CHAPTER I

INTRODUCTION

India is at present facing an epidemiological transition with more urbanization, and a rapid shift in the economy. As a result of this, changes in lifestyle occur with a westernized dietary pattern and reduced physical activity, leading to increased consumption of dietary fat, sugar and calories. This has led to a shift in health burden from communicable disease to non-communicable diseases, particularly diabetes. India today leads the world with its largest number of subjects. This explosion does not only relate itself to the genetic factors but may be attributed to the role of environment.\footnote{1}

Diabetes is a clinical syndrome characterized by hyperglycemia due to deficiency or diminished effectiveness of insulin. Each cell in the body needs glucose in the form of sugar as fuel to function effectively. The cell can never use nor burn this fuel unless it is properly processed with the help of the hormone insulin. Lack of insulin, whether absolute or relative, affects the metabolism of carbohydrate, protein, fat, water and electrolytes, some times with grave consequences.\footnote{1}

According to a study there are several types of diabetes mellitus; they may differ with cause, clinical course or treatment. The major types of diabetes are Type I diabetes (previously referred to as insulin dependent diabetes mellitus), Type II diabetes (previously referred to as non insulin dependent diabetes mellitus), Gestational diabetes mellitus and Diabetes mellitus associated with other conditions or syndrome.\footnote{2}
A patient with diabetes mellitus may or may not show the symptoms of diabetes. The diagnosis is established with symptoms of diabetes plus blood sugar values. The values are different in a diabetic as compared to a non diabetic. In a non diabetic, the fasting glucose levels are less than 100 mg/dl whereas in a diabetic, the fasting glucose levels is more than 126mg/dl; in a non diabetic the post meal glucose levels are less than 140 mg/dl whereas in a diabetic they are more than 200 mg/dl.\(^3\)

The complications of diabetes mellitus include retinopathy, nephropathy, and neuropathy (both peripheral and autonomic). The risk for atherosclerotic vascular disease is also increased in persons with diabetes mellitus. The risk for micro vascular and neuropathic complications is related to duration of diabetes, the severity of hyperglycemia and the increased risk for vascular disease.\(^4\)

Strategies for detection, prevention and management of complications are all important in dealing with patients who have diabetes mellitus. As the disease is affecting the younger population in India, the duration they suffer from the disease increases. This leads to development of complications, which may increase the burden of Indian economy.\(^5\)

Family history certainly is an important factor as Asian Indians have strong familial aggregation of Diabetes with high prevalence of Diabetes among first-degree relatives and vertical transmission through two or more generations. Thus family history could be used to identify individuals at different levels of risk or to influence health-promoting behaviors.\(^6\)

A study done in US with the data collected from 5,200 diabetics is a cause of concern. It quantified the exact loss in years of a diabetic as those who are diagnosed
with diabetes at the age of 25 – 30 years to have lost 10 years from their expected life span, while the number stood at 7 years for diabetics diagnosed at the age of 40 – 50 years and those diagnosed with diabetes between 50-60 years had lost about 5 years. It also showed that the longer the duration of a person suffering from diabetes, the faster the aging and degeneration process. The results of a similar survey conducted in India showed that sixty percent of 30 million of India’s diabetics are over 50 years of age. If these patients are left untreated it could lead to cardiovascular disease, blindness and kidney failure. The preventive measures taken and the timely adequate treatment given would bring in considerable relief.  

Not all those who seek medical help follow advice, and those who fail to adhere to regimens always find excuses. A study related to adherence/non adherence to diet restrictions, revealed that 17 percent of the participants stated frustration, 66 percent had difficulty at social gatherings and 36 percent embarrassment in revealing their disease to others etc. Adherence /non adherence to recommended treatment revealed that 64 percent of men and 36 percent of women patients were non-adherent, the cause stated being lack of time and laziness. 

Creating awareness among the population on all aspects of diabetes is primary, considering the possibility of the number of undiagnosed cases. Even in the advanced society 50 percent of the cases go undiagnosed. It should be made mandatory that those who are 40 years and above should be screened for diabetes. This would involve huge monitoring cost and extra personnel. Considering these limitations the high-risk group, (which includes persons with a family history of diabetes, those with high Body Mass
Index (BMI) and those in sedentary occupations), should be motivated to have a checkup.  

The prevalence of Non Insulin Dependent Diabetes Mellitus (NIDDM) varied in different geographic regions and also in different ethnic groups. According to a study conducted by Indian Council of Medical Research (ICMR), there was a prevalence of 2.3% in the urban and 1.5% in the rural areas. Many epidemiological studies carried out in different parts of the world reported that Indian migrants settled abroad had a high prevalence of NIDDM which was believed to be due to a more sedentary Lifestyle as compared to the native Indian population. Type 2 diabetes is also found to be lowest among people who still have a 'traditional' or 'primitive' lifestyle as either laborers or subsistence farmers, but the prevalence is higher in people who have moved away from the traditional way of life, either to live in towns and cities or through migration to another country.  

Statistical report predicted that the future will see increasing number of diabetic cases especially in developing countries, which points to a major health care crisis in the coming days. At least 171 million people worldwide would have diabetes and this figure is likely to more than double by 2030. The World Health Organization (WHO) has estimated that in 1995, 19.4 million individuals were affected by diabetes in India and these numbers are expected to increase to 70 million by 2025 one sixth of the world total. Every fifth diabetic in the world would be an Indian. What’s even more disheartening is that by 2030, the Indian diabetic population is predicted to rise to 80.9 million. This would mean that over 20 percent of the diabetic patients worldwide would reside in India making it the diabetic capital of the world. It was also projected by the diabetes atlas
2007, that India would have 70 million diabetics by 2025, but it is now feared that India will reach the figure by 2015.  \(^{10}\)

The prevalence of diabetes in Southern India was found to be 14 % among Chennai residents, in Bangalore 12 % and Hyderabad 17% which was higher than in Eastern India 12 % (Kolkata), in Northern India 12% (New Delhi) and in Western India 10% (Mumbai). What’s worse, over the next 30 years, a three -fold excess of diabetes is predicted for urban areas in India. \(^{11}\)

Worldwide 3.2 million deaths are attributable to diabetes every year. One in 20 deaths is attributable to diabetes, 8700 deaths every day, and six deaths every minute. At least one in ten deaths among adults between 35 and 64 years old is attributable to diabetes. Half of all people with diabetes older than 65 years are hospitalized each year. \(^{12}\)

The prevalence of diabetes is increasing Globally. India has the maximum increase during the last few years. Type 2 diabetes mellitus is the commonest form of diabetes. The prevalence of type 2 diabetes mellitus is 2.4% in rural population and 11.6% in urban population. Prevalence of impaired glucose tolerance is also high in urban population. Subjects under 40 years of age have a higher prevalence of impaired glucose tolerance than diabetes. The important risk factors for high prevalence include obesity (especially central one) and Lifestyle changes due to rapid urbanization. \(^{11}\)

The prevalence rate of diabetes type 2 among 10 countries is given in table 10.
According to World Health Organization Report, the “top three” countries are the same as those identified for 1995, INDIA, China and US. 4

- 60% of World population does not do enough physical activity.

- 50% of diabetic patients worldwide are unaware that they have the disease.

- 46 million diabetics in India. The number of diabetics in the country is the highest in the world.

Until the recent past, Type 2 diabetes was considered a disease of adults and the elderly. But increasing prevalence of type 2 diabetes in children, teenagers and adolescent, out numbering type 1 diabetes, even in the very young, is a new and alarming
fact of the epidemic and is considered as a significant emerging public health problem not only in India, but also worldwide. In Chennai Urban rural epidemiology study (CURES) 3 percent of subjects below the age of 25 had either diabetes or pre diabetes. Prevalence of diabetes was assumed to be similar in urban and rural areas of developed countries. For developing countries, urbanization was used as a proxy measure of increased risk of diabetes associated with altered diet, obesity, decreased physical activity and other factors such as stress, which are assumed to differ between urban and rural populations. 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. The Chennai Urban Rural Epidemiology Study (CURES) reveals that awareness, treatment and control measures for diabetes are still grossly inadequate. 

Health care professionals as well as policy makers are well aware of the public health impact of diabetes. Diabetes is a silent disease – many sufferers, become aware that they have diabetes, only when they develop one of its life-threatening complications. Knowledge of diabetes mellitus can assist in early detection of the disease and reduce the incidence of complications. An understanding of the level of public awareness is helpful for health educators to plan for future programmes. 

Diabetes imposes a high cost, for both the individual and health care system. The economic cost of diabetes continues to rise because of increasing health care cost and aging population. It was found that the direct cost of diabetes to the patient was high in
our country. And the cost per patient with or without complications worked out to be Rs. 5,000 per annum. It is also found that people with diabetes use more health care resources than those who do not have the condition. This excess expenditure is related to the high cost of treatment for late-developing diabetes complications, such as retinopathy or nephropathy as well as indirect costs resulting from lost work days or unrealized economic opportunity.8

Direct costs to individuals and their families include medical care, drugs, insulin and other supplies. Patients may also have to bear other personal costs, such as increased payments for health, life and automobile insurance. Direct costs to the healthcare sector include hospital services, physician services, lab tests and the daily management of diabetes, like availability of products such as insulin, syringes, oral hypoglycemic agents and blood testing equipment. Costs range from relatively low-cost items, such as primary care consultations and hospital outpatient episodes, to very high cost items, such as long hospital inpatient stays for the treatment of complications.7

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 (DAQL)12

World Health Organization estimated that four to five percent of the health budget is spent on diabetes related illness. A person with diabetes incurs medical costs that are two to five times higher than those of a person without diabetes. Direct costs to
individuals and their families include medical care, drugs, insulin and other supplies. Patients may also have to bear other personal costs, such as increased payments for health, life and automobile insurance.\(^8\)

Hospital services, physician services, lab tests and daily management of diabetes—which includes availability of products such as insulin, syringes, oral hypoglycemic agents and blood testing equipment, are some of the direct costs to the healthcare sector. Costs range from relatively low-cost items, such as primary-care consultations and hospital outpatient episodes, to very high-cost items, such as long hospital inpatient stays for the treatment of complications.\(^11\)

While many people with diabetes continue to enjoy very productive working lives, both in paid employment and at home, some may not be able to continue working. Loss of productivity resulting from disability, sickness absence, premature retirement or premature death are some of the indirect costs incurred by the society and estimating it will be difficult.\(^13\)

The intangibles or psychological costs have the greatest impact on the lives of people with diabetes and their families, and include stress, pain and anxiety. Life expectancy and quality of life can be significantly reduced by diabetes. Diabetes can negatively influence personal relationships, leisure and mobility.\(^14\)
Creating awareness on all aspects of diabetes is primary. This can be achieved through creating public awareness; 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.  

Diabetes requires a life long 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. Therefore, it is important to learn as much as possible about diabetes and take an active role in making decisions about health care and treatment. 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.  

Diabetes is now a world wide epidemic. By the year 2025, more than three quarters of all persons with diabetes will reside in developing countries. India and China are leading this surge in diabetes. There are compelling reasons why aggressive efforts must be directed towards primary prevention of diabetes in developing countries. Once diabetes develops, the cost of caring for patients is prohibitive. Poorly managed diabetes leads to several complications, e.g., end stage renal failure, blindness, amputation and
heart disease. Lifestyle modification approaches are found to be more efficacious than expensive medications in the prevention of diabetes complications. This is fortunate because Lifestyle modification can be implemented locally, whereas medications often need to be imported at high cost. The first task is the education of all diabetics on Lifestyle modification, urgent need for timely action to prevent the translation of diabetes complications through dietary modification, and increased physical activity. This would require careful planning.¹⁶

Effective and good diabetes 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, no smoking, avoiding alcohol, monitoring blood sugar level, and managing medication. Helping people with diabetes to acquire the knowledge and skills to manage their own condition is central to leading a full and healthy life.¹⁶

Lifestyle changes intended to help diabetic patients to lose weight and engage in 150 minutes of physical activities per week which lasted for 3 years, found that patients in the Lifestyle intervention group pointed out that it is possible to delay or prevent the development of complications, substantially reducing the individual and public health burden of diabetes.¹⁷

Individuals with diabetes can lead a full life while keeping their diabetes under control. Lifestyle modification is an essential component of any diabetes management plan. A patient should incorporate into his/her lifestyle a variety of cognitive and technical skills for metabolic control with planned medical treatment where the patient adopts a healthier Lifestyle and needs to acquire skills of self management.¹⁸
The importance of creating public awareness is evident. A patient who knows better, lives better and lives longer. A diabetic patient’s education can do more than empowering him to manage glycemic levels. Intensive education can improve diabetes related attitudes and well being.\textsuperscript{19}

The exposure to diabetes education session can ensure significant patient empowerment irrespective of age, gender, literacy and language skills. In a prospective study the patients exposed to educational sessions showed a greater awareness about diabetes related factors with the passage of time.\textsuperscript{20}

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.\textsuperscript{21}

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 undertaken to assess the effectiveness of nutrition counseling 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 favorable side. Thus the health education
programme was effective and thereby helps in arresting or delaying the secondary complications of diabetes.\textsuperscript{22}

The investigator with his vast experience of having worked in various hospitals involved in providing direct care to many diabetic patients had found that the diabetic patients, though they are provided with some information after their initial diagnosis, are not adequately adhering to Lifestyle changes to keep their diabetes under control and many are unaware of the complications of diabetes. Thus the investigator was motivated to undertake the present study.

**Statement of the problem**

Effectiveness of Structured Teaching Programme on Lifestyle Modification of Diabetes patients, in Kempegowda Institute of Medical Sciences Hospital and Research Center, Bangalore.

**Objectives**

1. To determine the pre-test knowledge and practice of the subjects on diabetes lifestyle modification
2. To administer structured teaching programme on lifestyle modification of diabetes subjects.
3. To assess the post-test knowledge and practice of subjects on diabetes lifestyle modification.
4. To find out the effectiveness of structured teaching programme on diabetes lifestyle Modification.

5. To find out correlation between knowledge and practice of diabetes subjects.

6. To know the association between pre-test and post-test knowledge and practice scores with the selected socio-demographic variables of the subjects.

**Operational definitions**

**Diabetes mellitus:** Diabetes mellitus is a group of metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The lack of effective insulin action leads to alterations in carbohydrate, fat, and protein metabolism.

**Diabetes mellitus type 2:** The category of diabetes named type 2 includes the most common form of diabetes, which results from insulin resistance combined with inadequate insulin secretion.

**Lifestyle modification:** Lifestyle modification refers to adopting activities such as understanding diabetes, medication management, diet, exercise, monitoring blood glucose level, foot care, eye care, managing hypoglycemia, taking precaution while traveling and driving, which includes improving knowledge and knowledge on practice for self care abilities in the study subjects.

**Knowledge:** Refers to responses of diabetes patients in the study on structured interview schedule prepared to elicit the knowledge and knowledge on practice of diabetes patients on Lifestyle modification.
Practice: Refers to self reported practice in which adaptation of lifestyle modification to implement self care practices by the study subjects on the management of diabetes.

Structured teaching programme: Refers to systematically developed teaching programme to impart knowledge and knowledge on practices using relevant teaching methods, with the use of audiovisual aids like charts, over head projector and black board, the content of teaching programme includes diabetics lifestyle modification knowledge and practices and also provided with information booklet, which provides information to adapt to new diabetes Lifestyle practices.

Effectiveness: Refers to significant gain in knowledge and knowledge on practice scores as determined by significant differences in pre-test-post-test scores.

Assumptions

1. Diabetes patients will have limited knowledge related to lifestyle modification.
2. Diabetes patients will have limited knowledge on practice or not adhering to Lifestyle practices required for diabetes management.
3. Diabetes patient’s knowledge and knowledge on practice can be modified through structured teaching programme related to Lifestyle modification.
4. Structured teaching programme is the best means of imparting knowledge and knowledge on practice to diabetes patients for their lifestyle modification.
Hypotheses

**H$_1$:** There will be significant difference in the level of knowledge and practice score of diabetes patients on lifestyle modification, before and after administration of structured teaching programme.

**H$_2$:** There will be significant association between knowledge on lifestyle modifications of diabetes patients with their selected socio demographic variables.

**H$_3$:** There will be significant association between practices of lifestyle modifications of diabetes patients with their selected demographic variables.

Delimitations of the study

The study is delimited to:

- only selected diabetes patients from Kempegowda Institute of Medical Sciences Hospital And Research Center, Bangalore.
- type 2 diabetes patients with co-morbid disease condition.
Modified Conceptual Frame Work based on Rosenstock’s et all Integrated Health Belief Model

Conceptual models are frame work made up of concepts, which describe the mental images of phenomena and integrated into a meaningful configuration. The conceptual frame work gives the idea to the researcher about main view and core theme of the research (i.e) it is a visual diagram by which the researcher explains the specific area of interest.

Nursing theory Rosenstock, et, al, health belief model was identified as most suitable theory, and it was modified for the study to assess the effectiveness of structured teaching programme on life style modification of diabetes patients in Kempegowda Institute of Medical Sciences Hospital and Research Institute, Bangalore.

The health belief model is health behavior change and psychological model by Irwin M. Rosenstock (1966). The model was furthered be Beker and colleagues in the years 1970 and 1980. Originally this model was designed to predict behavioral response to the treatment received by acutely or chronically ill patients. The model included four constructs.

Model consists of individual perception, modifying factors and likelihood of taking action. These concepts were proposed as accounting for people readiness to act. Furthered perceived susceptibility, (one’s opinion of chances of getting a condition) perceived severity, (one’s opinion of how serious a condition and its consequence are) perceived benefits (one’s belief in the efficacy of the advised action to reduce risk or seriousness of impact) and barrier, one’s opinion of the tangible and psychological costs of the advised action.
The prediction of the likelihood of the individual concerned to undertake recommended health action such as preventive and curative health action.

Considering the theorist view as a salient feature for the current study the model was modified to the proposed research the study identified diabetes type 2 patients can modify their life style with enhanced knowledge and practice adhering to each domain under study. This can be attributed to perceived susceptibility, severity and barrier.

Constructs of mediating factors were later added to various type of perception with predicted health behavior; the socio demographic variables are age, sex, religion, education, family income, residence, marital status, type of family food habits and duration of diabetes, along with the level of perception for knowledge domain and practice domain. Assessment of Pre-test knowledge and practice was implemented.

Perceiving benefits an individual assessment of positive consequences of adopting the behavior structured teaching programme was administered to enhance knowledge and practice to modify lifestyle. After structured teaching programme, assessment of post-test knowledge and practice of diabetes patients was carried out,

Rosenstock point of view is based upon the idea that an individual must have the willingness to participate in health intervention and believe that being healthy is highly valued outcome; therefore it was possible to predict if an individual would engage in modifying activities.

Knowledge and practice play in personal responsibility; originally, the model was designed to predict behavioral response to the treatment received by acutely or chronically ill patients, but in more recent years the model has been used to predict more general health behavior.
The modified framework is in view with original theorist that perceived benefit for betterment of health would bring positive change; structured teaching being a time tested and effective complementary can be used by a Nurse as a Diabetes Health Educator (NDHE). NDHE can be used for changing diabetes’s life style after initial diagnosis of diabetes and other conditions to participate in health interventions and believe that being healthy is highly valued outcome.

According to model with individual with perceived susceptibility of diabetes depends on their demographic factors, like age, gender, education, income, place of residence, type of family, diabetes type 2 patients with perceived severity of ill health condition, for cue to action in order to improve their knowledge structured teaching programme on diabetes life style modification was provided to the subject as a modifying factors, this was in order to find out the likelihood of change in their knowledge based on structured teaching programme was assessed before giving structured teaching and after giving structured teaching through the instruments structured interview schedule on diabetes life style modification. It was found there is a statistically significant gain in mean score knowledge on diabetes life style modification compared to pre test mean score knowledge level. Indicating perceived benefit by the study subject which is dependent on the participation of the subject and their positive value placed on the health due to structured teaching programme in relation to the model Rosenstock Health belief model. The study reported by Aas AM et,al. life style intervention programme was effective as insulin treatment in improving glycemic control. Similar study by Deshmukh . et,el reported that life style modification is very effective way to keep diabetes in control.
Another study by Krook et al. reported exercise and diabetes diet is a powerful treatment to reduce diabetes complication even in patients who have not responded to conventional diabetes therapy. Thus reveals gaining knowledge and knowledge on practice in different domains of diabetes lifestyle modification, which is based on structured teaching programme intervention which support the adaptation of above model in the present study.