# "EFFECTIVENESS OF SELF-MANAGEMENT TRAINING ON TYPE 2 DIABETES MELLITUS"- A COMMUNITY BASED STUDY

**A Thesis Submitted To**

## SUMANDEEP VIDYAPEETH

(Declared as Deemed to Be University U/S 3of UGC act 1956)

(Accredited by NAAC 'A' Grade with 3.53 CGPA scale)

In partial fulfillment of the requirement for the award of

**DOCTOR OF PHILOSOPHY**

**IN**

**NURSING**

Under the Guidance of

**Dr. J. D. LAKHANI**
Professor in Medicine & Academic director
SBKSMI & RC, SV

Submitted by:

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To

**Sumandeep Vidyapeeth, Vadodara**

This work has been carried out under my supervision and guidance.

The matter compiled in this thesis has not been submitted earlier

for the award of any other degree or fellowship and

free from any kind of plagiarism.

Name & Signature of Guide

**Dr. J. D. LAKHANI**

Professor in Medicine &
Academic Director, SBKSMI & RC, SV

Date:

Place: Vadodara.

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Principal
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Date:
Place: Vadodara.

## *ACKNOWLEDGEMENT*

*The completion of this Thesis gives me an immense joy and contentment after many years of demanding efforts, it also provides an opportunity to express my sincere gratitude to all those who had helped me in its successful completion.*

*I owe my gratitude to all those people who have made this thesis possible and because of whom experience during my PhD has been one that I will cherish forever.*

*I am thankful to the omnipotent* ***"LORD GANESH"*** *for his blessings throughout the uphill task of the present study. His unfailing presence helped me throughout the ups and downs of the endeavor.*

*At the very outset, I wish to acknowledge and thanks to* ***Sumandeep Vidyapeeth deemed University*** *and* ***Dr. Mansukh Shah Sir****, President of Sumandeep Vidyapeeth, &* ***Dr. Dixit M Shah Sir,*** *Executive Trustee, Sumandeep Vidyapeeth for providing me opportunity to undergo PhD at esteemed Sumandeep Vidyapeeth Deemed University.*

*I deem it a great privilege and honor to express my deepest sense of gratitude to esteemed teacher and guide* ***Dr. J. D. Lakhani****, Professor in Medicine & Academic director, SBKS MIRC, Sumandeep Vidyapeeth, for his constant support, valuable suggestions, encouragement and expert guidance. I learnt a lot from him, which I am sure, it will be useful throughout my academic career.*

*I express my respectful gratitude to Veteran, Air Commodore* ***Dr. G.D. Mehta****, Chancellor, Sumandeep Vidyapeeth &* ***Col. Dr. V. P. Singh****, Officiating Vice Chancellor, Sumandeep Vidyapeeth for their blessings in completion of the Study.*

*I wish to express my special sense of gratitude to **Dr. Manoj. M. Sattigerri**, Registrar, Sumandeep Vidyapeeth University, Vadodara who has offered me an opportunity to pursue higher studies.*

*It is my privilege to convey my sincere gratitude and thanks to **Dr. Poonacha**, Controller of Examination Sumandeep Vidyapeeth for his timely help and cooperation since the Registration to completion of the study.*

*I wish to express my sincere thanks and gratitude to **Dr. A. K. Seth,** Research Director, **Dr. Niraj Pandit**, Deputy Research Director, **Dr. Manish Parmar**, PhD coordinator, Sumandeep Vidyapeeth, Vadodara for the official approvals & constant monitoring to conduct the study.*

*I express my deep sense of gratitude to my colleagues **Mr. Swamy PGN**, Asst. Professor, **Mr. Suresh V**, Associate Professor, **Mr. Nirmal Raj,** Asst professor and **Mr. Rajesh P**, Asst Professor for their constant, valuable contribution in bringing out this theses.*

*My special Thanks to **Mrs. Janki B Patel & Mr. Kevin Christian,** Assistant Professors, Sumandeep Nursing college never can I forget who have been lead the team of trainers for Data collection throughout Waghodia taluka for long period of time and who were always ready for every task related to this research study.*

*I extend my sincere thanks to **Mr. Swamy PGN,** Asst professor in Nursing SNC**,** **Dr. Hemant Tiwari**, Professor in Statistics, Ahmedabad, **Dr. Medha Wadhwa,** Assistant*

*Professor, Department of Management, Sumandeep Vidyapeeth, for their guidance & active involvement in methodology, statistical analysis and presentation of data.*

*My sincere thanks to* ***Dr. Chaitri Shah,*** *Intensivist, Dhiraj General Hospital****,*** ***Dr. Hetal Pandya,*** *HOD Medicine, SBKSMI & RC****,*** ***Dr. Balaraman****, Professor, Department of Pharmacy, Sumandeep Vidyapeeth,* ***Dr. Sivabalan,*** *Professor & Principal &* ***Mrs Vimala Sivabalan,*** *Associate professor, Pravara Institute of Nursing, Nasik, Maharashtra for validating tool and the module.*

*I recognize the valuable support of* ***Mr. Ramanlal Patidar****, Ex-Assistant Professor, Sumandeep Nursing College.*

*I am indebted to all the* ***diabetic patients of Waghodia*** *taluka for their valuable support as a sample of the study without which the study wouldn't have been taken place.*

*I express my sincere thanks to* ***Mr.Raulji Jaydeepsinh,*** *Head Clerk, Sumandeep Nursing College for formatting, printing and binding of my dissertation copies. I also express gratitude to* ***Ms. Yashwanti Patak, Mrs. Nidhi Sagar, Mr. Bhogilal Rohit and Mr. Sandip Vasava,*** *Non-teaching staff of Sumandeep Nursing College for their timely support.*

*My special to thanks to the* ***PG & UG Nursing students*** *who have taken part in data collection during both diabetic demographic survey and intervention.*

*I am deeply indebted to my father* ***Mr. Ningaraju H. S.****, my mother* ***Mrs. Kamala****,* ***Mr. Dharmendra HN*** *my brother,* ***Mrs. Yogeshwari*** *&* ***Mrs. Roopa*** *my sisters, my beloved wife* ***Mrs. Mythri K S****, my daughter* ***Baby Nishika*** *and my son* ***Master Dhyan*** *for*

*their support, prayer and constant encouragement throughout the study. Without them I could not have completed this study.*

*My sincere thanks to the pre defense examiners* ***Dr. G V Shah****, Dean SBKSMI & RC,* ***Dr. Sivabalan****, Professor, Pravara Institute of Nursing, Nasik, Maharashtra,* ***Dr. JD Lakhani****, Professor in Medicine & Academic director, SBKS MIRC, Sumandeep Vidyapeeth,* ***Dr. Hetal Pandya****, HOD Medicine, SBKSMI & RC for their valuable suggestions in shaping this thesis in a better form.*

*I thank all those names who are not mentioned but have directly or indirectly helped me successfully to complete this study.*

***Place****:-Vadodara* ***Prof. Ravindra H N***

# PREFACE

Diabetes Mellitus is one of the major serious health problems throughout the world. Its incidence is much higher at present than it had been in the past. Although the disease is on the rise in both, developed and developing countries, it is far greater a problem in the latter, where in extreme cases affect 30-40% of adults as against 2-4% in the developed countries.In India, the level of awareness about diabetes and its consequences remains pathetically low. For many people, diabetes means it is just an increase in blood sugar level, which has to be controlled by a sugar free diet and some medications. Not many are aware of the serious implications of the disease.

This thesis is the culmination of ideas of investigator who has practiced on diabetic patients and taught Medical Surgical Nursing and Nursing Research.

This thesis is organized in three sections in logical sequence including all the Certificates, glossary, Chapters and annexure. Each chapter begins with introduction and ends with summary. Chapter – I covers general concept about diabetes mellitus, background of the study, need for the study, Statement of problem, Objectives, Operational definitions, Hypothesis and Conceptual framework.

Chapter – II depicts the review of literature related to various aspects of diabetes mellitus. The gathered reviews are classified into nine categories. The History, Definition and Classification of Diabetes Mellitus, Current Scenario on Diabetes Mellitus, Literature related to diabetes and its knowledge, Diabetes and diabetes diet, Diabetes and exercise, Diabetes and foot care practice, Literature related to self Monitoring blood glucose level, Literature related to Self administration of insulin and Literature related to diabetes &recognizing complication

Chapter – III deals with the methodology in which Research approach, Research design, setting of the study, Population, Sample and sample size, Sampling technique, Description of the tool, Pilot study, Data collection procedure and Plan for data analysis are incorporated.

Chapter –IV represents the research result which includes analysis and interpretation of data collected to determine the effectiveness of Self-Management Training on Type 2 Diabetes mellitus.

Chapter – V briefs about discussion and summary of the study.

Chapter VI covers the Bibliography & references.

Self management training provides information regarding individual's dynamic diabetic status. It helps in appropriate scheduling of food, activity, and medication. Lack of regular knowledge on DM predicts hospitalization for diabetes-related complications. Self management training is an essential tool for the people with diabetes, who are taking treatment or for those who experience fluctuations in their blood glucose levels or developing signs of complications.

Aim of this study is to enhance the Knowledge, Attitude and Practice regarding self management of type 2 diabetes among the community people through self management training programme.

Objectives of the study are to evaluate the effectiveness of self management training program on type 2 diabetes mellitus in terms of knowledge, Attitude and practice. among experimental and control group, to find out the association between pre test knowledge, attitude & practice score with their selected socio-demographic variables and to correlate the level of post test knowledge score with post test attitude and practice

score of experimental group regarding self management of type 2 diabetes mellitus.

Investigator has taken this herculean task of reaching out to all the villages of Waghodia taluka to provide the best of self-management training for the diabetic veterans to the rural population.

I humbly hope that this thesis will be immensely useful to nursing Fraternity, social workers, Community medicine, Community dentistry and other researchers who are engaging in research on diabetic patients.

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# CHAPTER I
# INTRODUCTION

The term “diabetes mellitus” is derived from the Greek word, “diabetes” meaning “to go through” or a siphon and the word “mellitus” is derived from the Latin word “mel” meaning honey describing the sweet odour of urine[1].The actual Evidence of diabetes was brought by an Egyptian scientist Papyrus Ebers in 1500 BC. The word “Diabetes” is a Greek word which Means “to run through” [2]. Charaka and sushrutha described ‘madhumeha’ in 5th century in which a person passes urine, which resembles honey and strongly attracts ants. They also found two forms of diabetes, one affecting the older and fatter people and the other than people who did not live long[3].

Diabetes is one of the major and serious health problems throughout the world. Incidence is much higher at present than it had been in the past. Although the disease is on the rise in bothdeveloped and developing countries, Diabetes is far greater a problem in the latter, the extreme cases affect 30-40% of adults as against 2-4% in the developed countries[4].

Diabetes Mellitus is one of the multi-system diseaseswhich is related to abnormal insulin secretion, impaired insulin utilisation or both. Recent statistics depicts, in the United States 17 million people or 62% of the population is estimated to occur Diabetes Mellitus. About one-third of the patients with Diabetes Mellitus are not diagnosed and those individuals are unaware of their disease that they have. Diabetes Mellitus is the fifth leading cause of deaths in the United states with 2,10,000 deaths per annam. About 20% of people above 65 years age have diabetes. Diabetes Mellitus is a leading cause of Coronary Artery disease, stroke and blindness[5].

Diabetes is an increasing public health problem especially in India. It is predicted that by the year 2025, the maximum prevalence of diabetes would be in India and every 4$^{th}$ diabetic in the world will be an Indian. In a period of 5 years, the prevalence has increased from 8.2% to 11.6% in urban India. The study also showed

that the prevalence of Diabetes in urbanizing rural population was found to be midway between rural and urban populations[6].

"According to WHO, Diabetes Mellitus is an iceberg disease and its prevalence in adults is around 4% worldwide, i.e., over 143 million persons are now affected. It is projected that the disease prevalence will be 5.4% by the year 2025, with global diabetic population reaching 300 million out of which 77% of the global burden of disease is projected to occur in the developing countries[7]".

**Table No 1:** Estimation of clients with Diabetes between 2000 - 2030

| Country | People with diabetes (In Million) 2000 | People with diabetes (In Million) 2030 |
|---|---|---|
| India | 31.7 | 79.4 |
| China | 20.8 | 42.3 |
| US | 17.7 | 30.3 |
| Indonesia | 8.4 | 21.3 |
| Japan | 6.8 | 8.9 |
| Pakistan | 5.2 | 13.9 |
| Russia | 4.6 | 11.1 |
| Brazil | 4.6 | 8.9 |
| Italy | 4.3 | 7.8 |
| Bangladesh | 3.2 | 6.7 |

According to World Health Organization Report, the "top three" countries are the same as those identified for 1995, India, China and United Nations**.**[6]

In India, the level of awareness about diabetes and its consequences remains pathetically low. For many people, diabetes means it is just an increase in blood sugar level, which has to be controlled by a sugar free diet and some medications. Not many are aware of the serious implications of the disease[8].

"Self management of DM is a process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social

context. Because the vast majority of routene care in diabetes is handled by patients or families, there is an important need for reliable and valid measures for self management of diabetes. There are seven essential self management behaviors in people with diabetes which predict good outcomes. These are healthy eating, being physically active, monitoring of blood sugar, compliant with medications, good problem-solving skills, healthy coping skills and risk-reduction behaviors[9]".

"Self Management is defined as a set of skilled behaviours engaged in to manage one's own illness. This emphasizes the responsibility and role of individual in managing the disease[10]".

Hospitalization for a diabetic patient works out to be very costly and may be even higher for patients with diabetes related complications. The high prevalence of diabetes in India poses a huge threat to the Indian economy. Low income, increased health care costs, complications to different organs and the psychological reaction in adjusting to new requirements of health care routine can cause stress in adopting a diabetes adjusted quality of life [11]

A Research study was conducted on diabetes at Delhi, found that around 2% of the 12000 people surveyed in Indian villages were found to be diabetic and It was an alarming observation that, half of them were not knew that, they have diabetes[12].

"Times of India, a National News Paper reported that one among the nine diabetic patients in the world is an Indian and by 2025, it is assumed that every 5$^{th}$diabetic patient in the world will be an Indian. Diabetes is one of the most economically burdensome chronic diseases of our times[13]".

A Descriptive survey study conducted in Tamil nadu, found out that rural areas in India had a significantly higher incidence of diabetes. These figures show that diabetes mellitus is more prevalent in rural areas[14].Recent studies have reported that migrant Indians living in different parts of the world shows a much higher prevalence of diabetes than the host population of those countries [15]. Even in the region wise prevalence of diabetes studies conducted in India among rural subjects the prevalence of diabetes in India was found to be more[16].

A casestudy conducted in Germany on intensive insulin for the diabetic patients and found that tight Glycemic control achieved with intensive insulin regimens can reduce the risk of developing retinopathy, nephropathy or neuropathy in patients with diabetes. It was found that intensive insulin regimens could achieve strict metabolic control in patients with diabetes mellitus and offers the best possible outcomes with regard to complications[17].

An experimental study was conducted in US to find out the relationship between Diabetes Mellitus and its clinical complications. The study provided the data on a new mouse model in which atherosclerosis irritation was accelerated in diabetic mice and was reduced by insulin therapy[18].

For effective management of diabetes, patients must be actively involved in their care: this requires performance of many complex self management behaviours including lifestyle modifications such as dietary control, regular exercise and psychosocial coping skills and medical self management such as medication use and self-monitoring of blood glucose. Importantly, adequate self management needs to persist over time if it is going to reduce complications and prolong life. The increase in severity of diabetes every year has been linked to patient's lack of knowledge and practice of proper self management management of Diabetes.[19]

## NEED FOR THE STUDY

Thirteen percent of population in Vadodara is suffering from heart disease risk due to sedentary lifestyle. This is what a survey conducted by Indus Health plus in association with Sterling Add Life India Limited has indicated. The Indus Abnormality Report released a day before World Heart Day which will be observed on Tuesday indicates that both male and female are at equal risk of cardiovascular diseases (CVDs).

It states that 21 percent of the total population in Baroda are at risk of CVDs. The sample size for the study was 14,100 people who underwent preventive health check-ups between January 2014 and August 2015. "16 percent of male and 18 percent of female who underwent the diagnostic test were obese and didn't exercise

regularly. This is the leading factor for aggravating heart ailments between the age group of 30 and 40 years".

The abnormality report clearly states that out of 17 per cent of obesity cases, 7.8 per cent of them were from the age group of 25 to 40 years. Only 5 to 7% of the population followed a regular healthy regime. The increasing prevalence of diseases like hypertension, dyslipidemia, diabetes and obesity has led to an increase in the burden of cardiovascular diseases in Baroda. Pollution, smoking and high stress level with sedentary lifestyle are contributing factors for heart diseases[20].

Creating awareness on all aspects of diabetes is fundamental need. This can be achieved through creating health awareness among general public. This may enable those with initial symptoms and those at risk to adopt remedial and preventive measures. The ideal treatment for diabetes would allow the patient to lead a completely normal life to remain not only symptom free but in good health and to avoid the complications associated with long term diabetes[21].

Diabetes requires a lifelong management plan, and persons with diabetes have a central role in this plan. Lifestyle modification is an opportunity for diabetics to take charge of their health. A study conducted related to adherence/non adherence to diet restriction, 17 % stated frustration, 66 % had difficulty at social gatherings to recommend treatment, 645 of men and 325 of women patients were non adherent, and they cited lack of time or being lazy. The study also revealed that not all those who seek medical help follow advice and those who fail to adhere to regimen always find excuses[22].

Diabetes, i.e., higher glucose level is a slow, silent, stealthy and lethal killer. It does such an intensive and extensive damage to our body than any other ailment. The population in India has an increased susceptibility to diabetes mellitus. In India 30 million people are affected with diabetes mellitus and it is expected to be 57 million by 2025[23].

Diabetes education is important but it must be transferred to action or self management activities to fully benefit the patient. Self management activities refer to

behaviours such as following a diet plan, avoiding high fat foods, increased exercise, self-glucose monitoring, and foot care. Decreasing the patient's glycosylated haemoglobin level may be the ultimate goal of diabetes self-management but it cannot be the only objective in the care of a patient. Changes in self management activities should also be evaluated for progress toward behavioural change[24].

Effective and good diabetic management helps to prevent or delay many of the complications. Effective management includes lifestyle measures such as a healthy diet, physical activity, and foot care, eye care, smoking cessasion, avoiding alcohol, monitoring blood sugar level, and managing medication. Helping clients with DM to acquire the knowledge and skills to self manage their own condition is crucial to leading a full and healthy life style[25]. Ageing is associated with the greater prevalence of type 2 diabetes in all regions. Women showed a higher prevalence in the highland and coastal areas and men in the urban and midland areas[26].

Self management is the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health and well being. Self management in diabetes is crucial. It has been claimed that as much as 98% of diabetes care is self management. Self management in diabetes falls mostly on the patients and their families. It is essential that individuals with diabetes adhere to self management, to prevent the complications associated with diabetes[27].

Diabetes self-management education is the process of teaching individuals to manage their diabetes and has been considered an important part of the clinical management of individuals. The goals of self-management education are to optimise metabolic control, prevent acute and chronic complications and optimise quality of life, while keeping costs acceptable[28].

Lifestyle modification can be a very effective way to keep diabetes in control. Improved blood glucose control can slow the progression of long term complications. Multiple small changes can lead to improvements in diabetes control, including a decreased need for medication. Diabetes requires a lifelong management plan, and persons with diabetes have a central role in this plan. Therefore, it is important to

learn as much as possible about diabetes and to take an active role in making decisions about health care and treatment[29].

Lifestyle related risk factors play an important role. Some of these risk factors like dietary choices, smoking, alcohol consumption, over weight and sedentary Lifestyle are modifiable. Studies have shown that these factors, if effectively controlled can lead to reduction in the risk of developing further complications. Thus a study was under taken to assess the effectiveness of nutrition counselling and education programme on serum biochemical parameters, for delaying of secondary complications in the diabetic subject. Result of the study showed a significant reduction in fasting blood sugar, decreased in their weight, an altered lipid profile towards the favourable side. Thus the health education programme was effective and thereby helps in arresting or delaying the secondary complications of diabetes[30].

The American Diabetes Association recommends assessment of self-management skills and knowledge of diabetes at least annually and the provision of encouragement of continuing diabetes education[31].

A study conducted in US stated that diabetes is a chronic and serious disease which cannot be neglected and self-management activities will control their diabetes and reduce the likelihood of long-term complications. If self-management is to be effective, diabetic patients must have knowledge and be motivated to look after themselves and take appropriate action when complications are present. A great deal depends on the patient education[32].

A study conducted to evaluate the health and utilisation outcomes of a 6-week community-based programme for patients with chronic diseases like heart disease, lung disease or Type 2 diabetes about the self-management and concluded that the intervention group demonstrated improved health status, health behaviour, self-efficiency as well as fewer casualty visits comparing to the control group[33].

A survey study was conducted in Chandigarh about knowledge and practices regarding diet, care of foot, complication of diabetes and medication. This study has

concluded that there is a need to reorient and motivate health personnel in educating diabetics about self management[34].

An evaluative study of nurse directed intervention for improvement of quality of life and the health promoting behaviour conducted among diabetic adults in selected hospitals of Goa and Mangalore concluded that self management practiced by patients was poor[35].

One of the most disabling complications of DM is Diabetic Foot Ulcers (DFU) which affects 15-25% of diabetic patients and may lead to gangrene, infection and/or foot amputation. These complications can lead to severe adverse effects including a high financial burden, physical disability, depression, low quality of life and high mortality. Since effective long term treatment of DFU is difficult, costly and time consuming and since ulcers often reoccur even after healing, their prevention is very important. Proper daily foot care is an essential, low cost and effective part of DFU prevention[36].

Performing daily foot care routines enables diabetic patients to detect foot abnormalities and injuries earlier and as a result to reduce or even prevent the risk of foot ulceration effectively. However, many diabetic patients do not perform daily foot care appropriately, for instance, failing to conduct a daily foot self-inspection, walking barefoot or wearing improper footwear, improperly trimming their toenails, or using unsafe water for washing their feet[36]

"A study has been conducted on knowledge and self management practices of diabetes in Chandigarh. It has been found that, out of 60 subjects none of the patients on insulin injection knew about self administration of Insulin therapy. Knowledge on diabetic complications was partial. The Researcher concluded that there is a need for repeated Health education to enhance the knowledge to diabetic patients about self management of Diabetes[37]".

A study was conducted on "Diabetes self management knowledge among outpatients at a Veterans Affairs Medical Centre" in Chillicothe on five hundred subjects to assess their knowledge regarding diabetic care including proper use of

insulin, adverse effects of insulin and its complications. Result of the study indicated that a majority of the patient's withinsufficient knowledge contributed to their inability to perform appropriate self management practice[38"].

An evaluatory study was conducted to assess the effectiveness of STP on knowledge and practice regarding Self Administration of insulin among insulin requiring for diabetic patients. The research depicts that there was a significant development in knowledge and skill regarding self-administration of insulin after the administration of teachings. It was concluded that teaching programs are effective and recommended that, such studies would be conducted on a larger scale for making a more valid generalisation[39].

Effective control of diabetes is worthwhile. Diabetes complications are preventable. Long and healthy life is possible despite diabetes. Education is a process of delivering self control to motivate self management so that they can look after themselves without being dependent on trained health professionals and thereby reduce the complications and burden on family, society and government[40].

Self management teaching should be part of a regular management plan for patients with diabetes. It provides the information regarding an individual's dynamic diabetic status. This information can help with the appropriate scheduling of food, activity, and medication. Lack of regular knowledge on DM predicts hospitalization for diabetes-related complications. Self management teaching is an essential tool for people with diabetes who are taking treatement or for those who experience fluctuations in their blood glucose levels, especially hypoglycaemia[41].

In patients diagnosed with diabetes mellitus (DM), the therapeutic focus is on preventing complications caused by hyperglycemia. In the United States, 57.9% of patients with diabetes have one or more diabetes-related complications and 14.3% have three or more. Strict control of glycaemia within the established recommended values is the primary method for reducing the development and progression of many complications associated with micro vascular effects of diabetes (eg, retinopathy, nephropathy, and neuropathy), while aggressive treatment of dyslipidemia and

hypertension further decreases the cardiovascular complications associated macro vascular effects[42].

## STATEMENT OF THE PROBLEM: -

***"Effectiveness of self-management training on type 2 Diabetes mellitus- a community based study"***

## AIM OF THE STUDY:

Aim of the study was to evaluate the effectiveness of self management training programme on type II diabetes mellitus among diabetic patients in terms of knowledge, attitude and Practice.

## OBJECTIVES OF THE STUDY:

1. Assess the existing level of knowledge, attitude & Practice regarding self management of type 2 diabetic patients among experimental and control group.
2. Evaluate the effectiveness of self management training program on type 2 diabetes mellitus in terms of knowledge, attitude & Practice among experimental and control group.
3. Find out the association between the Pre test knowledge, attitude & Practice scores with their selected socio-demographic variables.
4. Correlate the post test knowledge scores with post test attitude scores & Post test practice scores regarding self management of type 2 diabetes mellitus.

## OPERATIONAL DEFINITIONS:

- **Effectiveness:-**Refers to significant difference between Pre test and post test scores of knowledge, Attitude and Practice on Type 2 Diabetes mellitus among experimental and control group.

- **Self-management:-**Self-managementis defined as a set of skilled behaviours engaged to manage, monitor and follow up. This emphasizes the responsibility and role of the individual in managing the diabetes in terms of knowledge attitude and Practice.

- **Self-Management Training**:-Self management training is about giving training to people living with diabetes to know the effectiveness of self management on diabetic diet, exercise, diabetic foot care, SMBG & administration of insulin.

- **Type 2 diabetes:-**Type 2Diabetes mellitus (DM), is a insulin resistance, commonly referred as diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period.

- **Community**:-A community is a social unit of any size that shares common values. Community involve for the present study are Waghodia Taluka of Vadodara district.

**HYPOTHESES OF THE STUDY: -**

- $H_1$: Mean post-test knowledge, attitude and practice score of patients in experimental group will be significantly higher than the mean post-test knowledge attitude and practice score of patients in Control group.
- $H_2$: There will be significant association between pre test knowledge, attitude & practice score with their selected socio demographic variables.
- $H_3$: There will be a significant correlation between post test knowledge score and post test attitude score of experimental group regarding self management of type 2 diabetes mellitus.
- $H_4$: There will be a significant correlation between post test knowledge score and post test practice score of experimental group regarding self management of type 2 diabetes mellitus.

## VARIABLES:

1. Dependent variable: - Knowledge, Attitude and practice of type 2 diabetic patients.
2. Independent variable: - Self management training programme on self management of type 2 diabetic mellitus among selected rural area.
3. Demographic variable:-The demographic variables are age, Gender, demographic area, family income, educational status, occupation, family history of diabetes, duration of illness, participation in any other diabetic self management practice training programme.

## DELIMITATIONS: -

- Patients who diagnosed as diabetic and taking treatment for the same.
- Who are present at home during the period of data collection.
- Who are able to understand and respond.
- Knowledge, attitude and practice of patients are assessed through structured questionnaire, rating scale and check list.

## CONCEPTUAL FRAME WORK

Conceptual frame works are interrelated concepts (or) abstractions that are assembled together in some rational scheme by virtue of their relevance to a common theme. The conceptual frame work for this study is based on self care theory by Dorothy Orem which has the following components.

1. Theory of self care
2. Theory of self care deficit
3. Theory of nursingsystem

### 1. Theory of self care

This theory includes

- **Self care** – Practice of activities that individual initiates & performs on their own behalf in maintaining life, health & wellbeing.
- **Self care agency** – It is the human ability for engaging in self care.
- **Therapeutic self care demand** – Actions to be performed to meet self care requisites using valid methods.

- **Self care requisites** – Actions directed towards provision of self care. 3 categories of self care requisites are
    a. Universal self care requisites
    b. Developmental self care requisites
    c. Health deviation self care requisites

**2. Theory of self care deficit**

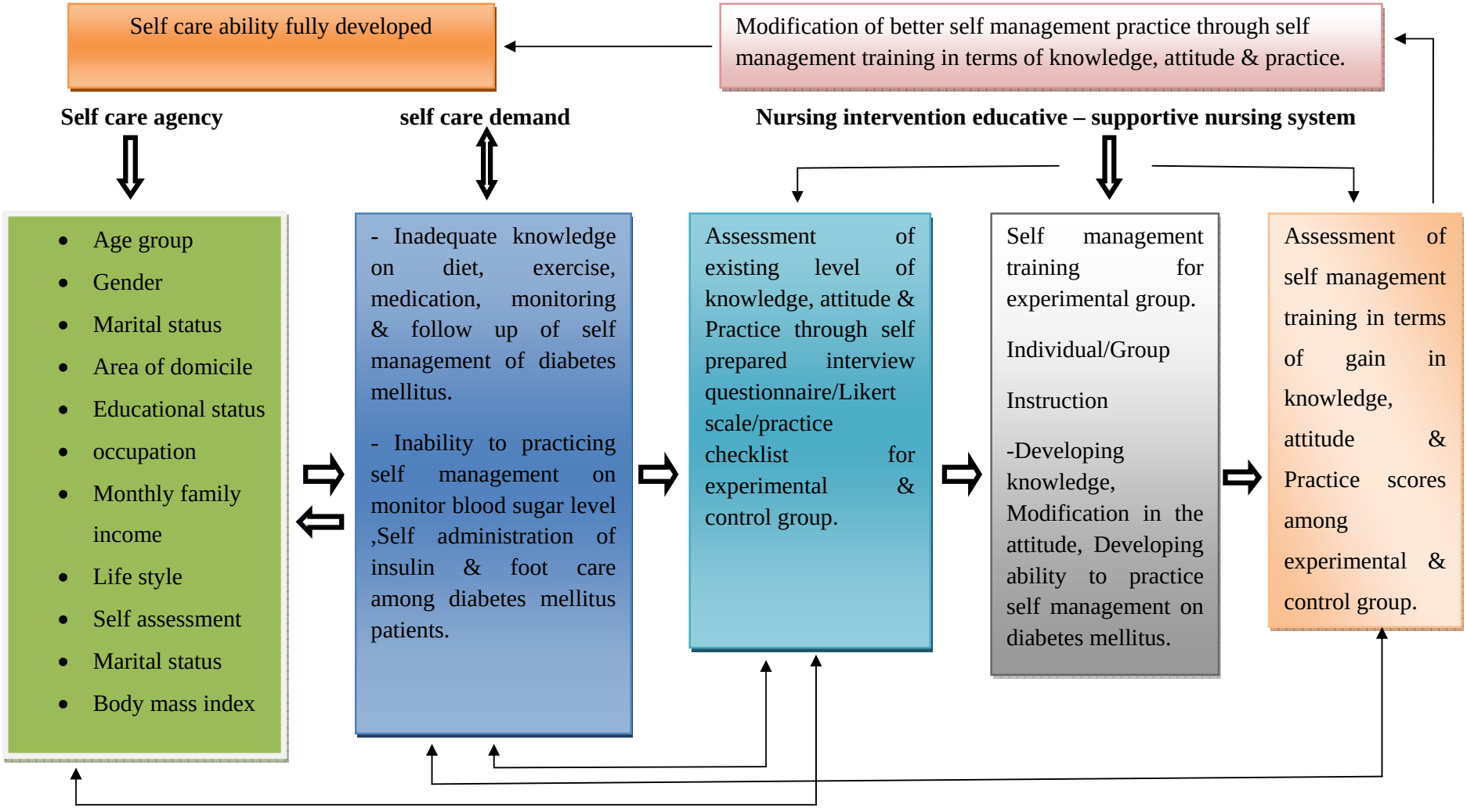
Self care deficit specifies when nursing is needed. Nursing is required when an adult is incapable or limited in the provision of continuous effective self care.

**3. Theory of nursing systems**

Describes how the patient's self care needs will be met by the nurse, the patient or both. There are 3 classifications of nursing system to meet the self care requisites of the patient. They are

a. Wholly compensatory system
b. Partly compensatory system
c. Supportive educative system"

## CONCEPTUAL FRAME WORK – OREM'S SELF CARE THEORY



In the present study,

**Self care**: Refers to the activities independently performed by type – 2 diabetic patients

**Self care agency:** Refers to the abilities of type 2 diabetes mellitus patients to practice self management on diabetes mellitus as the patient is having lack of information on self care of diabetes mellitus that could be assessed by pre-test. The practicing ability of the patients is demonstrated by pre-test to assess the need of self care requisites. The determinate of the self care agency are demographic variables like age, sex, education status, occupation, monthly income, religion, marital status, and place of residency, life style, family history of diabetes, co morbid disease, and body mass index.

**Therapeutic self care demand**: Refers to the need of knowledge on self care of diabetes mellitus to maintain better Glycemic practice. The knowledge regarding self management of diabetes mellitus is assessed by a cafeteria questionnaire and practice of self care of diabetes mellitus was assessed by check list before training session.

**Self care requisites**: Refers to the self care needs of type 2 diabetes mellitus patients to learn live with effects of disease that is practicing self care of diabetes mellitus.

**Self care deficit**: Refers to lack of knowledge, negative attitude & poor practice regarding self monitoring of blood glucose level & the role of researcher is to improve the knowledge, develop positive attitude & good practice onSelf management of diabetes mellitus.

**Nursing System:** Refers to the services by the researcher to the clients in assessing and imparting knowledge on diabetic self management, the clients fall under the category of supportive and educative system of nursing agency. Here knowledge on diabetes mellitus was imparted through self management training program by assessing the Knowledge, Attitude and Practice. Also the researcher will get the feedback which in turn helps to assess effectiveness of self management training program in improving knowledge, attitude and practice of Self management of diabetes mellitus**.**

# CHAPTER II

# REVIEW OF LITERATURE

The purpose of review of literature is to discover what is already known and what others have attempted to find out. Therefore, an intensive review of literature has been done from published and unpublished thesis and journals. For the purpose of systematic compilation, review of literature has been presented in the table as follow.

| Sl. No | Description of ROL | Sources | | | | | |
|---|---|---|---|---|---|---|---|
| | | Books | Journals | Websites | Articles | Reports | Others |
| **2.1** | History, Definition and Classification of Diabetes Mellitus | 3 | 3 | 3 | 5 | - | |
| **2.2** | Current Scenario on Diabetes | 1 | 2 | 2 | 1 | 1 | |
| **2.3** | Literature related to diabetes and its knowledge | 1 | 5 | - | 3 | - | |
| **2.4** | Diabetes and diabetes diet | 3 | | 1 | 1 | 2 | |
| **2.5** | Diabetes and exercise | 3 | - | - | 3 | 2 | |
| **2.6** | Diabetes and foot care practice | 1 | 6 | - | 3 | 1 | |
| **2.7** | Literature related to self Monitoring blood glucose level | - | 2 | 1 | 3 | 2 | 2 |
| **2.8** | Literature related to Self administration of insulin | - | 3 | - | 4 | 1 | 2 |
| **2.9** | Literature related to diabetes and recognizing complication | 1 | 1 | - | 5 | 4 | - |
| **Total** | | 13 | 22 | 07 | 27 | 13 | 04 |

## 2.1. THE HISTORY, DEFINITION AND CLASSIFICATION OF DIABETES MELLITUS

The first known mention of diabetes symptoms was in 1552 B.C., when Hesy-Ra, an Egyptian physician, documented frequent urination as a symptom of a mysterious disease that also caused emaciation. In 150 AD, the Greek physician Arateus described what we now call diabetes as "the melting down of flesh and limbs into urine." From then on, physicians began to gain a better understanding about diabetes. Centuries later, people known as "water tasters" diagnosed diabetes by tasting the urine of people suspected to have it. If urine tasted sweet, diabetes was diagnosed. To acknowledge this feature, in 1675 the word "mellitus," meaning honey, was added to the name "diabetes," meaning siphon. It wasn't until the 1800s that scientists developed chemical tests to detect the presence of sugar in the urine.[43]

Physicians in India at around the same time developed what can be described as the first clinical test for diabetes. They observed that the urine from people with diabetes attracted ants and flies. They named the condition "madhumeha" or "honey urine." Indian physicians also noted that patients with "madhumeha" suffered from extreme thirst and foul breath (probably, because of ketosis). Although the polyuria associated with diabetes was well recognized, ancient clinicians could not distinguish between the polyuria due to what we now call diabetes mellitus from the polyuria due to other conditions[44]

**Mering and Minkowrski,** One of the first clues to the pathology underlying diabetes came in 1889 from the experimental work of Von Mering and Minkowrski. found that removal of pancreas from dogs gave rise to a syndrome resembling diabetes and showed that pancreas is a gland of internal secretion which produced a substance that regulated glucose metabolism. Laguesse in 1894 drew attention to the original observations of Paul Langerhans who had in 1869 described small heaps of islands of previously unknown cell s in the pancreas. Laguesse suggested that these islands of cell should be called as the 'Islets of Langerhans'. The hypothetical pancreatic secretion was given the name 'Insulin' by De Meyer in 1900 (Mount, 1985)[45]**.**

The American Diabetes Association (ADA) reports that in 1910, medical professionals took the first steps toward discovering a cause and treatment mode for diabetes. Edward Albert Sharpey-Shafer announced that the pancreas of a diabetes patient was unable to produce what he termed "insulin," a chemical the body uses to break down sugar. Thus, excess sugar ended up in the urine. Physicians promoted a fasting diet combined with regular exercise to combat the disorder[46].

American Diabetes Association Diagnosis and Classification of Diabetes Mellitus Diabetes Care (2004) several pathogenic processes are involved in the development of diabetes. These range from autoimmune destruction of the β-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from

inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia.[47]

In 1980 WHO proposed a classification for diabetes which is accepted widely. Appropriate classification of the syndrome is essential for the treatment and for orderly and standardised epidemiological, genetic and clinical research on diabetes mellitus. The WHO classification underwent minor changes in 1985 and 1990.

**A. "Clinical Classes"**

1)" Type 1 (Insulin – Dependent Diabetes Mellitus, IDDM)

2) Type 2 (Non- Insulin Dependent Diabetes Mellitus, NIDDM)

a) Obese

b) Non obese

3) Malnutrition – Related Diabetes Mellitus (MRDM)

4) Diabetes related to other conditions and syndromes are:

a) Due to pancreatic disease

b) Disease of hormonal or endocrine etiology

c) Due to drugs or chemicals induced conditions

d) Abnormalities of insulin or its receptors

e) Certain genetic syndromes

5) Gestational diabetes mellitus (GDM)

6) Impaired Glucose tolerance (IGT)

a) Obese

b) Non obese

B. Statistical risk classes

1) Patients with previous abnormality of glucose tolerance

2) Patients with potential abnormality of glucose tolerance (Page, 2003) According to Kuzuya et al., (2002) classification of diabetes and related disorder of glycaemia include (1) type 1 (2) type 2 and (3) those due to specific mechanisms and disease and (4) gestational diabetes mellitus.

Classification of Diabetes by American Diabetic Association-2003

1) Type 1 Diabetes Mellitus: β cell destruction usually leading to absolute insulin deficiency. It is classified as- a) Immune- mediated and b) Idiopathic

2) Type 2 Diabetes Mellitus: It may range from predominantly insulin resistance with relative insulin deficiency to a predominantly secretary defect with insulin resistance

3) Impaired Glucose Homeostasis

4) Gestational diabetes mellitus (GDM)

5) Other specific types:

1. Genetic defects of beta cell function
2. Genetic defects in insulin action
3. Diseases of the exocrine pancreas
4. Endocrinopathies (e.g., Cushing's)
5. Drug or chemical induced (e.g., steroids)
6. Infection (e.g., rubella, Coxsackie, CMV)
7. Uncommon forms of immune-related diabetes
8. Other genetic syndromes[48]"

**Banerji M et al.** Classification of diabetes in youth poses special problems. Although type 1diabetes remains the most common form of diabetes in youth of European background, type 2 diabetes is increasingly common, especially among adults at particularly high risk of type 2 diabetes. With the increase in obesity over the last 20 years, there has been an increase in type 2 diabetes in children especially among ethnicities at high risk as well as an increase in the number of children with type 1 who is overweight. Type 2 diabetes may also be present in youth with ketosis or ketoacidosis, which serves only to compound the problem further[49.]

**'TYPE I DIABETES (INSULIN DEPENDENT DIABETES MELLITUS-IDDM)'**

**American Diabetes Association,** This form of diabetes, which accounts for only 5–10% of those with diabetes, previously encompassed by the terms insulin-dependent diabetes, type I diabetes, or juvenile-onset diabetes, results from a cellular-mediated

autoimmune destruction of the β-cells of the pancreas. The rate of β-cell destruction is quite variable, being rapid in some individuals (mainly infants and children) and slow in others (mainly adults). Some patients, particularly children and adolescents, may present with ketoacidosis as the first manifestation of the disease. Others have modest fasting hyperglycemia that can rapidly change to severe hyperglycemia and/or ketoacidosis in the presence of infection or other stress[50].

**TYPE II DIABETES (NON-INSULIN DEPENDENTDIABETES MELLITUS-NIDDM)**

Type 2 diabetes once known as adult-onset or noninsulin-dependent diabetes, is a chronic condition that affects the way the body metabolizes sugar (glucose), body's important source of fuel. With type 2 diabetes, the body either resists the effects of insulin — a hormone that regulates the movement of sugar into body cells — or doesn't produce enough insulin to maintain a normal glucose level. More common in adults, type 2 diabetes increasingly affects children as childhood obesity increases. There's no cure for type 2 diabetes, but patients may be able to manage the condition by eating well, exercising and maintaining a healthy weight[51].

**GESTATIONAL DIABETES MELLITUS (GDM)**

"American Diabetes Association Diabetes Care, Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy (1). The definition applies whether insulin or only diet modification is used for treatment and whether or not the condition persists after pregnancy. It does not exclude the possibility that unrecognized glucose intolerance may have antedated or begun concomitantly with the pregnancy. Approximately 7% of all pregnancies are complicated by GDM, resulting in more than 200,000 cases annually. The prevalence may range from 1 to 14% of all pregnancies, depending on the population studied and the diagnostic tests employed[52]".

## MALNUTRITION RELATED DIABETES MELLITUS (MRDM)

**Becker DJ et al.** Protein energy malnutrition (PEM) has been reported to cause persistent insulin deficiency and glucose intolerance (1) as well as insulin resistance. In 1985, the World Health Organization (WHO) thus incorporated the category of malnutrition-related diabetes mellitus (MRDM) in the classification of diabetes. The criteria proposed for identification of MRDM are blood glucose >200 mg/dl (11.1 mmol/1), onset before 30 years of age, body mass index <19 kg/m2 ,absence of ketosis on insulin withdrawal, poor socioeconomic status, history of childhood malnutrition, and insulin requirements >2 U • kg" 1 • day"1 (suggesting insulin resistance)[53].

## MATURITY ONSET DIABETES OF THE YOUNG (MODY)

**Gardner, D et al.** Maturity onset diabetes of the young (MODY) was a term first used in the 1970s. In the initial reports, MODY patients displayed a familial form of noninsulin-dependent diabetes, which showed Autosomal dominant inheritance and which typically presented before the age of 25 years. The molecular genetic basis of MODY was subsequently recognized in the 1990s, the genetic mutations result in diabetes primarily through their effects on β-cell dysfunction. The clinical features of patients with MODY are now known to be heterogeneous, depending on the genetic etiology[54].

## NEONATAL DIABETES MELLITUS (NDM)

**Rubio-Cabezas et. al** Over the last decade, we have witnessed major advances in the understanding of the molecular basis of neonatal and infancy-onset diabetes. It is now widely accepted that diabetes presenting before 6 months of age is unlikely to be autoimmune type 1diabetes. The vast majority of such patients will have a monogenic disorder responsible for the disease and, in some of them, also for a number of other associated extra pancreatic clinical features. Reaching a molecular diagnosis will have immediate clinical consequences for about half of affected patients, as identification of a mutation in either of the two genes encoding the ATP-sensitive potassium channel allows switching from insulin injections to oral sulphonylureas. It also facilitates genetic counselling within the affected families and predicts clinical prognosis [55].

## 2.2 CURRENT SCENARIO ON DIABETES MELLITUS

Demographic and epidemiological evidences suggest that in the absence of effective intervention of diabetes will continue to increase its frequency worldwide. Thus prevention of diabetes and its consequences is not only a major challenge for future but essential, if health for al is to be an attainable target.

### 2.2.1 GLOBAL SCENARIO

**Amit Vaibhavet al.**Diabetes poses a major health problem globally and is one of the top five leading causes of death in most developed countries. A substantial body of evidence suggests that it could reach epidemic proportions particularly in developing and newly industrialized countries. It has been estimated that the global burden of type 2 diabetes mellitus (T2DM) for 2010 would be 285million people (2010) which is projected to increase to 438 million in 2030; a 65 % increase. Similarly, for India this increase is estimated to be 58%, from 51 million people in 2010 to 87 million in 2030 Indeed, by the year 2025, three-quarters of the world's 300 million adults with diabetes will be in developing countries and almost a third in India and China alone [56].

**Global status report on non-communicable diseases,** globally, an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in 1980. The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population. This reflects an increase in associated risk factors such as being overweight or obese. Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries. Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases. Forty-three percent of these 3.7 million deaths occur before the age of 70 years. The percentage of deaths attributable to high blood glucose or diabetes that occurs prior to age 70 is higher in low- and middle-income countries than in high-income countries[57].

**Colagiuri S et al,** Type 2 diabetes accounts for over 85% of all diabetes cases. Far from being a disease of affluence, the major burden of type 2 diabetes is borne by the developing world, where it is increasingly affecting poor people. Due to the worldwide epidemic of obesity and sedentary lifestyle, type 2 diabetes has become one of the fastest-growing public health problems in both developed and developing countries. For example, the prevalence of diabetes in urban Chennai, India, has increased by over 70% in only 14 years. In a similar time period the prevalence of diabetes in China has tripled. Most recent data from China show that current diabetes prevalence in that country is double the prevalence estimated on the basis of studies done 10–15 years ago[58].

### 2.2.2 INDIAN SCENARIO

**Kaveeshwar, S A et al.** Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease.1,2 In 2000, India (31.7 million) topped the world with the highest number of people with diabetes mellitus followed by China (20.8 million) with the United States (17.7 million) in second and third place respectively. According to Wild et al 3 the prevalence of diabetes is predicted to double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India. It is predicted that by 2030 diabetes mellitus may afflict up to 79.4 million individuals in India, while China (42.3 million) and the United States (30.3 million) will also see significant increases in those affected by the disease.3,4 India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country[59].

**V. Mohan**, India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the “diabetes capital of the world”. According to the Diabetes Atlas 2006 published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken. The so called “Asian Indian Phenotype” refers to certain unique clinical and biochemical abnormalities in Indians which include increased insulin resistance, greater abdominal adiposity i.e., higher waist circumference despite lower body mass index, lower adiponectin and higher high

sensitive C-reactive protein levels. This phenotype makes Asian Indians more prone to diabetes and premature coronary artery disease[60].

**"International Diabetes Federation,** statistics says, India has more diabetics than any other nation of the world. Current estimates peg the number of diabetics in the country at about 62 million – an increase of over 10 million from 2011 when estimates suggested that about 50.8 million people in the country were suffering from the disease. If you think the disease has already reached endemic proportions in the country, consider this. By the year 2030, over 100 million people in India are likely to suffer from diabetes, say researchers.[61]".

**Ramachandran A et al.** India, a country experiencing rapid socioeconomic progress and urbanization, carries a considerable share of the global diabetes burden. Studies in different parts of India have demonstrated an escalating prevalence of diabetes not only in urban populations, but also in rural populations as a result of the urbanization of lifestyle parameters. The prevalence of prediabetes is also high. Recent studies have shown a rapid conversion of impaired glucose tolerance to diabetes in the southern states of India, where the prevalence of diabetes among adults has reached approximately 20% in urban populations and approximately 10% in rural populations. Because of the considerable disparity in the availability and affordability of diabetes care, as well as low awareness of the disease, the glycemic outcome in treated patients is far from ideal[62].

## 2.3 LITERATURE RELATED TO DIABETES AND ITS KNOWLEDGE

**Nield LM et al.** conducted a study to assess the Knowledge and practice of a semi urban Omani population regarding diabetes mellitus. A total of 563 adult residents were interviewed using questionnaires.The percentages of correct responses to questions on diabetes meaning, classical symptoms and complications were 46.5%. 57.0% and 55.1% respectively. Only 29.5%.20.8% and 16.9% identified, obesity, physical inactivity and positive family history, respectively, as risk factors for diabetes. A higher level of education, a higher house hold income, and presence of family history of diabetes found to be positively associated with more knowledge. Study suggested that the level of

education is the most significant predictor of knowledge regarding risk factors, complications and prevention of diabetes[63]

.

**Bijlani RL et al.** conducted a descriptive study on 100, type 2 diabetes patients to assess the knowledge and attitude on self management activities by using interview schedule and Likert's scale. The results showed that 48% of the patients had inadequate knowledge, 35% of the patients had moderately adequate knowledge and 17% of the patients had adequate knowledge. Regarding attitude 72% of the patients had undesirable attitude, 16% of the patients had desirable attitude and 12% of the patients had most desirable attitude on self management activities. The researcher concluded that most of the patients were having inadequate knowledge and attitude about diabetes mellitus. So it is suggested that proper health education can improve the patient's knowledge and attitude on self management activities[64].

**Abdelmarouf Hassan Mohieldein et al.** A descriptive cross-sectional study was conducted to evaluate the awareness level of diabetes mellitus among non-diabetic population. This indicates that, there is need of more efforts for educating general population about diabetes and its associated secondary complications[65]**.**

**Qurieshi MA et al.** undertook a descriptive cross-sectional study in a rural panchayat of District Ernakulam of Kerala wherein 343 adults were randomly interviewed from six randomly selected wards. The interview schedule had 23 items on knowledge, which were assessed in four domains including general awareness of diabetes mellitus, its risk factors, complications, and lifestyle modifications. Each item was given a score. Maximum possible score was 23. Knowledge score of less than 9 was considered as poor, 9–17 as average and above 17 was taken as good. Educating community on risk factors is the key strategy for the prevention of diabetes and delaying the onset of disease among high-risk individuals[66]".

**"Al-Maskari, F et al.** conducted a study**,** a random sample of 575 DM patients was selected from diabetes outpatient's clinics of Tawam and Al-Ain hospitals in Al-Ain

city during 2006–2007, and their knowledge attitude and practice assessed using a questionnaire modified from the Michigan Diabetes Research Training Center instrument. The study showed low levels of diabetes awareness but positive attitudes towards the importance of DM care and satisfactory diabetes practices in the UAE[67].

**Del Prato S & Felton,** conducted a cross sectional study on the relationship between diabetes knowledge and compliance among women diabetes patients. The data was collected through structured self report interviews based on validated scales, assessing diabetes knowledge, compliance behaviour and demographic data. Strategies were suggested to bridge the gap between knowledge and practice and increase patient's motivation ability to comply with health regimen[68].

**Delmas L,** conducted a study to determine and compare the knowledge, beliefs and practice of diabetics receiving free medical care and those paid for medical care in Tamil Nadu, India. A questionnaire was administered to elicit diabetic patient's knowledge regarding diet, exercise, adverse effects, habits and other matters. Their beliefs about diabetes and their practices regarding diet, medication and self monitoring of blood glucose results showed a large gap between knowledge and action in both groups. Study suggested a need for increased efforts towards patient's education regarding diabetes mellitus[69].

**Poornima et al.,** undertook a cross-sectional study with 648 degree college students of Mandya City. The students were administered a 36 items, pre-tested, semi structured questionnaire assessing general and specific knowledge of diabetes like symptoms, causation, risk factors, complication, treatment, attitudes towards people with diabetes etc. The results were analyzed using Epi Info software. 648 (92.31%) out of 702 students participated in the study. Passing excess of urine, excessive tiredness and hunger were mentioned as symptom of diabetes by 73.15%:50.15% and 46.91% subjects, respectively; 59.94% students had knowledge about genetic factors in diabetes. Only 28.70% study participants were aware of diabetes as a rising problem. As much as 62.8% and 35.02% subjects stated that blood and urine tests are done for diagnosing diabetic

persons. Common complications not identified by the study subjects were impotence (82.25%), ulcer on foot (70.83%), loss of sensation (69.91%), repeated skin infections (62.80%), stroke (61.42%). According to them 50.46% diabetics can live normal life; 39.27% can start insulin and eat everything and 27.62% can take herbal medicine and get cured[70]".

**Yogesh Vohra et al** conducted a survey using a structured questionnaire (Diabetes Knowledge and awareness Questionnaire) validated by seven experts on 120 patients visiting the medicine department. Diabetic patients were further assessed for the practice they follow in order to control diabetes. The knowledge of the patients was assessed using set of 5 questions. Most people were aware of the disease called as diabetes (75.8%) and risk factors (83.3%). Level of knowledge between diabetics and non-diabetics was analysed regarding risk factors, complication and management and was found to be higher in case of diabetics. Practices regarding foot care were found to be on the down side. More number of educational programs is required to enhance the level of knowledge and awareness in a country where cases of diabetes is reaching epidemic proportions[71].

A Cross-sectional, household study on adults and elderly age group in Tamaka village was undertaken. Structured questionnaire was used to assess the knowledge of diabetes and capillary blood screening tests done to detect diabetes. 10% of the 311 adults screened had hyperglycemia. Half of the interviewed population had some awareness about diabetes and its symptoms. But more than half (75%) of them were not aware of the long term effects of diabetes and diabetic care. The common perception about diet in diabetes was to avoid sweets, rice and fruits and to consume more ragi, millet and wheat chapattis. Diabetes in young adults is common. Relevant knowledge about diabetes is poor in rural population. Hence community level awareness programs have to be organized. Healthcare providers must be aware of community perceptions and practices[72].

## 2.4 DIABETES AND DIABETIC DIET

**Nicholson& Sklar,** investigated to know whether glycemic and lipid control in patients with type 2 diabetes can be significantly improved using a low-fat, vegetarian diet in the absence of recommendations regarding exercise or other lifestyle changes. 11 subjects with type 2 diabetes were recruited from the Georgetown University MedicalCentre and the local community was randomly assigned a low fat vegetarian diet or aconventional low fat diet (four subjects). The 28 per cent mean reduction in fasting serumglucose of the experimental group, from 10.7 to 7.75 mmol/L (195 to 141 mg/dl), wassignificantly greater than the 12 per cent decrease, from 9.86 to 8.64 mmol/L (179 to 157mg/dl), for the control group ($P<0.05$). Study concluded stating that the use of a low fat, vegetarian diet inpatients with type 2 was associated with significant reductions in fasting serum glucoseconcentration and body weight in the absence of recommendations for exercise[73].

**Miller CK & et al,** a study on diabetes education programme had been designed specifically for older adults. This study evaluated the impact of nutrition intervention on blood glucose and lipoprotein levels of adult> 65 years of age without functional limitations. 98 people were randomized to the experimental group and for control group. A pre-test-post-test control group design was used to evaluate the intervention. 92 people (94%) completed the study. Participants exceeded the guidelines for optimal Glycemic control at the pre- test. The experimental group had greater improvement in fasting plasma glucose ($p= 0.05$) and glycated haemoglobin ($p<0.01$) than the control group. Study concluded stating that older adults with diabetes need additional education to achieve metabolic control. Study suggested that nutrition education can improve metabolic control. Improved metabolic outcomes reduce the morbidity and mortality associated with diabetes[74].

**Fritschet & et al,** A study to assess the effectiveness of weight loss more quickly with low carbohydrate diets with usual dieting obese patients with type 2 diabetes was

undertaken. Ten volunteers with type 2 diabetes, who were very obese, were taken for study purpose. For the first 7 days, patients were at their usual diet, for next 14 days, they followed a low carbohydrate diet. The study results showed that patients lost 1.65 kg after 14 days. Blood sugar and cholesterol level improved during the low carbohydrate diet. The researcher suggested that, reduced calorie intake seems to account for weight loss associated during the first 2 weeks of low carbohydrate diet[75].

**Franz MJ,** a study in life style laboratory and metabolic measures at the general clinical centre on reduction in risk factors for type 2 diabetes mellitus in response to a low sugar and high fibre intake among 54 over weight Latino adults (25-35 years). Results shown that those who decreased added sugar intake had an improvement in glucose level, those who increased fibre intake had an improvement in body mass index and visceral adipose tissue. The study concluded that individuals who reduced added sugar, increased fibre intake by the equivalent of a cup of beans showed decrease in glucose level and body weight[76]".

**Hunking P,** a study found from the North Karelia Project, Finland study and Stanford five city project communities based intervention trials, emphasized the role of nutrition, counselling and health education programme in reducing or modifying the risk factors. As risk reduction requires changes in a given individual's lifestyle, community action and ready access to support services, can lead to significant changes in behaviour. Similarly, family support can greatly enhance patient compliance with life style changes and/or pharmacological therapy leading to greater changes in targeted risk factors[77].

**Fritz &Wandell** conducted a study to assess the effects and frequency of different types of dietary advice. 1467 participants were included, dietary approaches assessed were low fat/high carbohydrate diet, high fat, low carbohydrate diets, low calorie (1000 Kcal per day) and very low calories (500Kcal per day) diets and modified fat diets, dietary advice plus exercise. The studies all measured weight and glycemic control. Other outcomes which were measured in these studies included mortality, blood pressure, serum cholesterol, serum triglycerides. The result suggested that adoption of

dietary advice is a good way to promote better Glycemic control[78].

**Williamson AR & et al,** conducted a study to identify the factors that contribute to the barrier to dietary adherence in individuals with diabetes, and strategies to overcome this barrier. A ten item open ended telephone questionnaire was used to obtain information. The sample included 75 registered dieticians who participated in a previous survey to identify barriers and agreed to follow up telephone interview of the 75 participants. At the conclusion factors identified as the greatest contributors to the barriers being evaluated included lack of time, lack of symptoms, lack of education, poor self esteem, lack of empowerment and misinformation from family, peer group and others with diabetes. The primary recommendation made for overcoming each of these barriers included individualizing meal plans and planning ahead, teaching about complications and setting obtainable goals [79].

## 2.5 DIABETES AND EXERCISE

**Thomas DE & et al.,** A study to assess the effect of exercise in type 2 diabetes mellitus was researched. Trials were identified through the Central Register of Controlled Trials. Fourteen randomized controlled trials comparing exercise, against no exercise in type 2 diabetes were identified involving 377 participants. Trials ranged from 8 weeks to 12 months duration compared with the control. The exercise intervention significantly improved Glycemic control as indicated by a decrease in glycated haemoglobin levels of 0.6 percent. This resulted in both statistically andclinically significant changes. There was no significant difference between groups in whole body mass, probably due to an increase in fat free mass, with exercise intervention significantly increased insulin response and decreased plasma triglycerides. No significant difference was found between groups in quality of life. The analysis shows that exercise significantly improves Glycemic control and reduces visceral adipose tissue and plasma triglycerides[80].

**Goldstein DE & et al.,** a study investigated the effects of an 8 weeks programme of supervised exercise on Glycemic control and cardio respiratory fitness in adolescents with NIDDM. The experimental group participated in supervised exercise programme in

the hospital exercise area for 30 -45 minutes for 3 days a week, for 8 weeks. The control group received instructions regarding the importance of regular exercise including frequency, duration and recommended activities. But glucose and cholesterol were not supervised, and weight was checked before and after the exercise programme. There was a significant improvement in the experimental group though no statistical significant changes were seen in the control group. It implies that regular, supervised exercise programme helps to maintain the Glycemic control[81].

**Loimaala, A., Huikuri & et al,** a study was designed to assess the effects of exercise training on patients with type 2diabetes. Subjects (50 men, mean age 53.3 years) with type 2 diabetes were randomized into either a control group, in which they received conventional treatment only, or an exercise group, in which they received conventional treatment together with heart rate controlled endurance training twice a week, and supervised muscle strength training twice a week for 12 months. Study concluded that exercise training improves glucose control sensitivity in type 2 diabetes subjects in addition to increasing the exercise capacity and muscle strength and improving glucose control[82].

**Agurs Collins & et al.,** a study to evaluate the weight loss and exercise programme designed to improve diabetes management in older African – Americans was undertaken. Overweight African-Americans (n=64) ages 55– 79 years with NIDDM were randomized to either an intervention or usual care at 0, 3 and 6 months of treatment. Significant net differences in the intervention versus usual care were observed for weight (-2.0 kg, P=0.006), physical activity and dietary intake of fat, saturated fat, cholesterol and nutrition knowledge at 3 months (all $P<0.05$), and for weight at 6 months (-2.4 kg; P=0.006) and mean HbAlc values at 3 and 6 months respectively, (-1.6 and -2.4%, both $P<0.01$). After the adjustment for changes in weight and activity, the intervention participants were approximately twice as likely to have a one unit decrease in HbAlc value as those in usual care. Study resulted that the intervention programme was effective in improving glycemic and blood pressure control[83]

**Zoppini,** a study was conducted on moderate aerobic exercise in type 2 diabetic patients. The purpose of the study was to determine long term cardiovascular autonomic adaptation to moderate endurance aerobic exercise, in people with type 2 diabetes. Testing was performed before and after 6 months with supervised progressive, aerobic training programme, twice weekly. Heart rate variability was assessed by autoregressive power spectral analysis. Study concluded stating that, a twice weekly, 6 month, moderate, aerobic exercise programme without a concomitant weight loss, is associated with significant improvement in cardiovascular autonomic function in type 2 diabetic individuals[84].

**Thomas D et al.,** conducted a randomised controlled trials of fourteen comparing exercise against no exercise in type 2 diabetes were identified involving 377 participants. Trials ranged from eight weeks to twelve months duration. Compared with the control, the exercise intervention significantly improved glycaemic control by a decrease in glycated haemoglobin levels. This result is both statistically and clinically significant. There was no significant difference between groups in whole body mass, probably due to an increase in fat free mass (muscle) with exercise, as reported in one trial (6.3 kg, 95% CI 0.0 to 12.6). There was a reduction in visceral adipose tissue with exercise (-45.5 $cm^2$, 95% CI -63.8 to -27.3), and subcutaneous adipose tissue also decreased. No study reported adverse effects in the exercise group or diabetic complications. The exercise intervention significantly increased insulin response (131 AUC, 95% CI 20 to 242) (one trial), and decreased plasma triglycerides (-0.25 mmol/L, 95% CI -0.48 to -0.02) [85].

**Joanie Larose et al.,** conducted a study to evaluate the effects of aerobic exercise training (A group), resistance exercise training (R group), combined aerobic and resistance training (A + R group), and sedentary lifestyle (C group) on cardio respiratory fitness and muscular strength in individuals with T2DM. 251 participants in the Diabetes Aerobic and Resistance Exercise trial were randomly allocated to A, R, A + R, or C. Peak oxygen consumption (V O (2peak), workload, and treadmill time were determined after maximal exercise testing at 0 and 6 months. Muscular strength was measured as the eight-repetition maximum on the leg press, bench press, and seated row. Responses were

compared between younger (aged 39-54 yr) and older (aged 55-70 yr) adults and between sexes. VO (2peak) improved by 1.73 and 1.93 mL O(2)*kg(-1)*min(-1) with A and A + R, respectively, compared with C ($P < 0.05$). Strength improvements were significant after A + R and R on the leg press (A + R: 48%, R: 65%), bench press (A + R: 38%, R: 57%), and seated row (A + R: 33%, R: 41%; $P < 0.05$). There was no main effect of age or sex on training performance outcomes. Combined training did not provide additional benefits nor did it mitigate improvements in fitness in younger subjects compared with aerobic and resistance training alone[86]

**Way KL et al.,** A study was conducted to examine the effect of regular exercise training on insulin sensitivity in adults with type 2 diabetes mellitus (T2DM) using the pooled data available from randomised controlled trials. Eligible trials included exercise interventions that involved ≥3 exercise sessions, and reported a dynamic measurement of insulin sensitivity. There was a significant pooled effect size (ES) for the effect of exercise on insulin sensitivity (ES, -0.588; 95% confidence interval [CI], -0.816 to -0.359; P<0.001). Of the 14 studies included for meta-analyses, nine studies reported the time of data collection from the last exercise bout. There was a significant improvement in insulin sensitivity in favour of exercise versus control between 48 and 72 hours after exercise (ES, -0.702; 95% CI, -1.392 to -0.012; P=0.046); and this persisted when insulin sensitivity was measured more than 72 hours after the last exercise session (ES, -0.890; 95% CI, -1.675 to -0.105; P=0.026). Regular exercise had a significant benefit on insulin sensitivity in adults with T2DM and this may persist beyond 72 hours after the last exercise session[87].

## 2.6 DIABETES AND FOOT CARE PRACTICE

**Melissa Scollan-Koliopoulos et al.,** conducted a descriptive cross-sectional study on perceived risk of amputation, emotions, and foot self management among adults with type 2 diabetes. This was using paper-and-pencil surveys by mail. Adults with type 2 diabetes and a family history of diabetes attending a self-management education program in the Metropolitan New York/New Jersey area were recruited. Measures were completed

about risk perception and fear of amputation, emotional representations of diabetes from the Illness Perception Questionnaire, and the foot self management behaviour component of the Summary of Diabetes Self management Activities Survey. In those who remembered a family member needing an amputation, high perceived risk and fear was associated with less routine foot self management. For those without family history of amputation, fear was positively associated with foot self management. Motivation for foot self management behaviour may be driven by risk perception and emotional responses. [88].

**Gao J & et al.,** A cross-sectional study of 222 Chinese adults with type 2 diabetes in one primary care center collected information on demographics, self-efficacy, social support, patient-provider communication (PPC) and diabetes self management. Hemoglobin A1c (HbA1c) values were also obtained. Measured variable path analyses were used to determine the predicted pathways linking self-efficacy, social support and PPC to diabetes self management and glycemic control. Diabetes self management had a direct effect on glycemic control[89].

**Comellas M et al.,** conducted a study to develop, implement, and evaluate a peer-led diabetes self-management support program in English and Spanish for a diverse, urban, low-income population. After a new training program for peers led by a certified diabetes educator (CDE) was implemented with 5 individuals, this pilot evaluation study was conducted in 2 community settings in the East and South Bronx. Seventeen adults with diabetes participated in the new peer-led 5-session program. Survey data were collected pre- and post intervention on diabetes self management activities, quality of well-being, and number of steps using a pedometer. Significant improvements were found in several physical activity and nutrition activities, with a modest improvement in well-being. Feedback from both peer facilitators and participants indicated that a longer program, but with the same educational materials, was desirable[90].

**Youngshin Song et al.,** a study was conducted to assess the unmet needs for social support and effects on diabetes self management activities in korean americans with type 2 diabetes. Baseline data obtained from a community-based intervention trial were used for this study of 83 middle-aged KAs with type 2 diabetes. Study design and data analysis were guided by social cognitive theory. The key variables were dictated the order of the variables in multivariate regression analysis. Findings indicated that for diabetic KAs, the primary source of social support differed according to gender. Unmet needs for support were significantly associated with self management activities, but the amount of support needs and of social support received were not. Multivariate analysis also confirmed that unmet needs for social support are a significant strong predictor of inadequate type 2 diabetes self management activities, after controlling for other covariates[91].

**Zainab Fatehi et al.,** a quasi-experimental study was conducted to evaluate the effectiveness of self management management intervention on psychological well being for Jordanian patients with type two diabetes mellitus. The study was conducted in a diabetes clinic of a specialized diabetes centre in Amman. 149 participants completed the three-month post-treatment assessments (76 in the intervention group and 73 in the control group). Both the control and intervention groups received a standard diabetic educational program. To assess the group differences of dependent variable changes, repeated measure ANOVA was used. It was found that psychological wellbeing was not significant at 2-week post-intervention and significant change was observed at 3-month post-intervention. The findings from this study can guide the health providers to be trained to provide relevant diabetic interventions into their nursing interventions, education, and research[92].

**Ali Hassan Alhaiti et al.** A systematic literature review had been done on the effectiveness of self-management education with type 2 diabetes patients in Saudi Arabia. This review revealed 11 published papers which included Prospective cohort study, uncontrolled quasi-experimental intervention study with pre–post assessment, non experimental retrospective cross sectional survey, naturalistic observation, case control

study, and qualitative interview. The results from this review indicated that a significant percentage of T2D patients do not observe, or are selective with the type of self management management they use. This habit leads to reduced quality of life, prolonged stay at the hospital, and extended recuperation period. The reviews indicated that educational programs have promoted self management management among T2D patients[93].

**Boulton, AJ & et al,** A cross sectional study on knowledge and practice of foot care in Iranian people with type 2 diabetes, to determine the knowledge and practice of foot care in people with type 2 diabetes was undertaken. A questionnaire was completed by 148 patients with type 2 diabetes in Tehran, Iran. Knowledge score was calculated and current practice was determined. The knowledge score was 6.6 out of possible 16 illiterate patients who were the least knowledgeable. Lack of adequate knowledge includes the following 56% not aware of the effect of smoking on circulation to the feet, 60% failed to inspect their feet and 42 % did not know to trim their toenails and high risk practice including walking bare foot. The results of this study highlighted the patient's inadequate knowledge of self management about their foot and lack of optimal foot care services[94].

**Mazin Shigidi et al.,** A cross-sectional study conducted in Khartoum State - Sudan, during the period from February to April 2013. It targeted adult diabetics admitted to hospital with diabetic foot. Data was obtained from the Hospital Medical Records as well as by direct interviewing of patients. Descriptive analysis of data was done using SPSS computer software. A total of 76 patients were included, their mean age was 58 ± 1.01 years and 59.2% were males. Diabetic retinopathy and nephropathy were seen in 56.6% and 27.6% of patients, respectively. Regular follow-up was evident in 59.2% of patient. Following hospital admission and the diagnosis of diabetic foot, 73.7% were unable to tell why they had diabetic complications. Prior screening for DN was done in 31.6% of patients mostly in the form of urine dipstick for protein, and measurement of serum creatinine, whereas 53.9% of patients were not aware of prior screening for DN. A

substantial proportion of Sudanese patients with diabetes remain far from achieving their Glycemic goals[95].

**Viswanathan V,** Researchers expressed that among persons diagnosed as having diabetes mellitus, the prevalence of foot ulcers is 4 to 10 per cent, the annual population based incidence is 1.0 to 4.1 percent, and the lifetime incidence may be as high as 25 per cent. Prevention of diabetic foot ulcers begins with screening for loss of protective sensation, which is best accomplished in the primary care setting with a brief history and the Semmes – Weinstein monofilament. Studies all over proved that educating patients about proper foot care and periodic foot examination are effective interventions to prevent ulceration. Substantial evidence supports screening all patients with diabetes to identify those at risk for foot ulceration. These patients might benefit from certain prophylactic interventions, including patient education, prescription foot wear, intensive podiatric care and evaluation for surgical interventions[96].

**Mayfield, Reiber, et al,** A study was conducted on daily foot care and concluded that inspection can prevent the development of foot ulcers. This descriptive study of foot care practices involved a convenience sample of 61 adult men and women with type 1 or type 2 diabetes, 24 with existing foot ulcers and 37 without foot ulcers who resided in a rural areas of a south-eastern state. Out of a possible score of 20, those with foot ulcers scored an average of 13.88 and those without ulcers averaged 13.57. These results reveal that those without foot ulcers have similar foot care practices to those with foot ulcers. Study suggested that preventive practices must be stressed and reinforced so those without foot ulcers do not develop ulcers[97].

**Shaw & Bolton,** A cross sectional study was conducted in an institute of endocrinology, Iran on 148 types 2 diabetes subjects. The aim of the study was to determine the knowledge and practice of foot care in people with type 2 diabetes. A questionnaire was administered to subjects to collect the data, and the results showed inadequate knowledge of self management about their foot and lack of optimal podiatry

services. The study concluded that Management of patient's care regarding foot care services in diabetes patients is recommended[98].

## 2.7 LITERATURE RELATED TO MONITORING BLOOD GLUCOSE LEVEL

**"Ezaki,** conducted a study was conducted with the aim of clarifying and redefining the concept of monitoring of blood glucose level in type 2 diabetes mellitus patients, which includes consideration of patients' subjective experience and cultural context. Rodgers Evolutionary method was used. The pub Med, CINAHAL, Psyc INFO, and Cochrane data base of systematic reviews were searched for the years 2002- 2000. Results revealed that monitoring blood glucose level in type 2 diabetes mellitus was composed of three attributes. 1. Awareness. 2. Interpretation 3. Reponses, this attributes contributes to the patient's particulars manifestations of type2 diabetes mellitus. The findings indicated that considering a patients subjective life experiences and individual cultural contexts may be important while monitoring blood glucose level. This concept analysis will be useful for researchers and health care providers seeking to understand the role, while monitoring blood glucose level[99].

**David K Mc Culloch,** A study to explore the pros and cons of glucose monitoring from the patients perspective was undertaken. 40 patients with type 2 diabetes were selected for the study. The study revealed that glucose monitoring can lighten patient's awareness of the impact of life style. Glucose monitoring amplifies a sense of success, or failure about self management and often results in anxiety and self blame if glucose reading remains consistently high. Their analysis highlighted the importance of understanding and monitoring of blood glucose level[100].

**Faculty of earth and life science,**A study was undertaken to investigate effectiveness and safety of real time blood glucose monitoring in patients with type 2 diabetes mellitus. Open label cross over, randomized study was used among 31 type 2 diabetes patients. Primary outcome was time in euglycemia; secondary outcomes included time in other glucose ranges, incidence of adverse events and patients satisfaction. Glucose monitoring was assessed. Results revealed that there were no

serious adverse events. Patient satisfaction was good, median, relative, absolute difference of blood glucose level. Conclusion of the study stated that short term use of glucose monitoring was safe with good care of diabetics. Study suggested conducting the perceptions of patients and educators match in further studies[101].

**Hansen MV &et al** A cross sectional study Danish- British multi-centre survey of 1076 patients with diabetes mellitus was undertaken. The variables were test frequency and motive. Glucose monitoring was performed daily by 39% of the patients and less than weekly by 24% and 67% reported to perform routine testing while the remaining 33 % only tested when hypo or hyperglycemias was suspected. Age, gender and level of diabetes related concern were associated with test pattern. Reported frequencies of mild and severe hypoglycaemia and awareness of hypoglycaemia were independently associated with testing behaviour. Conclusion of the study was patient's compliance regarding continuous blood glucose monitoring is thus limited. Almost two thirds of the patients do not perform daily blood glucose monitoring and one third does not perform routine tests[102].

**Puglise G & Dever,** A study conducted in Italy recommended that monitoring of blood glucose before, during and after physical exercise can reduce the incidence of mortality rates in the general population as well as subjects with diabetes. In diabetes subjects who were treated with insulin/oral hypoglycaemic drugs, exercise may result in complications leading to hypoglycaemia, hyperglycemias and possible ketoacidosis. Both complications may also occur several hours after exercise. Thus, supervised exercise training associated with blood glucose monitoring is an effective and safe intervention to decrease blood glucose levels in type 2 diabetic subjects[103"].

**"Enza Gucciardi et al.** A qualitative study to examine the views and current practice of SMBG among Black Caribbean and South Asian individuals with non-insulin treated Type 2 diabetes mellitus. Twelve participants completed semi-structured interviews that were guided by the Health Belief Model and analyzed using thematic network analysis. The frequency of monitoring among participants varied from several

times a day to once per week. Most participants expressed similar experiences regarding their views and practices of SMBG. Minor differences across gender and culture were observed. All participants understood the benefits, but not all viewed SMBG as beneficial to their personal diabetes management. While the majority of participants value SMBG as a self-management tool, barriers exist that impede its practice, particularly its cost.[104].

**Klungel OH & et al,** A study was undertaken to investigate patients perception of diabetes status related to glucose monitoring. Cross sectional method was used for the study. Among 1561 patients 30 years or older who filled at least two prescriptions for any glucose lowering drug between 2003- 2004, In Netherland. Using 30 items self administered questionnaire, data on self monitoring behaviour, perceived diabetes status and disease severity were gathered. Study result shown that practicing glucose monitoring was more common among patients who rated their diabetes status as poorly or moderately controlled, compared to those who rated it very well controlled. A better perceived diabetes status was more likely in those who performed blood sugar tests frequently. Researcher concluded the study stating that, among type 2 diabetes mellitus patient's blood glucose monitoring behaviour is associated with patient's perception of diabetes status, irrespective of the self reported disease severity[105].

AProspective randomised controlled trial of self monitoring versus no monitoring (control) study was conducted to assess the effect of self monitoring of blood glucose concentrations on glycaemic control and psychological indices in patients with newly diagnosed type 2 diabetes mellitus. 184 (111 men) people aged <70 with newly diagnosed type 2 diabetes referred to the participating diabetes clinics. Participants were randomised to self monitoring or no monitoring (control) groups for one year with follow-up at three monthly intervals. Both groups underwent an identical structured core education programme. The self monitoring group received additional education on monitoring. Main outcome measures between group differences in HbA1c, psychological indices, use of oral hypoglycaemic drugs, body mass index (BMI), and reported hypoglycaemia rates. In patients with newly diagnosed type 2 diabetes self monitoring of blood glucose concentration has no effect on Glycemic control but is associated with

higher scores on a depression subscale[106].

**Malanda UL et al.** A randomised controlled trial investigated the effects of SMBG compared with usual care, self-monitoring of urine glucose (SMUG) or both in patients with type 2 diabetes who were not using insulin. Two authors independently extracted data from included studies and evaluated the studies' risk of bias. Twelve randomised controlled trials were included and evaluated outcomes in 3259 randomised patients. Intervention duration ranged from 6 months (26 weeks) to 12 months (52 weeks). Nine trials compared SMBG with usual care without monitoring, one study compared SMBG with SMUG, one study was a three-armed trial comparing SMBG and SMUG with usual care and one study was a three-armed trial comparing less intensive SMBG and more intensive SMBG with a control group. Seven out of 11 studies had a low risk of bias for most indicators. Meta-analysis of studies including patients with diabetes duration of one year or more showed a statistically significant SMBG induced decrease in HbA1c at up to six months follow-up [107"].

**"Johanna Hortensius et al.**The study investigated whether capillary glucose concentrations, as measured in the first and second drops of blood, differed ≥10% compared with a control glucose concentration in different situations. Capillary glucose concentrations were measured in two consecutive drops of blood in the following circumstances in 123 patients with diabetes: without washing hands, after exposing the hands to fruit, after washing the fruit-exposed hands, and during application of different amounts of external pressure around the finger. The results were compared with control measurements. Not washing hands led to a difference in glucose concentration of ≥10% in the first and in the second drops of blood in 11% and 4% of the participants, respectively. In fruit-exposed fingers, these differences were found in 88% and 11% of the participants, respectively. Different external pressures led to ≥10% differences in glucose concentrations in 5–13% of the participants. The study recommended that washing the hands with soap and water, drying them, and using the first drop of blood for self-monitoring of blood glucose[108"].

## 2.8 SELF ADMINISTRATION OF INSULIN

**"Pritha Sarkar,** a pre-experimental evaluatory study was conducted in Tamilnadu to assess the impact of STP on knowledge and practice regarding the Self-Administration of Insulin among insulin requiring diabetic patients by using structured interview schedule and observation checklist. Thirty samples were selected by purposive sampling technique. The study showed that there was a significant improvement in practice regarding self-administration of insulin[109].

**DeSouza & Zanetti,** a descriptive study was conducted regarding the use of disposable syringes in the administration of insulin at home. The aim of the study was to learn the utilisation and reutilisation of disposable syringes for the administration of insulin at home. Sample size was 113 people with diabetes mellitus. Semi-structured interviews were used for data collection. The study suggested that this unhealthy practice had to be changed by giving education to prevent complications of diabetes[110].

**Dall & Zanetti** a descriptive study on insulin self-administration in children with Type 1 diabetes mellitus was conducted in Portugal to categorise the children according to socio-demographic variables and identifying the difficulties related to insulin self-management and home care. Sample size was 34, Type 1 diabetic childrenResults of the study showed that the need for a planned work integrated by a multi professional team and directed to the children[111]".

**"Asakara et al. a** study regarding proper use of insulin in diabetic patients was conducted in Japan. The aim of the study was to find out patients' awareness and practice of their treatment and to find out how much the patient understood and followed the instructions. The study indicated that the older patients' ability to understand the method of insulin administration was diminished. As a result the patients forgot to shake the NPH vial, immediately before injection. He also found that even when the NPH insulin was shaken, the administration was delayed. He found that the insulin would be effective if it is injected within 2-5 minutes if being shaken[112].

**Edith& Debra,** a study to describe syringe disposal practices of individuals with diabetes who take insulin and to investigate the attitude toward and effect of previous information on proper syringe disposal was conducted in Missouri. Adult men and women who injected insulin were recruited as samples. Two questionnaires concerning syringes disposal practices were given to subjects. Non-parametric statistical procedures were used to analyse the data. The findings of the study was men with higher income tended to use the trash for syringe disposal more often than lower income men, and older women exhibited a higher positive attitude significantly correlated with the proper syringe disposal and those who had received previous information were more likely to dispose of syringes properly. The study concluded saying that diabetic educators can improve the syringe disposal practices of their patients through education[113].

**Selvakani,** a study was conducted on existing technique of insulin administration, serving and supervising therapeutic diet to adult diabetic patients by nursing personnel and the selected aspects of communication between them during these procedures in general, medical and surgical units. This descriptive study was carried out on a sample of 162 subjects. Observations of the performance of nursing personnel on various aspects of insulin administration revealed that the highest percentage of scores obtained on aspects related to checking doctors order, identifying patients and preparation of equipment (76.30%) rather than on aspects related to 'administration of insulin and communication' with patients (63.7%); whereas the aspect of aftercare of equipment and recording of insulin accounted for 64.8%".[114]

**"DR. Balachandra,** adescriptive study was conducted among 70 patients to assess the knowledge and practice of patients with diabetes mellitus on prevention of complications among those who visited outpatient department admitted in Christian Medical College and Hospital, Vellore, South India. According to the statistical information, it was revealed that the average percentage of overall knowledge and practice of diabetes mellitus patients about prevention of complications was inadequate (60%), moderately adequate (32.9%) and adequate (2.1%). The chi-square value was found to be significant at 0.001 levels. The chi-square analysis showed that there was a

significant relationship between age, treatment regimen (i.e., diet alone, insulin injection or oral drugs) and the level of knowledge and practice regarding the prevention of complication[115].

**Asakura T et al.,** A study to find out the occurrence of coring in insulin vial and the possibility of rubber pieces contamination by self-injection was conducted in Japan. Thirty insulin cartridges from 30 hospitalised patients were collected and used for the primary injection, the secondary injection and the cartridge remaining preparation as samples. The number and shape of the rubber pieces were observed under microscope. The study finding indicates a high possibility of rubber pieces being injected under subcutaneous tissue. [116].

**Lombardo et al.** A study was conducted in Italy to assess how self-management therapy can improve quality of life for diabetic patients. Study says self-control led therapy is vital in the treatment of insulin dependent diabetes mellitus. Correct insulin therapy, a reduction in hospitalisation and modification of therapy for individual needs can be done by this. The patient must learn to live and develop normally, by fully understanding how to manage the illness autonomously and how to prevent short and long term complications[117].

**Sarui & Daido et al.**An Evaluatory study was conducted to find out the benefit of an assessment and instruction of injection technique in patients using insulin pens. Sample size was 100 patients on insulin using insulin pen. Injection technique was inspected by the instructor of insulin pens. After inspection each patient was given individualised advice and full instructions for pen use.. The study concluded saying that assessment and reinstruction for insulin injection technique is beneficial to improve glycemic control not only for those with erroneous injection skill but also for those with apparently proper technique[118"].

## 2.9 LITERATURE RELATED TO DIABETES AND RECOGNIZING COMPLICATIONS

**"Bandurska & Stankiewicz et.al**A study explained the Type 2 diabetes mellitus and prevention of macro vascular complications. Most patients with type 2 diabetes will develop vascular complications. This may be micro vascular disease, such as nephropathy, retinopathy or poly neuropathy and also macro vascular disease, such as coronary heart disease, stroke or peripheral artery disease. Optimal control of elevated blood glucose levels will reduce the symptoms of hyperglycemia levels and help to prevent the development of complications. In addition, treatment of hypertension and lipid disturbances has been shown to reduce the incidence and severity of vascular complications significantly[119].

**Buse JBa** study explained that preventing vision loss due to diabetes relies on an intensive metabolic control of diabetes and elimination of coexisting risk factors for development of diabetic retinopathy and, on the other hand on carrying out a programme for early detection and treatment of diabetic retinopathy. Proper treatment of diabetes expressed by good Glycemic control, proper arterial pressure parameter and lipid concentration in blood, reduce the risk of heavy complications and extend life span and improve its quality. An ideal model of screening studies diabetic retinopathy is based on an annual examination of vision acuity in all diabetic patients, by an experienced ophthalmologist using precise methods for imaging eye fundus. The incidence of vision loss due to diabetes is significantly lower in the countries which introduced programs preventing retinopathy, than in those which do not have them[120].

**Jefferson VW & et al,** a study expressed that the management of type 2 diabetes has been revolutionized over the last 3 to 5 years as a result of dramatic changes in our health care system, new clinical trial data, novel pharmacologic agents and a better understanding of appropriate methods for patient education regarding lifestyle issues. As a result, diabetes management has become much more heterogeneous, with dramatic differences in style and approach. Diabetes care has also become much more rewarding: The vast majority of patients can now achieve excellent Glycemic control while leading

full and unrestricted lives[121].

**Goldstein MG & et al,** a study was conducted to assess the clinical features of coronary heart disease with concomitant diabetes mellitus. 243 type 2 diabetic patients were assessed and examined by coronagraph. Clinical and ECG observations were supplemented by measurement of total cholesterol and selective coronagraph. Patients of the study group more frequently consumed tobacco, alcohol, and had obesity. However after trials patients had a history of class II angina, circulatory insufficiency, and high cholestrolemia and hypertension further deteriorating to coronary heart disease. Hence it is concluded that patients with diabetes are at higher risk of coronary heart disease[122"]

**"Guerci,** a study explained that the diabetes prevention programme (DPP) randomized trial has shown that a combined programme of weight loss, improvement of diet and increased physical exercise, lowers the risk of development of type 2 diabetes by 58%. Benefits have been found for metaphoric acrabose and troglitazone. Treatment with metaphoric was less effective than life style modification resulting in an average reduction of risk for development of type 2 diabetes by 31 percent compared with placebo. Similarly, acrabose in the stop NIDDM trial reduced the risk of developing type 2 diabetes in patients with IGT by 25 percent. Remarkably, cardiovascular event rates, in particular myocardial infarction, were significantly reduced[123].

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**Huang, Basu et al.** a cohort study (2004-2010) included 72 310 older (≥60 years) patients with type 2 diabetes enrolled in a large, integrated health care delivery system. Incidence densities (events per 1000 person-years) were calculated for each age category (60-69, 70-79, and ≥80 years) and duration of diabetes (shorter [0-9 years] vs. longer .Among older adults with diabetes of short duration, cardiovascular complications followed by hypoglycaemia were the most common nonfatal complications. They observed a similar pattern among patients in the same age group with a long duration of diabetes, with some of the highest incidence rates in coronary artery disease and hypoglycaemia compared with end-stage renal disease lower limb amputation and acute hyperglycaemic events [124].

**Chukwuemeka Nwaneri et al.**A comprehensive literature search was undertaken for studies (published 1990–2010) on mortality in type 2 diabetes. In total 35 studies (220,689 patients; mean follow-up of 10.7 years) were eligible for inclusion: 33 studies reported increased mortality risks; 24 had full data on 95% confidence intervals (CIs), one study reported no excess mortality in men diagnosed after 65 years whereas three reported increased mortality in similar age groups in both sexes. Meta-analysis showed RR = 1.85 (95% CI 1.79–1.92) for all-cause mortality [men RR=1.57 (95% CI 1.46–1.68); women RR=2.0 (95% CI 1.89–2.12)], RR=1.76 (95% CI 1.66–1.88) for cardiovascular mortality and RR=2.26 (95% CI: 1.7-3.02) for stroke. There was no statistically significant evidence of publication bias". [125]

**Van Dooren FEP, Nefs G et al.** A Systematic Review and Meta-Analysis study was conducted to examine the association between depression and all-cause and cardiovascular mortality in people with diabetes by systematically reviewing the literature and carrying out a meta-analysis of relevant longitudinal studies. The pooled hazard ratios were calculated using random-effects models. After adjustment for demographic variables and micro- and macro vascular complications, depression was associated with an increased risk of all-cause mortality (HR = 1.46, 95% CI = 1.29-1.66), and cardiovascular mortality (HR = 1.39, 95% CI = 1.11-1.73). Heterogeneity across studies was high for all-cause mortality and relatively low for cardiovascular mortality, with an I-squared off respectively 78.6% and 39.6%. Subgroup analyses showed that the association between depression and mortality not significantly change when excluding three articles presenting odds ratios, yet this decreased heterogeneity substantially (HR = 1.49, 95% CI = 1.39-1.61, I-squared = 15.1%)[126].

**Cai, H & Xu, Z et al.** A total of 11 cohort studies were included in a meta-analysis, of which seven studies were carried out to investigate whether diabetes mellitus is associated with all-cause mortality amongst those with prostate cancer, seven studies to investigate whether diabetes mellitus is associated with prostate cancer-specific mortality and two studies to investigate the relationship of diabetes mellitus and non prostate cancer mortality. The meta-analysis results suggested that diabetes mellitus could

significantly affect the incidence of all-cause mortality amongst those with prostate cancer (hazard ratio = 1.50, 95% confidence interval = 1.25–1.79). Besides, diabetes mellitus was also associated with prostate cancer-specific mortality (hazard ratio = 1.26, 95% confidence interval = 1.20–1.33) and non prostate cancer mortality (hazard ratio = 1.83, 95% confidence interval = 1.33–2.52) separately. There was no obvious publication bias amongst the studies included. The results of this meta-analysis reveal an association of diabetes mellitus with adverse prognosis amongst those with prostate cancer[127].

**An Pan & Michel Lucas et al.** A Prospective cohort study was conducted to evaluate the individual and joint effects of depression and diabetes on all-cause and CVD mortality rate. A total of 78 282 women who participated in the Nurses' Health Study aged 54 to 79 years at baseline in 2000 were followed up until 2006. Self-reported type 2 diabetes was confirmed using a supplementary questionnaire**.** During 6 years of follow-up 4654 deaths were documented, including 979 deaths from CVD. Compared with participants without either condition, the age-adjusted relative risks (RRs) (95% confidence interval) for all-cause mortality were 1.76 (1.64-1.89) for women with depression only, 1.71 (1.54-1.89) for individuals with diabetes only, and 3.11 (2.70-3.58) for women with both conditions. The corresponding age-adjusted RRs of CVD mortality were 1.81 (1.54-2.13), 2.67 (2.20-3.23), and 5.38 (4.19-6.91), respectively. These associations were attenuated after multivariate adjustment for other demographic variables, body mass index, smoking status, alcohol intake, physical activity, and major co morbidities but remained significant, with the highest RRs for all-cause and CVD mortality found in those with both conditions[128].

# CHAPTER-III

# RESEARCH METHODOLOGY

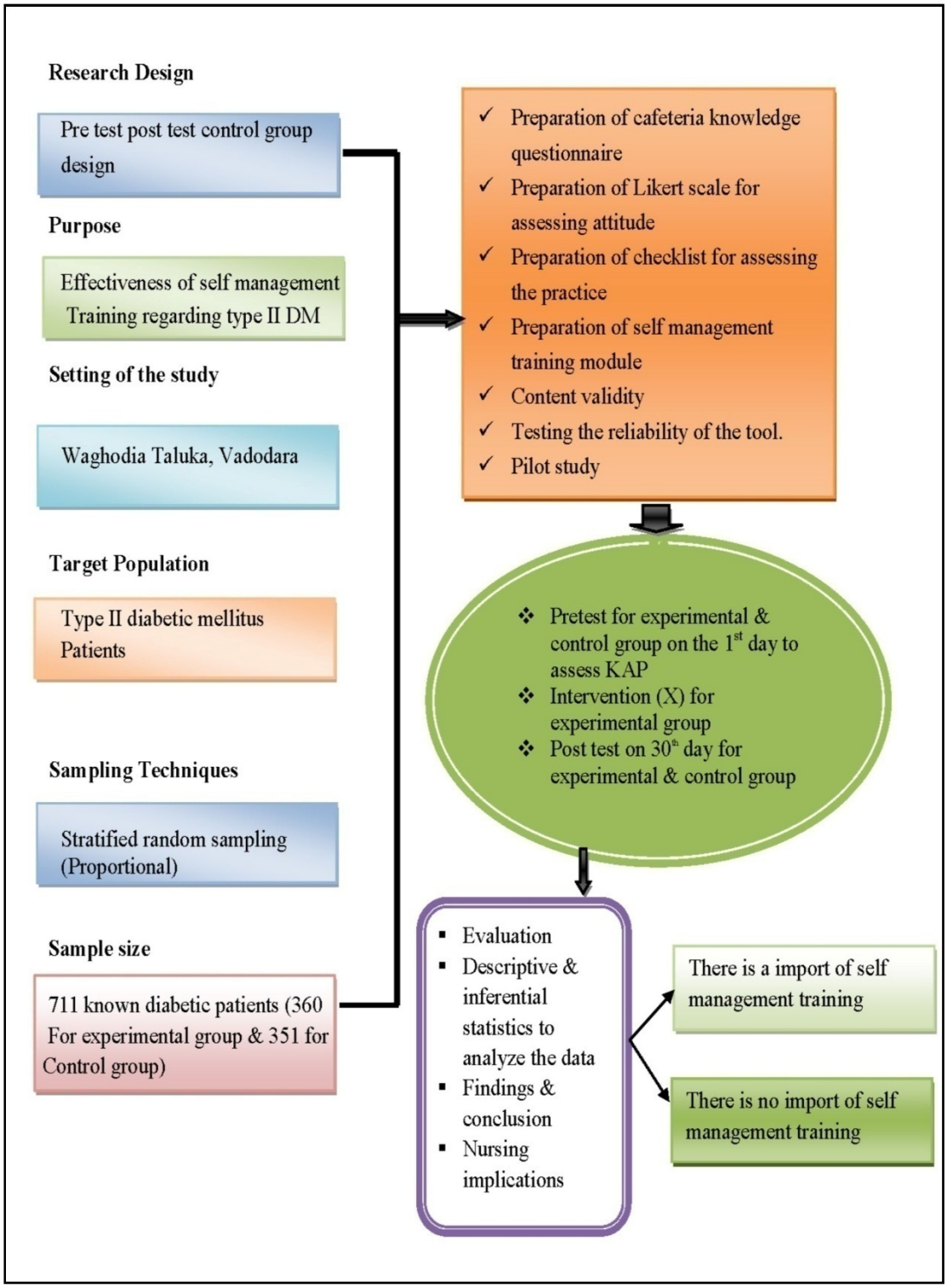
This chapter contains description of method which was adopted to accomplish to achieve the set objectives. Research methodology provides guidelines, research steps, research process & data collection.

It includes:

1. Research approach.
2. Research design
3. Setting of the study.
4. Population.
5. Sample and size.
6. Sampling criteria.
7. Sampling Technique.
8. Description of variables.
9. Development of the Tool.
10. Pilot Study.
11. Process of data collection.
12. Plan for data analysis.
13. Ethical consideration.

The present study aims to assess the effectiveness self-management training on Type 2 DM to the patients in terms of KAP.

Figure No: 2 Schematic Representation of Research Methodology.



**1. Research approach:-**

Quantitative Evaluatory approach was used to determine the effectiveness of self-management Training on Type 2 Diabetes mellitus.

Quantitative Research approach is used to quantify the problem by way of generating numerical data or data that can be transformed into useable statistics. It is used to quantify knowledge, practice, attitudes, opinions, behaviors, and other defined variables – and generalize results from a larger sample population[129].

**2. Research design: -**

Pre-test post-test with control group design was adopted in this study to assess the effectiveness the knowledge, attitude &practice of patients regarding Self-Management on Type 2 Diabetes mellitus.

Pre-test post-test with control group designis a type of true experimental design where test units are randomly allocated to an experimental group and control group. Both groups are measured before and after the experimental group is exposed to a treatment[130].

In this study, pre-test was carried out for both Experimental and Control group and individual/Group teaching was administered only to experimental group, eventually Post-test was conducted for both experimental and control group.

**Table No.-2:- Symbolic representation of Research Design**

| GROUP | SAMPLES | PRE-TEST | INTERVENTIONS | POST-TEST |
|---|---|---|---|---|
| EXPERIMENTAL | Patients with Type 2 Diabetes mellitus residing at Waghodia taluka. | $O_1$ 1st day | X | $O_2$ After 2 weeks |
| CONTROL | | $O_3$ 1st day | No Intervention | $O_4$ After 2 weeks |

**KEY -:**

$O_1$ = It is the First Observation means Assessing pretest knowledge, Attitude and practice regarding self-management of the type 2 diabetic patients among experimental group.

X = Conducted individual/ Group Training to the patients with diabetes mellitus on Self-management training among experimental group.

$O_2$ = It is the second observation means Assessing posttest knowledge, Attitude and practice regarding self-management of type 2 diabetic patients among experimental group.

$O_3$= It is the third observation means Assessing pretest knowledge, Attitude and practice regarding self-management of type 2 diabetic patients among control group .

$O_4$= It is fourth observation means Assessing posttest knowledge, Attitude and practice regarding self-Management of type 2 diabetic patients among control group.

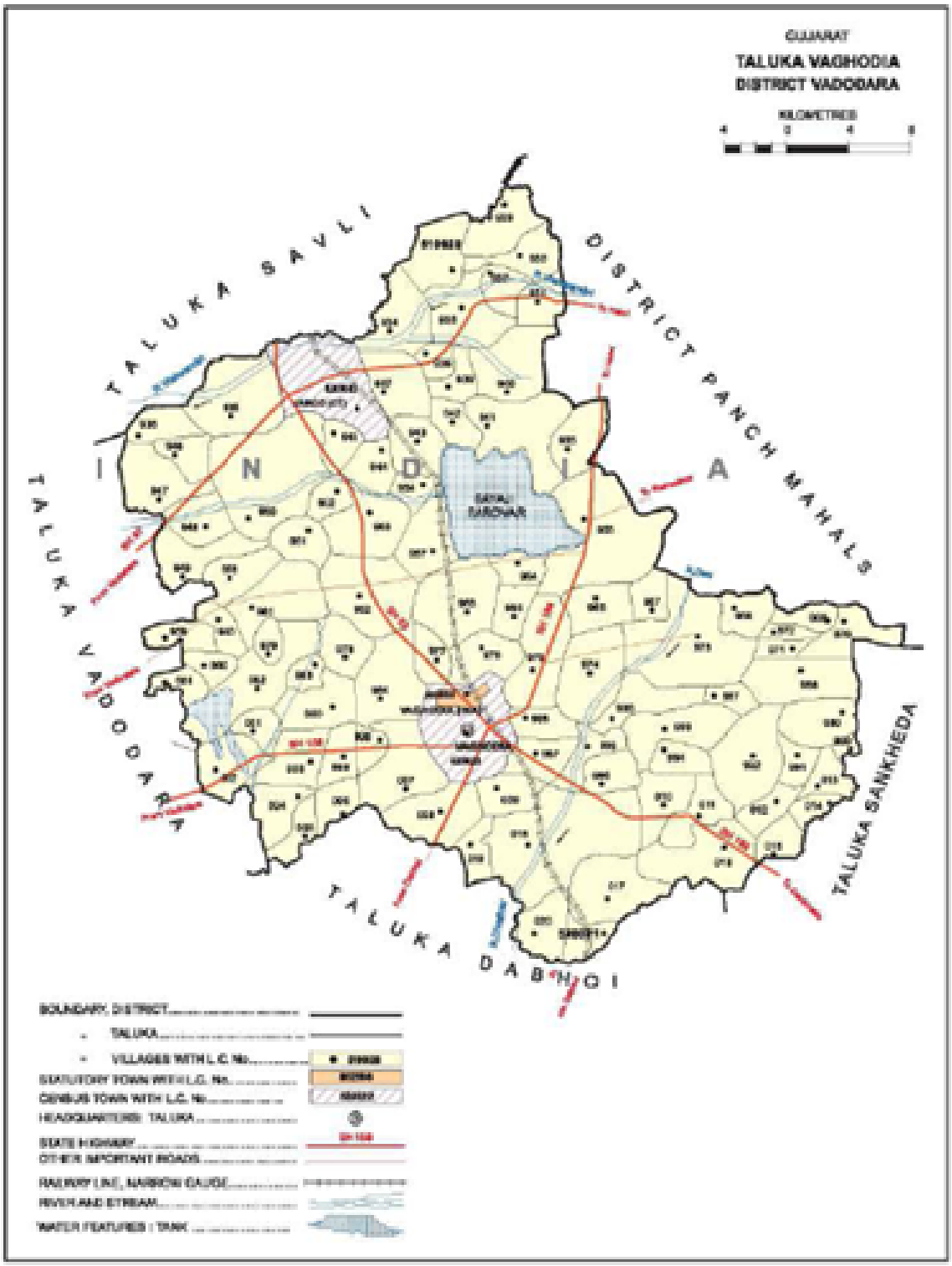
**3. Setting of the study:**

The study was conducted in 97 villages of Waghodia Taluka, Gujarat. Waghodia has a total population of 149914, out of which 77319 are male and 72523 are female. Waghodia taluka which comes under Vadodara district has 97 villages. It has four PHCs namely Asoj,Rustampura, Goraj and Waghodia. In the first phase of the study, investigator has conducted a Diabetic demographic survey in order to find the total diabetic population.

In this study all the villages of Waghodia has been classified into four strata in accordance to the Primary health centers & door to door survey was conducted

Investigator has taken this herculean task of reaching out to all the villages of Waghodia taluka to provide the best of self-management training for the diabetic veterans to the rural and tribal population.

Figure No. - 3: Geographical Layout of Waghodia Taluka, District Vadodara.[151]



## 4. POPULATION

In this study the population includesPatients diagnosed with Type 2 diabetes mellitus belongs to geographical area of Waghodia taluka.

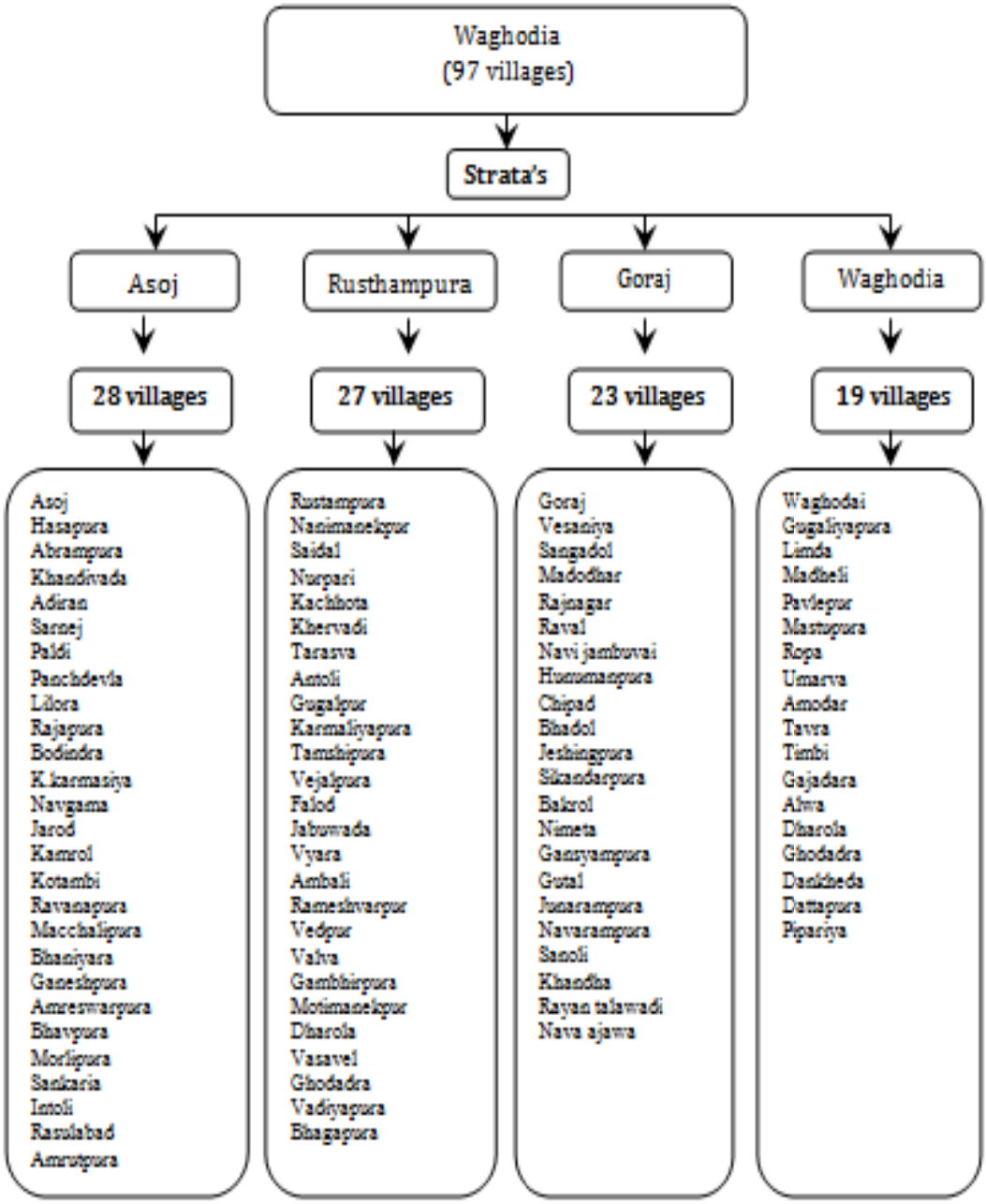



Figure No. 4:- Organogram of the geographical areas of Waghodia Tahuka selected for selecting the population of the study.

The diabetic demographic survey was conducted to screen the total Type 2 diabetic patients existing in Waghodia taluka. Demographic survey Proforma was prepared to collect the necessary data. The schedule for survey and road map for easy accessibility to each and every village was prepared. Door to door survey was conducted systematically with a structured demographic survey Performa. Total of 2998 known diabetic patients were ruled out from 97 villages of Waghodia taluka.

5. **SAMPLE AND SAMPLE SIZE:**

Prevalence of adult diabetic population between 31 to 63 years is 1.1% & the sample size was calculated by using the formula $N= Z^2 (pXq) / d^2$ Where Z = (SD score at 99% confidence) is 2.58, P = (Assumed prevalence of adult diabetic population as per the criteria) is 1.14%, q = (1-p) 0.9886, d = 0.01. By using the above formula, the sample size estimated was 750 type-2 Diabetes Mellitus Patients Residing in Waghodia Taluka out of which, 375 in Experimental and 375 in control group were randomly assigned by using computer aided random assignment table.

**Table No. -3: Table representing the total accessible samples.**

| Sample Size (750) | | | |
|---|---|---|---|
| Experimental Group | | Control Group | Total |
| 375 | | 375 | 750 |
| Drop out | 15 | 24 | 39 |
| Accessible sample | **360** | **351** | **711** |

#

6. **SAMPLING CRITERIA:**

"In the sampling criteria, we specify the characteristics of the population under the study. It has inclusive and exclusive criteria.

**Inclusion Criteria**

- Patients with knownType II diabetes mellitus aged between 30 – 65 years.
- Patients those who are residing in Waghodia taluka.
- Who gave written informedconsent to participate in the study

**Exclusion Criteria**

- Patients who have professional qualification in health care services.
- Juvenile & gestational DM patients.
- Diabetic Patients those who were admitted in the hospital with severe complications associated with diabetes mellitus".

## 7. SAMPLING TECHNIQUE:

**Proportionate Stratified Random Sampling** was used in this study.

The type-2 Diabetic patients were screened all over the Waghodia taluka using a Diabetic survey proforma. Accordingly, the total diabetic patients identified after the demographic survey was 2998 (Juvenile, gestational diabetes and complicated cases were excluded). The investigator segregated the entire population according to the villages. (Total 97 villages) those villages were stratified into 4 as per the PHC's of Waghodia Taluka i.e. Asoj, Rustampura, Goraj and Waghodia.

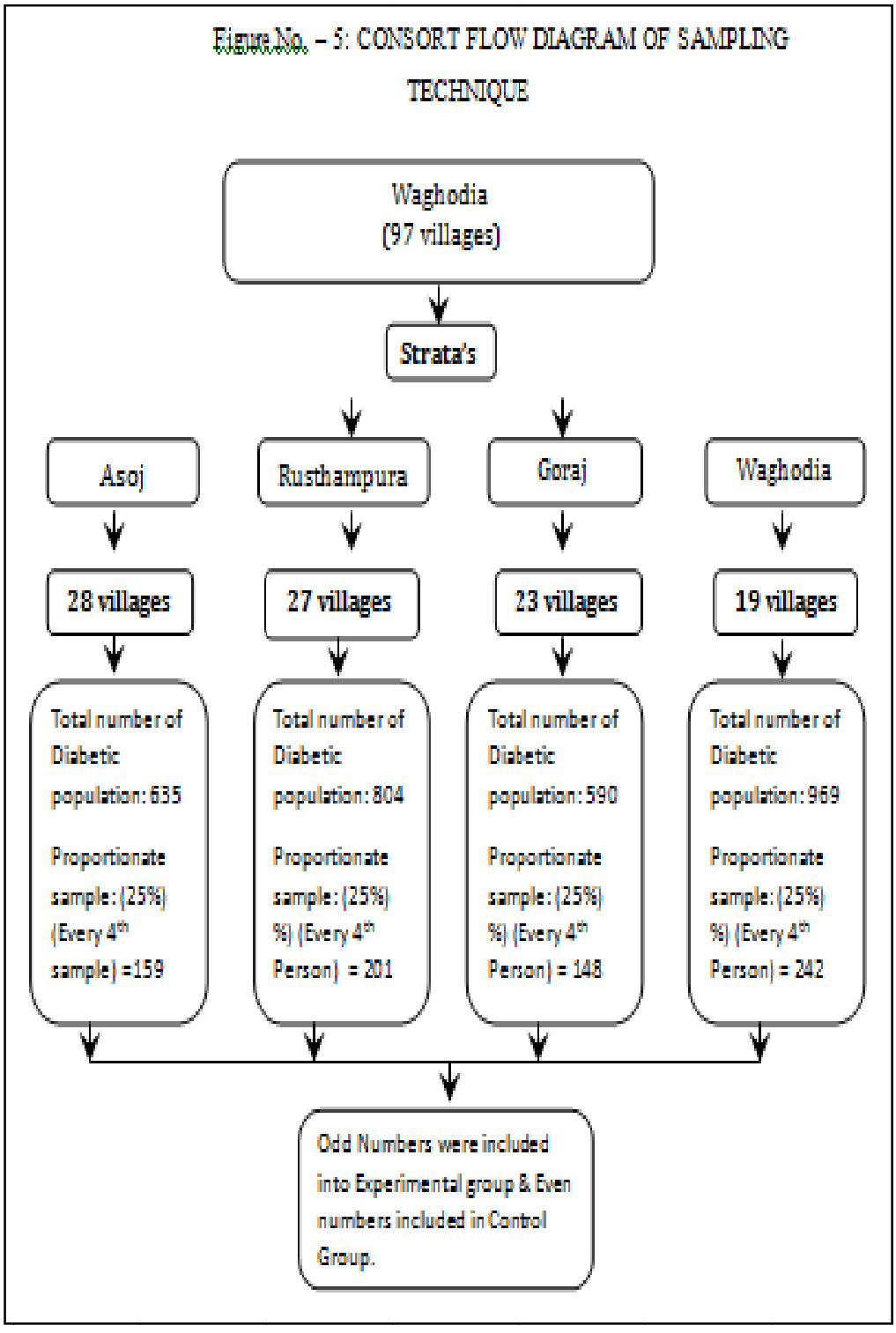
**Proportionate Stratified Random Sampling** is a probability sampling technique wherein the researcher divides the entire population into different subgroups or strata, then randomly selects the final subjects proportionally from the different strata.

In this study the sample size of each stratum is made proportionate to the population size of the stratum. Each stratum has the same sampling fraction; here are 4 strata with 365,804,590 and 969 Population sizes respectively. Thus, chose a sampling fraction of ¼ from each stratum.

The **systematic random sampling** was used to select the samples from each stratum i,e every $4^{th}$ person. The samples of 159, 201,148 and 242 subjects were selected respectively.Therefore the total samples become 750.

In order to classify the samples into experimental & control group, systematic random sampling was used. Odd numbers of the listed samples included into experimental group and even numbers included into control Group. Therefore, 375 samples were included in experimental group and the same numbers of samples were allocated for the control group. Amongthe experimental group, 15 samples were drop outs and 24 from control group among this 29samples have not shown the interest to continue, 4 samples had severe illness and 6 samples were hospitalized. Therefore, the final samples participated in the intervention were 360 in experimental group and 351 in control group. Thus the total samples for the study were 711.

Figure No. – 5: CONSORT FLOW DIAGRAM OF SAMPLING TECHNIQUE

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## 8. DESCRIPTION OF THE VARIABLES:

"In this study, Variables are the qualities, properties, or characteristics of person, things or situations that change or vary.

The variables under this study are the following,

**a) Independent Variable:**

In this study, the independent variable is Self-Management Training on Type 2 Diabetes mellitus.

The investigator prepared the overall plan of individual/Group self-management training on the basis of suggestions given by the guide and necessary modifications were made and the teaching plan was finalized.

**b) Dependent Variable:**

In this study, dependant variable refers to knowledge, Attitude and Practice of diabetic patients regarding self-management on type II diabetes mellitus. Here, the knowledge, attitude and practice represent the outcome of interest that is affected by independent variables.

**c) Demographic Variable:**

In this study, demographic variables are characteristics or attributes of subjects that are collected to describe the sample such as age group, gender, marital status, area of residence, educational status, occupation, monthly family income, Life style, family history, duration, treatment of Diabetes mellitus, Co-morbid disease, Previous source of health information, self-assessment regarding knowledge of diabetes mellitus".

## 9. DEVELOPMENT OF TOOL FOR DATA COLLECTION:

The tool is designed to collect relevant information regarding knowledge, attitude and practice on self-management of type II Diabetes Mellitus.

There were two different parts in the tool in order to explicit the various parameters of the samples.

**Part I:** Structured Interview Schedule consists of 14 items is prepared to elicit **Personal and clinical characteristics** of diabetic patients.

**Part II:** This part consists of 3 different questionnaires to assess Knowledge, attitude and Practice.

**Section: 1** structured cafeteria questionnaire consists of 20 items to assess the knowledge on self-management of type II Diabetes mellitus.

**Section: 2** Structured Likert Scale consists of 18 items to assess the attitude on self-management of type II Diabetes mellitus.

**Section: 3** Structured Criteria Checklist consists of 29 items to assess practice on self-management of type II Diabetes mellitus.

**Description of tool and scoring method:**

**I: Demographic Data**

This section deals with the demographic variables. This is the characteristics of the samples. This includes age group, gender, marital status, area of domicile, educational qualification, occupational status, monthly family income, Life style, family history, duration, treatment of Diabetes mellitus, Co-morbid disease, life style practices, Previous source of health information&self-assessment regarding knowledge of diabetes mellitus.

**Operational definitions:**

**Urban:** It refers to the samples residing in the geographical area of Waghodia town under Municipal Corporation.

**Rural:** It refers to the sample residing in the villages of Waghodia Taluka other than Waghodia town.

**Illiterate:** Sample who seeks help to read or writes the questionnaire and the content during the data collection.

**Primary education:** The samples those who undergoneEarly or elementary schooling; I-V standard of education in any language medium.

**Secondary education:** Middle schooling of any medium of instruction from class IV to X.

**Higher secondary education:** Those who have completed their 11- 12th class examination

**Graduate:** A person who has successfully completed an undergraduate course.

**Medical/Para-medical education**: person who completed any education related to medical or medical related courses: it may be certificate, diploma, degree or post graduate degree.

**Unemployed:** Sample who has no paid job for his education.

**Farming:** Those who are involving in agricultural production.

**Self employed:** Persons earning by doing something by oneself other than agriculture.

**Government Employee:** Those who are employed in government agency and receiving monthly salary.

**Private employee**: Those who are employed in private agency and reciving monthly salary.

**Retired**: Those who are stopped working due to superannuation.

**Life style:** The sample's pattern of working style it is in terms of physical activity.

**Sedentary worker:** It denotes that the little or less physical activity during their routine job.

**Heavy worker:** It denotes that the Heavy or strenuous physical activity during their routine job.

**Co Morbid disease:** In this study, co morbidity is the presence of one or more additional diseases or disorders co-occurring with Diabetes mellitus such as Hypertension, CCF, Renal Disorder, Anemia, Liver disorder.

**Life style Practices:** It means samples behavior, attitude, interest, values or leisure activity such as exercise, yoga, social activities, alcohol consumption, smoking etc.

**Previous Source of health information:** this denotes area from where samples received the information regarding diabetes mellitus.

**Self Assessment:** It is samples own perception on his knowledge regarding diabetes mellitus in a rating scale of 1to 10.

**Body mass Index:** An approximate measure of whether sample is over or underweight, calculated by dividing their weight in kilograms by the square of their height in meters.

**Part-2:**

**Section1: Structured cafeteria questionnaire consists of 20 items to assess the Knowledge on Self-management of type II Diabetes mellitus.**

The self-developed cafeteria questionnaire is an interview questionnaire that focuses on subjective knowledge on self-management of type II diabetes mellitus. The tool consists of 20 items that would help to screen the knowledge regarding self-management of type II Diabetes mellitus. After the patient has completed the questionnaire the score will be add up. The highest possible total for the whole test would be 90. This would mean the patient circled all the options on all twenty questions. Since the lowest possible score for each question is zero. This would mean the patient has not given answer. If the score is 00-30 the screened level of knowledge is said to be Inadequate, if the score is 31-60 it is considered as moderately adequate and 61-90 is screened as adequate knowledge.

**Table No. -4: Scoring Procedure on knowledge regarding self-management of type II Diabetes mellitus.**

| Sl. No | Score (range ) | Level of Knowledge |
|---|---|---|
| 1 | 00-30 | Inadequate |
| 2 | 31-60 | Moderately adequate |
| 3 | 61-90 | Adequate knowledge |

**Section-2:** Structured Likert Scale consists of 18 items to assess the attitude on self-management of type II Diabetes mellitus.

It includes 18 items to assess the attitude of self-management of type II diabetes mellitus the section utilized five point Likert scale to assess the attitude in terms of strongly agree, agree, uncertain, disagree and strongly disagree. The positive statements secures the strongly agree carries a score of five, a score of four for agree, three for uncertain, two for disagree and one for strongly disagree. The reverse is for the negative statements. Out of 18 statements 14 were positive items and 04 were

negative statements under the areas of predisposing factors, care and management of type II diabetes mellitus. If the score is 18-42 the screened level of attitude is said to be poor, if the score is 43-60 it is considered as Average and 61-90 is screened as positive attitude.

**Table No.-5: Scoring Procedure on attitude regarding self-management of type II Diabetes mellitus.**

| **Sl. No** | Score (range ) | Level of Attitude |
|---|---|---|
| 1 | 61-90 | positive attitude |
| 2 | 43-60 | Average |
| 3 | 18-42 | Poor |

**Section-3:** Structured Criteria Checklist consists of 29 items to assess practice on self-management of type II Diabetes mellitus.

The tool consists of three areas such as:

1. Self-administration of insulin.
2. Self-monitoring blood glucose level
3. Foot care instructions

The observations were marked under two namenclutures, “yes” and “No”. One mark was assigned to each item if it was yes. The total possible score is 29. If the score is between 00-09 then it is considered as poor practice, if the score is between 10-19, then it is considered as average practice and if the score is 20-29, then it is considered as good practice.

**Table No. - 6: Scoring Procedure on Practice regarding self-management of type II Diabetes mellitus.**

| **Sl. No** | **Score (Range )** | **Level of Practice** |
|---|---|---|
| 1 | 20-29 | Good practice |
| 2 | 10-19 | Average |
| 3 | 00-09 | poor |

**Content Validity & Reliability of the tool**

Content validity of the tool was established by 08 experts comprising of 1 diabetologist, 1 physician, 1 Intensivist, 1 statistician, 1 Health care administrator and 3 were from nursing department.

The experts were requested to give their opinion and suggestions regarding the relevance of the tool for further modification of items, to improve the clarity and content of the items. Initially the tool developed consisted of 18 items on socio-demographic data in which 100% agreement on all items, but suggestions were given to modify and simplify the wording of question 15. The tool consisted of 20 items for knowledge assessment, 18 items Likert scale to assess the attitude and 29 items for observation checklist. Necessary corrections were made on the basis of the suggestions given by the validators. The tool and the content were translated to Gujarati by language experts.

In Part II, section 1, there were 20 structured cafeteria questions to assess the Knowledge on Self-management of type II Diabetes mellitus and experts suggested to rearrange the questions in a sequential order, it was arranged accordingly.

Section 2 was the attitude scale consisted of 18 items and all items had 100 % agreement.

Section 3 was the checklist which consists of 29 items on self-management of type II Diabetes mellitus and all the items had 100% agreement. The average time taken to complete the pre-test knowledge, attitude & practice questionnaire was 25-30 minutes, individual training session was 45- 60 minutes and post-test was 25-30 minutes.

After the validity of tool, reliability of the instrument was established by administrating to 25 subjects. Reliability of the knowledge questionnaire was found out by using Spearman Brown Prophecy Formula and it was found to be 0.77, which indicated that the tool was reliable and the same formula used for structured Likert scale to assess the attitude i.e. 0.9 hence the scale is found to be reliable.

Procedures performed by patients were observed and recorded at the same time by the investigator. Karl Pearson correlation co-efficient was used to find out linear relationship between the two sets of scores. The reliability of the observation checklist was found out by Spearman – Brown Prophecy Formula and it was found to be 0.78, which indicated that the tool was reliable.

**Development of self-management training Module:**

The self-management training module was developed for patients with type II diabetes mellitus. It was prepared based on review of literature and discussion with guide.

The content of Self-Management Training on Type 2 Diabetes mellitus includes Introduction, definition, Risk factors, classification, Sign & Symptoms, Diagnostic finding, self management management of diabetes mellitus such as dietary guideline, medication administration, exercise, blood glucose monitoring, foot care and prevention of complication.

**Demographic survey of Diabetic patients at Waghodia Taluka**

- In-order to study the total diabetic population, Investigator conducted the demographic survey all over 97 villages of Waghodia.
- About 12 volunteers were chosen to conduct door to door survey
- Area map and route map of Waghodia was prepared.
- Systematically assigned the villages to all the volunteers.
- Prepared a demographic survey Performa to collect the necessary data.
- Designed a Data sheet for entering village-wise data.
- Conducted door to door survey and obtained the data.
- The process of demographic survey was between May 2015 to August 2015.

## 10. PILOT STUDY:

The main aim of pilot study is to assess the feasibility, practicability and assessment of adequacy of measurement.

The duration of pilot study process was from 15$^{th}$ October 2015 to 30$^{th}$ October, 2015.The sample size for pilot study was 25. Purpose of the study was to know the difficulties in collecting data, administration of training, and post test. The informed consent was taken from the subjects prior to the study and obtained their co-operation, after which the tool was administered. On the first day, the pre-test was conducted and simultaneously self-management training was given. The post-test was conducted after 2 weeks by using the same interview schedule. The average time taken to complete the pre-test was 25-30 minutes, individual training session was 45-60 minutes and post-test was 20-25 minutes.

**Table No. - 7: PROCESS OF DATA COLLECTION**:

| Phase I | | Phase II | Phase III | | | Phase IV |
|---|---|---|---|---|---|---|
| **Sample** | **Tool and technique** | **Diabetic Demographic Survey** | **Pre-test** | **Treatment** | **Post-test** | **Plan of analysis** |
| Type-2 Diabetes mellitus patients residing in Waghodia Taluka. (Experimental Group )<br><br>Type-2 Diabetes mellitus patients residing in Waghodia Taluka. (Control Group ) | 1.Structured Interview Schedule-to assess clinical characteristics<br><br>2.structured cafeteria questionnaire -to assess the knowledge<br><br>3. Structured Likert Scale - to assess the attitude<br><br>4.Structured Criteria Checklist - to assess practice | Conducted door to door survey in-order to study the total diabetic population, all over 97 villages of Waghodia.<br><br>About 12 volunteers were chosen to conduct door to door survey<br><br>Area map and route map of Waghodia was prepared.<br><br>Prepared a demographic survey Performa to collect the necessary data.<br><br>Designed a Data sheet for entering village-wise data. | The questionnaire was administered to 711 samples - to assess the existing knowledge, attitude and practice. | Self Management training on DM | The post-test was conducted after 2 weeks by using the same interview schedule. | 1. Descriptive statistics for demographic variables<br><br>2. Inferential statistics to find out the effectiveness of Self-Management training among experimental and control group.<br><br>3. Spearman browns prophecy was used to find the correlation between the knowledge and practice.<br><br>4. Chi-square test was used to test the association between demographic variables with the mean pretest level of knowledge, attitude and practice. |

- **Period of data collection**

The process of Data collection for the main study was from 15th January 2016 to 30th May 2016.

- **Permission from the samples, informed consent and Rapport building.**

The research investigator obtained the ethical clearance and formal permission from the samples and informed consent was obtained to conduct the study. Prior to data collection, the investigator familiarized him with the subjects and explained to them the purpose of study. He requested the participants' full co-operation and assured them the confidentiality of their response.

- **Training for the trainers:**
- The investigator selected 12 voluntary nursing professionals, trained them in the intended subject and collected data from villages of Waghodia taluka. Community survey of Waghodia taluka was done to identify  All of them were given training regarding assessing knowledge, attitude & Practice of diabetic patients on self management of type II diabetes mellitus.
- **Classification of  Waghodia and route mapping:**

The investigator segregated the entire population according to the villages. (Total 97 villages) those villages were stratified into 4 as per the PHC's of Waghodia Taluka i.e. Asoj, Rustampura, Goraj and Waghodia.

- **Pre-Test:**

The questionnaire was administered to 711 samples in order to assess the existing knowledge, attitude and practice.

- **Intervention:**

On the same day, the training session was conducted to the samples at their home environment with the help of Demo Kit.

- **Post Test:**

The post-test was conducted after 2 weeks by using the same tool. The average time taken to complete post-test was 25-30 mts, duration of training program was 45-60 minutes and average time taken for post-test was 20-25 mts.

- **Data Compilation:**

A data sheet was designed to systematically gather the collected data and compiled for data analysis.

## 11. PLAN FOR DATA ANALYSIS:

The data was analyzed using descriptive statistics for demographic variables and inferential statistics such as Mann Whitney test to find out the effectiveness of Self-Management training among experimental and control group. Spearman browns prophecy was used to find the correlation between the knowledge and practice. Chi-square test was used to test the association between demographic variables with the mean pre-test level of knowledge, attitude and practice.

## 12. CONSIDERATION:-

Ethical clearance was obtained from the Sumandeep Vidyapeeth University HRRP department with Ref No: SVIEC/ON/2015/15009 dated 20.01.2015.

Written consent was obtained from the samples after explaining the importance of getting self-management training. No financial burden was given to the participants towards the materials used during the intervention. Anonymity and confidentiality of the participants have been maintained during study.

**Summary:**

This chapter deals with the methodology under taken for the study. It includes research approach, research design, and setting of the study, variables, population, sample and sampling technique used for the study, pilot study, data collection procedure, plan for data analysis and ethical consideration.

We were motivated by the co-operation and appreciation of the subjects and their positive response throughout the study. The subjects were very co-operative and showed much interest to keep abreast with diabetic self management training.

# CHAPTER IV

# RESULTS

This chapter depicts the analysis and interpretation of data collected to determine the Effectiveness of Self-Management Training on Type 2 Diabetes mellitus.

The data has been analysed and interpreted in the light of the objectives and hypothesis of the study using descriptive and inferential statistics in order to interpret the data in an intelligible form.

## OBJECTIVES

1. Assess the existing level of knowledge, attitude & Practice regarding self management of type 2 diabetic patients among experimental and control group.
2. Evaluate the effectiveness of self management training program on type 2 diabetes mellitus in terms of knowledge, attitude & Practice among experimental and control group.
3. Find out the association between the Pre test knowledge, attitude & Practice scores with their selected socio-demographic variables.
4. Correlate the post test knowledge scores with post test attitude scores & Post test practice scores regarding self management of type 2 diabetes mellitus.

## HYPOTHESIS

- $H_1$: Mean post-test knowledge, attitude and practice score of patients in experimental group will be significantly higher than the mean post-test knowledge attitude and practice score of patients in Control group.
- $H_2$: There will be significant association between pre test knowledge, attitude & practice score with their selected socio demographic variables.
- $H_3$: There will be a significant correlation between post test knowledge score and post test attitude score of experimental group regarding self management of type 2 diabetes mellitus.
- $H_4$: There will be a significant correlation between post test knowledge score and post test practice score of experimental group regarding self management of type 2 diabetes mellitus.

The analysis & interpretation of data for this study are based on data collected through self administered knowledge questionnaire, attitude scale and practice checklist for the Type II diabetes mellitus patients (N=711) consisting of experimental group (N=360) & control group (N=351). The results were tabulated using descriptive & inferential statistics based on the objectives of the study. Interpretations of results were described under 5 sections as described below.

**Section I:**

Sample characteristics such as age in years, Gender, Marital status, Area of residence, Education, Occupation, Family Income in Rs, Family history of diabetes, Duration of DM, treatment of DM, Co morbidity, Life style habits, Source of knowledge, Self assessment.

**Section II:**

a) Analysis of existing level of knowledge regarding self management Training of type 2 diabetic patients among experimental and control group
b) Analysis of existing level of attitude regarding self management of type 2 diabetic patients among experimental and control group
c) Analysis of existing level of practice regarding self management of type 2 diabetic patients among experimental and control group

**Section III:**

a) Comparison of post - test knowledge scores of experimental and control group regarding self management training on type 2 diabetes mellitus.
b) Comparison of post test attitude scores among experimental and control group regarding self management training on type 2 diabetes mellitus
c) Comparison of post test practice scores among experimental and control group regarding self management training on type 2 diabetes mellitus.

**Section IV:**

a) Association between pre test knowledge score with their selected socio-demographic

variables.

b) Association between pre test attitude score with their selected socio-demographic variables.
c) Association between pre test practice score with their selected socio-demographic variables.

**Section V:**

a) Correlation between post test knowledge score and post test attitude score among experimental group
b) Correlation between post test knowledge score and post test practice score among experimental group.

## SECTION I

**Sample characteristics**

This section deals with the description of sample characteristics of the subjects and is explained in frequency and percentage distribution and represented.

**Table No. 8: Frequency & Percentage distribution of samples based on their age**

| Age in Years | | | |
|---|---|---|---|
| Group | | Frequency | Percent |
| Experimental | 31 – 39 | 15 | 4.2 |
| | 39 - 47 | 61 | 16.9 |
| | 47 – 55 | 110 | 30.6 |
| | 55 – 63 | 174 | 48.3 |
| Control | 31 – 39 | 25 | 7.1 |
| | 39 - 47 | 51 | 14.5 |
| | 47 – 55 | 105 | 29.9 |
| | 55 – 63 | 170 | 48.4 |

Table No 8 & Diagram No 6 shows that the majority of samples in both experimental & control groups (174 & 170) were aged between 55-63 whereas less number of samples in both groups (15 & 25) were aged between 31-39. It is evident from the above data that DM affects majorly to the elderly people rather than younger people.

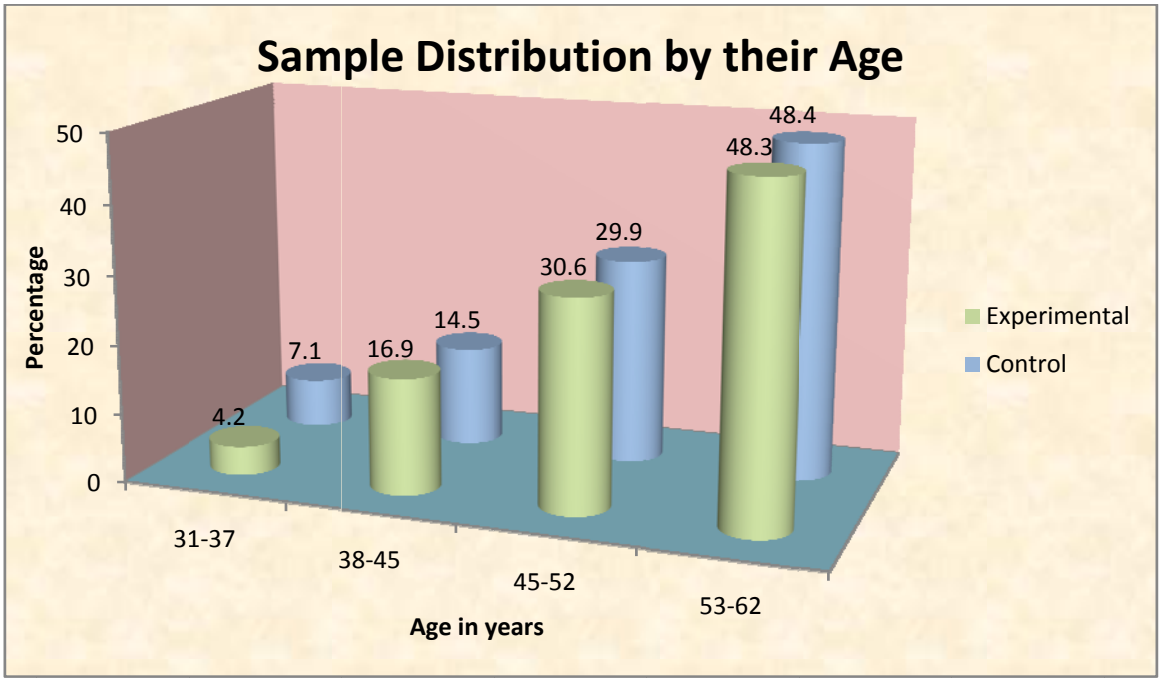


**Figure No. 6: Sample distribution by their age**

**Table No. 9: Frequency & Percentage distribution of samples based on Gender**

| Gender | | | |
|---|---|---|---|
| **Group** | | Frequency | Percentage |
| Experimental | Male | 177 | 49.2 |
| | Female | 183 | 50.8 |
| Control | Male | 156 | 44.4 |
| | Female | 195 | 55.6 |

Table No. 9 & Diagram No. 7 shows that 360 samples were allocated to experimental group out of which 177 were male & 183 were female. 351 samples were allocated to control group in the study out of which 156 were male & 195 were female. It is evident from the above table that female from either group were suffering from DM.

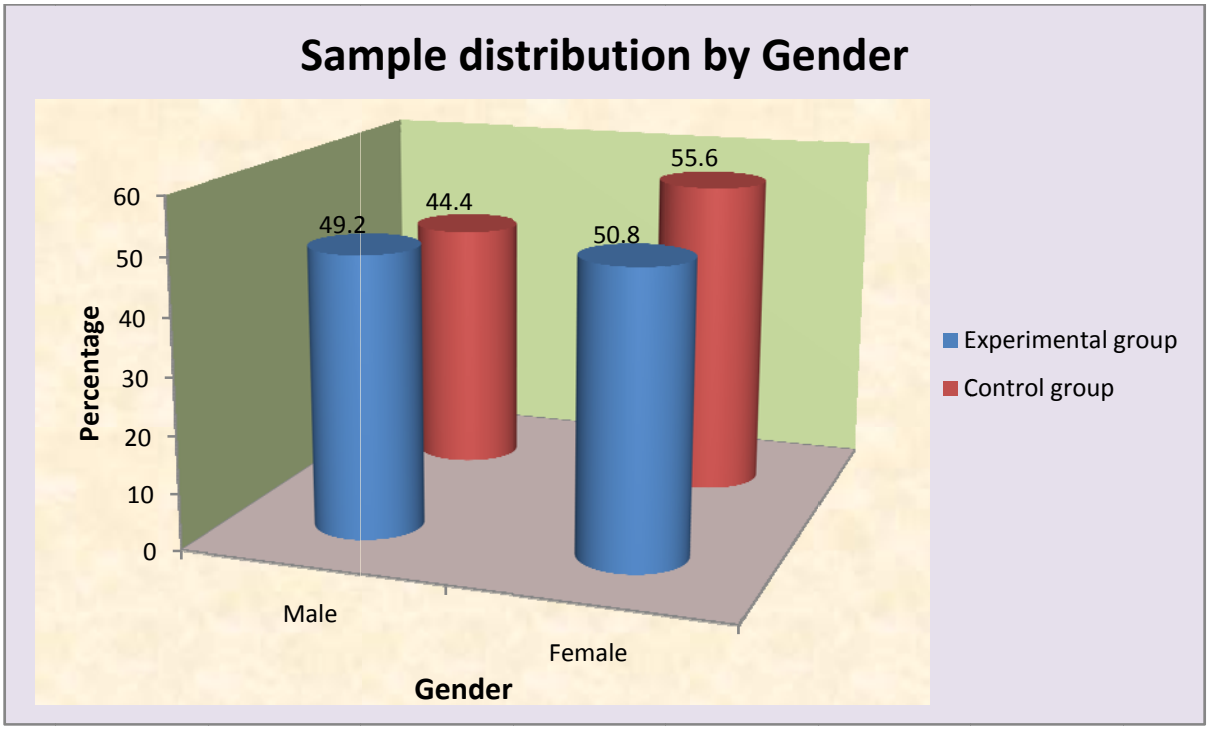


**Figure No. 7: Sample distribution by Gender**

**Table No. 10: Frequency & Percentage distribution of samples based on marital status**

| Marital Status | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | Single | 18 | 5.0 |
| | Married | 307 | 85.3 |
| | Widow | 28 | 7.8 |
| | Divorced | 7 | 1.9 |
| Control | Single | 21 | 6.0 |
| | Married | 279 | 79.5 |
| | Widow | 41 | 11.7 |
| | Divorced | 10 | 2.8 |

Table No. 10 & Diagram No. 8 depicts that majority of the sample in experimental group (307) were married followed by widow (28), single (18) & only 7 were divorced. Majority of the sample in control group (279) were married followed by widow (41), single (21) & only 10 were divorced. Majority of the DM patients from either group were married.

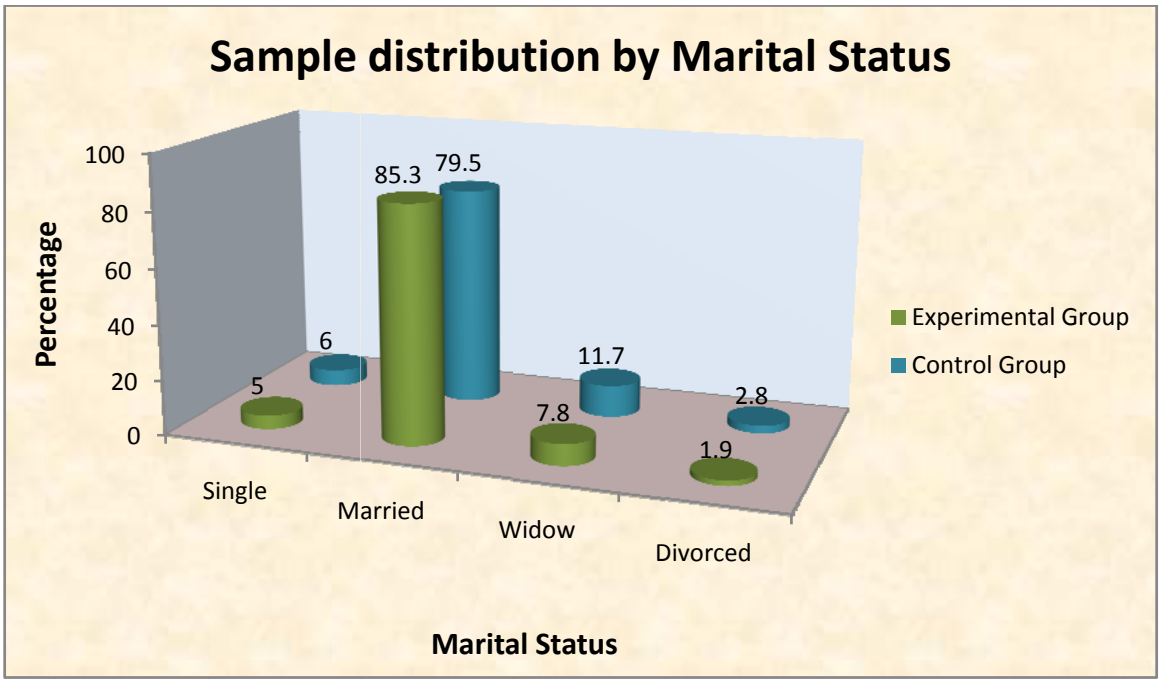


**Figure No. 8: Sample distribution by Marital Status**

**Table No. 11: Frequency & Percentage distribution of samples based on area of residence**

| Area of residence | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | Urban | 13 | 3.6 |
| | Rural | 347 | 96.4 |
| Control | Urban | 28 | 8.0 |
| | Rural | 323 | 92.0 |

Table No. 11 & Diagram No. 9 shows that 360 samples were allocated to experimental group out of which 13 from urban & 347 from rural. 351 samples were allocated to control group in the study out of which 28 from urban & 323 from rural. It was observed that majority of DM patients were residing in rural area.

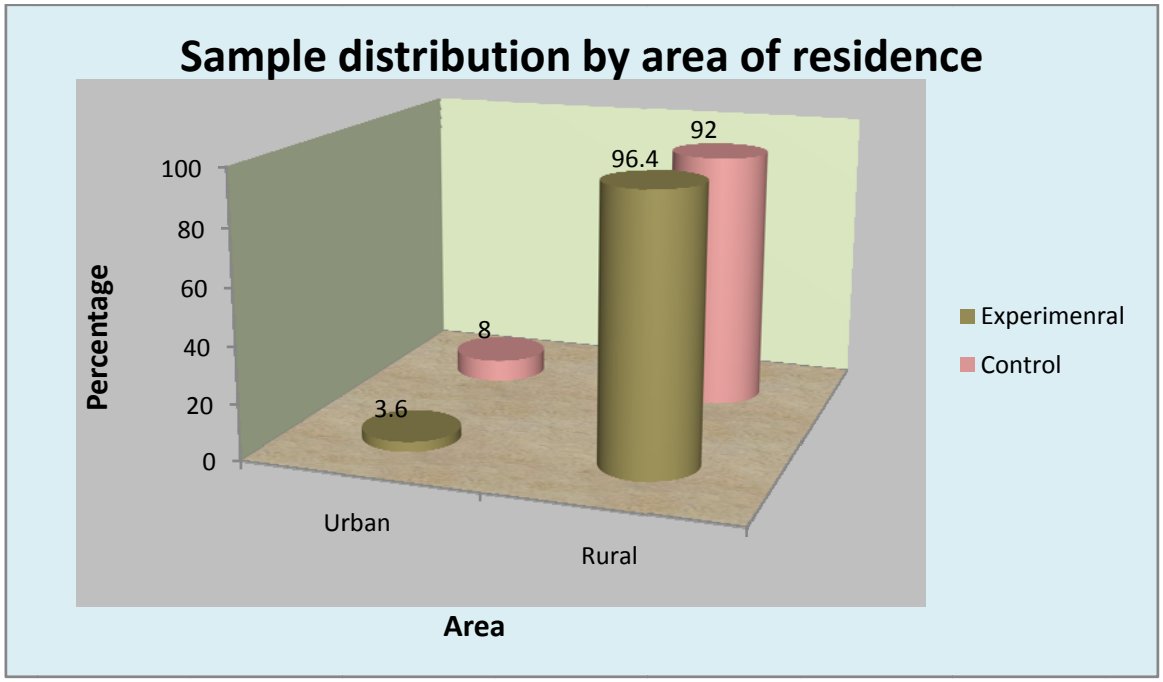


**Figure No. 9: Sample distribution by Area of residence**

**Table No. 12: Frequency & Percentage distribution of samples based on education status**

| Education | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | Illiterate | 82 | 22.8 |
| | Primary education | 180 | 50.0 |
| | Secondary education | 48 | 13.3 |
| | Higher secondary education | 28 | 7.8 |
| | Graduate and above | 13 | 3.6 |
| | Medical/Para-medical education | 9 | 2.5 |
| Control | Illiterate | 121 | 34.5 |
| | Primary education | 151 | 43.0 |
| | Secondary education | 49 | 14.0 |
| | Higher secondary education | 22 | 6.3 |
| | Graduate and above | 2 | .6 |
| | Medical/Para-medical education | 6 | 1.7 |

As per Table No. 12 & Diagram No. 10, in experimental group majority of the sample (180) had primary education, 82 samples did not get any education, 48 of them had secondary education, 28 of them got higher secondary education, 13 were graduated & only 9 were from medical/Paramedical background.

In Control group majority of the sample (151) had primary education, 121 samples did not get any education, 49 of them had secondary education, 22 of them got higher secondary education, 2 were graduated & only 6 were from medical/Paramedical background. It was evident that majority of DM patients in either group had primary education.

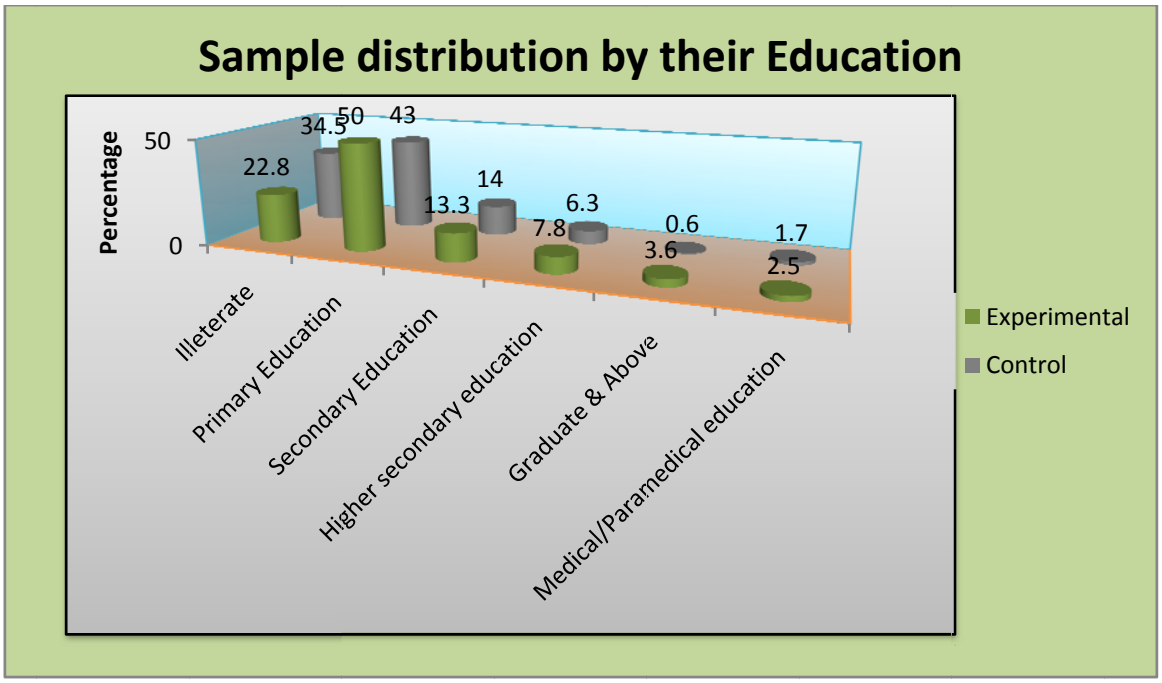


**Figure No. 10: Sample distribution by their education status**

**Table No. 13: Frequency & Percentage distribution of samples based on occupation**

| Occupation | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | Unemployed | 91 | 25.3 |
| | Farming | 138 | 38.3 |
| | Self employed | 52 | 14.4 |
| | Govt. employee | 36 | 10.0 |
| | Private employee | 19 | 5.3 |
| | Retired | 24 | 6.7 |
| Control | Unemployed | 96 | 27.4 |
| | Farming | 157 | 44.7 |
| | Self employed | 49 | 14.0 |
| | Govt. employee | 22 | 6.3 |
| | Private employee | 6 | 1.7 |
| | Retired | 21 | 6.0 |

As per Table No. 13 & Diagram No. 11, in experimental group majority of the sample (138) were farmers, 91 samples were unemployed, 52 samples had their own

occupation, 36 of them were government employees, 19 samples were working in private sector & 24 samples were retired.

In control group majority of the sample (157) were farmers, 96 samples were unemployed, 49 samples had their own occupation, 22 of them were government employees, 6 samples were working in private sector & 21 samples were retired. It was evident from the data that majority of the DM patients are farmers by their occupation.

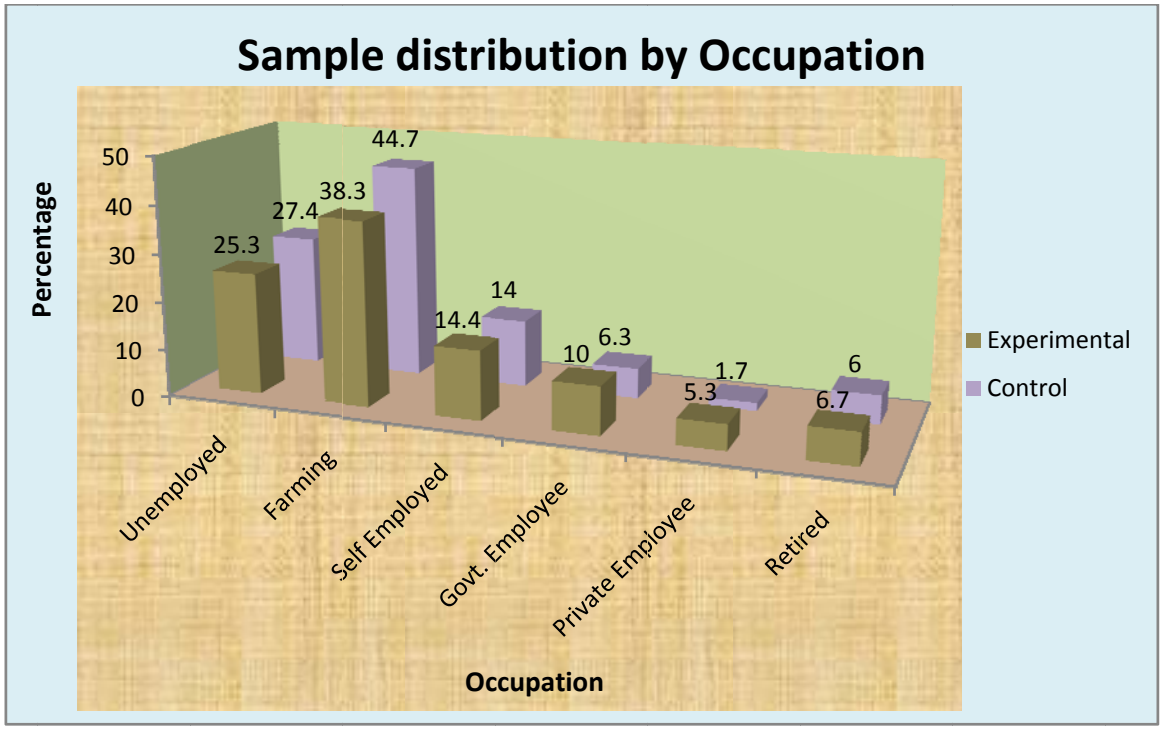


**Figure No 11: Sample distribution by their occupation**

**Table No. 14: Frequency & Percentage distribution of samples based on Family Income**

| Family Income in Rs | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | < 5000 | 109 | 30.3 |
| | 5001-10000 | 157 | 43.6 |
| | 10001-20000 | 41 | 11.4 |
| | > 20001 | 53 | 14.7 |
| Control | < 5000 | 124 | 35.3 |
| | 5001-10000 | 122 | 34.8 |
| | 10001-20000 | 51 | 14.5 |
| | > 20001 | 54 | 15.4 |

Table no.14 and Diagram No.12 shows that the majority of samples in experimental group (157) had income of Rs. 5001-10000 & only 41 samples had income between 10001-20000, whereas in control group majority of samples(124) had family income of Rs. <5000/- & only 51 samples had income between 10001-20000. It was observed that majority of the DM patients in either group had low income status ranging from < 5000-10000.

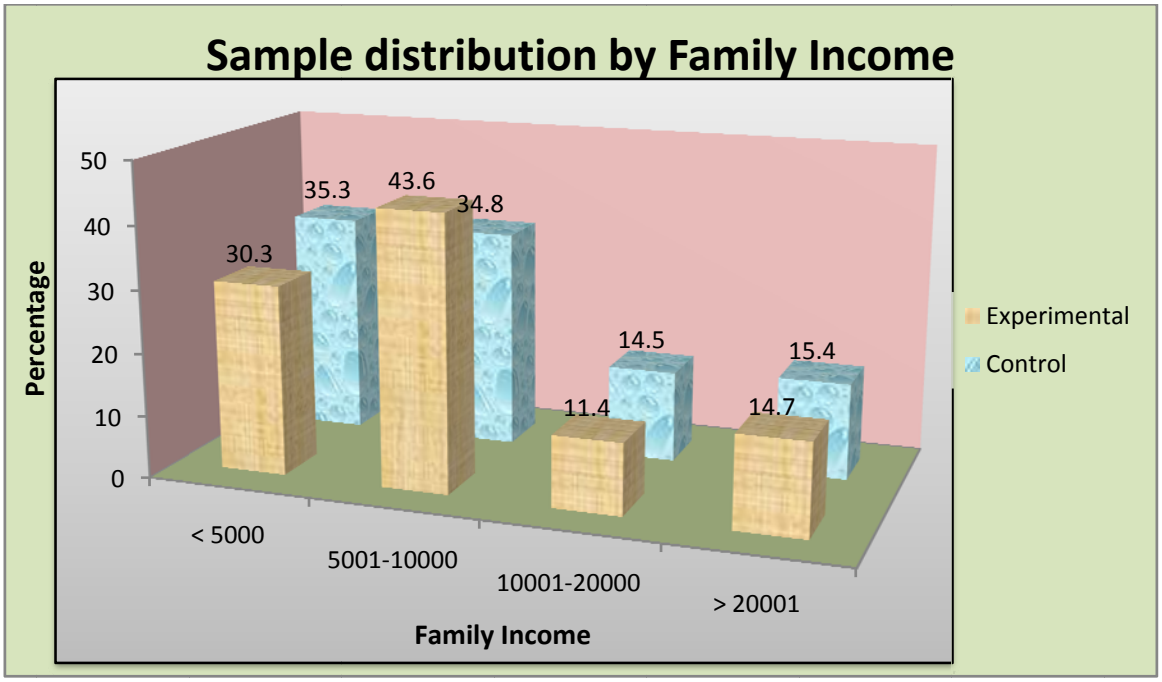


**Figure No 12: Sample distribution by their family income**

**Table No. 15: Frequency & Percentage distribution of samples based on Family history**

| Family History of Diabetes | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | Yes | 91 | 25.3 |
| | No | 269 | 74.7 |
| Control | Yes | 122 | 34.8 |
| | No | 229 | 65.2 |

According to Table No 15, Diagram No 13, majority of the samples both in experimental group & control group (269 & 229) did not had any family history of diabetes where as average number of samples in both groups (91 in experimental & 122

in control) had family history of diabetes. As per the data collected it was evident that majority of patients in either group did not had family history of DM.

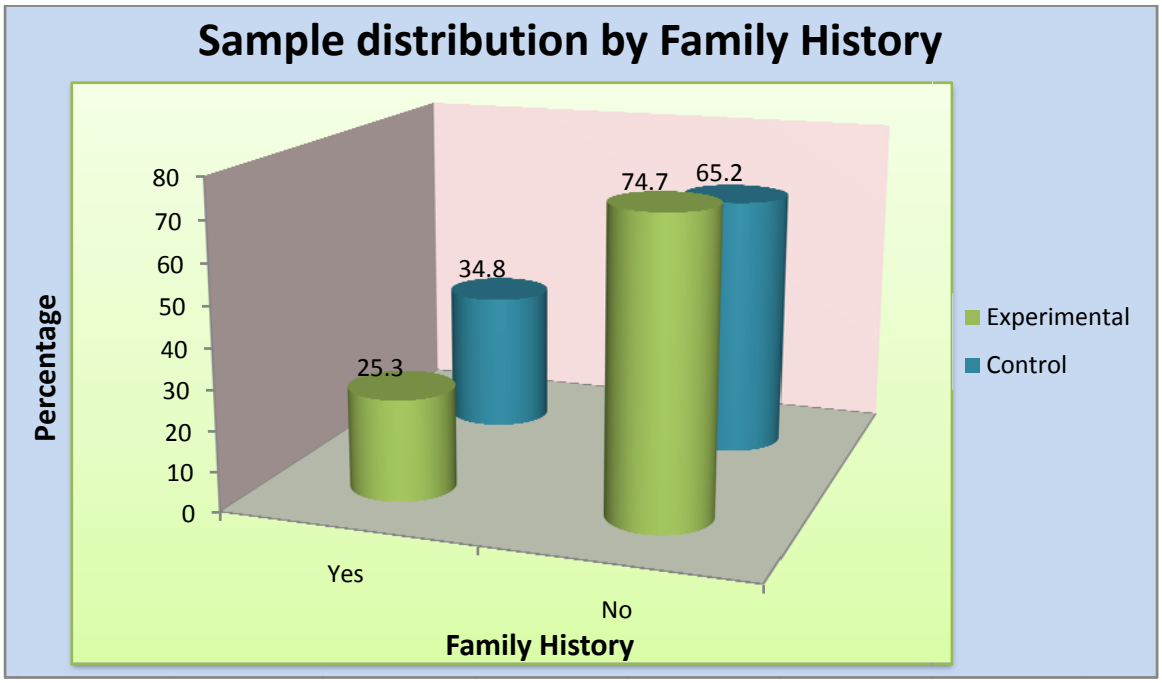


**Figure No. 13: Sample distribution by their family history of illness**

**Table No. 16: Frequency & Percentage distribution of samples based on duration of DM**

| Duration of DM | | | |
|---|---|---|---|
| Group | | Frequency | Percent |
| Experimental | Recently diagnosed (less than 1 month ) | 48 | 13.3 |
| | 1 month-1 year | 99 | 27.5 |
| | 1-5years | 119 | 33.1 |
| | 6-10 years | 56 | 15.6 |
| | >11 years | 38 | 10.6 |
| Control | Recently diagnosed (less than 1 month ) | 45 | 12.9 |
| | 1 month-1 year | 95 | 27.1 |
| | 1-5years | 128 | 36.6 |
| | 6-10 years | 50 | 14.3 |
| | >11 years | 32 | 9.1 |

Table no.16 and Diagram No.14 shows that majority of the samples in both experimental group (119) & control group (128) were suffering from DM, duration of which ranges between 1-5 years & few (38 & 32 in each group respectively) samples were having DM since more than 11 years. It was evident from the table that majority of patients in either group are suffering from DM from past 5 years.

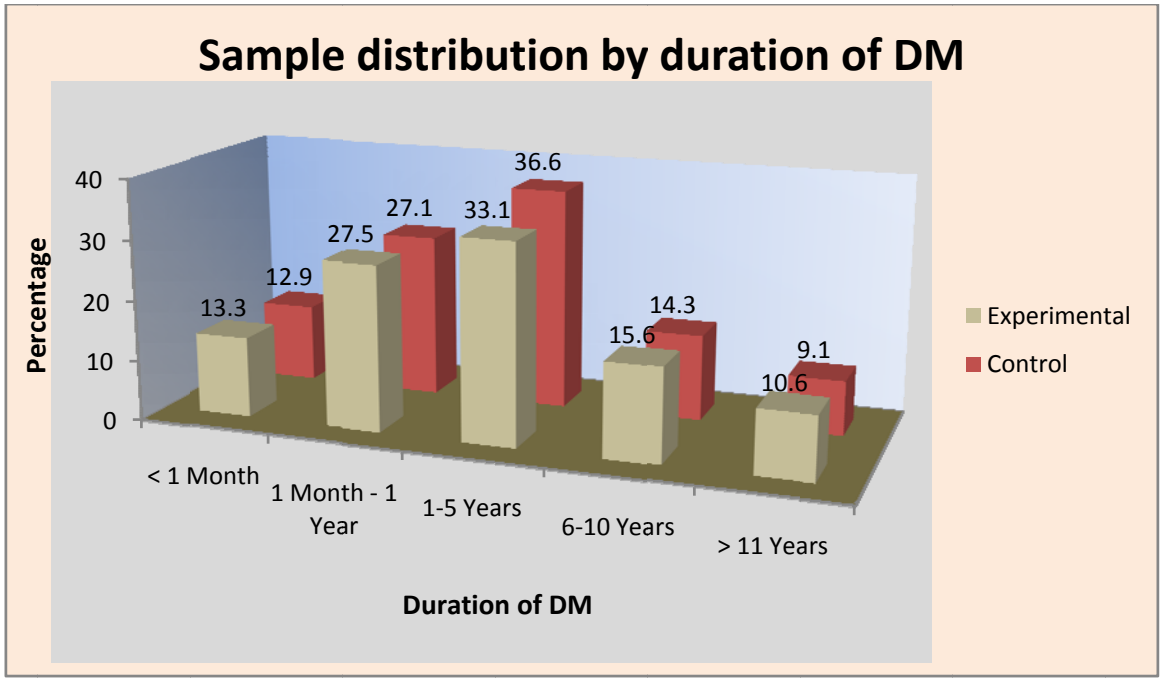


**Figure No 14: Sample distribution by duration of DM**

**Table No. 17: Frequency & Percentage distribution of samples based on treatment**

| Treatment of DM | | | |
|---|---|---|---|
| group | | Frequency | Percent |
| Experimental | Oral Hypoglycaemic agents | 268 | 75.7 |
| | Insulin Therapy | 41 | 11.6 |
| | Combined therapy | 21 | 5.9 |
| | Alternative therapy | 24 | 6.8 |
| Control | Oral Hypoglycaemic agents | 305 | 86.9 |
| | Insulin Therapy | 22 | 6.3 |
| | Combined therapy | 16 | 4.6 |
| | Alternative therapy | 8 | 2.3 |

Table No 17 & diagram No 15 depicts that majority of the samples in experimental & control group (268 & 305 respectively) were on oral hypoglycaemic treatment & only 21 from experimental & 8 from control were on combined treatment & alternative therapy respectively. It was evident that majority of the patients in either group are on oral hypoglycaemic agents.

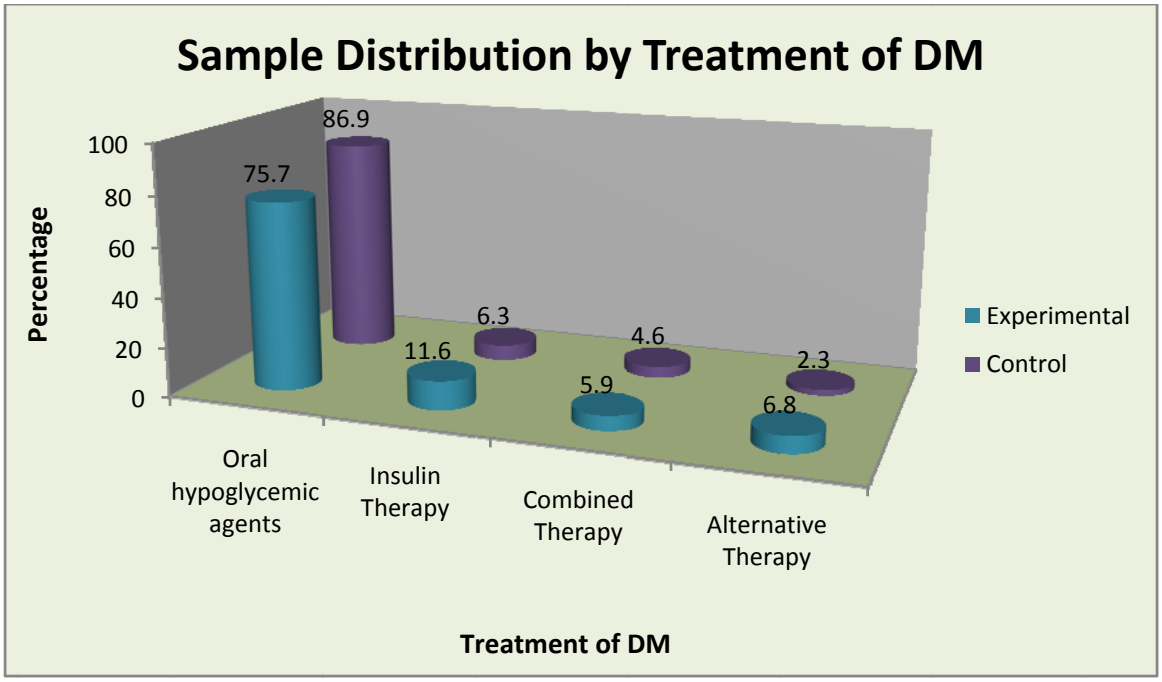


**Figure No 15: Sample distribution by treatment of DM**

**Table No. 18: Frequency & Percentage distribution of samples based on Co-morbidity**

| Co - morbidity | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | No Co - Morbidity | 41 | 11.4 |
| | Vascular disorders | 172 | 47.26 |
| | Anaemia | 81 | 22.7 |
| | Liver Disorders | 16 | 4.5 |
| | Renal Disorders | 31 | 8.8 |
| | Other Diseases | 40 | 11.1 |
| Control | Vascular Disorders | 233 | 66.4 |
| | Renal Disorder | 34 | 9.7 |
| | Anaemia | 22 | 6.3 |

| | | | |
|---|---|---|---|
| | Liver disorder | 25 | 7.1 |
| | Other Diseases | 37 | 10.5 |

As per Table No. 18&Diagrams 16 & 17, Majority of the samples in both groups (172 in experimental & 233 in control group respectively) are having vascular disorders where as few samples in both groups are suffering from other disorders in addition to Diabetes such as renal disorders, anaemia, liver disorders. It was evident that majority of diabetes patients are suffering from associated vascular disorders & few patients were suffering from other disorders such as anaemia, liver disorders & renal disorders.

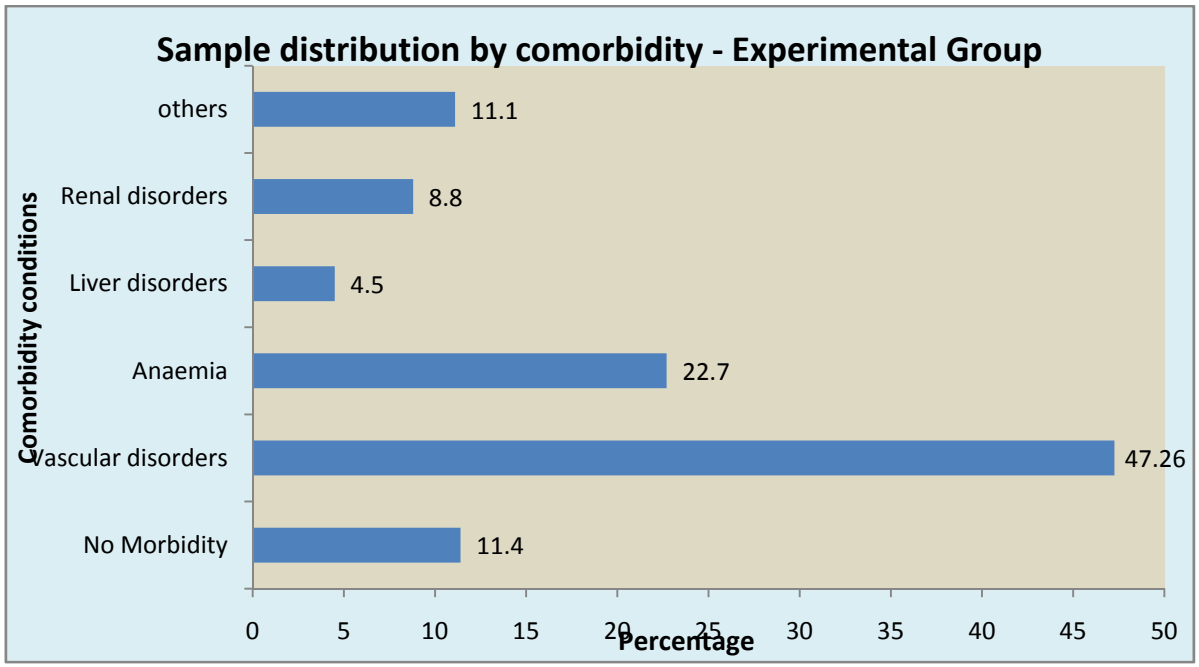


**Figure No 16: Sample distribution by Co-morbidity (Experimental group)**

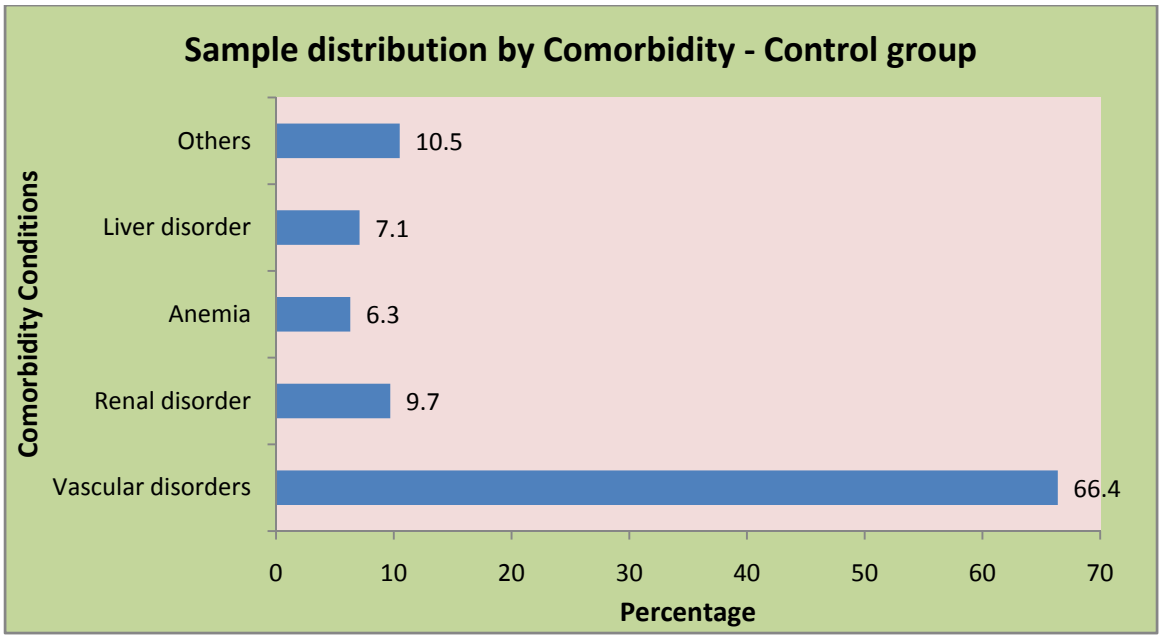


**Figure No 17: Sample distribution by Co-morbidity (Control Group)**

**Table No. 19: Frequency & Percentage distribution of samples based on Life style**

| Life Style Habits | | | |
|---|---|---|---|
| Group | | Frequency | Percent |
| Experimental | Nil | 181 | 50.3 |
| | Smoking | 54 | 15.0 |
| | Smoking, Alcohol | 10 | 2.8 |
| | Smoking, Alcohol, Exercise | 1 | .3 |
| | Smoking, Exercise | 11 | 3.1 |
| | Alcohol | 49 | 13.6 |
| | Alcohol, Exercise | 10 | 2.8 |
| | Exercise | 44 | 12.2 |
| Control | Nil | 173 | 49.3 |
| | Smoking | 36 | 10.3 |
| | Smoking, Alcohol | 29 | 8.3 |
| | Smoking, Exercise | 8 | 2.3 |
| | Alcohol | 44 | 12.5 |
| | Alcohol, Exercise | 16 | 4.6 |
| | Exercise | 45 | 12.8 |

Table No 19, Diagram No 18 & 19 depicts majority of the samples in experimental & control group (181 & 173) do not have any bad life style habits where as

average number of samples in both groups adopted unhealthy life style habits such as smoking, alcohol drinking & few have adopted healthy habit of doing exercises in their day to day life. It was evident that majority of DM patients in either group did not had had bad life style habits where as less patients from both groups were alcoholics & smokers. Only few patients had practice of daily exercise.

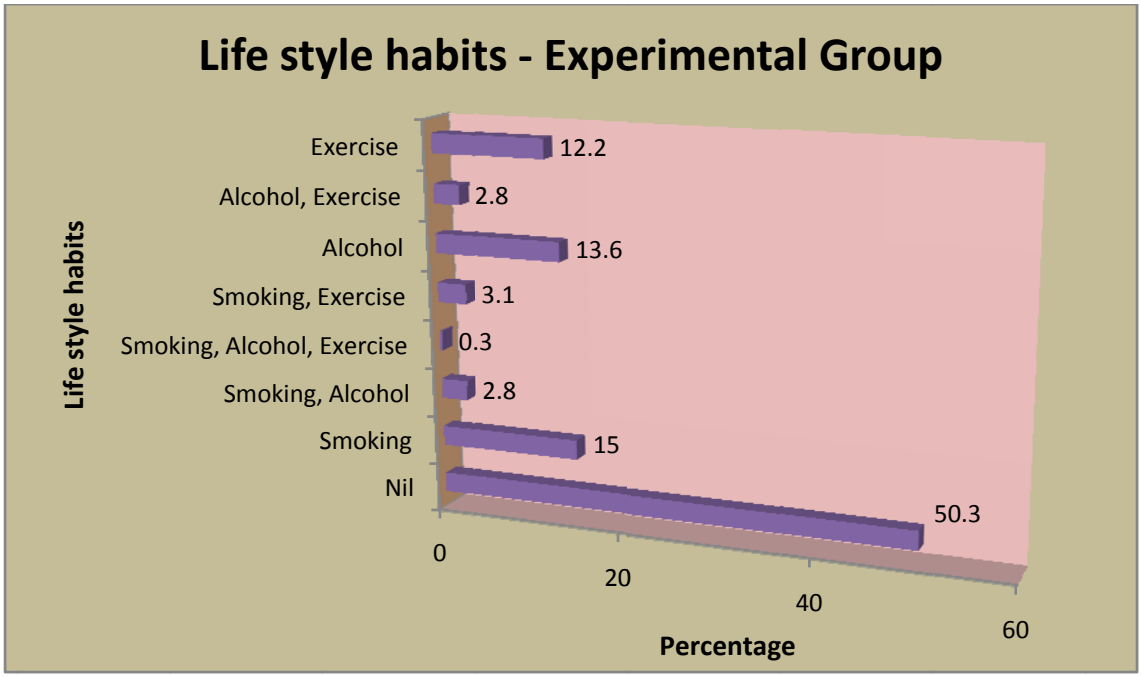


**Figure No 18: Sample distribution by life style habits**

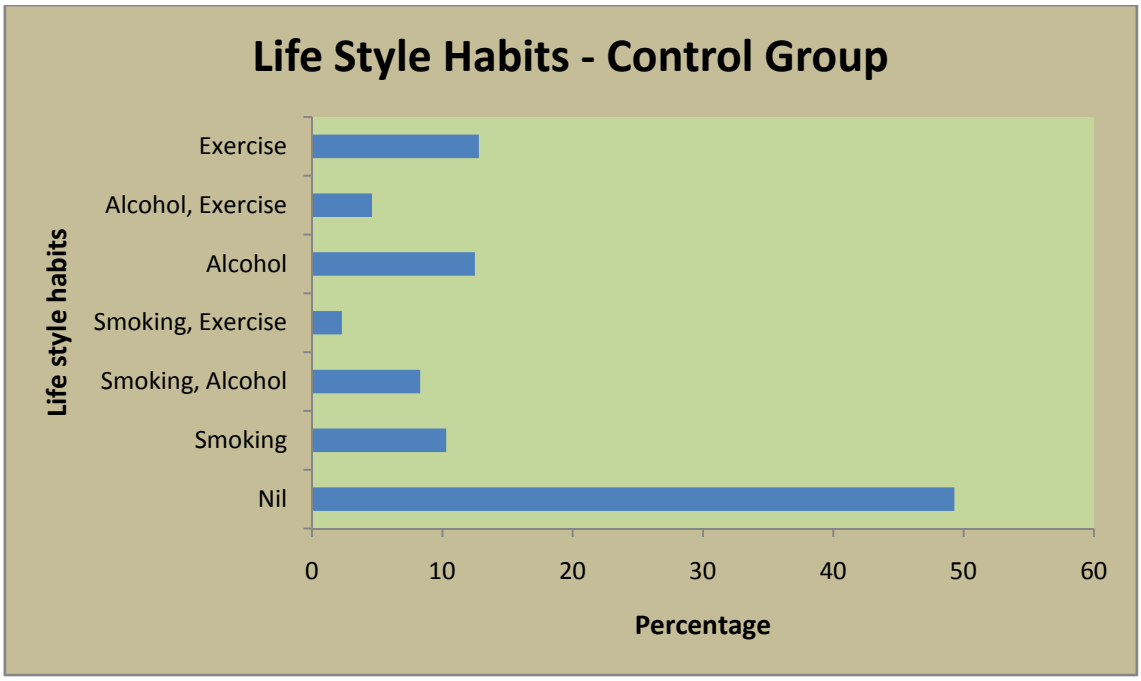


**Figure No 19: Sample distribution by life style habits (Control Group)**

**Table No. 20: Frequency & Percentage distribution of samples based on Source**

| Source of Knowledge | | | |
|---|---|---|---|
| Group | | Frequency | % |
| Experimental | Nil | 31 | 8.6 |
| | Mass Media | 127 | 54.5 |
| | Electronic Medias | 33 | 9.2 |
| | Health care Professionals | 204 | 56.6 |
| | Friends & Relatives | 55 | 15.4 |
| Control | Nil | 29 | 8.3 |
| | Mass Media | 64 | 18.3 |
| | Electronic Medias | 69 | 19.7 |
| | Health care Professionals | 170 | 48.5 |
| | Friends & Relatives | 74 | 21.2 |

As per Table No 20, Diagram No 20 & 21, Majority of the information in both groups related to the management of Diabetes was provided by health care professionals where as few samples from both groups got health information related to diabetes from other sources such as mass media, electronic media, friends & relatives. It was evident that information related to self management of diabetes mellitus is majorly provided by health care professionals. Hence efforts need to be increased to create awareness among patients regarding prevention & control of DM.

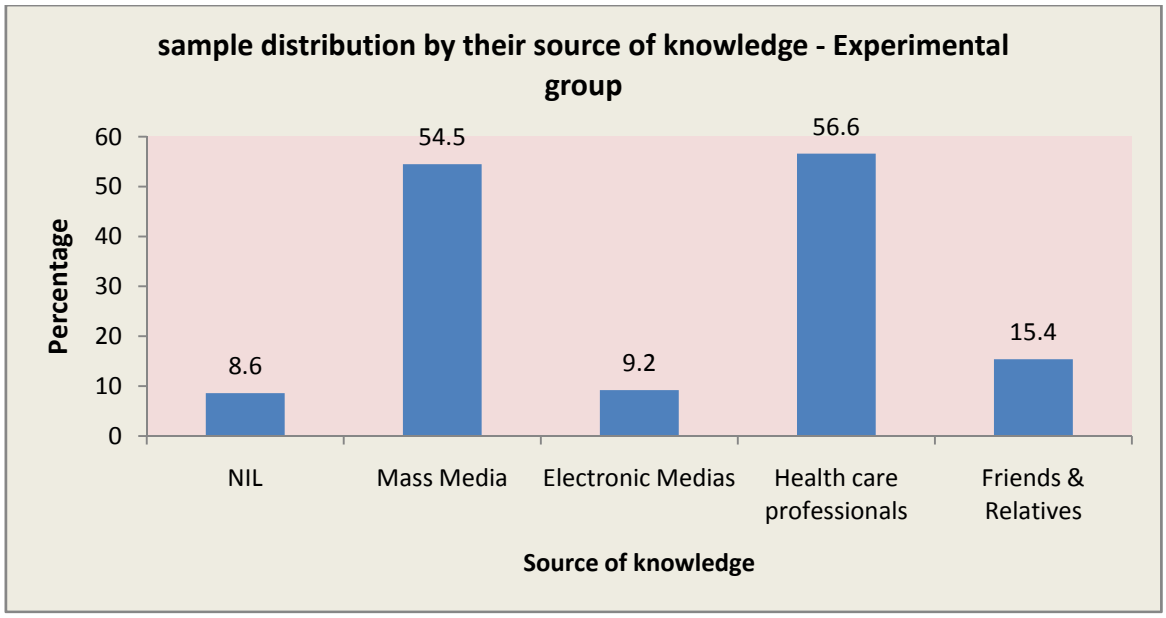


**Figure No 20: Sample distribution by source of knowledge (Experimental Group)**

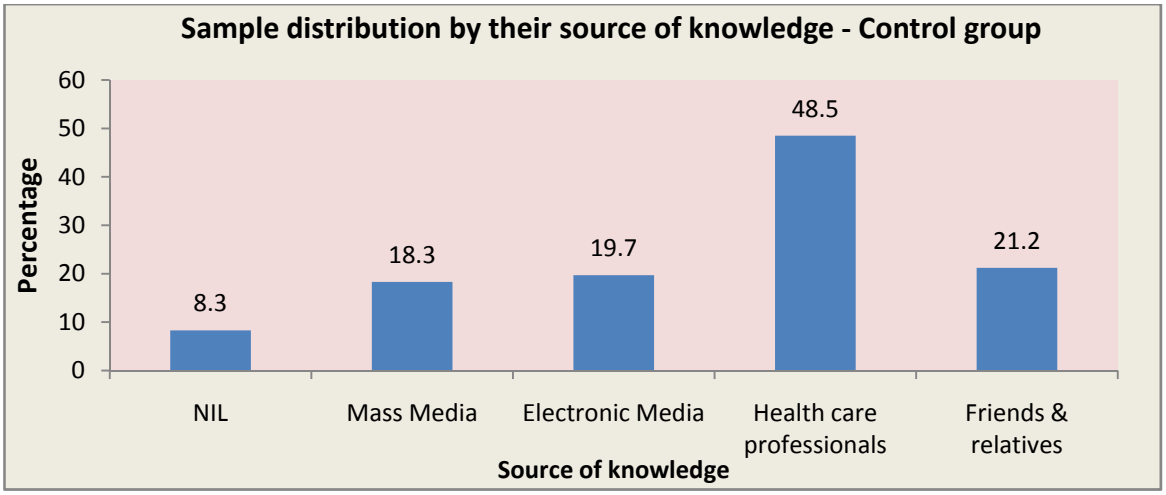


**Figure No 21: Sample distribution by source of knowledge (Control Group)**

**Table No. 21: Frequency & Percentage distribution of samples based on overall self assessment**

| Self Assessment | | | |
|---|---|---|---|
| Group | | Frequency | Percentage |
| Experimental | Poor ( 0-3) | 247 | 68.7 |
| | Average (4-6) | 91 | 25.3 |
| | Good (7-10) | 21 | 6 |
| Control | Poor ( 0-3) | 303 | 86.4 |
| | Average (4-6) | 30 | 8.5 |
| | Good (7-10) | 18 | 5.1 |

Table No 21 & Diagram No 22 represents the overall self assessment of samples where majority of the samples in both groups (247 & 303) had poor self assessment regarding management of DM whereas less number of samples had good self assessment regarding management of DM. It was evident that majority of the patients in either group are poorly assessing their health status & few patients have practice of assessing their health status regularly.

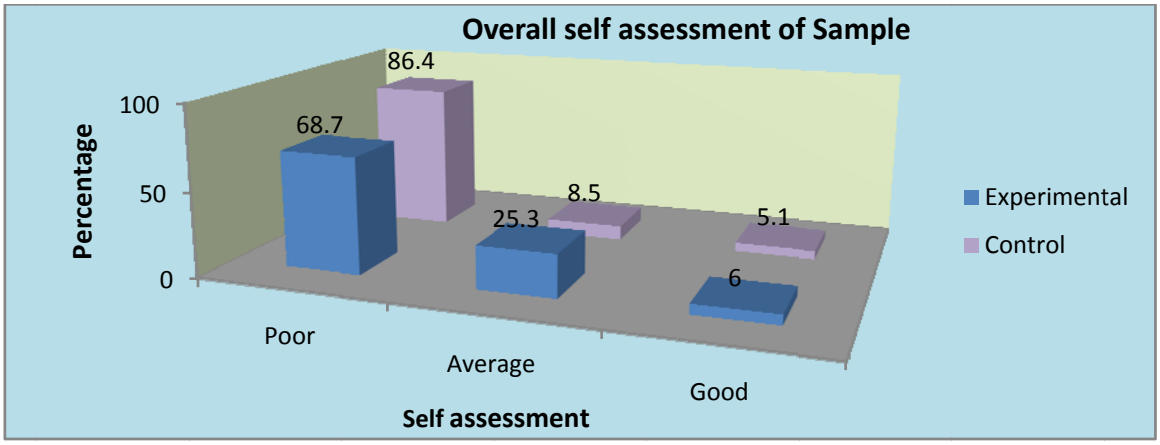


**Figure No 22: Sample distribution by overall self assessment.**

## SECTION II

### Pre – Test KAP scores of Experimental & Control group

This section deals with description of analysis & interpretation regarding pre – test knowledge, attitude & practice scores of both experimental & control group.

**Table No. 22: Description of Pre – test KAP scores of Experimental & Control group (N=711)**

| Group | | N | Mean | SD |
|---|---|---|---|---|
| Experimental Group | pre test knowledge Score | 360 | 32.35 | 16.08 |
| | Pre test Attitude score | 360 | 52.48 | 8.06 |
| | Pre test Practice score | 360 | 7.38 | 4.92 |
| Control Group | pre test knowledge Score | 351 | 34.76 | 10.15 |
| | Pre test Attitude score | 351 | 54.56 | 9.29 |
| | Pre test Practice score | 351 | 7.29 | 6.34 |

Table No 22 & Diagram No 23 shows that the mean pre test KAP scores of experimental & control group was almost same with small variations in their overall scores. It was evident that both groups had neutral attitude as per their pre test attitude scores & negative attitude with respect to knowledge & practice scores.

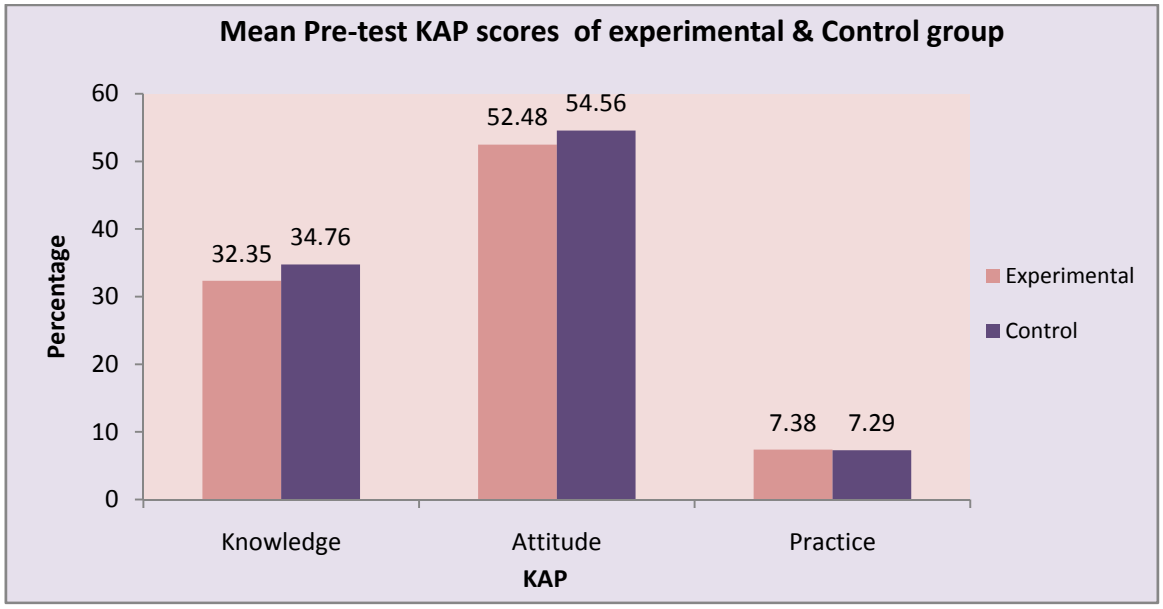


**Diagram No 23: Mean Pre-test KAP scores of experimental & Control group**

**Table No. 23: Description of Overall Pre – test Knowledge scores of Experimental & Control group (N=711)**

| Sl. No | Category | Scoring | Experimental Group | Control Group |
|---|---|---|---|---|
| 01 | Poor | 00-30 | 126 | 135 |
| 02 | Average | 31-60 | 225 | 208 |
| 03 | Good | 61-91 | 009 | 008 |

Table No 23 & Diagram No 24 shows the overall knowledge scores of both experimental & control group wherein out of 360 participants in experimental group 126 falls under poor, 225 in moderate, and 09 in good category. Similarly in control group out of 351 participants, 135 belong to poor, 208 belong to average and 08 in good knowledge category. It was evident that majority of the patients had average & below, knowledge scores & hence structured teaching program

need to be prepared & demonstrated for effective self assessment of their health status.

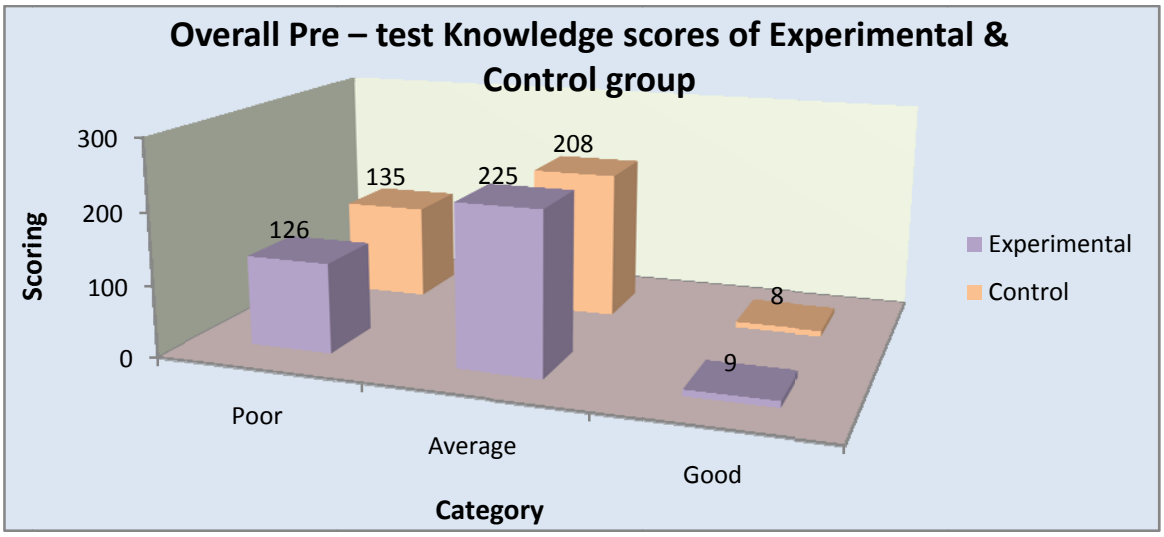


**Diagram No 24: Overall Pre – test Knowledge scores of Experimental & Control group**

**Table No. 24: Description of Overall Pre – test Attitude scores of Experimental & Control group (N=711)**

| Sl. No | Category | Scoring | Experimental Group | Control Group |
|---|---|---|---|---|
| 01 | Negative | 18-42 | 41 | 38 |
| 02 | Neutral | 43-60 | 259 | 218 |
| 03 | positive | 61-90 | 60 | 95 |

Table No 24 & Diagram No 25 shows the overall attitude scores of both experimental & control group. Out of 360 participants in experimental group 41 falls under negative, 259 in neutral, and 60 in positive category. Similarly in control group out of 351 participants, 38 belong to negative, 218 belong to neutral and 95 in positive attitude category. It was evident that majority of the patients have neutral & negative attitude on self assessment of their health condition & hence effective strategy is essential to modify their attitude into positive regarding self assessment of their health status.

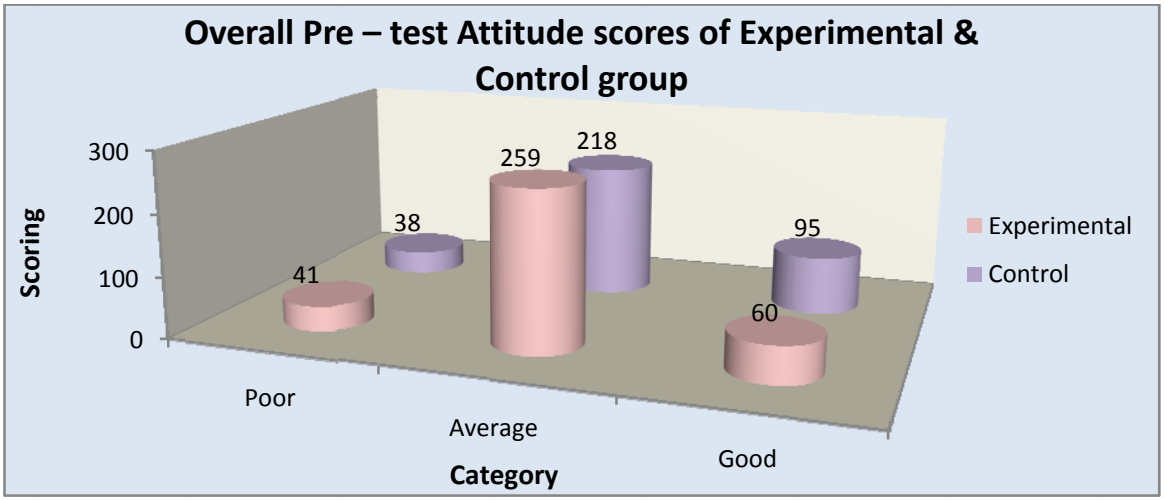


**Diagram No 25: Overall Pre – test Attitude scores of Experimental & Control group**

**Table No. 25: Description of Overall Pre – test Practice scores of Experimental & Control group (N=711)**

| Sl. No | Category | Scoring | Experimental Group | Control Group |
|---|---|---|---|---|
| 01 | Poor | 00-09 | 246 | 233 |
| 02 | Average | 10-19 | 109 | 96 |
| 03 | Good | 20-29 | 005 | 22 |

Table No 25 & Diagram No 26 shows the overall practice scores of both experimental & control group. Out of 360 participants in experimental group 246 falls under poor, 109 in moderate, and 05 in good category. Similarly in control group out of 351 participants, 233 belong to poor, 96 belong to average and 22 in good practice category. It was evident that majority of the patients had poor practice on self assessment of their health status. This was due to less knowledge & negative attitude in assessing

their health status & hence structured teaching program was implemented to increase their knowledge & attitude thereby improve their practice level regarding self assessment of their health status.

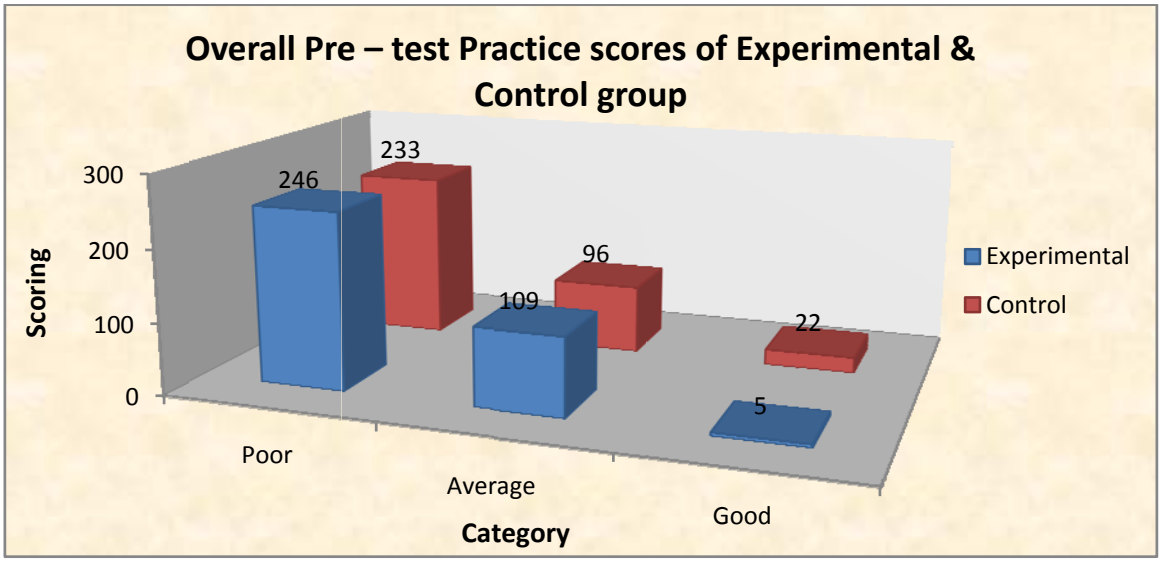


**Diagram No 26: Overall Pre – test Practice scores of Experimental & Control group**

## SECTION III

### Effectiveness of post test KAP scores of Experimental & Control group

This section deals with the description of analysis & interpretation regarding effectiveness of post test knowledge, attitude & practice scores of experimental & control groups.

**Table No. 26: Comparison of post test KAP scores of Experimental & Control group (N=711)**

| | Experimental | Control | Man Whitney 'U' test | P Value |
|---|---|---|---|---|
| Post test Knowledge score | 66.46 | 35.60 | 2754.5 | < 0.001 |
| Post Test Attitude score | 58.62 | 55.77 | 49554.5 | < 0.001 |
| Post test Practice Score | 21.33 | 8.01 | 5978 | < 0.001 |

It is evident from the table no 26& diagram no 27 that the median post test KAP scores of experimental group is higher than the control group. P value is less than at 0.001 level of significance. There is a significant difference between median values of experimental & control group with respect to knowledge, attitude & practice scores. Hence the research hypothesis ($H_1$) is accepted & concluded that difference between population median is statistically significant.

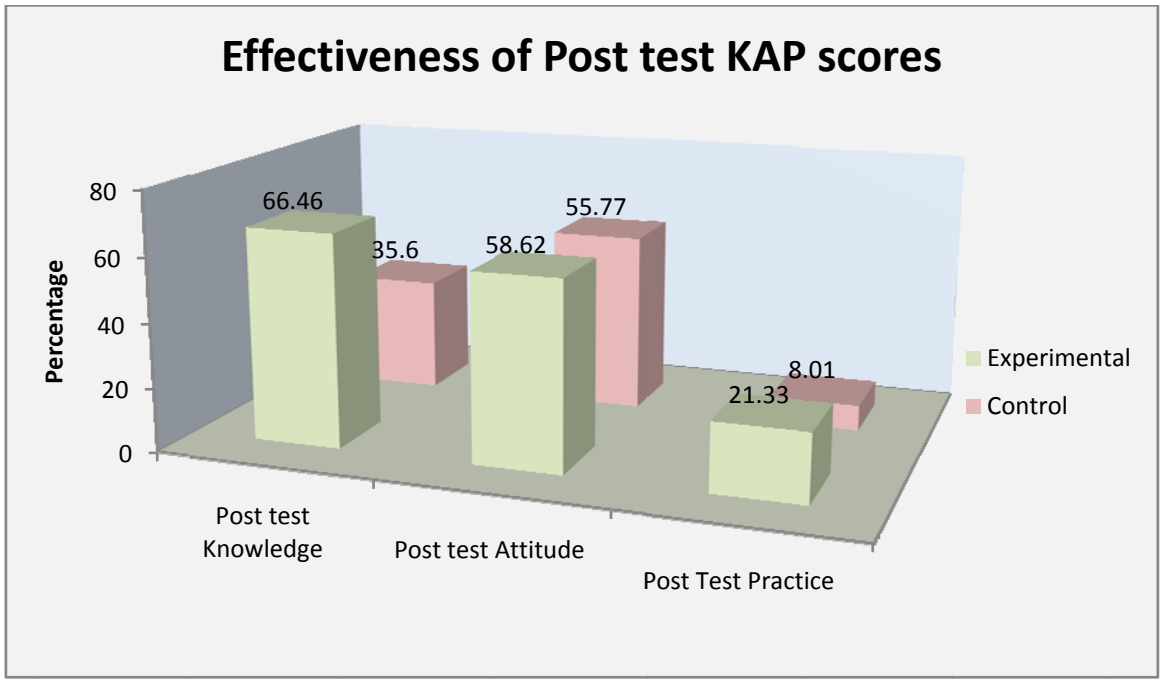


**Diagram No 27: Effectiveness of Post – test Practice scores of Experimental & Control group**

## SECTION – IV

This section deals with description of analysis & interpretation regarding association of pre test knowledge, attitude & practice scores with socio demographic variables.

**Table No. 27: Association between pre test knowledge scores with demographic variables**

**(N=711)**

| Variables | | Pre Test Knowledge Scores | | | Total | Chi Square | P value |
|---|---|---|---|---|---|---|---|
| | | Poor | Average | Good | | | |
| Age in Years | 31 - 39 | 10 | 29 | 1 | 40 | | |
| | 39 - 47 | 46 | 64 | 2 | 112 | | |
| | 47 - 55 | 80 | 128 | 7 | 215 | | |
| | 55 - 63 | 125 | 212 | 7 | 344 | 4.37 | 0.627 |
| Gender | Male | 115 | 214 | 4 | 333 | | |
| | Female | 146 | 219 | 13 | 378 | 5.679 | 0.058 |
| Marital Status | Single | 13 | 25 | 1 | 39 | | |
| | Married | 217 | 357 | 12 | 586 | | |
| | Widow | 22 | 43 | 4 | 69 | | |
| | Divorced | 9 | 8 | 0 | 17 | 6.467 | 0.373 |
| Area | Urban | 15 | 24 | 2 | 41 | | |
| | Rural | 246 | 409 | 15 | 670 | 1.166 | 0.558 |
| Education | Illiterate | 84 | 110 | 9 | 203 | | |
| | Primary | 115 | 213 | 3 | 331 | | |
| | Secondary | 38 | 58 | 1 | 97 | | |
| | Higher secondary | 14 | 33 | 3 | 50 | | |
| | Graduate & above | 4 | 11 | 0 | 15 | | |
| | Medical/Paramedical | 6 | 8 | 1 | 15 | 17.682 | 0.061 |
| Occupation | Unemployed | 63 | 118 | 6 | 187 | | |
| | Farming | 118 | 174 | 3 | 295 | | |
| | Self employed | 36 | 61 | 4 | 101 | | |
| | Govt. employee | 19 | 37 | 2 | 58 | | |
| | Private | 7 | 17 | 1 | 25 | | |
| | Retired | 18 | 26 | 1 | 45 | 7.391 | 0.688 |
| Family Income | < 5000 | 72 | 155 | 6 | 233 | | |
| | 5001-10000 | 121 | 151 | 7 | 279 | | |
| | 10001-20000 | 34 | 57 | 1 | 92 | | |
| | > 20000 | 34 | 70 | 3 | 107 | 10.694 | 0.098 |
| Life Style | Sedentary | 117 | 191 | 9 | 317 | | |
| | Heavy | 144 | 242 | 8 | 394 | 0.526 | 0.769 |
| Family History | Yes | 72 | 133 | 8 | 213 | | |
| | No | 189 | 300 | 9 | 498 | 3.188 | 0.203 |

*Significance

From the Table No 27, it was evident that the obtained chi square is less than the table value at 0.05 level of significance. There was no significant association between pre test knowledge scores with demographic variables such as age, gender, and marital status,

area of residence, Education status, occupation, family income, life style habits & family history of DM. Hence the research hypothesis ($H_2$) was rejected.

**Table No. 28: Association between pre test attitude scores with demographic variables**

**(N=711)**

| Variables | | Pre Test attitude Scores | | | Total | Chi Square | P Value |
|---|---|---|---|---|---|---|---|
| | | Poor | Average | Good | | | |
| Age in Years | 31 - 39 | 3 | 25 | 12 | 40 | | |
| | 39 - 47 | 7 | 86 | 19 | 112 | | |
| | 47 - 55 | 28 | 141 | 46 | 215 | | |
| | 55 - 63 | 41 | 225 | 78 | 344 | 8.246 | 0.221 |
| Gender | Male | 40 | 221 | 72 | 333 | | |
| | Female | 39 | 256 | 83 | 378 | 0.515 | 0.773 |
| Marital Status | Single | 7 | 27 | 5 | 39 | | |
| | Married | 62 | 392 | 132 | 586 | | |
| | Widow | 6 | 46 | 17 | 69 | | |
| | Divorced | 4 | 12 | 1 | 17 | 8.389 | 0.211 |
| Area | Urban | 11 | 27 | 3 | 41 | | |
| | Rural | 68 | 450 | 152 | 670 | 13.871* | 0.001 |
| Education | Illiterate | 16 | 138 | 49 | 203 | | 0.033 |
| | Primary | 37 | 209 | 85 | 331 | | |
| | Secondary | 15 | 71 | 11 | 97 | | |
| | Higher secondary | 8 | 35 | 7 | 50 | | |
| | Graduate & above | 1 | 11 | 3 | 15 | | |
| | Medical/Para-medical | 2 | 13 | 0 | 15 | 19.659* | |
| Occupation | Unemployed | 28 | 109 | 50 | 187 | | 0.054 |
| | Farming | 31 | 201 | 63 | 295 | | |
| | Self employed | 7 | 74 | 20 | 101 | | |
| | Govt. employee | 4 | 44 | 10 | 58 | | |
| | Private employee | 6 | 14 | 5 | 25 | | |
| | Retired | 3 | 35 | 7 | 45 | 18.03 | |
| Family Income | < 5000 | 30 | 158 | 45 | 233 | | 0.02 |
| | 5001-10000 | 27 | 200 | 52 | 279 | | |
| | 10001-20000 | 13 | 48 | 31 | 92 | 15.072* | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | > 20000 | 9 | 71 | 27 | 107 | | |
| Life Style | Sedentary | 41 | 201 | 75 | 317 | | 0.152 |
| | Heavy | 38 | 276 | 80 | 394 | 3.773 | |
| Family History | Yes | 24 | 148 | 41 | 213 | | 0.556 |
| | No | 55 | 329 | 114 | 498 | 1.175 | |

*Significance

From the Table No 28, it was evident that the obtained chi square is more than the table value in selected variables such as area of residence, Education status & family income at 0.05 level of significance. There was significant association in above 3 variables & hence the research hypothesis ($H_2$) was failed to reject. Obtained chi square is less than the table value in selected variables such as age, gender, marital status, occupation, life style habits & family history of DM & there was no significant association in those variables hence the research hypothesis was rejected.

**Table No. 29: Association between pre test practice scores with demographic variables (N=711)**

| Variables | | Pre Test Practice Scores | | | Total | Chi Square | P Value |
|---|---|---|---|---|---|---|---|
| | | Poor | Average | Good | | | |
| Age in Years | 31 - 39 | 23 | 16 | 0.221 | 40 | | |
| | 39 - 47 | 77 | 32 | | 112 | | |
| | 47 - 55 | 141 | 66 | | 215 | | |
| | 55 - 63 | 238 | 91 | | 344 | 4.385 | 0.625 |
| Gender | Male | 215 | 105 | 0.773 | 333 | | |
| | Female | 264 | 100 | | 378 | 2.333 | 0.311 |
| Marital Status | Single | 30 | 8 | 0.211 | 39 | | |
| | Married | 380 | 181 | | 586 | | |
| | Widow | 54 | 15 | | 69 | | |
| | Divorced | 15 | 1 | | 17 | 12.81* | 0.046 |
| Area | Urban | 29 | 12 | 0.001 | 41 | | |
| | Rural | 450 | 193 | | 670 | 1.728 | 0.421 |
| Education | Illiterate | 137 | 57 | 0.033 | 203 | | |
| | Primary | 222 | 95 | | 331 | | |
| | Secondary | 73 | 24 | | 97 | | |
| | Higher secondary | 25 | 21 | | 50 | | |
| | Graduate & above | 8 | 7 | | 15 | | |
| | Medical/Para-medical | 14 | 1 | | 15 | 20.429 * | 0.025 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Occupation | Unemployed | 111 | 65 | 0.054 | 187 | | |
| | Farming | 203 | 85 | | 295 | | |
| | Self employed | 75 | 19 | | 101 | | |
| | Govt. employee | 43 | 14 | | 58 | | |
| | Private employee | 20 | 5 | | 25 | | |
| | Retired | 27 | 17 | | 45 | 20.326* | 0.026 |
| Family Income | < 5000 | 145 | 80 | 0.02 | 233 | | |
| | 5001-10000 | 200 | 69 | | 279 | | |
| | 10001-20000 | 56 | 28 | | 92 | | |
| | > 20000 | 78 | 28 | | 107 | 15.402* | 0.017 |
| Life Style | Sedentary | 217 | 84 | 0.152 | 317 | | |
| | Heavy | 262 | 121 | | 394 | 3.534 | 0.171 |
| Family History | Yes | 145 | 60 | 0.556 | 213 | | |
| | No | 334 | 145 | 19 | 498 | 0.07 | 0.965 |

*Significance

From the Table No 29, it was evident that the obtained chi square is more than the table value in selected variables such as marital status, Education status, Occupation & family income at 0.05 level of significance. There was significant association in above variables & hence the research hypothesis was failed to reject. Obtained chi square is less than the table value in selected variables such as age, gender, area of residence, life style habits & family history of DM & there was no significant association in those variables hence the research hypothesis was rejected.

## SECTION – V

This section deals with description of Correlation between post test knowledge scores and post test attitude scores among experimental group

**Table No. 30: Correlation between post test Knowledge & attitude scores**

| Description | 'r' value | Inference |
|---|---|---|
| Post test knowledge & post test attitude scores | + 0.06 | Positive correlation |

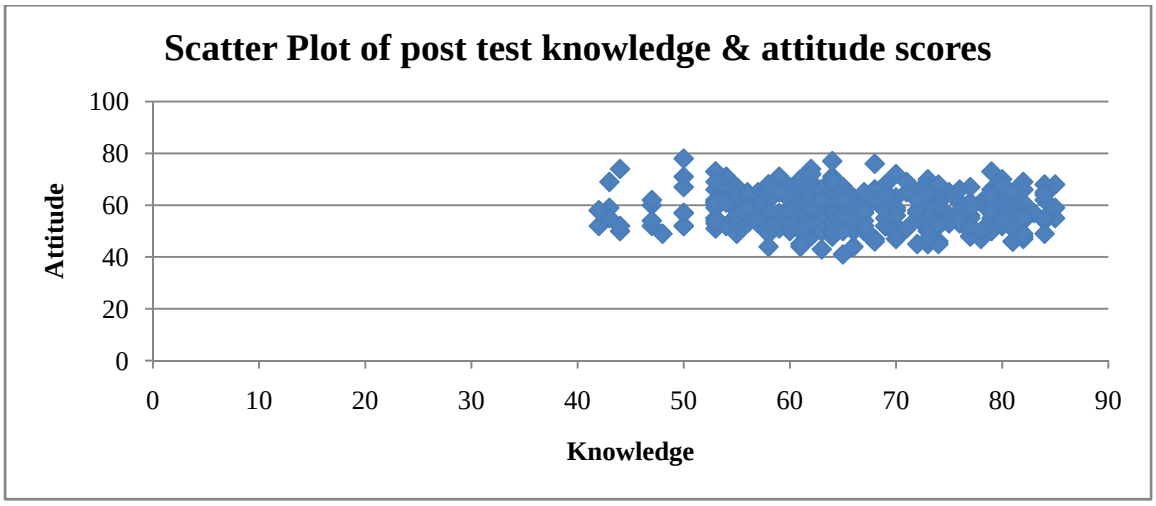


**Diagram No 28: Correlation between post test knowledge & post test attitude scores**

Description of correlation between post test knowledge score and post test practice score among experimental group.

**Table No. 31: Correlation between Post test Knowledge & practice scores**

| Description | 'r' value | Inference |
|---|---|---|
| Post test knowledge & post test practice scores | + 0.66 | Positive moderate correlation |

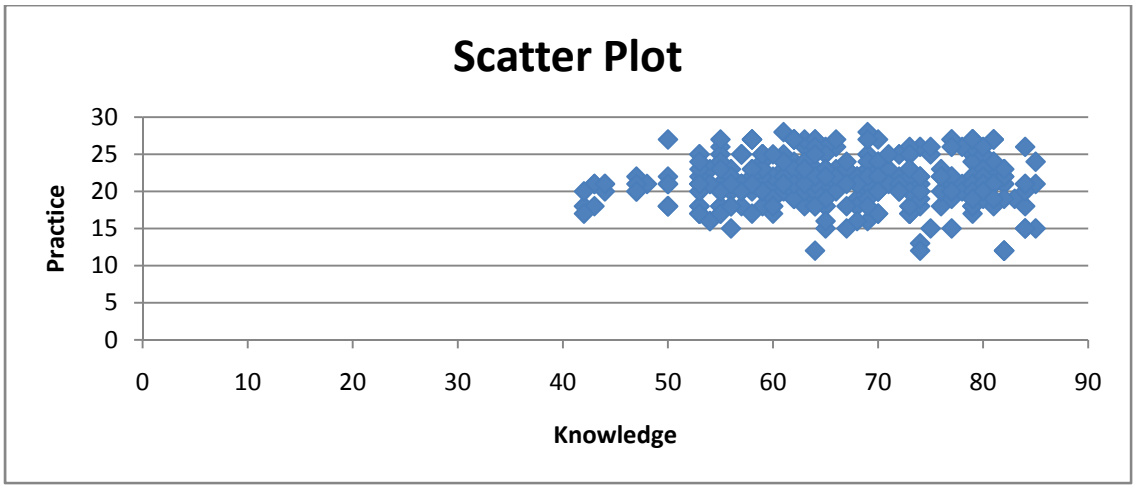


**Diagram No 29: Correlation between post test knowledge & post test practice scores**

From the table no 30 & 31, diagram no 28 & 29, it was observed that positive correlation exists between post test knowledge & attitude scores (0.06) as well as post test knowledge & practice scores (0.66) hence it was concluded that there was positive correlation exists between post knowledge, attitude & practice scores. Further, apart from research activity, different strategies were planned by the researcher to improve knowledge & attitude of patients there by impacting on their practice level which takes longer period.

This chapter deals with the analysis and interpretation of data using descriptive and inferential statistics. Frequency and percentage was used to analyse the socio-demographic variables such as age, gender, marital status, area of residence, education, occupation, family income, family history of diabetes, duration of DM, treatment of DM, co-morbidity, life style habits, source of knowledge, self assessment of health status.

Mean, standard deviation was computed to analyze the knowledge, attitude and practice scores of type 2 diabetes mellitus patients regarding self management training program of DM. Effectiveness of self management training programme was assessed by using Mann Whitney 'U' test. Obtained P value was less at 0.001 level of significance & hence difference between populations median was statistically significant.

Chi-square test was used to find out the association between pre-test level of knowledge, attitude and practice regarding self management training program with selected socio-demographic variables of type 2 diabetes mellitus patients. There was no significant association found between pre test knowledge scores with socio demographic

variables. Significant association was found in pre test attitude & practice scores with selected socio demographic variables.

Spearman rank correlation was computed to analyse correlation between post test knowledge, attitude and practice scores. It was observed that Mild positive correlation exists between post test knowledge & attitude scores as well as Moderate positive correlation between post test knowledge & practice scores. Hence it was concluded that in order to create positive attitude & improve practice level of patients towards maintaining their health in optimum status, strategies has to be framed for longer period to create positive impact in health of society.

The aim of study was to create awareness regarding self management of type 2 diabetes among the community people through a self management training programme was successfully completed.

# CHAPTER V

# DISCUSSION

This chapter presents the major findings of this study and discusses them in relation to similar studies conducted by other researchers.

Aim of the study was to evaluate the effectiveness of self management training program on type II diabetes mellitus among diabetic patients in terms of knowledge, attitude and Practice**.** Data collection and analysis were carried out based on the objectives and hypotheses of the study.

Findings of study have been discussed with reference to the objectives and hypotheses stated under the following sections.

**Section 1:** Findings related to sample characteristics.

**Section 2:** Findings related assessment of knowledge, attitude and Practice.

**Section 3:** Findings related to effectiveness of self management training program on knowledge, attitude and practice.

**Section 4:** Findings related to association between pre-test level of knowledge, attitude and practice with selected socio - demographic variables.

**Section 5:** Findings related to correlation between knowledge, attitude and practice.

1. **Findings related to sample characteristics.**

- **Age** - Majority of samples in both experimental & control groups (174 & 170) were aged between 55-63 whereas less number of samples in both groups (15 & 25) were aged between 31-39.
- **Gender –** Majority of the samples in both experimental & control groups (183 & 195) were female.
- **Marital status** - Majority of the samples in experimental & control groups (307 & 279) were married.
- **Area of residence** – Majority of respondents in experimental & control groups (347 & 323) were residing in rural area.
- **Education** - Majority of samples in experimental & control groups (180 & 151) had primary education.

- **Occupation**: Majority of the samples in experimental & control groups (138 & 157) were farmers by their occupation.
- **Family Income** - Majority of the samples in experimental group (157) had family income between Rs 5001 - 10000 & less than 5000 Rs in control group (124).
- **Family history of diabetes** - Majority of the samples both in experimental group & control group (269 & 229) did not had any family history of diabetes.
- **Duration of DM** - Majority of the samples in both experimental group (119) & control group (128) were suffering from DM, duration of which ranges between 1-5 years.
- **Treatment of DM** - Majority of the samples in experimental & control group (268 & 305 respectively) were on oral hypoglycemic treatment.
- **Co morbidity** - Majority of the samples in both groups (172 in experimental & 233 in control group respectively) are having vascular diseases along with Diabetes.
- **Life style habits** - Majority of the samples in experimental & control group (181 & 173) do not have any bad life style habits whereas average number of samples are having unhealthy life style habits such as smoking, drinking alcohol.
- **Source of knowledge** - Majority of the information in both groups related to the management of Diabetes was provided by health care professionals (204 in experimental & 170 in control).
- **Self assessment** - Majority of the samples in both groups (247 & 303) had poor self assessment regarding management of DM.

**2. Findings related to assessment of knowledge, attitude and Practice.**

Findings of pre-test knowledge scores shows that,out of 360 participants in experimental group 126 falls under poor, 225 in moderate, and 09 in good category. Similarly in control group, out of 351 participants, 135 belong to poor, 208 belong to average and 08 in good knowledge category.

It was observed from the pre-test attitude scores that out of 360 participants in experimental group, 41 falls in poor, 259 in moderate, and 60 in good category. Similarly in control group out of 351 participants, 38 belong to poor, 218 belong to average and 95 in good attitude category.

Overall pre-test practice scores of both groups' shows that out of 360 participants in experimental group 246 falls under poor, 109 in moderate, and 05 in good category. Similarly in control group out of 351 participants, 233 belong to poor, 96 belong to average and 22 in good attitude category.

3. **Findings related to effectiveness of self management training program on knowledge, attitude and practice**.

Since the population was not normally distributed, Mann Whitney 'U' test was used to find effectiveness of self management training program. It was evident that the median post test KAP scores of experimental group were higher than the control group. P value was less at 0.01 level of significance. There was a significant difference exists between median values of experimental & control group with respect to knowledge, attitude & practice scores. Hence the research hypothesis was failed to reject & concluded that difference between populations median was statistically significant.

"Recent studies highlight barriers of diabetes educational programs in Iran and also present some successful experiences carried out for improving the knowledge, attitude, and practice (KAP) of type-2 diabetic patients. The results of this study showed that recent educational programs in Iran improved KAP level. Patients' KAP increases as their condition worsens/progresses. Hence education should be considered as a priority for newly diagnosed patients and those with lower KAP levels before occurrence of diabetes complications[132]".

"A study has been conducted to obtain goals such as management of type 2 diabetes mellitus includes ability and empowerment of the patient to change lifestyle, maintain an adequate diet and physical activity, manage the disease therapeutic patient education (TPE) is considered a crucial element not only in the treatment but also in the prevention of type 2 diabetes[133]".

4. **Findings related to association between pre-test level of knowledge, attitude and practice with selected socio - demographic variables**.

Analysis with the pre - test knowledge scores of demographic variables shown that the obtained chi square value was less than the table value at 0.05 level of

significance. There was no significant association between pre test knowledge scores with demographic variables such as age, gender, and marital status, area of residence, Education status, occupation, family income, life style habits & family history of DM. Hence the research hypothesis was rejected.

It was evident from the pre-test attitude scores of demographic variables that the obtained chi square value was more than the table value in selected variables such as area of residence, Education status & family income at 0.05 level of significance. There was significant association in above 3 variables & hence the research hypothesis was failed to reject. Obtained chi square value was less than the table value in selected variables such as age, gender, marital status, occupation, life style habits & family history of DM & there was no significant association in those variables hence the research hypothesis was rejected.

Pre test practice scores of demographic variables shows that the obtained chi square was more than the table value in selected variables such as marital status, Education status, Occupation & family income at 0.05 level of significance. There was significant association in above variables & hence the research hypothesis was failed to reject. Obtained chi square is less than the table value in selected variables such as age, gender, area of residence, life style habits & family history of DM & there was no significant association in those variables hence the research hypothesis was rejected.

5. **Findings related to correlation between knowledge, attitude and practice of type 2 diabetes mellitus patients**.

It was observed that Mild positive correlation (0.06) exists between post test knowledge & attitude scores & Moderate positive correlation between post test knowledge & practice scores (0.66).

“A cross sectional study was conducted to assess knowledge, attitude and self-care practices related to diabetes in an urban population in Pakistan. The results show that most participants had a negative attitude and very little knowledge regarding diabetes. There is a need for increased diabetes related education and for developing positive attitudes towards reduction of diabetes related complications[134].

A cross sectional study was conducted to find the effect of diabetic knowledge & attitude on self management & quality of life of people with type 2 diabetes mellitus

(T2DM). The findings suggest a theoretical basis to direct the development of appropriate health programs & interventions for improving QOL in people with T2DM & warrant replication in diverse samples[135].

A cross sectional study was conducted to examine a model describing the relationship between diabetes knowledge, attitudes, self management & QOL of people with T2DM based on previous research linking pairs of variables. Results shown that diabetes knowledge, attitude & self management are important factors that can impact the QOL among people with type 2 diabetis[136].

A cross sectional study was carried out to evaluate the knowledge, attitude & Practices among type 2 diabetics attending outpatient diabetes clinic. The results shown that attitude related to diabetes was acceptable in the majority of the sample while knowledge & self care practices were insufficient. It was concluded that patients need to be educated on how to prevent diabetes complications. Health care providers should promote self care activities in the process of diabetic education[137"].

"A study was conducted to evaluate the knowledge, attitude & practice of type 2 diabetes patients regarding self care practices towards diabetes. The results shown that the patients who regularly followed self care practices had sound knowledge regarding the disease, achieved better glycemic control[138].

A cross sectional study was conducted to assess the knowledge, attitude & Practice among type 2 diabetes mellitus patients regarding diabetes. Results revealed that the knowledge among the respondents was poor. The attitude & practices were not satisfactory. There felt a need for regular conduct of awareness programs to improve attitude & Practices of diabetic patients to promote better compliance towards diet, exercise & medications[139"].

# CHAPTER VI

# SUMMARY & CONCLUSION

This chapter deals with summary of the study. Implementation of self management training program on Type II diabetes mellitus is to strengthen the knowledge, to create the positive attitude and improve practice level regarding self management training program among type II diabetes mellitus patients. Limitations are stated, Explanations are based on the objectives and findings are presented followed by recommendations.

## Summary of study

The primary aim of study was to evaluate the effectiveness of self management training program on type II diabetes mellitus among diabetic patients in terms of knowledge, attitude and Practice.

**Objectives of study were:**

1. Assess the existing level of knowledge, attitude & Practice regarding self management of type 2 diabetic patients among experimental and control group.
2. Evaluate the effectiveness of self management training program on type 2 diabetes mellitus in terms of knowledge, attitude & Practice among experimental and control group.
3. Find out the association between the Pre test knowledge, attitude & Practice scores with their selected socio-demographic variables.
4. Correlate the post test knowledge scores with post test attitude scores & Post test practice scores regarding self management of type 2 diabetes mellitus.

**HYPOTHESES: -**

- $H_1$: Mean post-test knowledge, attitude and practice score of patients in experimental group will be significantly higher than the mean post-test knowledge attitude and practice score of patients in Control group.
- $H_2$: There will be significant association between pre test knowledge, attitude & practice score with their selected socio demographic variables.
- $H_3$: There will be a significant correlation between post test knowledge score and post test attitude score of experimental group regarding self management of type 2 diabetes mellitus.
- $H_4$: There will be a significant correlation between post test knowledge score and post test practice score of experimental group regarding self management of type 2 diabetes mellitus.

**Review of literature was organized as follows:**

- The History, Definition and Classification of Diabetes Mellitus.
- Current Scenario on Diabetes Mellitus.
- Literature related to diabetes and its knowledge.
- Diabetes and diabetes diet.
- Diabetes and exercise.
- Diabetes and foot care practice.
- Literature related to self Monitoring blood glucose level.
- Literature related to Self administration of insulin.
- Literature related to diabetes and recognizing complication

The research approach selected for the study was Evaluative Approach. Research design included pre test and post-test with both the experimental group and control group. Independent variable in the study was structured training program on self management of type II diabetes program and dependent variables were knowledge, attitude and practice scores.

The tools developed and used for data collection were structured cafeteria questionnaire to assess the knowledge, structured Likert scale to assess the attitude &

structured criteria checklist to assess the practice on self management of type II diabetes mellitus among diabetic patients.

The content validity of the tool was established by experts in medical surgical nursing department. The tool was found to be valid, reliable and feasible. The reliability of the tool was established by "Split half method" and by using "Spearman browns prophecy formula". The co-efficient of correlation of knowledge questionnaire, attitude scale and practice checklist was found to be statistically significant.

The self structured cafeteria questionnaire was prepared that focuses on subjective knowledge using interview schedule on self-management of type II diabetes mellitus. The tool consists of 20 items that would help to screen the knowledge regarding self-management of type II Diabetes mellitus.

Pilot study was conducted from 15th October 2015 to 30th October, 2015. Sample size for pilot study was 25. Purpose of the study was:

- To evaluate the effectiveness of self management training program on knowledge, attitude and practice.
- To find out the feasibility of conducting the final study.
- To determine the method of statistical analysis.

Pre-testing of the tool was done to check the clarity of the items, their feasibility and practicability. It was administered to 25 samples from Waghodia. The sample chosen were similar in characteristics to those of the population under study.

Data collection for the main study was conducted in rural areas of Waghodia Taluka. Simple random sampling was adopted to select the Type II diabetes mellitus patients. Total sample size was 711 out of which 360 patients were assigned to experimental group & 351 were assigned to control group.

Data was collected from 15th November 2015 to 30th September 2016 at rural areas of Waghodia Taluka. The self management training program was tested for its effectiveness by pre-test & post-test. On day One, the pretest was administered, followed by administration of self management training program. The average duration of pre-test was 25 mts. On the same day self-management training was administered. The post-test was conducted after 2 weeks by using the same interview schedule. The average duration was taken to complete the pre-test was 25 minutes, individual training session was about

45 mts and average time taken for the post-test was 20 mts. The investigator selected 12 volunteers, trained them in the intended subject and collected data from various parts of Waghodia taluka.

The data gathered were analyzed and interpreted according to the objectives of study. The descriptive and inferential statistics were used for the data analysis.

**Findings of the study**

**Major findings of the study are summarized as follows:**

"Majority of samples in both experimental & control groups (174 & 170) were aged between 55-63 whereas less number of samples in both groups (15 & 25) were aged between 31-39.

Majority of the samples in both groups (183 & 195) were female.

Majority of the samples in either groups (307 & 279) were married.

Majority of respondents in experimental & control groups (347 & 323) were residing in rural area.

Majority of samples from both groups (180 & 151) had primary education.

Majority of the samples in experimental & control groups (138 & 157) were farmers by their occupation.

Majority of the samples in experimental group (157) had family income between Rs 5001 - 10000 & less than 5000 Rs in control group (124).

Majority of the samples both in experimental group & control group (269 & 229) did not had any family history of diabetes.

Majority of the samples in both experimental group (119) & control group (128) were suffering from DM, duration of which ranges between 1-5 years.

Majority of the samples in experimental & control group (268 & 305 respectively) were on oral hypoglycemic treatment.

Majority of the samples in both groups (172 in experimental & 233 in control group respectively) are having vascular diseases along with Diabetes.

Majority of the samples in experimental & control group (181 & 173) do not have any bad life style habits.

Majority of the information in both groups related to the management of Diabetes was provided by health care professionals (204 in experimental & 170 in control).

Majority of the samples in both groups (247 & 303) had poor self assessment regarding management of DM.

Findings of pre-test knowledge scores had shown that, out of 360 participants in experimental group 126 falls under poor, 225 in moderate, and 09 in good category. Similarly in control group, out of 351 participants, 135 belong to poor, 208 belong to average and 08 in good knowledge category.

It was observed from the pre-test attitude scores that out of 360 participants in experimental group, 41 falls in poor, 259 in moderate, and 60 in good category. Similarly in control group out of 351 participants, 38 belong to poor, 218 belong to average and 95 in good attitude category.

Overall pre-test practice scores of groups' shown that, out of 360 participants in experimental group 246 falls under poor, 109 in moderate, and 05 in good category. Similarly in control group out of 351 participants, 233 belong to poor, 96 belong to average and 22 in good attitude category.

It was evident that the median post test KAP scores of experimental group was higher than the control group. P value was less than at 0.01 level of significance. Hence there was a significant difference exists between median values of experimental & control group with respect to knowledge, attitude & practice scores. Hence the research hypothesis was failed to reject.

Analysis with the pre - test knowledge scores of demographic variables shown that the obtained chi square value was less than the table value at 0.05 level of significance. There was no significant association between pre test knowledge scores with demographic variables such as age, gender, and marital status, area of residence, Education status, occupation, family income, life style habits & family history of DM. Hence the research hypothesis was rejected.

It was evident from the pre-test attitude scores of demographic variables that the obtained chi square value was more than the table value in selected variables such as area of residence, Education status & family income at 0.05 level of significance. There was significant association in above 3 variables & hence the research hypothesis was failed to reject. Obtained chi square value was less than the table value in selected variables such as age, gender, marital status, occupation, life style habits & family history of DM & there was no significant association in those variables & hence the research hypothesis was rejected.

Pre test practice scores of demographic variables shows that the obtained chi square was more than the table value in selected variables such as marital status, Education status, Occupation & family income at 0.05 level of significance. There was significant association in above variables & hence the research hypothesis was failed to reject. Obtained chi square is less than the table value in selected variables such as age, gender, area of residence, life style habits & family history of DM & there was no significant association in those variables hence the research hypothesis was rejected.

It was observed that mild positive correlation exists between post test knowledge & attitude scores (0.06) as well as moderate positive correlation exists between post test knowledge & practice scores (0.66). Further the researcher felt the need of developing long term strategies to bring impact on society in terms of improving knowledge, positive attitude & improve practice levels in health care services.

## CONCLUSION

The study was conducted to enhance the Knowledge, Attitude and Practice regarding self management of type 2 diabetes among the community people of Waghodia through self management training programme.

**Highlights of the study were:**

1. The demographic survey conducted door to door at all over Waghodia in order to find the diabetic population which was herculean & laborious task to move to the entire dimension of Waghodia & to meet diabetic patients.

2. Developed the knowledge, attitude & practice questionnaire.
3. Compiled a self management training module.
4. Developed a mobile application on diabetic education.
5. Conducted individual self management training session for 711 samples at their door steps.
6. Evaluated the sample's knowledge attitude and practice level 15 days after individual training programme.
7. Supported the samples for medical consultation in Dhiraj Hospital at concessional or free of cost.

The study revealed that even though the diabetic patients had moderate knowledge, less attitude and practice on self management of type 2 diabetes mellitus, they had keen interest to learn about all aspects of self management training programme.

The pre-test conducted to identify the knowledge, attitude and practice of type 2 diabetes mellitus on self management training programme showed that, the type 2 diabetes mellitus patients had minimum knowledge, attitude and Practice regarding self management training programme.

Analysis of the findings indicated that, self management training programme is an effective means to increase the knowledge and to change the attitude and practice of type 2 diabetes patients on self management training programme in a positive direction, as the computed Mann Whitney 'U' test was significant at 1% level of significance.

The post-test was conducted on the experimental group- shown that there is a very minimal difference as compared to post-test of control group indicating that the self management training programme is effective and there is a need for reinforcement.

Results of the study will enable the medical, Nursing or other health care providers to utilize the self management training programto educate the diabetic patients on management of type 2 DM in the community settings as an additional intervention in preventing diabetes related complications by improving the knowledge, having positive attitude and good practice regarding self management of their diabetic condition.

Self management training program (individual or small group) is one of the effective teaching methods in imparting the knowledge and practice on self care of diabetes patients. Nurses play a vital role by creating awareness among the diabetes patients and their care giver to opt for quality services.

Hence it is concluded that the Self management training program is an effective strategy where type 2 diabetic patients could be helped to enhance the knowledge and change of attitude & practice in a positive direction. In further the researcher would like to continue the same service both in the hospital & community either as a service or as part of the research in future too.

**NURSING IMPLICATIONS:**

"Nurses working in different areas of clinical & community setting initially assesses implements and coordinates care for diabetes patents in all settings. Nurses educate the diabetes patients for adapting healthier life style in order to improve self care abilities. Nurses play a vital role by creating awareness among the diabetes patients and their care giver to opt for quality services. This gives opportunities and time to the nurses to accomplish evidence based practice to fulfill their demands which will help them to achieve quality care. The investigator is of the opinion that knowledge and practice of self care will bring about awareness among diabetes patients. With advancement in Nursing and medical field nurses are occupying the Diabetic Specialist role and providing education, counseling to diabetic Patients".

Findings of this study have implications in various areas of nursing namely: nursing practice, nursing education nursing administration and nursing research.

**Nursing Practice**

1. Self management Training on type 2 diabetes can be made an ongoing continuing education in inpatient and outpatient department.
2. Tool will be helpful to patients in understanding the importance of pathophysiology, clinical manifestation, and complication of diabetes.

3. There are modules in two languages, i.e. English and Gujarati. Further it can be used by the Patients or students for getting training.

**Nursing Education**

1. Self care management pamphlet can be used in educating the diabetic population & their family members regarding diabetic care.
2. A short term course regarding self care management on DM will be helpful to nursing students as a guide on diabetic education.
3. Arrange in service education for nurses working in clinical areas on Self management on Type 2 diabetic Mellitus.
4. Training module can be adopted in the nursing curriculum to train the student nurses in educating diabetes patients on life style modification.

## Nursing administration

1. The researcher can arrange for continuing education programme for nursing personnel working in clinical areas regarding self management of Type 2 Diabetes Mellitus.
2. The researcher can plan for educating diabetic self help group like alcoholic anonymous group. Here the patients can interact with each other, discuss their problems and way to overcome in health care set up.
3. Training material will provide information about the nongovernmental organization and other agencies which will financially support the patients for diabetic care.

## Nursing research

1. Tool can be used by other researchers to assess the knowledge, attitude & practice of other health care professionals who are involved in diabetic education in the community.
2. This study implicates that the research is required in different domains such as diabetic diet, exercise, medication, foot care, eye care, SMBG, Self administration of insulin etc which help us to maintain the standard of care and prevent diabetes related complications.

3. Findings of this study can motivate nurse researchers to conduct more studies related to self management training program on type 2 diabetes mellitus.

## Recommendations

1. Similar study can be done using mixed method research.
2. Similar training module can be developed using other educative materials.
3. Training can be given to other health care professionals such as home nurses, anganwadi workers, multipurpose workers who are directly involved in education of diabetic population in the community.
4. A similar study can be replicated on a subject with different demographic characteristics in different settings.
5. An extensive protocol may be developed including all aspects in management of type 2 diabetes mellitus.
6. A comparative study can be done on rural and urban patients.
7. Each domain wise diabetes self care management can be conducted.
8. Similar study can be conducted with larger sample in other district.

This chapter has dealt with conclusion, implications in nursing fields and recommendations.

## CHAPTER VII

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## *ACKNOWLEDGEMENT*

*The completion of this Thesis gives me an immense joy and contentment after many years of demanding efforts, it also provides an opportunity to express my sincere gratitude to all those who had helped me in its successful completion.*

*I owe my gratitude to all those people who have made this thesis possible and because of whom experience during my PhD has been one that I will cherish forever.*

*I am thankful to the omnipotent* ***"LORD GANESH"*** *for his blessings throughout the uphill task of the present study. His unfailing presence helped me throughout the ups and downs of the endeavor.*

*At the very outset, I wish to acknowledge and thanks to* ***Sumandeep Vidyapeeth deemed University*** *and* ***Dr. Mansukh Shah Sir****, President of Sumandeep Vidyapeeth, &* ***Dr. Dixit M Shah Sir,*** *Executive Trustee, Sumandeep Vidyapeeth for providing me opportunity to undergo PhD at esteemed Sumandeep Vidyapeeth Deemed University.*

*I deem it a great privilege and honor to express my deepest sense of gratitude to esteemed teacher and guide* ***Dr. J. D. Lakhani****, Professor in Medicine & Academic director, SBKS MIRC, Sumandeep Vidyapeeth, for his constant support, valuable suggestions, encouragement and expert guidance. I learnt a lot from him, which I am sure, it will be useful throughout my academic career.*

*I express my respectful gratitude to Veteran, Air Commodore* ***Dr. G.D. Mehta****, Chancellor, Sumandeep Vidyapeeth &* ***Col. Dr. V. P. Singh****, Officiating Vice Chancellor, Sumandeep Vidyapeeth for their blessings in completion of the Study.*

*I wish to express my special sense of gratitude to **Dr. Manoj. M. Sattigerri**, Registrar, Sumandeep Vidyapeeth University, Vadodara who has offered me an opportunity to pursue higher studies.*

*It is my privilege to convey my sincere gratitude and thanks to **Dr. Poonacha**, Controller of Examination Sumandeep Vidyapeeth for his timely help and cooperation since the Registration to completion of the study.*

*I wish to express my sincere thanks and gratitude to **Dr. A. K. Seth,** Research Director, **Dr. Niraj Pandit**, Deputy Research Director, **Dr. Manish Parmar**, PhD coordinator, Sumandeep Vidyapeeth, Vadodara for the official approvals & constant monitoring to conduct the study.*

*I express my deep sense of gratitude to my colleagues **Mr. Swamy PGN**, Asst. Professor, **Mr. Suresh V**, Associate Professor, **Mr. Nirmal Raj,** Asst professor and **Mr. Rajesh P**, Asst Professor for their constant, valuable contribution in bringing out this theses.*

*My special Thanks to **Mrs. Janki B Patel & Mr. Kevin Christian,** Assistant Professors, Sumandeep Nursing college never can I forget who have been lead the team of trainers for Data collection throughout Waghodia taluka for long period of time and who were always ready for every task related to this research study.*

*I extend my sincere thanks to **Mr. Swamy PGN,** Asst professor in Nursing SNC**,** **Dr. Hemant Tiwari**, Professor in Statistics, Ahmedabad, **Dr. Medha Wadhwa,** Assistant*

*Professor, Department of Management, Sumandeep Vidyapeeth, for their guidance & active involvement in methodology, statistical analysis and presentation of data.*

*My sincere thanks to* ***Dr. Chaitri Shah,*** *Intensivist, Dhiraj General Hospital****,*** ***Dr. Hetal Pandya,*** *HOD Medicine, SBKSMI & RC****,*** ***Dr. Balaraman****, Professor, Department of Pharmacy, Sumandeep Vidyapeeth,* ***Dr. Sivabalan,*** *Professor & Principal &* ***Mrs Vimala Sivabalan,*** *Associate professor, Pravara Institute of Nursing, Nasik, Maharashtra for validating tool and the module.*

*I recognize the valuable support of* ***Mr. Ramanlal Patidar****, Ex-Assistant Professor, Sumandeep Nursing College.*

*I am indebted to all the* ***diabetic patients of Waghodia*** *taluka for their valuable support as a sample of the study without which the study wouldn't have been taken place.*

*I express my sincere thanks to* ***Mr.Raulji Jaydeepsinh,*** *Head Clerk, Sumandeep Nursing College for formatting, printing and binding of my dissertation copies. I also express gratitude to* ***Ms. Yashwanti Patak, Mrs. Nidhi Sagar, Mr. Bhogilal Rohit and Mr. Sandip Vasava,*** *Non-teaching staff of Sumandeep Nursing College for their timely support.*

*My special to thanks to the* ***PG & UG Nursing students*** *who have taken part in data collection during both diabetic demographic survey and intervention.*

*I am deeply indebted to my father* ***Mr. Ningaraju H. S.****, my mother* ***Mrs. Kamala****,* ***Mr. Dharmendra HN*** *my brother,* ***Mrs. Yogeshwari*** *&* ***Mrs. Roopa*** *my sisters, my beloved wife* ***Mrs. Mythri K S****, my daughter* ***Baby Nishika*** *and my son* ***Master Dhyan*** *for*

*their support, prayer and constant encouragement throughout the study. Without them I could not have completed this study.*

*My sincere thanks to the pre defense examiners* ***Dr. G V Shah****, Dean SBKSMI & RC,* ***Dr. Sivabalan****, Professor, Pravara Institute of Nursing, Nasik, Maharashtra,* ***Dr. JD Lakhani****, Professor in Medicine & Academic director, SBKS MIRC, Sumandeep Vidyapeeth,* ***Dr. Hetal Pandya****, HOD Medicine, SBKSMI & RC for their valuable suggestions in shaping this thesis in a better form.*

*I thank all those names who are not mentioned but have directly or indirectly helped me successfully to complete this study.*

***Place****:-Vadodara* ***Prof. Ravindra H N***

# ANNEXURE - I

**SUMANDEEP VIDYAPEETH**
(Declared as Deemed to be University Under Section 3 of UGC Act, 1956)
At. & Post : Piparia, Ta : Waghodia, Dist : Vadodara-391760

SV/Acad /13-14/ 9931

01.01.2015

To,
**The Controller of Examination, SV**

**Sub: -** RAC report of the student along with the changes recommended by the RAC expert (Nov-Dec 2014)

Dear Sir,

The RAC was conducted for the following students and status of the same is forwarded to your office for kind consideration.

| Sr No | Date of RAC | Name of the Student | Department | Status after RAC | Title |
|---|---|---|---|---|---|
| 1 | 23.12.2014 | Mr Ravindra H N | Nursing | Cleared | **Title change**-Effectiveness of self management training on type-II diabetes mellitus-A community based study. |

So please do the needful

Thanking you

Yours Sincerely

Dr A K Gangawane

Dy. Registrar (Acad) & Member Secretary- PSC/PRC

Copy forwarded to

1. Principal, College of Nursing, SV
2. Research Guide
3. Research Scholar (PhD)

Copy forwarded for kind information

4. The Vice Chancellor & Chairman- PRC, SV
5. The Director General, SV
6. The Registrar, SV
7. The Director of Research & Chairman-PSC

Sumandeep Nursing College
Piparia, Waghodia, Vadodara
Inward No. SNC/2014/02
Date: 1/1/15
Time: 3.30 pm

# ANNEXURE - II


SUMANDEEP VIDYAPEETH

(Declared as deemed to be University Under Section 3 of UGC Act, 1956)

Vill.: Piparia, Tal.: Waghodia, Dist.: Vadodara-391760(Gujarat)


No. SV/A/Ph.D/ 12-13/1867 30th January, 2014

**REGISTRATION CERTIFICATE**

This is to certify that Mr. Ravindra H.N. has been admitted to Ph.D (Doctor of Philosophy) course in the Allied Health Sciences (Nursing) of this university from 22.11.2012. He has been admitted as a Ph.D student with this university with effect from 22.11.2012.

His Registration No. is: Ph.D Nursing 0012012

He has passed his Pre Ph.D University Examination.

His registration for said Ph.D is confirmed here with.

Secretary
Ph.D Regulation Committee

Sumandeep Vidyapeeth Deemed University

To,
Mr. Ravindra H.N.
Sumandeep Nursing College

Copy to:

1. Principal, Sumandeep Nursing College
2. Dr. J.D. Lakhani, Medicine Department, DGH
3. The CAO, SVDU

## ANNEXURE - III

## SVIEC (HRRP) PERMISSION LETTER


INSTITUTIONAL ETHICS COMMITTEE

**Sumandeep Vidyapeeth**

Deemed University (declared u/s 3 of UGC Act of 1956)
At & Po. Piparia, Tal. Waghodia, Dist. Vadodara 391 760 (Gujarat) INDIA.
Phone : +02668-245262/64/66
Website : www.sumandeepuniversity.co.in




**Mr. Ravindra H N**
Sumandeep Nursing College
Sumandeep Vidyapeeth,
Piparia, Waghodia Road,
Vadodara-391760
Gujarat

**Date: 20th Jan.2015**

SUMANDEEP VIDYAPEETH
INSTITUTIONAL ETHICS COMMITTEE
OUTWARD: SVIEC/OUT/2015/15009
DATE: 20-1-15
SIGN.:

**Ref:** Your Ph.D synopsis entitled; **"**Effectiveness of Self-Management Training on Type 2 Diabetes mellitus- A Community based study**"** submitted to the SV IEC for approval.

**Sub: Approval for conducting the referenced study**

Dear Mr. Ravindra,

The SV IEC has reviewed your above mentioned Ph.D synopsis, we are pleased to inform you that after due delegations, the SV IEC has approved your study to be conducted in the presented manner.

The study needs to be initiated within one year of issuing of this approval. In case the study is not initiated within one year, the Ethics Committee expects to be informed about the reason for the same and a fresh approval will have to be obtained subsequently.

The Sumandeep Vidyapeeth Ethics Committee expects to be informed about the progress of the study (every 6 months), any Serious Adverse Event (SAE) occurring in the course of the study, and if any changes are made in the protocol or patient information/informed consent the EC needs to be informed about this in advance and an additional permission require to be taken, the SV IEC also requires you to submit a copy of the final study report.

**Dr Niraj Pandit**
**Member Secretary**
**SV Institutional Ethics committee**

ETHICS COMMITTEE
(Sumandeep Vidyapeeth University)
At. & Po. Pipariya, Tal. Waghodia,
Dist. Vadodara-391760

SNC/2015/34
21/1/15
10-30 am

## ANNEXURE - IV

## SVIEC (HRRP) STUDY COMPLETION CERTIFICATE


**Sumandeep Vidyapeeth**
**Institutional Ethics Committee (SVIEC)**
**Declared as deemed to be university u/s 3 of UGC act of 1956**
**At & Po Pipariya, Ta. Waghodia**
**Dist. Vadodara-391760(Gujarat), India, Phone: +2668-245262/64/66**
**E-mail: rd.sumandeep@gmail.com www.sumandeepuniversity.co.in**




SUMANDEEP VIDYAPEETH
INSTITUTIONAL ETHICS COMMITTEE
OUTWARD : SVIEC/ON/NURS/PhD/17002
DATE : 03/03/17
SIGN. :

**Date: 03rd March 2017**

### STUDY COMPLETION CERTIFICATE

This is to certify that your study synopsis entitled: "Effectiveness of Self-Management Training on Type 2 Diabetes mellitus- A Community based study" Research Project was done by **"Mr. Ravindra HN"** (Ph.D Scholar, Dept of Medical Surgical Nursing, Sumandeep College of Nursing, Piparia, Waghodiya road, Vadodara-391760, Gujarat) and it was conducted to the satisfaction of the Sumandeep Vidyapeeth Institutional Ethics committee.

**Dr. Niraj Pandit**
**Member Secretary**
**SV Institutional Ethics committee**

SUMANDEEP VIDYAPEETH
INSTITUTIONAL ETHICS COMMITTEE
At. & Po. Piparia. Ta. Waghodia.
Dist. Vadodara-391760.