CHAPTER I

INTRODUCTION

“Eat less sugar, you’re sweet enough already”

Diabetes mellitus is a major universal health problem afflicting human societies at all stages of development. Globally there are at least 30 million diabetes; the majority of them lack even the rudiments of care. The Hindustan Times news paper stated that the total number of people suffering in the country (India) as a whole is estimated at 15.2 million.

Global Scenario

The main goals of the world health day 2016 campaign are to increase awareness about the rise in diabetic. In 2014 the global prevalence of diabetic was estimated to be the 9% among adult age 18+ year. Prevalence rate (8th March 2016) of an estimated 8.9% adults have been diagnosed with diabetes or approximately 250,000 adults. According to the literature approximately 25% people with diabetes undiagnosed. Total 83,000 adults undiagnosed diabetes include type 1 and 2 diabetes. Males suffers higher than female.

W.H.O. Report

2013 estimated 8% of type 2 diabetes is preventable by changing diet, increasing physical activity and improving the living environment without effective prevention & control programme, the incidence of diabetes is likely to continue rising globally.

In 2012 estimated 1.5 million death were directly cause by diabetes type 2. More than 80% of diabetes death occur in low and middle income countries. WHO projects that diabetes will be 7th leading cause of death in 2030. The prevalence estimated of diabetes for all the age group was estimated in to 2013 is to be 2.85% & 4.4% in 2030.

Indian Scenario
Prevalence of diabetes mellitus in India has been growing by leaps and bound in the last 20 years there has been a threefold increase in the prevalence of diabetes and today it is estimated that there are over 28 million diabetic patients in India. India’s population now ranks first in the world.

Section 1.1: Concept of the Diabetes mellitus:

An Egyptian was given the first confirmation of diabetes by the name Papyrus Ebbers (1500 BC). The word “Diabetes” is origin from Greek word which mean “to run through” or a term “siphon” was first used by Aristaeus of Cappadocia in 2 century A.D. An accurate factual description of the diabetes condition, which is instantly recognizable even today. Diabetes is a fearful problem, not very common among man, being a melting down of the fleshy tissue and limbs into urine. The patients may have increased thirst an increased urination. In the 5 century B.C. Charka and Susruta described a situation “Madhumeha” in which a person passes urine, which contain honey, so that it strongly attracts ants.

Section 1.2: Meaning of Diabetes mellitus:

Diabetes mellitus is a chronic condition that arises when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Failure of insulin production, insulin action or both leads to raised glucose levels in the blood (hyperglycaemia). This is associated with long term damage to the body and the failure of various organs and tissues.
Section 1.3: Types of Diabetes mellitus:

Mainly there are two types of diabetes mellitus, type I and type II. Type I is characterized by the destruction of insulin production in the pancreas and type II is characterized by lack of use of insulin that is produced effectively. Type I is diagnosed most commonly in children and accounts about 5-10% and type II accounts about 90-95% worldwide and is closely linked with obesity and physical inactivity. Type II diabetes mellitus is a global health problem and one of the major causes of morbidity and mortality. The incidence of the disease is high worldwide and varies between populations because of differences in genetic susceptibility and other modifiable risk factors.

Other type of Diabetes mellitus is Gestational Diabetes (GD) mellitus and secondary diabetes. Gestational Diabetes mellitus refers to the onset or initial recognition of glucose intolerance during pregnancy, usually in the second or third trimester. It occurs in about 4% of all pregnancies. Patients with GD have a 30% to 50% chance of developing DM, usually type II DM. Secondary diabetes may develop due to another chronic illness such as pancreatitis or cystic fibrosis. It is not true diabetes mellitus, because blood glucose levels usually return to normal when the cause is corrected. Prolonged use of some drugs, most commonly steroids, may also cause secondary diabetes.

Type 1 Diabetes Mellitus

Type 1 diabetes (formerly called insulin-dependent diabetes mellitus, or IDDM) is caused by destruction of the beta cells of pancreas. When the beta cells are destroyed the pancreas produces no insulin at all. Insulin must be injected in order for the body to use food for energy.

It is believed that the pancreas may attack itself following a viral infection. Almost 85 percent of clients newly diagnosed with type 1 diabetes have islet cell antibodies in their blood. From 10 to 30 percent of type 1 diabetes cases are hereditary. The client with type 1
diabetes is prone to develop **ketoacidosis** when blood glucose is elevated. When insufficient insulin is available to allow glucose to enter cells, the body breaks down fat to be used for energy. Fat breakdown release an acid substance called Ketones. The build-up of these acids in the blood causes ketoacidosis.\(^4\)

**Type 2 Diabetes Mellitus**

In type 2 diabetes mellitus (formerly called non–insulin dependent diabetes mellitus, or NIDDM), some insulin is still made by the pancreas, but in inadequate amounts. Sometimes, the amount of insulin is normal or even high, but the tissues are resistant to it, and hyperglycaemia results.\(^4\)

Heredity is responsible for up to 90 percent of cases of type 2 diabetes. Obesity is also a major contributing factor. Often the client with a new diagnosis of type 2 diabetes is obese, relates a family history of diabetes, and has had a recent life stressor such as the death of family member, illness, or loss of a job. Clients with type 2 diabetes are not prone to developing ketoacidosis, because they usually have some insulin available.\(^4\)

**Gestational Diabetes**

Gestational diabetes mellitus (GDM) may develop during pregnancy. Gestational diabetes may occur in a woman with the risk factor for type 2 diabetes. The extra metabolic demands of pregnancy trigger the onset of diabetes. Blood glucose usually returns to normal after delivery, but the mother will have an increased risk for type 2 diabetes in the future. If she is overweight, she should be counselled that weight loss will decrease her risk of developing diabetes. Mothers with GDM require specialized care and should be referred to an expert in this area\(^4\).

**Secondary Diabetes**

Secondary diabetes may develop due to another chronic illness such as pancreatitis or cystic fibrosis. It is not true diabetes mellitus, because blood glucose levels usually return to normal when the cause is corrected. Prolonged use of some drugs, most commonly steroids, may also cause secondary diabetes.\(^4\)
Magnitude of Diabetes Mellitus

Global Scenario

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Section 1.4: Pathogenic processes:

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 hyperglycaemia.

Section 1.5: Symptoms:

Symptoms of marked hyperglycaemia include polyuria, polydipsia, weight loss, sometimes with polyphagia, and blurred vision. Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycaemia. Acute, life-threatening consequences of uncontrolled diabetes are hyperglycaemia with ketoacidosis or the nonketosis hyperosmolar syndrome.

Long-term complications of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers, amputations, and Charcot joints; and autonomic neuropathy causing gastrointestinal, genitourinary, and cardiovascular symptoms and sexual dysfunction. Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial, and cerebrovascular disease. Hypertension and abnormalities of lipoprotein metabolism are often found in people with diabetes.

Section 1.6: Investigations:

The diagnosis of diabetes Mellitus is done through history collection, Physical examination and laboratory tests. Clinical manifestations suggest the presence of diabetes mellitus, but laboratory tests are needed to make a definite diagnosis.
**Fasting Blood Glucose Level**

A fasting blood glucose sample is drawn when the client has not taken any food other than water for at least 8 hours and the diagnosis is made when a client’s fasting blood glucose level is greater than 126 mg/dl. The fasting blood glucose measurement provides the best indication of overall glucose homeostasis and is the preferred method of diagnosing diabetes mellitus.

**Random Blood Glucose Level:**

Clients may also be diagnosed with diabetes mellitus based on clinical manifestations and a random blood glucose level greater than 200 mg/dl. A random blood glucose sample can be drawn at any time of the day without regard to fasting. Elevated blood glucose levels may occur after meals, after stressful events in sample drawn from an IV site, or in cases of diabetes mellitus.

**Postprandial Blood Glucose Level:**

A postprandial (after a meal), glucose level can also be drawn and used to diagnose diabetes mellitus. Postprandial blood glucose samples are drawn 2 hours after a meal and normally blood glucose returns to fasting level within 2 hours. If postprandial glucose level greater than 200 mg/dl during an oral glucose tolerance test (OGTT) is confirmation for diagnosis of diabetes mellitus.

According to the American Diabetic Association (ADA) recommendation changes in 1997, the fasting glucose concentration should be used in routine screening for diabetes as well as epidemiological studies; the threshold for fasting glucose was changed from 7.8 mmol/L (140 mg/dl) to 7.0 mmol/L (126 mg/dl); however the 2 hrs glucose criterion remains as 11.1 mmol/L (200 mg/dL). For the diagnosis of diabetes, at least one of the criteria must apply. The first one is symptoms of diabetes (polyuria, polydipsia, unexplained weight loss, etc) as well as casual plasma glucose concentration = 11.1 mmol/L (200 mg/dL). Fasting plasma glucose = 7.0 mmol/L (126 mg/dL), with no caloric intake for at least
8 hrs and the last is 2 hrs plasma glucose = 11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test (OGTT), with the glucose load containing 75 g anhydrous glucose in water.

Section 1.7: Management of diabetes mellitus:

The management of diabetes mellitus includes medications, diet, exercise, lifestyle modification and self-care measures.

Medications:

**Oral Hypoglycaemic Agent (OHA):**

Oral hypoglycaemic are the drugs which when administered orally bring down the blood glucose. Usually, these drugs are used in patients of type 2 diabetes (NIDDM) who do not respond to dietary management and who would otherwise require treatment with insulin in later situation, they are used adjuvant to insulin in obese patients. These drugs require presence of insulin secreting beta cells for their action and that is the reason why they are not effective in type 1 diabetes. Insulin is used specifically in type I diabetes.

A stepwise approach is followed for the treatment of type 2 DM. In this the initial drug of choice for obese is biguanide (metformin) and for non-obese is sulphonylurea or any other insulin secretogogue. If single drug is not able to bring the HbA1C to target level, another drug is added (combination therapy). A combination of two or three drugs can be tried to bring the HbA1C to < 7%; if triple drug regimen fails, insulin therapy is started. Some physicians prefer insulin therapy after failure of a combination of 2 drugs.

**Insulin:**

Insulin is the treatment of choice in type I DM and in some cases of type 2 DM where OHA have failed the insulin is used. There are different types of insulin depending on how quickly they work, when they peak, and how long they
last. Insulin is available in different strengths; the most common is U-100. Inside the pancreas, beta cells make the hormone insulin. With each meal, beta cells release insulin to help the body use or store the blood glucose it gets from food. In people with **type 1 diabetes**, the pancreas no longer makes insulin. The beta cells have been destroyed and they need insulin shots to use glucose from meals. People with **type 2 diabetes** make insulin, but their bodies don't respond well to it. Some people with type 2 diabetes need diabetes pills or insulin shots to help their bodies use glucose for energy. Insulin cannot be taken as a pill because it would be broken down during digestion just like the protein in food. It must be injected into the fat under your skin for it to get into your blood. Insulin has 3 characteristics: Onset is the length of time before insulin reaches the bloodstream and begins lowering blood glucose. Peak time is the time during which insulin is at maximum strength in terms of lowering blood glucose. Duration is how long insulin continues to lower blood glucose. 

There are four types of insulin they are:

1) **Rapid-acting insulin** and it begins to work about 15 minutes after injection, it reaches to the peak in 1 hour, and continues to work for 2 to 4 hours. The types of rapid –acting insulin are **insulin glulisine (Apidra)**, **insulin lispro (Humalog)**, and **insulin aspart (NovoLog)**.

2) **Regular or Short-acting insulin** and it usually reaches the bloodstream within 30 minutes after injection, it reaches to the peak from 2 to 3 hours after injection, and is effective for approximately 3 to 6 hours. The types of Short-acting insulin are **Humulin R, Novolin R**.

3) **Intermediate-acting insulin** generally reaches to the bloodstream for about 2 to 4 hours after injection, reaches to the peak 4 to 12 hours later, and is effective for about 12 to 18 hours. The type of Intermediate-acting insulin is **NPH (Humulin N, Novolin N)** and...
4) **Long-acting insulin** and it reaches to the bloodstream several hours after injection and tends to lower glucose levels fairly evenly over a 24-hour period. The type of Long-acting insulin are *insulin detemir (Levemir)* and *insulin glargine (Lantus).*

**Diet:**

Appropriate food choices are considered necessary for ensuring and maintaining good health. Diet therapy is medically necessary and cost effective way of treating and controlling diabetes mellitus. Its objective is to attain and maintain optimal metabolic outcomes, including blood glucose levels in the normal range, lipid & lipoprotein profile that the risk for vascular disease and blood pressure levels in the normal range or as close to normal as is safely possible, to prevent, or at least slow, the rate of development of chronic complications of diabetes - nutrient & lifestyle modification to address individual nutritional needs, taking into consideration personal, cultural preferences and lifestyle to maintain the pleasure of eating by only limiting food choices when indicated by scientific evidence.  

Daily energy requirement for an individual is calculated according to age, weight height and activity. On an average 36 K.cal/kg for non-obese men and 34 kcal/kg for non-obese women is reasonable as initial treatment. The diet should be palatable and according to the taste of the patient.

**Carbohydrates:**

The carbohydrates prescribe should be taken in the form of starch and complex sugars. About 100-300g of carbohydrates spread over 3 meals (60gm each) and 3 snacks (30gm each) with half a litre of milk (30.0g) are advised. The division of carbohydrates into frequent meals and snack provides good matching between drug treatment and it lowers blood lipids and prevents hypoglycaemia. Simple sugars i.e. glucose or sucrose are avoided. Rich fibrecontent foodlike barley, oat, legumes, beans, and peas as supplement with soluble fibreslike guar, gum, pectin will improve glycemic control.
Proteins:

Amino acids stimulate insulin secretion, hence proteins combined with carbohydrates in diet lower the blood sugar effectively. Proteins stimulate appetite also. Daily intake of proteins should be 60-100g (1.0-1.5 g/kg) divided between meals constituting 10-15\% of total calories\textsuperscript{12}.

Fat:

The fat intake should be adjusted to bring the total calories to the desired level. The amount varies from 50-150g daily divided between meals. The fat should contain 10\% saturated fatty acids, 10-15\% monosaturated fat and rest 10\% as polysaturated fat\textsuperscript{13}.

Salts:

Normal salt intake of 6.0g daily is allowed to diabetics. It is reduced to half i.e. 3.0g if the diabetic is hypertensive also\textsuperscript{14}.

There are different types of Diet. (i) Low energy and weight-reducing diet; This is for Obese type 2 diabetestreated with insulin and OHA. These diets provide daily deficit of 500 kcal and induce a weekly loss of 0.5 kg of weight. Patients on this diet should omit snacks in between meals. Weight reduction restores insulin sensitivity and (ii) weight maintain diet; This diet is prescribed to no obese (normal BMI) type 2 diabetes patients. This diet is rich in carbohydrates and low in fat. In this the fat consumed should be mostly

Exercise:

Physical exercise has been considered as one of the cornerstones in the treatment of diabetes mellitus along with diet and medication. Physical activity is defined as the total of planned and repetitive movements of skeletal muscles, which are performed using energy. Exercise has a significant role in the regulation of blood glucose, improves insulin action, metabolism of proteins and fats, prevents
complications of diabetes, improves muscle flexibility and strength, has beneficial effects on the cardiovascular system and increases life expectancy of the patients. In addition, physical activity is beneficial for the mental state of the individual, because it increases the energy of the human body, improves self-esteem and decreases depression. Based on the literature, if completely sedentary and underactive individuals participate in moderate physical activity 30 minutes a day, they would obtain at least a 30% of risk reduction\textsuperscript{15}.

Section 1.8: Lifestyle modification:

Lifestyle modification is must in type II DM patients because rapid urbanization and industrialization have produced advancement on the social and economic front in developing countries such as India which have resulted in dramatic lifestyle changes leading to lifestyle related diseases. The transition from a traditional to modern lifestyle, consumption of diets rich in fat and calories combined with a high level of mental stress has compounded the problem further. Life style related risk factors like dietary choices, smoking, alcohol consumption, overweight & sedentary life style are modifiable which need to be informed to the patient so that they can modify their lifestyle\textsuperscript{15}.

Diabetic patients must have knowledge about medication, its effects and side effects, diet, exercise, disease progression, prevention strategies and blood glucose monitoring techniques. A crucial element in secondary prevention is self-care. That is the diabetic patient must take a major responsibility for his/her own care with medical guidance. Providing an appreciate knowledge and skills to a diabetic patients is the prime responsibility of a nurse\textsuperscript{16}.

Section 1.9: Need for the Study

At present there are 19.4 crore diabetes patients worldwide, out of these 3.5 crore were identified in India. U.S. death certificates status of 2007 shows
that diabetes was the 7th major leading reason of death in the country. India's embrace of the worst of both Eastern and Western ways is sending lifestyle illnesses such as obesity and diabetes skyrocketing. According to the International Diabetes Federation (IDF) and the Madras Diabetes Research Foundation report in 2011 India had 62.4 million people suffered by type 2 diabetes, compared with 50.8 million the previous year. In India the crude prevalence rate of diabetes in urban areas is about 9% and that the prevalence in rural areas has also increased approximately 3% of the total population.

A study was conducted to assess the general characteristics, knowledge, attitude and practices of type 2 diabetic patients attending the Out-Patient Department (OPD) of Baqai Institute of Dialectology and Endocrinology (Karachi, Pakistan). The result revealed that 57% of the patients were overweight or obese. Only 10.7% had good glycaemic control. Sixty seven percent did not do exercise of any kind. The overall awareness about the risk of complications was satisfactory but the misconceptions regarding diet, insulin and diabetes were quite common. This study highlights the need for better health information to the patient through large scale awareness programmes so as to change the attitude of our public regarding diabetes.

A descriptive study was conducted at Chennai on 100 samples on type 2 diabetic patients’ knowledge and attitude on self care activities were accessed by using interview schedule and Likert’s scale. The result shows that 48% at the patients had inadequate knowledge, 35% of the patients had moderately adequate knowledge and 17% of patients had adequate knowledge. Regarding attitude, 72% of patients had undesirable attitude, 16% patients had desirable attitude and 12% of patients had most desirable attitude on self care activities. The researcher concluded that, most of the patients were inadequate knowledge and attitude about diabetes mellitus. So proper health education can improve the patients knowledge and attitude on self care activities. (unpublish research).

The investigator during her clinical experiences identified that the diagnosis of diabetes created anxiety and doubts among diabetics on how to adjust
with the restrictions imposed on them to control diabetes, also the investigator identified lack of knowledge in Preventing complications of diabetes mellitus and to make the patient to adhere with right self care activities so that they can maintain a quality of life\textsuperscript{17}.

Section 1.10: **Statement of the Problem**

“A study to assess the effectiveness of an information booklet regarding knowledge and practice of diabetic patients towards the self care activities for quality of life in selected clinics and hospitals in Kota (Raj)

**Section 1.11: Aim of the Study:**

1. To provide education to diabetic patients about knowledge and practice towards the self care activities for quality of life.
2. To prepare an information booklet on self care activities for quality of life for diabetic patients.

**Section 1.12: Objectives of the Study:**

1. To assess the knowledge regarding self care activities of quality of life among type II diabetic mellitus patients using structures Knowledge questionnaire.
2. To assess the practices regarding self care activities of quality of life among type II diabetic mellitus patients using rating scale.
3. To evaluate the effectiveness of an information booklet on knowledge regarding self care activities of quality of life among type II diabetic mellitus patients by comparing pre and post test knowledgescores.
4. To evaluate the effectiveness of an information booklet on practices regarding self care activities of quality of life among type II diabetic mellitus patients by comparing pre and post test practice scores.
5. To find out the association between mean pre test knowledge scores regarding self care activities of quality of life among type II diabetic mellitus patients with selected socio-demographic variables.
6. To find out the association between mean pre test practice scores regarding self care activities of quality of life among type II diabetic mellitus patients with selected socio-demographic variables.

7. To find out the co-relation between knowledge and practice score regarding self care activities of quality of life among type II diabetic mellitus patients

Section 1.13: Operational Definition:

**Information booklet:** In this study information booklet refers to the booklet where information is given about how to improve quality of life in various self care activities of type II diabetic mellitus patients including dietary management, exercise, medication, foot care, and precaution of complication of diabetes mellitus.

**Knowledge:** Refers to the correct responses of type II diabetic mellitus patients to the Knowledge questionnaire.

**Effectiveness:** The degree to which an information booklet has achieved the desired results as measured by type II diabetic mellitus patients knowledge and practice scores which was assessed by comparing pre and post test knowledge and practice scores.

**Practice:** Refers to the correct responses of type II diabetic mellitus patients to the Practice rating scale.

**Quality of life:** In this study the quality of life refers to general and subjective wellbeing among type II Diabetes mellitus patients

**Diabetic patient’s:** Men & women who are attaining diabetic clinic (age group of 40 to 70 Year & above.

**Diabetes mellitus:** A distribution in the oxidation and utilization of glucose, which is the
secondary malfunction of the beta cells in the pancreas, whose function in the production and release of insulin.

**Self care activity:** In this study, self care refers to the earning of the oneself in the terms of dietary management, exercise, medication of diabetes mellitus.

**Section 1.14: Assumptions**

1. Diabetes mellitus patients will have some knowledge on self care activities of quality of life.
2. Diabetes mellitus patients will have some practices on self care activities of quality of life.
3. Information booklet improves the knowledge and practices on self care activities of quality of life.
4. There will be an association between mean pre test knowledge scores regarding self care activities of quality of life among type II diabetic mellitus patients with selected socio-demographic variables.
5. There will be an association between mean pre test practice scores regarding self care activities of quality of life among type II diabetic mellitus patients with selected socio-demographic variables.
6. There will be a co-relation between knowledge and practice score regarding self care activities of quality of life among type II diabetic mellitus patients.

**Section 1.15: Null Hypothesis:**

$H_{01}$: There will be statistically no significant relationship between pre & post test knowledge scores regarding self care activities of quality of life among type II diabetic mellitus patients.

$H_{02}$: There will be statistically no significant relationship between pre & post test practice scores regarding self care activities of quality of life among type II diabetic mellitus patients.
H03 There will be statistically no significant relationship between knowledge of type II diabetic mellitus patients with selected socio demographic variables.
H04 There will be statistically no significant relationship between practices of type II diabetic mellitus patients with selected socio demographic variables.
H05 There will be statistically no significant co-relation between Pre &Post test knowledge and practice scores type II Diabetic mellitus patients on self care activities of quality of life.

**Section 1.16: Delimitations:**

The study was limited to type II diabetes mellitus patients who were:

- Read & write Hindi or English.
- Available during time of data collection.
- Attending diabetic clinic

**Section 1.17: Diabetes Mellitus Related Issue in India: An Overview:**

An overview today is greatest world wise problem is diabetes mellitus. It is a challenge for health professionals as there is no effective cure for it. Diabetes Mellitus considering the tremendous economic burden of the disease in the society, measures directed towards preventing the disease are highly desirable.  

Type I diabetes mellitus is the third common chronic disease. Type 1 diabetes mellitus for 5-10% of all diabetes in which the insulin producing percentage beta cells are destroyed by an autoimmune process. As result, they produce little or no insulin and require insulin injections to control their blood glucose levels. Type 1 diabetes is characterized by an acute onset, usually before age.  

Approximately 90% to 95% of people have Type 2 diabetes which results from decreased sensitivity to insulin (called insulin resistance) and impaired beta cells functioning resulting in decreased insulin production. Type 2 diabetes is first treated with diet and exercise. If elevated glucose levels persist, diet and exercise
are supplemented with oral hypoglycaemic agents. In some individual with type 2 diabetes, oral agents do not control hyperglycaemia, and insulin injections are required. In addition and some individuals whose type 2 diabetes can usually be controlled with diet, exercise, and oral agents may require insulin injections during periods of acute physiology stress (eg, illness or surgery). Type 2 diabetes occurs more among people who are older than 30 years and obese.

Diabetes complications may develop in any person with type 1 or type 2 diabetes; not only in patients who take insulin. Some patients with type 2 diabetes who are treated with oral medications may have impression that they do not really have diabetes or that they have “borderline” diabetes. They may believe that, compared with diabetic patients who required insulin injections, their diabetes is not a serious problem. It is important for the nurse to emphasize to these individuals that they do have diabetes and not a borderline problem with sugar (glucose). Borderline diabetes is classified as impaired glucose tolerance (IGT) or impaired fasting glucose (IFG) and refers to a condition in which blood glucose levels fall between normal levels and levels considered diagnostic for diabetes.

Indian data regarding the prevalence of type I diabetes mellitus. Susceptibility to type I diabetes mellitus is altered by changes in geography and lifestyle. Type 2 diabetes mellitus is a major public health problem. According to the WHO people affected by type 2 diabetes mellitus around the world estimated into 2013 is to be 2.85% & 4.4% in 2030. In India is an estimated 79 million by the year 2030 and it is the highest number of diabetes in the world. There has been significant increase in the prevalence of type 2 diabetes mellitus in Indian population. Recent studies indicate that the increase is even more substantial in rural areas as compared to urban areas. Even more significant is the increase in prevalence of type 2 diabetes mellitus in younger’s. Earlier it is believed to be limited to subjects above 30 years of age, the disease has been increasingly identified in adolescents.

A study to evaluate the prevalence of undiagnosed diabetes among patients with stress hyperglycaemia and association between baseline glycaemic control and mortality. Total 299 patients enrolled in the medical intensive care unit. A prospective
study on haemoglobin A1C levels were obtained from any patients who developed hyperglycaemia and all known diabetic patients. The result shows 102 (34.1%) had no history and 197 (65.9%) had a history of diabetes and non diabetic patient 14 (13.7%) had an HbA1C of at least 6.5%. There was a significant difference in mortality between patients with HbA1C less than 6.5% and those with HbA1C of at least 6.5% (19.3% v/s 11.7% \( P= .038 \)) Sura et all (2014)\textsuperscript{23}.

**Section 1.18: Knowledge of Diabetes Mellitus**

A cross sectional study on knowledge of 500 diagnosed type 2 diabetes in Tertiary Hospital, Bangladesh. Mean knowledge score was 15.29 (3.6%). A significant negative association was found between the knowledge score and the HbA1C level, Farzaza Salah (2014)\textsuperscript{24}.

An observational cross sectional study on knowledge of diabetes mellitus among rural dwellers in Southeast, Nigeria. Majority of subjects were over 50 years of age. 296 subjects assessed, overall knowledge of subjects on nutritional cause of diabetes. 5% of subjects (30.7%) knew that diabetes mellitus can be prevented. Only 89 (30.1%) of subjects knew that diabetes mellitus can be prevented by being carefully with one eats 59 (59.9%) were aware of regular exercise & 88 (29.7%) knew that diabetes mellitus can be prevented by regular blood testing for sugar this will improve their ability to prevent diabetes mellitus by adopting healthy life style, Nidibuagu. Edmund O. (Jan 2016)\textsuperscript{25}.

A cross sectional study was conducted in Turkey to determine the level of knowledge of patient in diabetes mellitus among 524 rural adults with the age over 30 years by a knowledge questionnaire. The results that mean diabetic knowledge score was 30.2. The result indicated that the patients knowledge on diabetes mellitus was lower,Zara(2010)\textsuperscript{26}.
Section 1.19: Practice of Diabetes Mellitus

A cross sectional study to determine the practice of self care activities of diabetic patients in GovtVenlock Hospital, Mangalore, Karnataka. A total 290 patients were asked to respond about self care activates of diabetes mellitus. Results a healthy diet daily followed 45.4% (133) & exercise for 30 minutes were followed by 43.4% (126), & regular blood testing monitoring was done by 76.6% (222) daily, medication taken among 60.5% (155), 66.9% were (138) taking insulin injection daily, self care practise were found to be unsatisfactory except blood sugar monitoring, & treatment. So as these practices are essential for prevention of complication, D. Rajasekharan [2015] 27.

A descriptive study to assess the practices of diabetic patient toward self care activities in Diabetic clinic MLB Medical College Jhansi. Result indicate that measure score (9.44) with SD 2.06 of practice towards Self care activities of diabetic patients & this value shows that the practice of diabetic patients towards self care activates were not satisfactory, Singh Mahipal (2014) 28.

Section 1.20: Acute Complications of Diabetes Mellitus:

Hyperglycaemia and Diabetic Ketoacidosis:

Hyperglycaemia results when glucose cannot be transported to the cells because of a lack of insulin. Without available carbohydrates for cellular fuel, the liver converts its glycogen stores back to glucose (glycogenosis) and increases the biosynthesis of glucose glycogenosis in type 1 diabetes mellitus, the body begin to draw on its fat and protein store for energy. Excessive amount of fatty acid are mobilized from fatty acid are mobilized from adipose tissue cells and transported to the liver. The liver in turn, accelerates the rate at which it produce s Ketenes bodies (ketogenesis for catabolism by other body tissues, particularly muscles 25.
Hyperglycaemic Hyperosmolar Non ketosis Syndrome:

Hyperglycaemic hyperosmolar non ketotic syndrome is the variant degree of diabetic ketoacidosis characterized by extreme hyperglycaemia (600 to 2000 mg/dl), profound dehydration, mild and undetectable ketone urea, and the absence of acidosis.

Hypoglycaemia

Hypoglycaemia (also known as insulin reaction or hypoglycaemic reaction, the decrease blood glucose level at which client’s have manifestation of hypoglycaemia occurs, but they usually do not occurs until the glucose level is less than 50 to 60 mg/dl).

Section 1.21: Concept of Information Booklet:

Information booklet is a integral part of education special function of information booklet is impart to impart knowledge develop practices skill. It is consider as skill occupation. It is art and science establishing specific objectives, organizing and selecting contents, organising AV aids dazing self care activates and evaluating performance in right direction to enable diabetic patient to learn and practice self care activity about diabetes mellitus.

The impact of informational booklet, urea of glucometer for testing of sugar, test tube use of urine sugar in diabetic clinic to improve the knowledge and self care activity to words diabetes mellitus, including change in life style modification of diabetes mellitus.

An information booklet when implemented systematically the diabetic patient gain the better knowledge and practices. The variable included in the study or knowledge about diabetes mellitus and practices to words self care activity. After pre test when administer information booklet in post test the result shows knowledge and practice skills improve.
Section 1.22: Background of the Study:

The main goals of the world health day 2016 campaign are to increase awareness about the rise in diabetic. In 2014 the global prevalence of diabetic was estimated to be the 9% among adult age 18 plus year. W.H.O. Report, 2013 estimated 8% of type 2 diabetes is preventable by changing diet, increasing physical activity and improving the living environment without effective prevention & control programme, the incidence of diabetes is likely to continue rising globally.\textsuperscript{34}

In 2012 estimated 1.5 million death ware directly cause by diabetes type 2. More than 80% of diabetes death occur in low and middle income countries. WHO projects that diabetes will be 7th leading cause of death in 2030. The prevalence estimated of diabetes for all the age group was estimated in to 2013 is to be 2.85% & 4.4% in 2030.\textsuperscript{35}

Can Prevent Type 2 Diabetes Mellitus:

Results of several research studies over the past few years have indicated that lifestyle approaches can effectively prevent or delay the onset of type 3 diabetes mellitus characteristics associated with an increased risk of type 3 diabetes mellitus include elevated fasting glucose levels and post-load oral glucose tolerance test (OGTT) concentration. Increased body mass index, central obesity, certain ethnic and racial background, family history of diabetes mellitus, and gestational diabetes mellitus. Clinical trails of diabetes mellitus prevention among high risk individuals have demonstrated the association between lifestyle interventions and decreased progression to type 2 diabetes mellitus.\textsuperscript{37}

Knowledge of characteristics associated with an increased risk type 2 diabetes mellitus is very useful in identifying appropriate population subgroups to target screening efforts aimed at identifying high risk group individual and those individual with undiagnosed type 2 diabetes mellitus. Several studies have provided evidence that there is an association between successfully implemented lifestyle intervention (diet, physical activity, or both) and a decrease in progression to type 2 diabetes mellitus. The Diabetes prevention programme showed reduction in incident
rates of diabetes mellitus among racially and ethnically diverse group of males with IGT and a body mass index greater then 24kg/m2. The effectiveness of the lifestyle intervention group in reducing the incidence of type 2 diabetes mellitus group significantly greater lowered then that of the medication group (metformin). In addition, lifestyle education programme about diet and exercise lowered plasma glucose levels and reduced the incidence of type 2 diabetes mellitus. Weight loss also reduced the incidence of type 2 diabetes mellitus. Therefore the focus of future research needs to identify the most effective lifestyle intervention in terms of clinical outcome, time required, and cost.

**Cinnamon and Blood Glucose Levels:**

Research related to cinnamon consumption and weight loss cholesterol level and serum glucose level reduction is mixed. A 2013 study in Pakistan consisted of 60 type 2 diabetic clients (30 males and 30 female) with an average age of 52 years who were randomized in to 1 of 6 groups. Group 1 through 3 respectively consumed 1,3 and 6 g of cinnamon daily for 40 days, all levels of 6 were given placebos for 40 days and group 4 to 6 were given placebos for 40 days, all levels of cinnamon consumption decreased level by 18% to 29% total cholesterol fasting glucose by 12% to 26%, LDL (bad cholesterol) levels by 7%to 17% and triglycerides by 23%to30% ;however, there was no change in HDL (good cholesterol) levels. No significant changes were found in the studies, Khan A et all (2003)39.

However two other studies in 2006 had somewhat opposing results. A study in Germany looked at 79 clients with type 2 diabetes mellitus taking prescription oral ant diuretic medications but no insulin. They were randomly assigned to take a placebo or a 3-g cinnamon capsule 3 times per day for 120 days. There was a significantly greater reduction in blood glucose levels in the cinnamon group compared to the placebo group (-3.4%). Clients with higher blood glucose levels had greater responses then clients with lower levels. However, there was no significant difference in HbA1C or cholesterol levels between the cinnamon and placebo groups41.
In the third study the Netherlands a total of 25 type 2 diabetic, postmenopausal women with an average age of 63 years and a BMI of 30 were given either 1.5 g of real cinnamon or a placebo for 6 weeks. Insulin sensitivity glucose levels and cholesterol levels did not change in either group\(^40\).

All three studies have small sizes and limited timeframes for cinnamon consumption. Hence additional randomized related to cinnamon consumption via capsule or powder can be determined. Emerging epidemiologic evidence suggested that higher coffee consumption may reduce the risk of type2 diabetes mellitus, Mang B.et al (2006)\(^42\).

**Coffee Consumption and risk of type 2 Diabetes Mellitus:**

A MEDLINE review examined 9 cohort studies of coffee consumption and risk of type 2 diabetes mellitus including 193. A 473 participants and 8394 incident cases of type2 diabetes mellitus. The relative risk of type 2 diabetes mellitus was 0.65 (65% confidence interval, (54-0.78) for the highest coffee consumption (6 or 7 cups per day) and 0.72 (95% CI.0.62-0.83) for the lowest (4 to 6 cups per day ) coffee consumers compared with the lowest consumption category. The association did not differ substantially by sex, obesity, or region (United state and Europe). In the cross-sectional studies conducted in northern Europe, southern Europe and Japan, higher coffee consumption was consistently associated with a lower prevalence of newly detected hyperglycaemia, particularly postprandial hyperglycaemia, Venschoonbeek K et all (2005)\(^43\).

**Multivitamin And Mineral Supplement And The Risk Of Infection In Clients With Type 2 Diabetes Mellitus**

A randomized, double blind placebo controlled trial was conducted in which 130 community dwelling adults were allocated to a multivitamin and mineral supplement or placebo daily for 1 year. More individual taking placebo then those
taking the multivitamin supplement reported an infectious illness over the year of study (73% versus 43% (P > 0.001). Infection related absenteeism (e.g., missing work) was also higher in the placebo group (57% versus 21% (p < 0.001). The individual for this finding. Among diabetes mellitus clients receiving placebo, 93% reported an infection, where 17% of those receiving supplements (p < 0.001) reported an infection. A higher clinical trial is needed, but this study does initially support the use of a daily inexpensive multivitamin for clients with type 2 diabetes mellitus to reduce the risk of infection. (upper respiratory tract infection, lower respiratory tract infection and urinary tract infection influenza like syndrome, gastrointestinal infection.) participants, any change in reported infections compared to those taking placebo in this study.  

Lifestyle intervention or Metformin to prevent or delay type 2 Diabetes Mellitus:  

A unique randomized, placebo controlled trial with a mean follow up 2.8 years was conducted with a total no of 3234 participants from 27 centres in the United States. The mean age of the participants was 51 years and 68% were women. Individuals had a body mass index greater than equal to 24 and a blood glucose level 5.3 to 6.9 m.mol/l in the fasting state and 7.8 to 11 mmol/l 2 hours after a 75 g oral glucose load. Follow up was 93%. participants were allocated to an intensive programme of lifestyle changes (n = 1079) standard lifestyle recommendation plus metformin (850mg twice daily) for glucose control (n = 1073), or placebo (n = 1082). The intensive lifestyle change consist of a combined intervention that would maintain a 7% of greater reduction in body weight through a low calorie, low fat diet and moderate physical activity. The incidence rates of diabetes mellitus were 4.8, 7.8, and 11 clients per 100 per year for the intensive lifestyle changes, metformin, and placebo groups, respectively. Thus the lifestyle intervention reduced the risk of being diagnosed with type 2 diabetes mellitus by 50% and metformin reduced the risk by 25% compared to placebo. In overweight individuals with elevated fasting and post load blood glucose concentration, and intensive lifestyle change or metformin treatment plus standard lifestyle recommendation was more effective than standard.
lifestyle recommendations alone for preventing or delaying the onset of type 2 diabetes mellitus. Johnson ,R. Williams S, and et all (2009)\textsuperscript{45}.

**Section1.23: Theoretical Framework of the Study:**

The theoretical framework for this study is based on open system theory with input, throughput, output & feedback, as introduced by on bertalanffy(1968). According to this theory, A system is a group of elements that interact with one other in order to achieve the goal. An individual is a system because he/she receives input from the environment. This input when processed provides on output all living system are open, in that there is a continual exchange of matters, energy & information. This system is cyclical in nature & continuous to be so as long as the four parts (Input, throughput, output & feedback) keep interacting, if there is change in all the parts, feedback from within the system or from the environment provides information, which help the system to determine whether it is meeting its goal or not.

**Input:**

Input consists of information, material or energy that enter the system in the process study diabetic patients is a system, with input from self and those enquired from the environment. These input includes diabetic patients background like age, gender, marital status, religion, education status, area of residence, family status, occupation status, monthly income, source of information about disease, family history of diabetes. This may influence the knowledge & practice of the diabetic patients towards the self care activities for quality of life.

**Throughput:**

After the input is absorbed by the system. It is processed in a way useful to the system. It refers to administer an information booklet regarding knowledge & practice of diabetic patients towards the self care activities for quality
of life and its mode of spread, sign symptoms, diagnosis, treatment, preventive measure & self care activities like diet, medication, personal hygiene, exercise & blood testing for sugar and principle to maintain quality of life to achieve the desired output, to increase the knowledge of diabetic patients towards Diabetes Mellitus & modify their practices towards the self care activities for quality of life.

Output:

Output from a system is energy, matter of information disposed of by the system as a result of its process. In the present study, it refers to change in knowledge & practice of diabetic patients towards the self care activities for quality of life. This is assessed through comparison of pre test & post test knowledge & practice score.

Feedback:

Feedback is the process that enable a system to regulate itself & provides information about the system’s output & its feedback as input. Accordingly the higher knowledge & practice score obtained by the diabetic patients in the post test would indicate that effectiveness of an information booklet on self care activities in increasing the level of knowledge and practice towards the self care activities for quality of life but giving feedback to system is not within the preview o
1.24 Summary

This chapter comprises of introduction regarding diabetes mellitus, concept of diabetes mellitus, concept of lifestyle of diabetic patients; their diet and diet formulation of carbohydrate, proteins, fats, salts and sweetening agents’ intake, diabetes and lifestyle modification like exercises, medications like oral hypoglycaemic agent (OHA), insulin and their types. It also encompasses issues related to diabetes mellitus in India, symptoms of diabetes mellitus and diagnosis like fasting blood glucose level, casual blood glucose level and post load blood glucose level and types of diabetes mellitus i.e. type I DM (Insulin dependent diabetes mellitus), type II DM (Non-insulin dependent diabetes mellitus), gestational and secondary diabetes mellitus.

This chapter contains drugs use for diabetes mellitus in first and second generation. It also shows the magnitude of diabetes mellitus in view of global scenario, Indian scenario and W.H.O report. It include knowledge and practice regarding diabetes mellitus, complications like acute complications which have hyperglycaemia and diabetic ketoacidosis, hyperglycaemic hyperosmolar nonketotic syndrome and hypoglycaemia and concept of information booklet on DM and background of the study.

It gives information on how to prevent type II diabetes mellitus like relation between cinnamon and blood glucose level, coffee consumption and risk of type II diabetes mellitus, multivitamin and mineral supplement and the risk of infection in clients with type II diabetes mellitus, lifestyle intervention or metformin to prevent or delay type II diabetes mellitus.

This research chapter also contain need for the study, aims of the study, objectives, null hypothesis, delimitation, and operational definition, theoretical framework of the study, conceptual framework and list of chapters included in thesis.

Therefore, Chapter I embrace us with the outline of the disease condition and the research work done on diabetes mellitus.
The present study is organized under six chapters.

Chapter I – Introduction

Outline the introduction, background of the problem need for the study, aims& objective of the study, operational definition of the terms, null hypothesis& theoretical frame work of the study.

Chapter II – Review of literature

Deals with brief review of literature regarding knowledge of diabetes mellitus & practice of care activities for quality of life of diabetes mellitus, review of letirative on diet, medication, personal hygiene, exercise blood listing for sugar, self care activities, health education.

Chapter III Methodology

Describe the methodology, which includes the research design, sampling approach, selection criteria, and discretion of the tools methods of caring out pilot study, procedure of data collection and plan for analysis of data & ethical issue.

Chapter IV- Analysis and Interpretation

Out time the results based on the analysis of the data & diagram followed by a brief discretion.

Chapter V – Discussion

It concerned with the discussion of the result.

Chapter VI –Summary, Conclusion, Implication and Recommendation.

Provides a brief summary with findings limitation of the study, its implication for nursing and conclusion along with recommendation for future research.