted adaptation model developed by Sister Callista Roy in the year 1964 for the study. An extensive review of literature was done by the investigator which helped her to develop the conceptual frame work and prepare the tool.

The study made use of descriptive comparative approach. Convenience sampling technique was used and the sample consisted 180 Diabetic patients (90 males and 90 females). A pilot study was conducted to find out the feasibility of the proposed study among 18 type 2 diabetic patients (9 males and 9 females). It was found that the tools were unambiguous and data obtained were amenable to statistical analysis.

The main study was conducted among 180 diabetic patients (90 males and 90 females) selected from FHC Chemmaruthy and CHC Kehavapuram.The glycemic level of diabetic patients were assessed using HbA1c, FBS and PPBS anh Health Related Quality of Life were assessed using Quality of Life Instrument for Indian diabetic patients. Data were analysed using Statistical Package for Social sciences (SPSS) version 20.

Conclusion

Diabetes mellitus is a group of common endocrine diseases characterised by sustained high blood sugar levels. There is no widely accepted cure for most cases of diabetes. Anti diabetic medications as well as life style modifications can be used to prevent or respond to type 2 diabetes. Inadequate glycemic control led to uncontrolled diabetes which leads to many complications of diabetes mellitus. This complications in turn can greatly reduce quality of life of patients, reduce the life expectancy as well as increase the health care cost of the disease. Evaluating glycemic control and determining the benefits of drug compliance is essential to reduce glycemic variability which will be essential to enhance the quality of life for persons living with diabetes mellitus in the immediate future.

According to the study findings the following conclusions were derived. Male diabetic patients had good glycemic control when compared to female diabetic patients and male diabetic patients had a good Health Related Quality of Life when compared to female diabetic patients. Male diabetic patients had good quality of life in all the domains like Role limitation due to physical health, Physical endurance, General health, Treatment satisfaction, Symptom botherness, financial worries, Emotional/mental health and Diet satisfaction.

Nursing implications

The present study has got implications in the field of nursing practice, nursing administration, nursing education and nursing research.

Nursing practice

1. Findings of the study will help the nursing staff to enhance the knowledge of diabetic patients for maintaining good glycemic control and there by improve the Health Related Quality of Life
1. Nurses can counsel to address the need for maintaining good glycemic control among female diabetic patients.
2. Nurses can use the pamphlet developed by the investigator to educate the diabetic patients in the CHCs, PHCs and Subcentres.
3. Visual aids on methods of improving glycemic control can be brought out.

Nursing administration

1. The nurse administrator can plan and conduct continuing nursing education programmes for health care workers to update their knowledge regarding Diabetes and its management.
2. The nurse administrator can conduct various awareness programmes regarding diabetes in the hospital as well as community settings.
3. Nurse administrator can provide greater emphasis on implementing lifestyle changes on a societal level to stop the tide of diabetic epidemic.
4. Gender sensitive and culturally tailored education programmes can be conducted.
5. The nurse administrator can make recommendations to setup policies regarding cost effective and socio culturally sensitive strategic interventions to promote self care behaviours among diabetic patients
6. The nurse administrator can utilise ASHA workers to educate and to give more focus on female diabetic patients, so as to eliminate the gender disparity in diabetic management.
7. The nurse administrator can notify higher authorities regarding gender difference in glycemic control and Health Related Quality of Life and can organize awareness programmes for female diabetic patients.

Nursing education

1. The pamphlet can be used by student nurses to educate diabetic patients and their families during their clinical posting, home visit etc.
2. The student nurses can prepare informational booklets or posters regarding diabetic management and can conduct incidental and planned teaching sessions in CHC, PHC and Subcentres.
3. Students can be motivated to conduct journal club presentation regularly to update their knowledge regarding the increased prevalence of diabetes globally.
4. Teachers can organize programmes to educate nurses and students regarding the disparities on the basis of gender in glycemic control and Health Related Quality of Life.
5. During home visit students can be encouraged to concentrate on primary prevention to control diabetic epidemic.
6. Research report can be kept in college library for reference.

Nursing Research

1. The study findings help the nurse researcher to develop insight into the importance of focusing more on female diabetic patients to help them to attain good glycemic control.
2. The research findings should be disseminated by publishing it in journals.
3. The findings of the study can be utilized by nursing researchers for future reference.
4. Nurse researchers can replicate this study with large samples and different settings.

Limitations

1. Most of the diabetic patients voluntarily check their fasting blood sugar on the day of review.So some of them were unwilling to do HbA1c and post prandial blood sugar.
2. Checking FBS and PPBS in a single day was difficult for study participants due to long waiting period. So, some of the participants were unwilling to participate in the study.

Recommendations

On the basis of the findings of the study, following recommendations are made:

1. The study can be replicated using large sample size and different settings.
2. The study can be replicated using different approaches.
3. HbA1c values can be assessed more than 1 time to assess the glycemic control.

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APPENDIX A

Sivagiri Sree Narayana Medical Mission

COLLEGE OF NURSING

(Affiliated to Kerala University of Health Sciences, Thrissur
Recognised by Govt. of Kerala, Kerala Nurses & Midwives Council and Indian Nursing Council)
Sreenivasapuram P.O., Varkala- 695 145, Thiruvananthapuram, Kerala
Phone: 0470-2602330 Fax: 0470- 2602330, 2602335
E-mail: nsgcollege.sivagiri@gmail.com, website:www.scn.ac.in

No. SCN/IEC/151/22.23 Date 28.11.22

INSTITUTIONAL ETHICS COMMITTEE

CHAIRMAN

Dr.ABHILASH RAMAN
Consultant Orthopedician
SSNMM HOSPITAL
VARKALA

SECRETARY

PROF.GRACEAMMA JOSEPH
PRINCIPAL
SSNMM COLLEGE OF NURSING
VARKALA

MEMBERS

Swami Visalananda
Secretary
SSNMM Hospital
Varkala.

Adv. A.Manoj
Legal Advisor
SNDST

Dr. Joshi K
Resident Medical Officer
SSNMM Hospital
Varkala.

Dr. Anil Prasad
Former Chief Consultant
in Psychiatry, Mental Health
Centre, Peroorkada.

Dr.Maya S
Social Scientist.
University of Kerala

Mr. Vipin Mohan
Statistician
Research Scholar
Karyavattom university

Prof. Kavitha V G
Vice Principal
SSNMM College of Nursing

IEC NO: SCN/151/22.'23

APPROVAL OF RESEARCH PROJECT

The Institutional Ethics Committee has evaluated the protocol of the project work/ Thesis entitled.

'Influence of gender on glycemic control and quality of life among the patients with type 2 Diabetes mellitus attending Non Communicable Disease (NCD) Clinics'.

Submitted by Rajani P S, I MSc Nursing, Community Health Nursing

The committee has provisionally approved the same/ rejected/ returned for further clarification.

CHAIRMAN — SECRETARY

CHAIRMAN
INSTITUTIONAL ETHICS COMMITTEE
S.S.N.M.M. COLLEGE OF NURSING
S.V. PURAM.P.O.,VARKALA-695145

PROF. Graceamma Joseph
PRINCIPAL
S.S.N.M.M. COLLEGE OF NURSING
VARKALA

Place: Varkala

Date : 28.11.2022

S.N.M.M. COLLEGE OF NURSING VARKALA 695 145

APPENDIX B

Sivagiri Sree Narayana Medical Mission
COLLEGE OF NURSING
(Affiliated to Kerala University of Health Sciences, Thrissur
Recognised by Govt. of Kerala, Kerala Nurses & Midwives Council and Indian Nursing Council)
Sreenivasapuram P.O., Varkala- 695 145, Thiruvananthapuram, Kerala
Phone: 0470-2602330 Fax: 0470- 2602330, 2602335
E-mail: nsgcollege.sivagiri@gmail.com, website:www.scn.ac.in

No. SCN/ Res/24/22.23. Date 24.02.23.

To

The District Medical Officer
Thiruvananthapuram.

Sir,

Sub: - permission to conduct the research project – II year M.Sc(Nsg) – request -reg

As part of the MSc Nursing curriculum requirement, Ms. Rajani P.S, II year MSc Nursing- Community Health Nursing Speciality - of this college (2021-23) has to conduct a research project titled "Influence of gender on glycemic control and Health Related Quality of life (HRQOL) among patients with type 2 Diabetes Mellitus attending Non communicable Disease (NCD) clinics of selected FHCs in Thiruvananthapuram". The pilot sstudy is planned from 06.03.2023 to 18.03.2023 at Chemmaruthy FHC and the main study from 03.04.2023 to 29.04.2023 at Manamboor, Chemmaruthy FHC & CHC, Kesavapuram.

I request your goodself to grant permission for the conduct of the pilot study & main study. Kindly do the needful.

Thanking you,

Yours faithfully,

Varkala
27.02.2023

Principal

PROF. Grace Joseph
PRINCIPAL
S.S.N.M.M. COLLEGE OF NURSING
VARKALA

APPENDIX C

PROCEEDINGS OF THE DISTRICT MEDICAL OFFICER OF HEALTH THIRUVANANTHAPURAM

Sub:- HSD – DMO(H) – Permission for conducting Research study – Sanctioned – orders issued.

Read:- (1)No.57/2023/FHC,Dated 04-02-2023
(2)No.AE/563/2023/CHCK,Dated 06-03-2023
(3)No.376/2023/CHCM,Dated 06-03-2023
(4)Request from Principal Sivagiri Sree Narayana Medical Mission College of Nursing,Varkkala,Thiruvananthapuram

ORDER NO.C4-5241/2023/DMOH DATED:15/03/2023

The Principal of Sivagiri Sree Narayana Medical Mission College of Nursing,Varkkala,Thiruvananthapuram recommended the request of Smt.Rajani.P.S Second Year MSC Nursing Student of their college for permission for conduct research work as a part of her study titled "Influence of Gender on glycemic control & health related quality of life (HRQOL) among patients with type2 diabetes Mellitus attending non communicable disese(NCD) at Govt. Hospitals.

The Medical officer in charge of Community Health Centre Chemmaruty,kesavapuram,Manamboor have issued NOC for the same.The incumbent Submitted Institutional ethics Committee report ,Questionnaire Research Synopsis for the study.

Hence sanction is hereby accorded to Smt.Rajani.P.S Second Year MSC Nursing Student of Sivagiri Sree Narayana Medical Mission College of Nursing,Varkkala,Thiruvananthapuram , to conduct research study.

The Study should be conducted without causing any interference to the day to day working of the Institutions and should comply with the instructions of the head of the institution.

The Research study has been approved by Ethics Committee of this institution.

Sd/-
Dr. BINDU MOHAN
DISTRICT MEDICAL OFFICER OF HEALTH

To,

The concerned Medical Officer,
Community Health Centre Chemmaruty,kesavapuram,Manamboor

Copy to:

1) The Principal Sivagiri Sree Narayana Medical Mission College of Nursing,Varkkala,Thiruvananthapuram.

//forwarded//

Superintendent

APPENDIX D

AE- 563/2023/CHCK

Community Health Centre,
Kesavapuram. Dtd 15/05/2023

Completion Certificate

Certified that Smt.Rajani.P.S, Second Year MSc Nursing student, Sree Narayana Medical Mission College of Nursing, Varkala, Thiruvananthapuram has successfully completed data collection as part of her research "Influence of Gender on glycemic control & health related quality of life among patients with type 2 Diabetes Mellitus" on 08-04-2023,15-04-2023,22-04-2023 and 29-04-2023 in this institution.

Dr. Shaji K V
Medical Officer

FAMILY HEALTH CENTRE, CHEMMARUTHY

Panayara.P.O, Varkala, Thiruvanthapuram, Pin: 695145
Phone: 04702612862 Email:- cmyphv@gmail.com

No .69/2023/FHC-C **Dated:-** 15/05/2023

TO WHOMSOEVER IT MAY CONCERN

Certified that **Ms. RAJANI.P.S**, Msc Nursing 2nd year student from S.S.N.M.M college of nursing, Varkala has successfully completed her Research from 03/04/2023 to 08/05/2023 on the topic **"Influence of Gender on glycaemic control & Health Related Quality Of Life (HRQOL) among patients with type2 diabetes Mellitus attending non communicable disease (NCD) Clinic"** at Family Health Centre Chemmaruthy.

During this period of her research her performance was good. We wish her all success in her future endeavours.

Dr.Soumya.U.S
Assistant Surgeon
Medical Officer In-Charge
FHC Chemmaruthy

Place: Panayara
Date:15/05/2023

APPENDIX E

INFORMED CONSENT

Sample no: ---

In signing this document, I give my consent to cooperate with the study "Influence of gender on glycemic control and Health Related Quality of Life among patients with type 2diabetes mellitus" conducted by Rajani P S, II nd Year MSc Nursing student of Sivagiri Sree Narayana Medical Mission College of Nursing, Varkala. I have been informed that I can decide to terminate from the study at any point of time. I understood that the information gathered will be kept confidential and will be used only for study purpose and would not affect me at any cost in being participant of the study.

Signature of participant

Signature of investigator

Place:

Date:

APPENDIX F

QUESTIONNAIRE TO ASSESS THE INFLUENCE OF GENDER ON GLYCEMIC CONTROL AND HEALTH RELATED QUALITY OF LIFE (HRQOL) AMONG PATIENTS WITH TYPE 2 DIABETES MELLITUS ATTENDING NON-COMMUNICABLE DISEASE (NCD) CLINICS

INSTRUCTIONS

1. Read questions carefully.
2. Put a tick (✓) mark against the most appropriate answer.
3. Answer all questions.

Section A

Sociodemographic variable

Sample no: …….

1. Age in years ……
2. Gender

a) Male ☐

b) Female ☐

3. Religion

a) Hindu ☐

b) Christian ☐

c) Muslim ☐

d) Others ☐

4. Education

a) Primary Education ☐

b) SSLC ☐

c) Higher Secondary School ☐

d) Graduate /diploma ☐

e) Post graduate ☐

5. Occupation

a) Unemployed ☐

b) Private sector ☐

c) Govt. Sector ☐

d) Retired employee ☐

e) Housewives ☐

f) Coolie ☐

6. Monthly income …….……

7. Marital status

a) Unmarried ☐

b) Married ☐

c) Divorced /Separated ☐

d) Widow/ Widower ☐

8. Place of residence ☐

a) Urban area

b) Rural area

9. Type of family

a) Nuclear family ☐

b) Joint family ☐

c) Extended family ☐

10. Dietary pattern ☐

a) Vegetarian ☐

b) Non-vegetarian ☐

c) Ovo- vegetarian ☐

11. Number of meals per day……

12. Time at which you go to bed

13. Hours of sleep

Section B

Clinical profile of participants

1. Age of onset of diabetes
2. Family history of diabetes …….
3. Diabetic medications, specify
4. Whether on regular treatment

a) Yes ☐

b) No ☐

If no specify the reason

……

5. Anthropometric measurement

a) Height ☐

b) Weight ☐

c) Body Mass Index ☐

6. Fasting blood sugar

7. Post prandial blood sugar
8. HbAlc
9. Complications if any, specify

……

……

……

……

Section C

Quality of life instruments for Indian Diabetic Patients (QOLID)

1. Role Limitation Due to Physical Health

a) How often do you miss your work because of your diabetes?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

b) A person with diabetes has the requirement of adhering to a schedule for eating and taking regular medication. How often does this affect your work?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

c) How often does diabetes affect your efficiency at work?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

d) How often do you find diabetes limiting your social life?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

e) To what extent do you avoid traveling (business tour, holiday, general outings) because of your diabetes?

A lot	Highly	Little	Very little	Not at all
1	2	3	4	5

f) Compared to others of your age are your social activities (visiting friends/partying) limited because of your diabetes?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

2. Physical Endurance

a) 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

b) How often in last three months has your overall health problems limited the kind of moderate activities you can do like moving a table, carrying groceries or utensils.

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

c) How often in last three months has your overall health problems limited you from walking uphill or climbing 1-2 floors.

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

d) 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

e) 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

f) 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

3. General Health

a) In general would you say your health

Poor	Fair	Good	Very good	Excellent
1	2	3	4	5

b) 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

c) 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

4. Treatment Satisfaction

a) 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

b) 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

c) 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

d) A person with diabetes needs to exercise for 35-45 min, 4 times a week. Keeping this in mind how satisfied are you with the time you spend exercising?

Very dissatisfied	Moderately dissatisfied	Neither satisfied nor dissatisfied	Moderately satisfied	Very satisfied
1	2	3	4	5

5. Symptom Botherness

a) How many times in the past three months have you had thirst/dry mouth?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

b) How many times in the past three months have you felt excessive hunger?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

c) 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

6. Financial Worries

a) 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

b) 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

c) 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

d) 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

7. Emotional/Mental Health

a) How satisfied are you with yourself?

Very dissatisfied	Moderately dissatisfied	Neither satisfied nor dissatisfied	Moderately satisfied	Very satisfied
1	2	3	4	5

b) How satisfied are you with your personal relationships (family, friends, relatives and known tos)

Very dissatisfied	Moderately dissatisfied	Neither satisfied nor dissatisfied	Moderately satisfied	Very satisfied
1	2	3	5	5

c) 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	5	5

d)How often are you discouraged by your health problems?

Always	Frequently	Often	Sometimes	Never
1	2	3	5	5

e)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 able to lead your life in the same way?

Not at all	A little	Moderate	Very much	An extreme amount
1	2	3	4	5

8. Diet Satisfaction

a) 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

b) As you have diabetes, how much choice do you feel you have in 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 snacks and desserts would you be able to make enough choice?

No choice	Very little	little	enough	A lot
1	2	3	4	5

c) How often do you eat the food items that you shouldn't, in order to hide the fact that you are having diabetes?

Always	Frequently	Often	Sometimes	Never
1	2	3	4	5

APPENDIX G

k½X]{Xw

km¼nÄ \¼À þþþ

Cu k½X]{X¯nÂ H¸v hbv¡p¶Xv hgn inhKncn {io\mcmbW saUn¡Â anj³ tImtfPv Hm^v \gvknwKv c-mw hÀj _ncpZm\´c _ncpZ \gvknwKv hnZymÀ°n\n cP\n.]n.Fkv.Xsâ]mTy]²XnbpsS `mKambn \S¯p¶ "ssS¸v 2 {]taltcmKnIfpsS ¥qt¡mkv \nb{´W¯nepw Btcm-KyPohnX \nehmc¯nepw enwKt`Z¯n\pÅ kzm[o\w" F¶]T\¯nÂ]s¦Sp¡p¶Xn\v Rm³ X¿mdmWv. CXn\mbn tiJcn¡p¶ hnhc§Ä clkyambn kq£n¡p¶XmsW¶pw]T\ dnt¸mÀ«nÂ t]tcm hnhc§tfm D-mIpIbnsÃ¶pw Ft¸mÄ thWsa¦nepw F\n¡v Cu]T\¯nÂ \n¶pw]n³amdm\pÅ kzmX{´yw Ds-¶pw Rm³ a\Ênem¡p¶p. BbXn\mÂ kza\Êmse Cu]T\¯nÂ]s¦Sp¡m³ k½Xn¡p¶p.

F¶v

]s¦Sp¡p¶ hyànbpsS H¸v :

KthjIbpsS H¸v :

Øew :

XobXn :

APPENDIX H

kmaqlnI BtcmKytI{µ¯nse kmw{IantIXc tcmK\nb{´W NnInÕmebw kµÀin¡p¶ ssS¸vþ2 {]taltcmKnIfpsS ¥qt¡mkv \nb{´W¯nepw Btcm-KyPohnX\nehmc¯nepw enwKt`Z¯n\pÅ kzm[o\w Is-¯p¶Xn\pÅ tNmZ-ym-hen.

\nÀt±i§Ä

- tNmZy§Ä {i²m]qÀÆw hmbn¡pI.
- Gähpw A\ptbmPyamb D¯c¯n\p t\sc icn (✓) ASbmfw tcJs¸Sp¯pI.
- FÃm tNmZy§Ä¡pw D¯cw \ÂIpI.

`mKw þ F

kmaqlnI ØnXn hnhc§Ä

km¼nÄ \¼À þþþ

1. hbÊv : þþþ
2. enwKw :
   a)]pcpj³ ☐
   b) kv{Xo ☐
3. aXw
   a) lnµp ☐
   b) {lnkvXy³ ☐
   c) apÉow ☐
   d) aäpÅhÀ ☐

4. hnZym`ymkw
   a) {]mYanIhnZym`ymkw ☐
   b) Fkv.-F-kv.-FÂ.-kn. ☐
   c) lbÀ sk¡âdn ☐
   d) _ncpZw/ Unt¹ma ☐
   e) _ncpZm\´c _ncpZw

5. tPmen
   a) sXmgnÂ clnX³ / sXmgnÂ clnX ☐
   b) kzImcy Poh\¡mc³/ Poh\¡mcn ☐
   c) Kh¬saâv DtZymKw ☐
   d) DtZymK¯nÂ \n¶pw hncan¨Xv ☐
   e) Iqen¸Wn ☐
   f) ho«½

6. IpSpw_¯nsâ amkhcpam\w

7. sshhmlnI AhØ

   a) hnhmlnX³ / hnhmlnX ☐

   b) Ahn-hm-ln-X³ / Ahn-hm-lnX ☐

   c) \nba]camtbm AÃmsXtbm thÀ]ncnªhÀ ☐

   d) hn[h/ hn`mcy³

8. XmakØew

   a) \Kc{]tZiw ☐

   b) {Kma{]tZiw ☐

9. IpSpw_ LS\

   a) AWpIpSpw_w ☐

   b) Iq«pIpSpw_w ☐

   c) hnIknX IpSpw_w ☐

10. BlmccoXn

    a) kky`pjv ☐

    b) amwk`pjv ☐

    c) Hmthm shPn-tä-dn-b³

11. Hcp Znhkw F{X XhW `£Ww Ignjp¶p.

12. Dd-§m³ t]mIp¶ kabw

13. F{X aWn-jqÀ Dd-§p-¶p.

`mKw þ _n

tcmKnIfpsS NnInÕmkw_ÔnX hnhc§Ä

1. {]talw Bcw`n¨ hbÊv :
2. {]tal IpSpw_]mc¼cyw
3. {]tal acp¶pIÄ, hniZoIcn¡pI.
4. IrXyamb NnInÕ¡v hnt[b³/ hnt[b BImdpt-m?

   a) D-v ☐

   b) CÃ ☐

   CsÃ¦nÂ AXn\pÅ ImcW§Ä hyàam¡pI.

5. icocLS\ kw_Ôn¨pÅ hnhc§Ä

   a) Dbcw ☐

   b) `mcw ☐

   c) _n.Fw.sF ☐

6. Blmc¯n\v ap³]pÅ cà¯nse]©kmcbpsS Afhv
7. Blmc¯n\v tijapÅ cà¯nse]©kmcbpsS Afhv (c-v aWn¡qdpIÄ¡v tijw)
8. F¨v._n.Fh¬.kn.
9. k¦oÀWXIÄ \ne-hn-ep-t-m?

   Ds--¦nÂ hy-à-am-¡p-I.

`mKw kn

C´y³ {]taltcmKnIfpsS PohnX\nehmcw \nÀWbn¡p¶Xn\pÅ AfhptImÂ (QOLID)

1. Btcm-Ky]cn-anXnaqew ssZ\w-Zn\ Pohn-X-¯nse]cnanXnIÄ.

a) {]talwaqew F{Xam{Xw Xm¦fpsS sXmgnÂ XSÊs¸Smdp-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

b) Hcp {]taltcmKn¡v Nn«bmb BlmccoXnbpw]Xnhmb acp¶pIfpw Bhiyap-v. CXv F{Xam{Xw Xm¦fpsS sXmgnens\ _m[n¨n«p-v.

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

c) {]talw Xm¦fpsS sXmgnÂImcy£aXsb F{Xam{Xw _m[n¨n«p-v.

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

d) {]talw Xm¦fpsS kmaqly PohnX¯ns\ F{Xam{Xw]cnanXs¸Sp¯nbn«p-v.

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

e) {]talw ImcWw Xm¦fpsS bm{XIÄ F{Xam{Xw Hgnhm¡nbn-«p--v. (I¨hS]camb bm{X, Ah[n¡mebm{X, km[mcW bm{X)

Hcp]mSv	hfsc IqSpXÂ	AÂ¸w	hfsc¡pdhv	XoscbnÃ
1	2	3	4	5

f) ka{]mb¡mcpambn XmcXays¸Sp¯pt¼mÄ {]talw ImcWw Xm¦fpsS kmaqlnI {]hÀ¯\§Ä F{Xam{Xw]cn-an-X-s¸-«n-«p--v. (kplr¯p¡sf kµÀin¡pI, kÂ¡mc hncp¶pIÄ)

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

2. imcocnI £aX

a) BtcmKy{]iv\§Ä ImcWw Ignª aq¶pamk¯n\pÅnÂ Xm¦fpsS DuÀÖkzeamb {]hÀ¯\§fmb HmSpI, NmSpI, `mcw DÅ hkvXp¡Ä DbÀ¯pI XpS§nb {]hÀ¯\§Ä F{Xam{Xw]cnanXs¸«n«p-v.

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

b) BtcmKy{]iv\§Ä ImcWw Ignª aq¶pamk¯n\pÅnÂ anXamb {]hÀ¯\§fmb tai XÅpI, km[\§Ä (]m{X§Ä) FSp¡pI XpS§nb {]hÀ¯\§Ä Ft¸msgmsi]cnanXs¸«n«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

c) BtcmKy{]iv\§Ä ImcWw Ignª aq¶pamk¯n\pÅnÂ Ibäw IbdpI, 1þ2 \neIÄ IbdpI XpS§nb {]hÀ¯\§Ä F{Xam{Xw]cnanXs¸«n«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

d) BtcmKy {]iv\§Ä ImcWw Ignª aq¶p amk¯n\pÅnÂ F{XXhW Xm¦Ä¡v 1þ2 Io.ao. XpSÀ¨bmbn \Si³]cnanXn D-mbn«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

e) BtcmKy {]iv\§Ä ImcWw Ignª aq¶p amk¯n\p ÅnÂ F{Xam{Xw Xm¦Ä¡v Ip\nbpI, Xncnbpl, Ip¯nbncn¡pI XpS§nb {]hÀ¯\§Ä sN¿m³]cnanXn D-mbn«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

f) BtcmKy {]iv\§Ä ImcWw Ignª aq¶p amk¯n\pÅnÂ Ft¸msgmsi Xm¦Äiv ssZ\w-Zn\ {]hÀ¯\§Ä sN¿p¶-Xn\v]cnanXn D-mbn«p-v?

FÃmbvt¸mgpw	IqsSiqsS	]et¸mgpw	Nnet¸mÄ	Hcniepw
1	2	3	4	5

3. s]mXp BtcmKyw

a) s]mXphmbn Xm¦fpsS BtcmKy\ne]dbpI.

tamiw	sa¨s¸«Xv	\ÃXv	hfsc \ÃXv	anI¨Xv
1	2	3	4	5

b) h-n HmSnipI, tPmen sN¿pI, hmbnipI XpS§nb Imcy§fnÂ Xm¦Äiv F{Xam{Xw {i²sNep¯m³ km[nip¶p-v.

HcnjepanÃ	Ipd¨v	anXambn	hfsc A[nIw	At§bäw
1	2	3	4	5

c) Ignª aq¶pamk¯n\pÅnÂ F{XXhW Xm¦Äiv AanXamb £oWw A\p`hs¸«n«p-v?

FÃmbvt¸mgpw	IqsSiqsS	]et¸mgpw	Nnet¸mÄ	Hcniepw
1	2	3	4	5

4. NnInÕm kwXr]vXn

a) \nehnepÅ {]tal tcmKNnInÕbnÂ Xm¦Ä F{Xam{Xw kwXr]vX\mWv?

hfsc AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc-A-[nIw kwXr]vX\mWv
1	2	3	4	5

b) {]tal tcmK \nb{´W¯n\mbn Nne-h-gn-ip¶ ka-b-¯nÂ Xm¦Ä F{Xam{Xw kwXr]vX\mWv?

hfsc AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc-A-[nIw kwXr]vX\mWv

1	2	3	4	5

c)]Xnhmb]cntim[\IÄ¡mbn (aq¶pamk¯nÂ Hcn¡Â) Nnehgn¡p¶ kabs¯¡p-dn¨v Xm¦Ä F{Xam{Xw kwXr]vX\mWv?

hfsc AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc-A-[nIw kwXr]vX\mWv
1	2	3	4	5

d) {]taltcmKnbmb HcmÄ BgvNbnÂ 4 XhW 35þ45 an\n«phsc hymbmaw sNt¿-Xmbp-v. AX\pkcn¨v Xm¦Ä hymbma¯n\mbn Nnehgn¡p¶ kab¯nÂ F{Xt¯mfw kwXr]vX\mWv?

hfsc AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc-A-[nIw kwXr]vX\mWv
1	2	3	4	5

5. e£W§Ä aqeap-mIp¶ _p²nap«pIÄ.

a) Ignª aq¶pamk¯n\pÅnÂ Xm¦Ä¡v F{XXhW AanX Zmlw/hc-hmb XpS§nbh A\p`hs¸«n«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

b) Ignª aq¶pamk¯n\pÅnÂ F{XXhW Xm¦Ä¡v AanXamb hni¸v A\p`hs¸«n«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

c) Ignª aq¶pamk¯n\pÅnÂ F{XXhW Xm¦Ä¡v {]taltcmK e£Wamb IqsS-¡qsSbpÅ aq{Xsamgn¡Â A\p`hs¸«n«p-v?

FÃmbvt¸mgpw	IqsS¡qsS	]et¸mgpw	Nnet¸mÄ	Hcn¡epw
1	2	3	4	5

6. km¼¯nI Bi¦IÄ

a) {]taltcmK NnInÕbv¡mbpÅ sNehns\ ]änbpÅ Xm¦fpsS [mcW.

hfsc sNethdnbXv	Ipd¨v sNethdnbXv	\ymbamb sNehv	H«pw sNethdn-b-X-Ã
1	2	3	4

b) {]taltcmK NnInÕaqew Xm¦fpsS aäp-sN-e-hp-IÄ F{X]cn-[n-hsc amän-h-bvt¡-n h¶n-«p--v ?

Hcp]mSv	hfscIqSpXÂ	AÂ¸w	hfsc¡pdhv	XoscbnÃ
1	2	3	4	5

c) {]taltcmK NnInÕbv¡mbn hcp¶ sNehpIÄ F{Xt¯mfw Xm¦fpsS IpSpw_ _UvPäns\ _m[n¨n«p-v?

Hcp]mSv	hfscIqSpXÂ	AÂ¸w	hfsc¡pdhv	XoscbnÃ
1	2	3	4	5

d) {]talw F{Xt¯mfw Xm¦fpsS aäpÅ sNehpIsf]cnanXs¸Sp¯nbn«p-v? (kn\na ImWpI,]pd¯pt]mhpI,]mÀ«nIÄ XpS§nhb)

Hcp]mSv	hfscIqSpXÂ	AÂ¸w	hfsc¡pdhv	XoscbnÃ
1	2	3	4	5

7. am\knImtcmKyw

a) Xm¦Ä F{Xt¯mfw kzbw kwXr]vX\mWv?

hfsc AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc-A-[nIw kwXr]vX\mWv
1	2	3	4	5

b) hyàn]camb _Ô§fnÂ Xm¦Ä F{Xt¯mfw kwXr]vX\mWv. (IpSpw_w, Iq«pImÀ, _ÔpiÄ)

hf-sc- AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc- A-[nIw kwXr]vX\mWv
1	2	3	4	5

c) IpSpw_¯nÂ \n¶pw kplr¯pifnÂ \n¶pw e`nip¶ sshImcnI]n´pWbnÂ Xm¦Ä F{Xt¯mfw kwXr]vX \mWv?

hf-sc- AkwXr]vXn	anX-amb AkwXr]vXn	kwXr-]vXntbm AkwXr]vXntbm CÃ	anX-amb kwXr]vXn	hf-sc- A-[nIw kwXr]vX\mWv
1	2	3	4	5

d) Xm¦fpsS BtcmKy{]iv\§Ä Xm¦sf F{Xt¯mfw \ncpÕmls¸Sp¯mdp-v?

FÃmbvt¸mgpw	IqsSiqsS	]et¸mgpw	Nnet¸mÄ	Hcnjepanà
1	2	3	4	5

e) FÃm BfpIÄjpw X§fpsS PohnX¯nse Nne ISaIÄ \ndthäphm\pw e£yt_m[t¯msS PohnXw \bnjphm\pw B{Klw D-v. Xm¦Äjv Xm¦fpsS PohnXw taÂ¸dª coXnbnÂ \bnjphm³ F{Xt¯mfw km[njp¶p?

Hcnjepanà	Ipd¨v	anXambn	hfsc A[nIw	At§bäw
1	2	3	4	5

8. Blmc kwXr]vXn

a)]pd¯p\n¶pw `£Ww Ignipt¼mÄ `£Ww XncsªSpip¶XnÂ \n¶pw {]taltcmKwaqew Xm¦Äiv F{Xam{Xw]cn-an[n D-m-Im-dp-v ?

FÃmbvt¸mgpw	IqsSiqsS	]et¸mgpw	Nnet¸mÄ	Hcnipan Ã
1	2	3	4	5

b) Xm¦Äiv {]taltcmKapÅXn\mÂ, ho«nÂ \n¶pw AIse Bbncnipt¼mÄ `£Ww/ eLp`£Ww XpS§nbh Xm¦-fpsS CjvSm-\p-k-cWw sXc-sª-Sp-im³ km[n-im-dpt-m?

(DZm: hfscb[nIw hdp¯ eLp`£W§fpw a[pc]elmc§fpw DÅ Hcp _ps^ ]mÀ«nbnÂ Xm¦Ä ]s¦SpipIbmsW¦nÂ Xm¦Äiv CjvSm-\p-k-cWw `£Ww XncsªSpim³ km[nimdpt-m?

aäphgnIÄ CÃ	hfscipd¨v	Ipd¨v	Bhiy¯n\v	hfscb[nIw
1	2	3	4	5

c) {]taltcmKmhØ ad¨p]nSnim³ th-n F{Xt¯mfw Xm¦Ä A\p-h-Z-\o-b-a-Ãm¯ `£W§Ä Ignimdp-v?

FÃmbvt¸mgpw	IqsSiqsS	]et¸mgpw	Nnet¸mÄ	Hcnipan Ã
1	2	3	4	5

APPENDIX-I

LIST OF VALIDATORS

1. Dr. S K Nishad, MBBS, MD

   Consultant in Internal Medicine and Diabetology

   SSNMM Hospital, Varkala

2. Dr. Soumya U S, MBBS

   Assistant Surgeon,

   FHC Chemmaruthy, Thiruvananthapuram.

3. Dr.Kiruba J C

   Principal

M.G.M Muthoot College of Nursing

Kolencherry

4. Dr.Mini G

   Professor

   College of Nursing

   Ananthapuri Hospital and Research Institute

   Thiruvananthapuram.

5. Dr.Lija R Nath

   Professor

   Sree Gokulam Nursing College

   Venjaramoodu

6. Mrs.Premini S

   Associate professor

   College of Nursing

   Ananthapuri Hospital and Research Institute

   Thiruvananthapuram.

7. Mrs.Jayaprabha P

   Rtd. Head Mistress

   Govt LPS.Kizhakkanela