A STUDY ON FASTING BLOOD SUGAR (FBS) BEFORE AND AFTER ADMINISTERING ROASTED FENUGREEK SEED POWDER (RFSP) AMONG NIDDM PATIENTS IN SELECTED M.V.R DIABETIC CLINIC, ARAKKONAM.

BY

30083631

A DISSERTATION SUBMITTED TO THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN NURSING

MARCH – 2010

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MARCH – 2010

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Praise the Lord! Oh give thanks to the Lord, for he is good,

For his loving kindness is everlasting

-Psalm 106:1

I give praise to my God Almighty for his abundant mercy, strength and support that guided me throughout this study.

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CHAPTER – I

INTRODUCTION

Whether therefore ye eat, or drink,

Or whatsoever ye do, do all to the glory of God   I cor.10:31

BACKGROUND OF THE STUDY

"Mantolsaham athisthoolam

Athisnigdham mahasanam

Mrithyuprameha roopena

Kskhipra Madhya gaehati"

This Sanskrit slogan of charaka gives overall concept of diabetes mellitus (DM). This means (DM) comes in the form of death to those who are obese, live without exercise and eat more, especially sweet items.

DM is a disease known during period of 1500 BC and it was described by Ebers papyrus of ancient Egyptians. In 1000 BC sushrutha, the father of medicine by charka in 400 BC and the same concept was described in 200 AD by aratentus cappadocia.

The term DM is derived from the Greek word "diabetes" meaning "to go through" or a siphon & the word "mellitus" is derived from the Latin word "Mel" meaning honey describing the sweet odor of urine.

Currently India has got the largest number of patients with diabetes and is being called as the "Diabetic capital" of the world.

Every 5th adult in India urban area is a diabetic. The approximate prevalence in an urban area is around 13.5% & in a village is around 3%.

India is the country with the most people with diabetes, with a current figure of 50.8 million, china (43.2 million), U.S.A (26.8 million), Russia (9.6 million), Brazil (7.6 million), Germany (7.5 million), Pakistan (7.1 million), Japan(7.1million), Indonesia(7million) and Mexico (6.8 million).(IDF 2009).

The WHO estimates that by the year 2025, India alone could have 60 million people with diabetes and at present there are 30 million cases in urban India (Priscilla et.al 2008)

The WHO estimates that by the year 2025, India alone could have 60 million people with diabetes. Diabetes occurs in the age group most likely at 40 years in India when compared to the other countries where it develops only at 50-60 years of age. The most common form of diabetes is type 2 diabetes and 90-95% of people have type 2 diabetes. This form of diabetes is associated with old age, obesity, family history of diabetes, previous history of gestational diabetes, physical inactivity& ethnicity. About 80% of people with gestational diabetes are over weight (National institute of diabetes Digestive &kidney disease 2003).

From 1989 to 1995, the prevalence of diabetes in chennai increased by 39.8 percent (8.3 to 11.6%) between 1995 to 2000 by 16.3 percent (11.6 to 13.5%) and between 2000 to 2004 by 6.0 percent (13.5 to 14.3%). Thus within a span of 14 years, the prevalence of diabetes increased significantly by 72.3%. (Dr.Sandeep. Ganesan.A,Dr. Mohan.V 2008)

Fenugreek (Trigonella foenum-graecum [Latin]), also known as Greek hay and fenugreek, was used to treat a whole slew of ailments in ancient Egypt, Greece, and Rome, everything from bronchial problems to low libido. Indian Ayurvedic and traditional Chinese medicine recommend fenugreek to treat arthritis and bronchitis, induce labor, improve digestion, and maintain a healthy metabolism. Fenugreek also has a long history of use for treatment of reproductive disorders in women.

NEED FOR THE STUDY

The current studies in India indicate that there is alarming rise in prevalence of diabetes which has gone beyond epidemic form to a pandemic one. The WHO has projected that the global prevalence of type 2 DM will be more than double 135 million in 1995 to 300 million by the year 2025, has been reported by international diabetes federation & WHO, that in the year 2002, at least 177 million people are having DM world wide: which indicates that previous estimate the greatest increases will be in India from 19.4 million to 57.2 million, unless effective methods are implemented to curb this enormous increase (Aubert 2003).

Currently the number of cases diabetes worldwide is estimated to be around 150 million. This number is predicted to double by prevalence rate of about 5.4% with the greater number is expected in china and India (WHO 2002) 171 million people were affected by type2 DM around the world in 2000 and it is. There will be an increase from 45% to 200% in developing countries. Nearly 63% of total diabetic patients are residing in developing countries. Around 20% of the diabetic population resides in the south East Asia region: the number is expected to increase by the year 2025 from the present 30 million to 80 million. In India, the type2 NIDDM is a silent, chronic unidentified killer among population. The prevalence of disease in adult is 2.4% in rural & 4.0 to 11.6% in urban dwellers. (Clement. N 2009)

COMPLICATIONS

Macrovascular

      Coronary artery disease

      Cerebrovascular disease

      Hypertension

      Peripheral vascular disease

      Infection

Microvascular

      Retinopathy

      Nephropathy

Neuropathic

      Sensorimotor neuropathy

      Autonomic neuropathy

         Pupillary

         Cardiovascular

         Gastro instestinal

         Gentiourinary

Mixed vascular and Neuropathic diseases

      Leg and foot ulcers

Economic Burden to nation

India faces a double burden on the health front. Non-communicable diseases (NCDs) have emerged as an even bigger hazard. According to the World Health Organisation report 2005, NCDs (excluding injuries) contributed to 52 per cent of all deaths in India, and the figure will rise to 70 per cent by 2025. These include diabetes, obesity, hypertension and coro nary artery disease, which are referred to as "metabolic NCDs," and chronic obstructive respiratory disease, cancer, mental illness and injuries, classified as "non-metabolic NCDs." The metabolic NCDs, specifically diabetes which can be taken as a model of metabolic NCDs as most of the risk factors are common to the metabolic NCDs, are in focus here.

Worldwide, there are an estimated 246 million people with diabetes, and this number is set to reach 380 million by 2025. Diabetes was traditionally considered to be a disorder affecting the affluent and the elderly. This is no longer true. By 2025, more than 80 per cent of all deaths will be in the developing countries. India holds the unenviable position of being the world leader with 40 million diabetics in 2007. This number is set to reach 70 million by 2025. This will represent almost 20 per cent of all cases of diabetes in the world.

Diabetes poses a huge economic burden on India. A recent paper showed that of five countries studied, namely the U.S., the U.K., Finland, China and India, India spends the highest share of GDP on diabetes.(Dr.Mohan 2008)

Family economic stress from diabetes

In the poorest countries, people living with diabetes and their families bear almost the entire cost of whatever medical care they can afford. In India, for example, the poorest people with diabetes spend an average of 25% of their income on private care. The most that they can pay for are treatments that keep them alive by blunting the highest, quickly fatal levels of blood sugar

Lost economic growth and development

Considering mainly the effects of premature mortality, WHO estimates that (between 2005 and 2014) diabetes, heart disease and stroke combined will cost

$555.7 billion in lost national income in China,

$303.2 billion in the Russian Federation;

$336.6 billion in **India**;

$49.2 billion in Brazil

$2.5 billion even in a very poor country like Tanzania

Global medical care expenditures for diabetes

World expenditures for diabetes treatment are growing more quickly than world population. In 2007, the world is estimated to spend at least USD 232 billion to treat and prevent diabetes and its complications. By 2025, this lower-bound estimate will exceed USD 302.5 billion. In industrialized countries, about 25% of the medical expenditures for diabetes; 25% go to treating long term complications, largely cardiovascular disease and 50% are consumed by the additional general medicines care that accompanies diabetes.

Diabetes is now emerging as one of the main threats to human health in the 21st century. The past two decades have seen an explosive increase in the number of people diagnosed with diabetes world wide. In recent years, India has witnessed a rapidly exploding epidemic of diabetes. Indeed India today leads the world with its largest number of diabetics in any given country.

In the recent national urban diabetes survey (NUDS) the prevalence of diabetes was found to be 13.5% among Chennai residents, in Bangalore 12.4%, Hyderabad 16.6%, Kolkata 11.7%, New Delhi 11.6% & Mumbai 9.3%. The survey also concluded that there is a large pool of individuals with impaired glucose tolerance test (GTT) at risk of conversion of diabetes especially among the younger age group below 40 years.(Makol.N, Manisha 2008)

Benefits of Fenugreek Seeds

Fenugreek seeds may help lower blood sugar and reduce the need for insulin. It may also improve glucose tolerance and excretion. Some research has shown that the benefits of fenugreek may inhibit the absorption of cholesterol as well as decrease the amount of cholesterol manufactured by the liver.

Fenugreek helps in maintaining a good metabolism and prevents constipation. It purifies blood and helps in flushing out the harmful toxins. It helps in dissolving excess mucus, thereby making the digestive organ refreshed and clean. Also fenugreek seeds are useful in improving memory power too.

This natural herb has very potent seeds, which help treat balding, thinning of hair and hair fall.

The benefits of fenugreek in breastfeeding stem from the diosgenin in its seeds, a compound similar to estrogen. As such it increases milk production and stimulates breast tissue growth.

This herb is very effective in losing weight. With the assistance of proper diet and exercise, fenugreek can work wonder on your body. The fiber in fenugreek fills the stomach, even when consumed in a little amount. Soak a few fenugreek seeds in water and chew them in the morning, on an empty stomach.

Fenugreek seeds prove to be an excellent beauty product. They help prevent wrinkles, blackheads, pimples, dryness and rashes. Apply a paste of fresh fenugreek leaves, mixed with water, over the face and keep it for twenty minutes. Then wash it with warm water. It can also be applied on the inflamed body parts and as a cosmetic product too.

Fenugreek helps attain hormonal balance in women and therefore, helps in enlargement of breasts. It is an essential ingredient of many breast enhancer medicines and is widely used in commercial preparation. Also, it helps increase the lactation in breast feeding women. It can even reduce labor pain and induce child birth in a woman. Moreover, it reduces the menstrual discomfort and eases menstrual cramps.

Fenugreek helps prevent hair loss, and also keeps the dandruff away. If applied on the hair, it makes it shiny and black. It can either make a conditioning potion by grinding its seeds and directly applying it to head or integrate it in your diet. Either ways, it helps preventing dandruff, keeps the hair lice free and makes it black and shiny.

Forms of fenugreek administration

Fenugreek is sold as a whole seed, in a crushed powder, in pill form, or as a liquid. Recommended dosage amounts of fenugreek are 1000-2000mg three times daily. Fenugreek can taste unpleasant and so it is recommended it is taken with food.

Fenugreek can also be taken orally as a tea. To prepare fenugreek tea, steep 500mg of fenugreek seed in 5 oz of cold water for 3-4 hours. Strain out the seeds, and then drink the tea hot or cold.

Other agents used for diabetes

Cinnamon

It has insulin-like properties, which able to decrease blood glucose levels as well as triglycerides and cholesterol, all of which are important especially for type 2 diabetes patients. Just half a teaspoon of cinnamon into the daily diet of diabetics can significantly reduce blood glucose levels.

Pterocarpus marsupium

It reduces the glucose absorption from the gastrointestinal tract, and improves insulin and pro-insulin levels. It also effective in beta cell

Bitter gourd

It is responsible for lowering blood-sugar-. These include charantin and an insulin-like protein referred to as polypeptide-P, or plant insulin. It is believed that bitter melon acts on both the pancreas and in nonpancreatic cells, such as muscle cells.

Gymnema

It improves the ability of insulin to lower blood sugar in both type I and type II diabetes. This herb is showing up in more and more over the counter weight loss products and blood sugar balancing formulas.

Onion

Onion consists of an active ingredient called APDS (allyl propyl disulphide). APDS has been shown to block the breakdown of insulin by the liver and possibly to stimulate insulin production by the pancreas, thus increasing the amount of insulin and reducing sugar levels in the blood.

Blueberry

Is a natural method of controlling or lowering blood sugar levels when they are slightly elevated - Sugar Diabetes.

Asian ginseng

It has been shown to enhance the release of insulin from the pancreas and to increase the number of insulin receptors. It also has a direct blood sugar-lowering effect.

Banaba

It possesses the powerful compound corosolic acid and tannins, including lagerstroemin that lends itself to the treatment of diabetes. These ingredients are thought to stimulate glucose uptake and have insulin-like activity.

Mrs. Shaini (2006) studied the Effectiveness of teaching programme on management of DM. Miss. Raji Raju(2008)studied on Maintaining diet control among DM patients. Non pharmacological method on diabetic control found to be accessible towards the community people. So the investigator motivated to study the effectiveness of fenugreek seed powder on DM.

Berlin et.al (1997), Effect of fenugreek on blood sugar in mild NIDDM patients in India among 20 NIDDM patients, about 2.5gm of fenugreek seed given twice a day for about 30 days, fenugreek seed significantly reduced both fasting and post prandial blood glucose level

STATEMENT OF THE PROBLEM

A study on fasting blood sugar (FBS) before and after administering roasted fenugreek seed powder (RFSP) among NIDDM patients in selected M.V.R diabetic clinic, Arakkonam.

OBJECTIVES

1. To compare the pre and post FBS in relation to administering roasted fenugreek seed powder among NIDDM patients in experimental group.
2. To compare the mean difference FBS among NIDDM patients in experimental and control group.
3. To find the association between the mean difference in FBS in relation to roasted fenugreek seed powder and demographic variables among NIDDM patients in experimental group

HYPOTHESIS

H$_1$:   There will be a significant difference in pre and post FBS in relation to RFSP among NIDDM patients in experimental group.

H$_2$:   There will be a significant difference in mean difference fasting blood sugar among NIDDM patients in experimental and control group.

H$_3$:   There will be a significant association between mean difference in FBS in relation to administering RFSP and back ground factors among NIDDM patients in experimental group.

OPERATIONAL DEFINITIONS

Fenugreek seed : Fenugreek is an annual dicotyledonous plant belonging to the subfamily Papilionaceae, family Leguminacae (the Fabacecae) with trifoliate leaves, branched stems, white flowers, roots bearing nodules and golden yellow seeds

Roasted fenugreek seed powder (RFSP): It refers to 24gms of fenugreek seed roasted and powdered.

NIDDM patients : Refer to those patients who were diagnosed to suffer from non insulin dependent diabetes mellitus whose fasting blood sugar level more than 121 mg/dl.

Fasting blood sugar (FBS): Refer to the blood sugar ascertained by administering roasted fenugreek seed powder in empty stomach

Selected background factors : Refers to those factors which are likely to influence the mean difference in FBS such as age, sex, education, occupation, income, family history, dietary pattern, exercise, duration of disease, hours of sleep, medication, social habits, traveling, checking blood glucose, intake of snacks and intake of coffee or tea.

ASSUMPTIONS

- NIDDM patients will be willing to participate in the study.
- Age group between 30 to 60 years
- Tool prepared for the study would be sufficient for collecting information regarding effectiveness of roasted fenugreek seed powder in maintaining normal blood sugar level.

DELIMITATIONS

- The study was delimited to NIDDM patients attending OPD in M.V.R Diabetic clinic in Arakkonam.
- NIDDM patients selected by non random method.
- FBS tested during the morning

CONCEPTUAL FRAME WORK

A conceptual framework is a group of concepts and set of propositions that spells out the relationship between them. Conceptual framework plays several inter related roles in the progress of science.

Polit and Hungler (1995) states that a Conceptual model is interrelated concepts or abstractions that are assembled together in some rational scheme by virtue of their relevance to a common theme.

Conceptual framework used in this study is the modification of Von Bertanlanffy's General System Theory. A system is a set of inter related parts that comes together to form a whole. The parts rely on one another are inter related, share a common purpose and together form a whole. A system has a specific purpose or goal and uses a process to achieve that goal. The content is the product and information obtained from the system. Von Bertanlanffy's explained that any system has four major aspects.

1. Input
2. Throughput
3. Output
4. Feedback

Input: it is the type of information that enters into the system from the environment through its boundaries. In this study, the input refers to the background factors of NIDDM patients at M.V.R Diabetic clinic Arakkonam.

Throughput: refers to the operation phase with manipulation and dietary pattern of the diabetic patients. In this study administration of roasted fenugreek seed powder on NIDDM patients was the throughput, through which blood sugar level maintained. There was inter action by the investigator, direct administration of roasted fenugreek seed powder and follow up over phone. The NIDDM patients were instructed and followed regular practice of taking 24 gms of roasted fenugreek seed powder was given in divided doses before breakfast and dinner for 15 days.

Output: refers to any information that learns the system and enters the environment through system boundaries. Here maintaining normal blood sugar level was the output which was measured by the glucometer.

Feedback: it is the result of throughput. It allows the system to monitor its internal function, so that it can either increase or restrict its input or output. Here the effectiveness of roasted fenugreek seed powder was the feedback, scored with respect to blood sugar values. However this was not included in the study.

FEED BACK*

INPUT → THROUGHPUT → OUTPUT

NIDDM patients
 Age, sex
 Marital status
 Education
 Occupation
 Income
 Dietary pattern
 Family History
 Duration of disease
 Hours of sleep
 Medications
 Social habits
 Exercise
 Traveling
 Intake of snacks
 Intake of coffee / tea
 Intake of sweets
 Checking blood
 glucose

Pretest FBS

Preparation of RFSP

Administration of RFSP 24 gms/day in divided dose before breakfast and dinner

Post test FBS

*Not included in the study

FIG 1 : CONCEPTUAL FRAME WORK BASED ON THE GENERAL SYSTEM THEORY

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CHAPTER – II

REVIEW OF LITERATURE

Review of literature is an important step in the development of research project .it provides readers with a background for understanding of what has already been learnt to illuminate what is the significant of the new study. Review of literature provides further understanding of the status of the problem area, clues to research approach, method, interpretation and data analysis. **Polit and Hungler (2004)**

Review of literature was organized under following headings

I. Studies related to fenugreek seed

II. Studies related to fenugreek and blood sugar

III. Studies related to NIDDM on selected variables

I. STUDIES RELATED TO FENUGREEK SEED

Tashman .L (2009) observed on the effects of Fenugreek seeds on glycemic control and insulin resistance in mild to moderate type 2 diabetes mellitus, a clinical trial was conducted with 25 newly-diagnosed patients with type 2 diabetes. The study group of patients received one gram per day of an alcoholic extract of Fenugreek seeds for a period of two months. At the end of the study period, patients who had received Fenugreek showed significant improvements in insulin resistance. The study researchers concluded that Fenugreek seeds are effective as an adjunct to conventional treatment for type 2 diabetes, improving glycemic control and decreasing insulin resistance in mild type 2 diabetic patients.

Abusaleh.M.et.al (2006) Effects of fenugreek on serum lipid profile in hypercholesteremic type2 diabetic patients in Rajshahi Medical College, Rajshahi, Bangladesh among 20 patients were divided into two groups by random selection 25 gm of fenugreek seed powder orally twice daily for 3 weeks and 6 weeks produces significant (P<0.001) reduction of serum total cholesterol triacylglyceride and LDL - cholesterol in hypercholesteremic group but the change of serum HDL- cholesterol was not significant. On other hand, changes of lipid profile n hypercholesteremic type 2 diabetic patients without fenugreek were not significant (P<0.001). The present study suggests that fenugreek seed powder would be considered as effective agent for lipid lowering purposes.

Raghuram et al (2003) conducted study on fenugreek seed powder on NIDDM reported the results of a randomized, controlled, crossover trial of fenugreek seeds in 10 patients with type 2 diabetes were divided into two groups experimental and control group. The doses of these patients' antidiabetic drug, glibenclamide, ranged from 2.5-7.5 mg per day; both medication dose and dietary intake were stabilized prior to the actual study periods. The patients were given either 25 g powdered fenugreek seeds in two equal doses with meals or meals without fenugreek supplementation for 15 days. The fenugreek powder was added to the experimental diet in the form of dietary fiber, resulting in higher fiber content in the experimental diet than in the control diet. Five diabetic patients were randomized to receive fenugreek during the first 15-day period; the other five received it during the second period. Subjects were then crossed over an additional 15 days with no washout period. In the fenugreek-treated patients, statistically significant mean improvements were reported for glucose-tolerance test scores and serum-clearance rates of glucose (control group, 153 11.92 mg/ml/min; fenugreek group, 136.4 6.36 mg/ml/min).

Gupta.A,Gupta.R,Lal.B (2001) observed on fenugreek seeds on glycemic control and insulin resistance type 2 diabetes mellitus in jaipur research diabetes centre among 25 newly diagnosed NIDDM patients was performed a double blind placebo controlled study were

randomly divided into two groups. Group I (n=12) received 1 gm/day hydroalcoholic extract of fenugreek seeds and Group II (n=13) received usual care (dietary control, exercise) and placebo capsules for two months.At baseline both the groups were similar in anthropometric and clinical variables. Oral glucose tolerance test, lipid levels, fasting C-peptide, glycosylated haemoglobin, and HOMA-model insulin resistance were also similar at baseline. In group 1 as compared to group 2 at the end of two months, fasting blood glucose (148.3 +/- 44.1 to 119.9 +/- 25 vs. 137.5 +/- 41.1 to 113.0 +/- 36.0) and two hour postglucose blood glucose (210.6 +/- 79.0 to 181.1 +/- 69 vs. 219.9 +/- 41.0 to 241.6 +/- 43) were not different. But area under curve (AUC) of blood glucose (2375 +/- 574 vs 27597 +/- 274) as well as insulin (2492 +/- 2536 vs. 5631 +/- 2428) was significantly lower (p < 0.001). HOMA model derived insulin resistance showed a decrease in percent beta-cell secretion in group 1 as compared to group 2 (86.3 +/- 32 vs. 70.1 +/- 52) and increase in percent insulin sensitivity (112.9 +/- 67 vs 92.2 +/- 57) (p < 0.05). Serum triglycerides decreased and HDL cholesterol increased significantly in group 1 as compared to group 2 (p < 0.05).

Swafford (2000) observed effect of fenugreek on breast milk production among ten women kept diaries of their breast milk production for two weeks. The first week established baseline milk production. During the second week three capsules of fenugreek seed were taken three times daily. This observational study used each patient as her own control in comparing breast milk production with and without the fenugreek. Average daily pump volumes for week 1 and week 2 were compared. These values were statistically analyzed using the Wilcox on signed rank test. The average daily milk volume for week 1 was 207 ml compared to 464 for week 2. This increase was statistically significant (P=0.004)

Sowmya.P and Rajyalakshmi.P (1999) observed on Hypocholesterolemic effect of germinated fenugreek seeds in human subjects The effect of consumption of germinated fenugreek seed powder at two different levels, i.e., 12.5g and 18.0g on the blood lipid profiles of twenty hypocholesterolemic adults of both sexes in the age range of 50–65 years was

studied. The subjects were divided into two groups, i.e., Group I and Group II who were asked to incorporate the powder into any dish of their choice at the rates of one packet per day containing 12.5 g and 18.0 g of the germinated powder, respectively, for a period of one month. Fasting blood was drawn intravenously one day before and at the end of 30 days feeding trials. The findings revealed that germination had brought distinct changes in soluble fiber content of the seeds. Consumption of the seed at both the levels resulted in a hypocholesterolemic effect. Between the two levels, higher levels of consumption, i.e., 18.0 g of the germinated seed resulted in a significant reduction in total cholesterol and LDL levels. No significant changes were found in HDL, VLDL and triglyceride levels in all the subjects.

II. STUDIES RELATED TO FENUGREEK AND BLOOD SUGAR

John .W, Roy.J,Jennifer.C,Ying Yu.,Frank.L(2009) observed on Use of fenugreek, a food with demonstrated efficacy in lowering blood sugar among 8 diet controlled diabetic subjects. The study was double-blind, and the order was randomized and balanced. Developed a fenugreek bread formula that was produced in a commercial bakery by incorporating fenugreek flour into a standard wheat bread formula. Whole wheat bread was prepared by the same formula in the same bakery using wheat flour. Eight diet-controlled diabetic subjects were served two slices (56 g) and 5% fenugreek. Blood glucose and insulin were tested periodically over a 4-hour period after consumption. The tests were run on two occasions 1 week apart, once with the fenugreek bread and once with regular bread. Fenugreek and whole wheat bread samples were evaluated for sensory attributes and nutrient composition. There was no statistically significant difference in proximate composition, color, firmness, texture, and flavor intensity between the fenugreek and wheat bread ($P> .05$).

Kassian,Azadbakht L,Forghani.B,Amini.M.(2009) observed on the hypoglycemic and hypolipidemic effects of fenugreek seeds in type 2 diabetic patients in Iran among 24 type 2 diabetic patients were placed on 10 grams/day powdered fenugreek seeds mixed with

yoghurt or soaked in hot water for 8 weeks. Weight, FBS, HbA(1)C, total cholesterol, LDL, HDL and food record were measured before and after the study. The differences observed in food records, BMI and serum variables were analyzed using paired-t-test and t-student and P<or=0.05 was considered as significant. After exclusion of 6 cases for changing in medication or personal problems, the results of 18 patients (11 consumed fenugreek in hot water and 7 in yoghurt) were studied. Findings showed that FBS, TG and VLDL-C decreased significantly (25 %, 30 % and 30.6 % respectively) after taking fenugreek seed soaked in hot water whereas there were no significantly changes in lab parameters in cases consumed it mixed with yoghurt. BMI, Energy, Carbohydrate, Protein and fat intake remained unchanged during study.

Nahas.R (2009) observed on Complementary and alternative medicine for the treatment of type 2 diabetes Three small short-term RCTs (N = 50) have evaluated fenugreek in patients with type 2 DM. In one trial, 25 patients consumed 1 g of seed extract or placebo for 2 months with no change in FBG levels. In a small crossover study, 10 patients added 25 g of defatted seed powder to 1 meal or ate the meal without the powder for 15 days. Several measures of glucose metabolism were all unchanged. A third trial, which used a higher dose (100 g) of defatted seed powder in 15 patients for 10 days, did report improvements in FBG values.

Amirthaveni, M.,Thirumanidevi,A.(2006)observed the Effect of supplementation of fenugreek seeds for non insulin dependent diabetes mellitus patients at AVM diabetic clinic in coimbatore city,45 NIDDM patients were selected and equally divided into 3 groups: experiment group 1 , experiment group 2 and control group. The mean fasting blood glucose level of the control group was 151.5 mg/dl. The initial mean value was reduced gradually to 148.24 mg/dl on the 30th day, 143.1 mg/dl on the 60th day and at the end of the supplementation period, the value was reduced to 141.4 mg/dl. Statistical comparison was carried out and indicated that there was no significant improvement in the control group. In group 1, after supplementation with soaked fenugreek seeds, there was a remarkable reduction

both in the fasting and postprandial glucose levels of diabetics. Similar results were observed in group 2, after supplementation with the fenugreek seed powder, the fasting and postprandial blood glucose levels were statistically significant (p<0.01).

Mitra.A(2006)observed on Effects of Fenugreek in Type 2 Diabetes conducted in rural Bengal Eighty patients were chosen randomly from the rural population suffering from mild Type 2 Diabetes and divided into four groups .Fenugreek seed powder, in doses of 25 g, 50 g, 75 g and 100 g/day mixed with water as a drink, was consumed by patients for 2 years. In patients receiving 25 g of fenugreek, FBS values ranged from 192 ± 11mg/dl to 174 ± 7 mg/dl after 2 years (p=0.075) among the group on 50 g of fenugreek, FBS values ranged from 182 ± 6 mg/dl to 167 ± 7mg/dl over a period of 2 years (p=0.075). In patients receiving 75 g dose, FBS ranged from 153 ± 7mg/dl to 125 ± 10 mg/dl after 2 years (p=0.025) patients receiving 100 g of fenugreek, FBS from 155 ± 10 mg/dl to 130 ± 7 mg/dl after 2 years (p=0.025).

Rajvinder K. Kang, **Rita Jain** and **D. Mridula Mridula (2005)** observed on Impact of Indigenous Fibre Rich Premix Supplementation on Blood Glucose Levels in Diabetics in Amritsar among 30 NIDDM patients. A premix, containing different proportion of locally available ingredients namely wheat, bengal gram, dried peas, defatted soyflour, barley and fenugreek seeds, equal number of both sexes to find out the impact of administering indigenous fibre rich therapeutic premix on blood glucose levels The premix supplementation for 45 days reduced the fasting blood glucose values significantly (p<0.01) from 170.53 to 160.77 mg dL^{-1} in male study subjects but the reduction in fasting blood glucose level from 161±5.13 to 147.37±7.07 mg dL^{-1} in female subjects was non significant After 90 days of premix supplementation, there was significant (p<0.01) reduction in fasting blood glucose level in both male and female study subjects. The presence of fenugreek seed powder in the premix can be the major contributing factor in reducing the fasting blood glucose in the study subjects because it contains trigonelline, an alkaloid, which is known to reduce the blood sugar level.

Kumari.S, Sinha.M (2000) observed on Impact of fenugreek incorporated therapeutic food on blood sugar levels The study was carried out in the Pusa campus of Samastipur district of Bihar among 24 NIDDM patients were divided into two groups; experimental (they were supplemented with therapeutic food, N = 18) and control (they were not supplemented with any therapeutic food, N = 6) group. Subjects comprising experimental group were supplemented with 30g of product per day divided into two equal doses of 15g each in the morning and evening for one month. They were asked to take the product mixed with salt (according to taste) and 100ml of water. Therapeutic food was developed from legumes viz., Bengal gram (100 gm), green gram (50g), horse gram (50g), dry peas (50g) and fenugreek seeds (50g). An amount of 30g of product was supplemented to the subjects (N=18) for a period of one month. It is observed that there is a significant reduction in fasting blood sugar levels of the experimental group after 30 days of supplementation. The reduction ranged from a mean initial value of 136.5 ± 24 mg/dl to 125.3 ± 19 mg/dl and was found to be significant at one percent level. Postprandial blood sugar levels of the subjects also showed a significant reduction after 30 days of supplementation with therapeutic food. The reduction ranged from a mean initial value of 117 ± 29.1 mg/dl to 165.2 ± 28.67 mg/dl and found to be significant at one percent level .Both fasting and postprandial blood sugar levels were reduced significantly after the administration of therapeutic food.

Sharma R.D et.al(1996) conducted on use of Fenugreek seed powder in the management of non-insulin dependent diabetes mellitus in S.N Medical college Agra U.P among 60 NIDDM patients A prescribed diet with and without Fenugreek seed powder was given to patients for 7 days of a control period and for 24 weeks of the experimental period. During the experimental period twenty five grams of Fenugreek seed powder divided into two equal doses was added to the diet and served during lunch and dinner. Diet containing Fenugreek seed powder lowered fasting blood glucose levels and improved glucose tolerance. Insulin levels were also diminished. Twenty four hour urinary sugar excretion was reduced

significantly (p < 0.001). Glycosylated hemoglobin measured at the end of the 8th week of Fenugreek seed powder administration was reduced significantly (p < 0.001).

Zargar . A.H, et.al., (1992) observed on effect of consumption of powdered fenugreek seeds on blood sugar levels in patients with type 2 Diabetes Mellitus in Endocrinology at the institute of science, Srinagar among 42 NIDDM patients. They were divided into 3 groups. Group 1 comprised 14 patients fed 10 gm of the powdered fenugreek seeds / day. Group2 comprised 14 patients fed 20gm of powdered fenugreek seeds/day. It was carried for 6 weeks. Group 3 14 patients not fed with any powdered fenugreek seeds but were continued on the diet and drug regimen. It is clear those small doses (10gm/d of fenugreek did not have any significant effect on blood sugar profiles where as large doses (20gms/d) produce significant in reduction in fasting blood sugars.

III. STUDIES RELATED TO NIDDM ON SELECTED VARIABLES

Ruigómez.A .et.al (2004) observed on Presence of diabetes related complication at the time of NIDDM diagnosis performed a cohort study using data from the General Practice Research Database in the UK. identified patients aged 30 to 74 years with a newly diagnosed NIDDM between 1990 and 1992 and followed them from the day of NIDDM diagnosis until June 1995. Among the 1077 patients identified, 437 (41%) developed a NIDDM complication during the follow-up. NIDDM complications were more frequent among males and in the elderly. Sixty-seven percent of the study cohort was initially free of any complication while the remaining 360 patients presented already one or more NIDDM complication at the time of their NIDDM diagnosis. History of diabetic related complication was associated with an increased risk of developing a new NIDDM complication (RR: 1.8; 95% CI: 1.5–2.2). Mortality was also greater among patients with history of NIDDM complication (RR: 1.5; 95% CI: 1.0–2.2). Patients with a history of any disorder related to diabetes before their clinical diagnosis of NIDDM are at increased risk of developing a NIDDM complication after the NIDDM diagnosis, as well as at increased risk of dying compared to diabetic patients with no history.

Dhadwal.D et.al (2000) observer on Prevalence of NIDDM in the general population A random survey for determining the prevalence of NIDDM was conducted in the population aged 40 years and above of Shimla town among 1195 subjects were screened for estimation of NIDDM prevalence from seven randomly selected wards. The prevalence of NIDDM in age group 40 years and above was 4.86% (5.17% in males and 4.38% in females). NIDDM was found to be positively associated with increasing age, BMI, WHR, family history of diabetes and negatively with physical activity. Stress should be on early detection of diabetes to reduce the heavy burden of morbidity and mortality caused by diabetes.

Kawakami.K.et.al (1999) observed on Overtime, psychosocial working conditions, and occurrence of non- insulin dependent diabetes mellitus in Japanese men. In an eight year prospective cohort study in an electrical company in Japan In 1984, a mailed questionnaire was sent to industrial workers of an electrical company in Japan. After excluding those who had a history of diabetes mellitus or other chronic diseases, 2597 male respondents were prospectively followed up for the succeeding eight years. Data from 2194 (84%) who were completely followed up were analysed. The occurrence of NIDDM during the follow up period was assessed according to the WHO criteria on the basis of an annual screening programme. The age adjusted incidence of NIDDM was significantly higher in those who worked overtime more than 50 hours per month than in those who worked 25 hours or less per month (p < 0.05). It was significantly higher in those who worked with new technology at baseline than in those who did not (p < 0.05). Cox's proportional hazard model indicated that those who worked overtime more than 50 hours per month had 3.7 times higher risk of NIDDM after controlling for known risk factors (p < 0.01) and those who worked with new technology had 2.4 times higher risk of NIDDM (p < 0.05).

CHAPTER – III

METHODOLOGY

This chapter includes research approach, research design, variables, setting, population, sample and sample size, sampling technique, developing of the tool, content validity, pilot study, data collection procedures, plan for data analysis and ethical consideration

RESEARCH DESIGN

Researcher's over all plans for obtaining answers to the research questions or for testing the research hypothesis is referred to as the research design.

Experimental research design was found to be most appropriate for the present study. The study intended to evaluate the effect of roasted fenugreek seed powder on fasting blood sugar level among NIDDM patients who were attending OPD in M.V.R Diabetic clinic Arakkonam. In the experimental group received an intervention of 24 grams/ day of roasted fenugreek seed powder administered in divided dose before breakfast and dinner for 15 days. The control group included NIDDM patients in the same settings who did not receive the intervention. They possessed similar characteristics of the experimental group. However in a quasi experimental research, randomization or control is missing. In this study randomization was not done. The design used in the present study was quasi experimental design, pretest post test non equivalent control group design.

Background factors
Age, Sex, Education, Occupation, Income, Marital status, Family history, Duration of disease, Medication, checking blood glucose, social habits, intake of snacks, intake of coffee/tea, sweets, Exercise, Traveling Dietary pattern Sleep

TARGET POPULATION
NIDDM PATIENTS

ACCESSIBLE POPULATION
NIDDM patients who attending MVR diabetic clinic

Sampling technique
Quota sampling

Samples
NIDDM PATIENTS (40)

Experimental group (20)

Control group (20)

Pre Test FBS

Pre test FBS

Data collection tool
Interview/Observation schedule

Intervention roasted Fenugreek seed powder (24gms)

NIL

Post test FBS

DATA ANALYSIS & INTERPRETATION
Descriptive And Inferential Analysis

Post test FBS

FINDINGS

Criterion measures
Pre& Post test FBS

REPORT
DISSERTATION

FIG 2 : SCHEMATIC REPRESENTATION OF RESEARCH DESIGN

SETTING OF THE STUDY

The setting was selected based on the feasibility of conducting the study, availability of sampling and proximity of setting to the investigator.

The study was conducted in M.V.R Diabetic clinic in Arakkonam

VARIABLES

Variables included in the study were:

Independent variables: Roasted fenugreek seed powder

Dependent variables   : Fasting blood sugar

Associate variables   : Age, sex, education, occupation, income,

marital status, family history, nature of physical activity, exercise, checking blood glucose level, drugs, traveling, intake of coffee/ tea, intake of sweets dietary pattern duration of disease, social habits and sleep.

POPULATION

Target population: Is the population in which researcher is interested and to which he/she would like to generalize the results of a study. The target populations were clients with NIDDM.

Accessible population: is the population available for a study. In this study the accessible populations were patients with NIDDM attending OPD at M.V.R Diabetic clinic, Arakkonam.

SAMPLE AND SAMPLING TECHNIQUE

NIDDM patients attending OPD at M.V.R Diabetic clinic, Arakkonam were the samples for the study.

Sampling is the process of selection a portion of selecting a portion of the population to represent the entire population. In this study, quota sampling technique was used.

SAMPLING CRITERIA

The inclusion criteria

Referred to NIDDM patients,

1. Who were diagnosed to suffer from NIDDM and willing to take part in the research
2. Patients with regular pharmacological treatment.
3. Fasting blood sugar level 121 mg/dl and above attending OPD at M.V.R Diabetic clinic, Arakkonam. During the time of data collection.
4. Aged between 30-60 years
5. Both male and female patient
6. Who could speak in Tamil.

The exclusion criteria

Referred to patients

1. Who were Insulin dependent diabetic patients
2. Who had other physical illness or complications (eg) renal failure, liver failure.

DESCRIPTION OF THE TOOL

The tool used in this study was an interview/ observation schedule regarding blood sugar and Roasted fenugreek seed powder among NIDDM patients.

It consisted of the following 2 sections.
1. Section -A: Background data of NIDDM patients.
2. Section -B: Observation schedule on blood sugar.

Section -A: Background data by NIDDM patients: It consisted of 18 items seeking information about age, sex, education, marital status, occupation, income, family history, dietary pattern, checking blood glucose, duration of disease, intake of snacks, intake of coffee/ tea, medication, social habits, traveling, exercise and sleep.

Section -B: Observation schedule on fasting blood sugar: Blood sugar was checked with glucometer before and after administration of roasted fenugreek seed powder.

VALIDITY

In the present study the structured tool was validated by 6 experts, including 3 nursing experts and 3 physicians. Based on their recommendation, few items were modified. The tool was first drafted in English and then translated into Tamil. Language validity was established by retranslating the tool to English.

Validity of the instrument

Validity of glucometer the instrument was done by comparing the blood sugar measurement of 10 individuals with standard one used by the physician and found to be the same.

RELIABILITY OF THE TOOL

The reliability of the instrument was established by inter-rater reliability among 10 individuals. The reliability was computed using Karl Pearson's correlation and it was found to r = .99. The tool was found to be reliable for the study.

PILOT STUDY

The pilot study was conducted in OPD at M.V.R Diabetic clinic, Arakkonam by taking prior permission from the authorities. 10 patients were selected as sample. Background factors were collected by interview method. The feasibility of the study was established. Those participants were excluded from the main study.

DATA COLLECTION PROCEDURE

The present study was conducted in OPD at M.V.R Diabetic clinic, Arakkonam. The data were collected for 4 weeks from October 5th to 31st October 2009. Prior permission was sought and obtained from authorities.

Subjects were assigned to the groups by quota sampling method. 20 patients were in experimental and 20 patients in control group. The objectives and purpose of the study was explained and confidentiality was maintained. Informed consent was obtained. Background data were collected using interview method. Pretest fasting blood sugar level was checked in both experimental and control group. In experimental group 24gms/ day of roasted fenugreek seed was administered for 15 days. Half dose was given the before breakfast and remaining half in the dinner Regularity of the intake of roasted fenugreek seed powder was ascertains by the investigate personally.

Post test was conducted at 16th day for experimental and control group.

PLAN FOR DATA ANALYSIS

The data were edited, coded and entered in Excel sheet. The data were analyzed using SPSS version 10. A probability of less than 0.05 was considered to be significant. The data were analyzed as follows.

1. Background factors of NIDDM patients in experimental and control groups were analyzed using descriptive statistics and chi square.
2. Data on effectiveness of fenugreek seed powder on NIDDM patients among experimental and control group were analyzed using descriptive and inferential statistics.
3. Data on association between the mean difference in fasting blood sugar and selected factors among NIDDM patients in experimental group were analyzed using linear regression.

ETHICAL CONSIDERATION

The study objectives, intervention and data collection procedure were approved by the research and ethical committee of the institution. Main study was conducted after obtaining permission from M.V.R. Diabetic clinic Arakkonam. Informed consent was obtained from NIDDM patients. The freedom was given to the client to leave the study at his/her will without assigning any reason. No routine care was altered or withheld.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

Polit (2004) states that data analysis is the systematic organization and synthesis of research data and testing of research hypothesis using those data.

The analysis and interpretation of data of this study was base don the data collected by interview/ observation schedule. The results were computed using descriptive and inferential statistics. The data were entered in to excel sheet and analyzed using SPSS version 10. A probability value of less than 0.05 was considered to be significant.

The objectives of the study were

1. To compare the pre and post fasting blood sugar in relation to roasted fenugreek seed powder among NIDDM patients in experimental group

2. To compare the mean difference fasting blood sugar among NIDDM patients in experimental and control group

3. To find the association between the mean difference in fasting blood sugar in relation to roasted fenugreek seed powder and demographic variables among NIDDM patients in experimental group.

The data collected were edited, tabulated, analyzed, interpreted and the findings were presented in the form of tables and diagrams under the following section.

Section 1   :   Data on background factors of NIDDM patients.

Section 2   :   Data on fasting blood sugar before and after administering roasted fenugreek seed powder among NIDDM patients in experimental group.

Section 3   :   Data on mean difference in fasting blood sugar among NIDDM patients in experimental and control group.

Section 4   :   Data on association between mean difference in fasting blood sugar and selected factors in experimental group.

SECTION 1: DATA ON BACKGROUND FACTORS OF NIDDM PATIENTS.

TABLE – 1

Frequency, percentage and chi square distribution of background factors among experimental and control group.

Background variables	Experimental group (n=20)		Control group (n=20)		χ^2 p value
	Frequency	Percentage %	Frequency	Percentage %	
Age					2.133
31-40 yrs	4	20.0	1	5.0	p= .344
41-50 yrs	6	30.0	8	40.0	
51-60 yrs	10	50.0	11	55.0	NS
Sex					.102
Male	8	40.0	9	45.0	p =.749
female	12	60.0	11	55.0	NS
Educational status					
Elementary status	6	30.0	11	55	7.137
High school	3	15.0	6	30.0	p = .068
Higher secondary	6	30.0	2	10.0	NS
Degree	5	25.0	1	5.0	
Nature of work					
Physically demanding job	6	30.0	6	30.0	
Both physically &mentally	8	40.0	7	35.0	.178
No demands in job	4	20.0	5	25.0	p =.981
No job	2	10.0	2	10.0	NS

Background variables	Experimental group (n=20)		Control group (n=20)		χ^2 p value
	Frequency	Percentage %	Frequency	Percentage %	
Family history of DM					
Father	2	10.0	3	15.0	7.771
Mother	3	15.0	0	0	
Sibling	1	5.0	6	30.0	p = .169
Paternal grand parent	7	35.0	7	35.0	
Maternal grand parent	6	30.0	3	15.0	NS
Not applicable	1	5.0	1	5.0	
Non veg					
Daily	13	65.0	2	10.0	7.033
Few days in a week	7	35.0	17	85.0	p = .030
Few days in a month	--	--	1	5.0	significant
Traveling					
Every day	2	10.0	1	5.0	9.238
Few days in a week	0	0	2	10.0	
Few days in a month	11	55.0	3	15.0	p = .026
Very rare or nil	7	35.0	14	70.0	significant
Taking snacks					
Always	1	5.0			5.714
Sometimes	15	75.0	20.0	100.0	p = .057
never	4	20.0			NS
Following habits			3	15.0	
Smoking	2	--	1	5.0	
Drinking	18	--	2	10.0	5.806
Both	--	10.0	13	65.0	p = .214
None	--	90.0	1	5.0	NS
Any other	--	--			

Table 1 shows the frequency and percentage distribution of selected factors of NIDDM patients in experimental and control group.

Regarding **age**, majority of NIDDM patients 10 (50%) were in the age group of 51- 60 years and the least 4 (20.0%) were in the age group of 31-40 yrs in experimental group .In control group majority of patients 11 (55.0%) were in the age group of 51-60 yrs and least 1 (5.0%) were in the age group of 31- 40 yrs in control group .The obtained chi square value, χ^2 = 2.133 (p =.344) was not significant

Regarding **sex**, majority of NIDDM patients were females 12(60%) 11 (55%) in both experimental and control group respectively. The obtained chi square value, χ^2 = .102(p =.749) was not significant.

Regarding **educational status**, majority of NIDDM patients had elementary and higher secondary 6 (30%) in experimental group .In control group majority of patients had elementary education 11(55%) and the least had control group degree 1 (5%). The obtained chi square value, χ^2=7.137(p =.068) was not significant.

Regarding **nature of work**, majority of NIDDM patients 8 (40%) was doing physically and mentally demanding job and least 2 (10%) had no job in experimental group. In control group majority of patients 7 (35%) were doing both physically and mentally demanding job and least 2 (10%) had no job in control group. The obtained chi square value, χ^2 =.178 (p =.981) was not significant

Regarding **family history of DM**, majority of NIDDM patients were 7 (35%) had family history of paternal grand parent in both control and experimental group. The obtained chi square value, χ^2 =7.771 (p =.169) was not significant

Regarding **non vegetarian diet**, majority of NIDDM patients 13(65%) t00k non vegetarian few days in a week in experimental group. In control group majority of patients 17 (85%) took non vegetarian in few days in a week. The obtained chi square value χ^2 =7.033 (p =.030) were significant

Regarding **traveling**, majority of NIDDM patients 11(55%) were traveling few days in a month and least 2 (10%) were traveling in experimental group. In control group majority of patients 14 (70%) were not traveling for the job and least 1 (5%) were traveling daily in control group. The obtained chi square value, χ^2 =9.238 (p =.026) were significant

Regarding **habits of snacks**, majority of NIDDM patients 15 (75%) took snacks sometimes between the meals .In control group majority of patients took snacks sometimes in between the meals. The obtained chi square value χ^2 = 5.714 (p = .057) were significant

Regarding **habits**, majority of NIDDM patients were no habits of drinking smoking in both experimental and control group 18 (10%) and 13(65%) The obtained chi square value, χ^2 =5.806 p= .214 was not significant

It was inferred that the experimental and control group were comparable with regard to age, sex , educational status, nature of work, family history of DM , non vegetarian diet, traveling , habit of taking snacks.

It was inferred that majority of NIDDM patients in experimental group between 51-60 years, were female, had education of both elementary and higher secondary equally, had both physical and mental demanding jobs, had family history of paternal grand parent, took non vegetarian few days in a week, traveled few days in a month, take snacks sometimes and they were not having any other bad habits.

It was inferred that majority of NIDDM patients in control group between 51-60 years, were female, had education of both elementary and higher secondary equally, had both physical and mental demanding jobs, had family history of paternal grand parent, took non vegetarian few days in a week, traveled few days in a month, take snacks sometimes and they were not having any other bad habits.

Figure 3 shows Frequency and percentage distribution of NIDDM patients according to family income per year.

Majority of patients belongs to above poverty line 17(85%) in experimental group and majority of patients belongs to below poverty line 11(55%) in control group. The obtained chi square value χ^2 value is 7.033 (p= .008) is significant

It was inferred that majority of NIDDM patients in experimental group belongs to above poverty line and NIDDM patients in control group belongs to below poverty line

Experimental Group

3 (15%)

☐ Below Poverty Line
☐ Above Poverty Line

$$\chi^2 = 7.033$$
$$p = .008$$

17 (85%)

Control Group

☐ Below Poverty Line
☐ Above Poverty Line

9 (45%)

11 (55%)

Fig 3: Frequency and percentage distribution regarding family income per year.

Figure 4 shows frequency and percentage distribution of NIDDM patients according to duration of disease.

Majority of patients belonged to less than 3 years in both experimental 18 (90%) and control group 15(75%). The obtained chi square value, value is 1.558, (p=.212) was not significant.

$$\chi^2 = 1.558$$
$$p \quad = .212$$
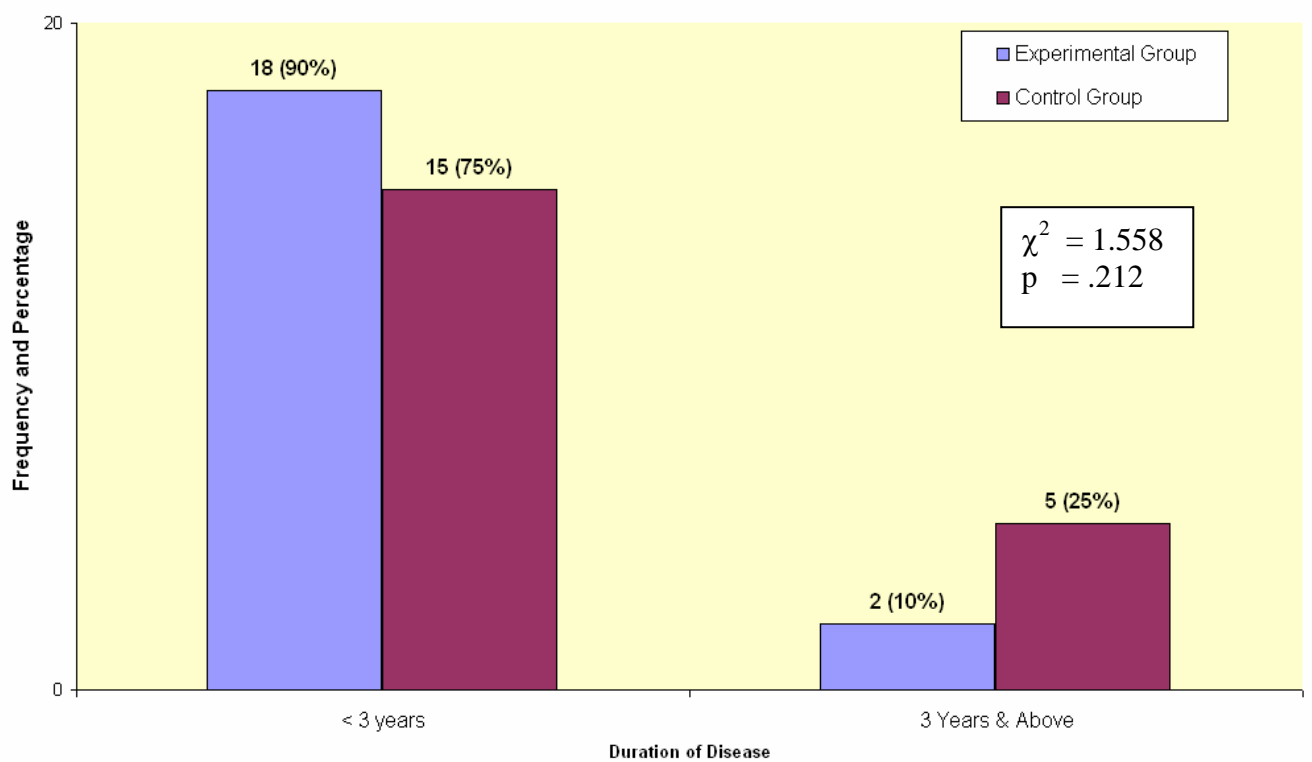
Fig 4: Frequency and percentage distribution regarding duration of disease

Figure 5 shows frequency and percentage distribution of checking blood glucose level.

Majority of 8 (40%) were checking blood sugar level once in 6 month in both experimental and control group and the least patients were checking once a month in control group 1(5%). The obtained chi square value, χ^2 value = 4.800 (p=.187) was not significant.

Experimental Group

0 (0%)

4 (20%)

8 (40%)

8 (40%)

Legend:
- Once a month
- Once a year
- Once in 6 months
- Only when needed

$\chi^2 = 4.800$
$p = .187$

Control Group

1 (5%)

3 (15%)

8 (40%)

8 (40%)

Legend:
- Once a month
- Once a year
- Once in 6 months
- Only when needed
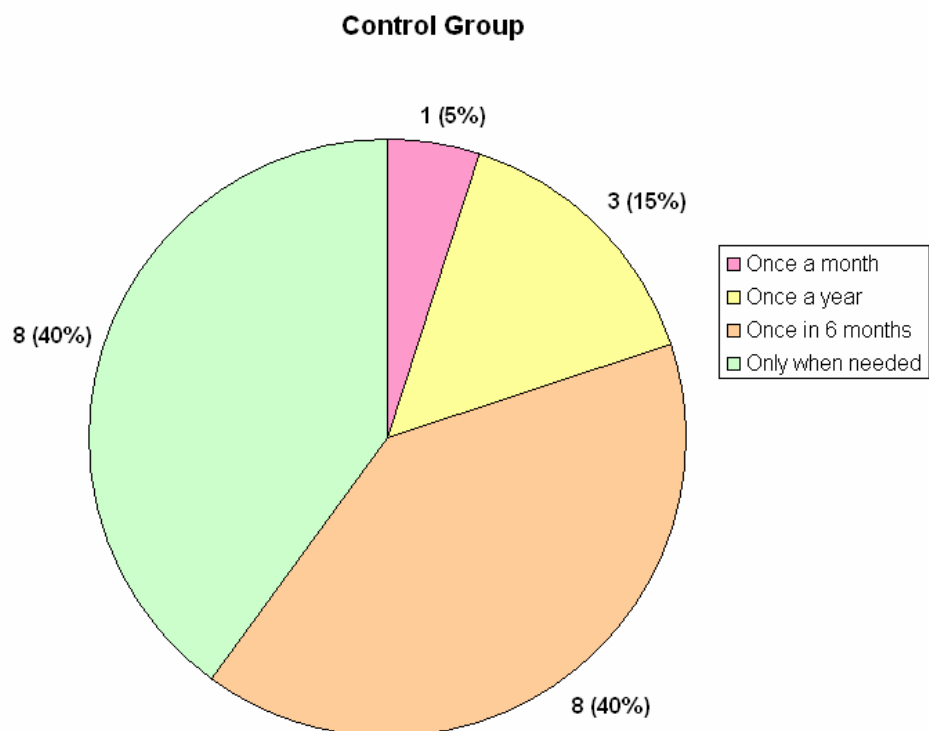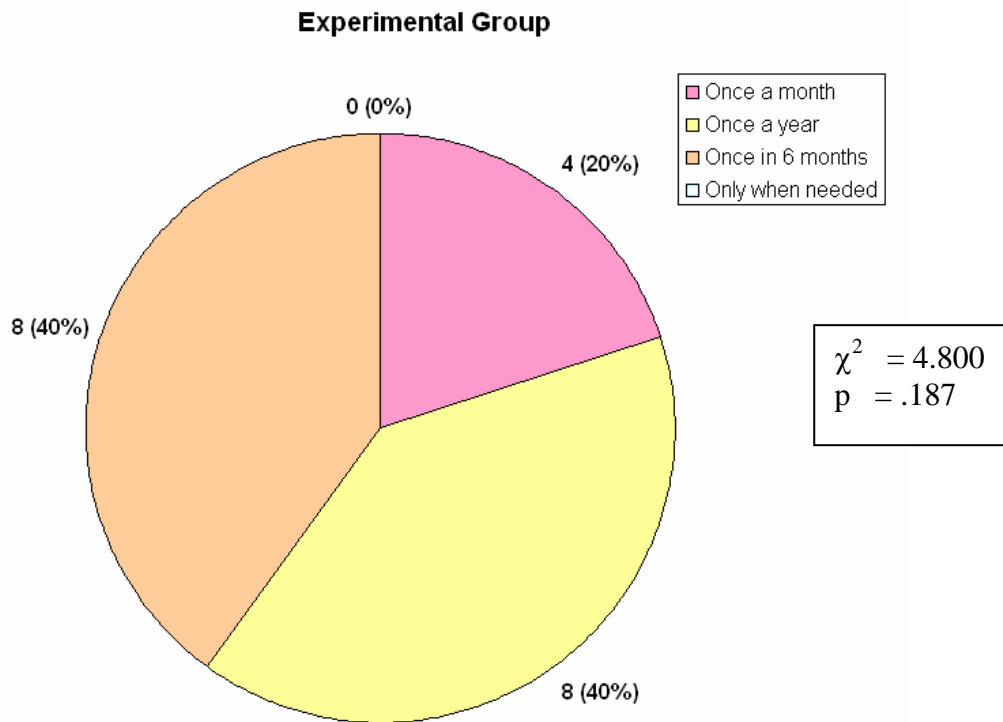
Fig 5 : Frequency and percentage distribution regarding checking blood sugar level.

42

Figure 6 shows frequency and percentage distribution of NIDDM patients according to drugs and dosage of medicine.

Majority of patients took only one drug in both experimental group17 (85%) and control group15 (75%). The obtained chi square value, χ^2 is 0.625 (p=0 .429) was not significant
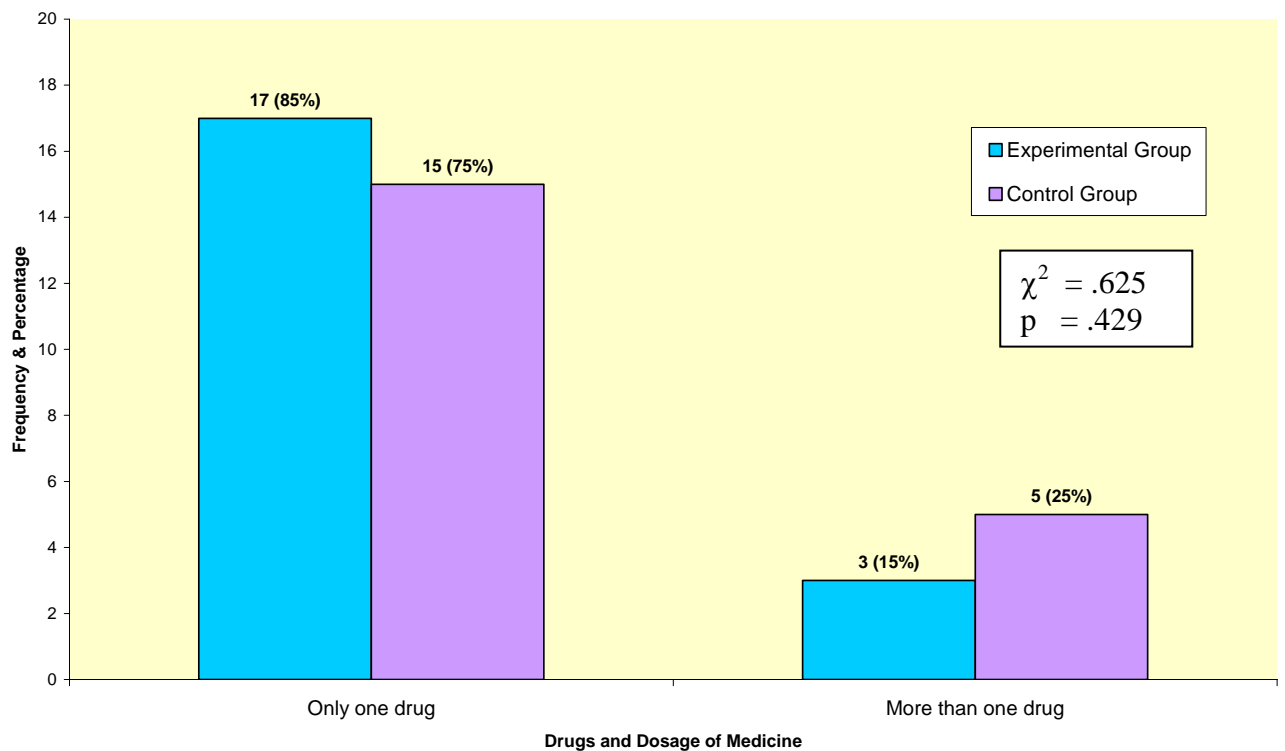
Fig 6: Frequency and percentage distribution regarding drugs and dosage of medicine

Figure 7 shows frequency and percentage distribution of NIDDM patients according restricting in sweet intake.

Majority of patients in control group 11(55%) fully restricted sweet intake and in experimental group were fully restricted sweet intake10 (50%). The obtained chi square value χ^2 value is .100 (p=.752) was not significant.

Experimental Group

Fully Restricted Sweet Intake
Sometimes I eat

10 (50%)   10 (50%)

$$\chi^2 = .100$$
$$p = .752$$

Control Group

Fully Restricted Sweet Intake
Sometimes I eat

9 (45%)

11 (55%)
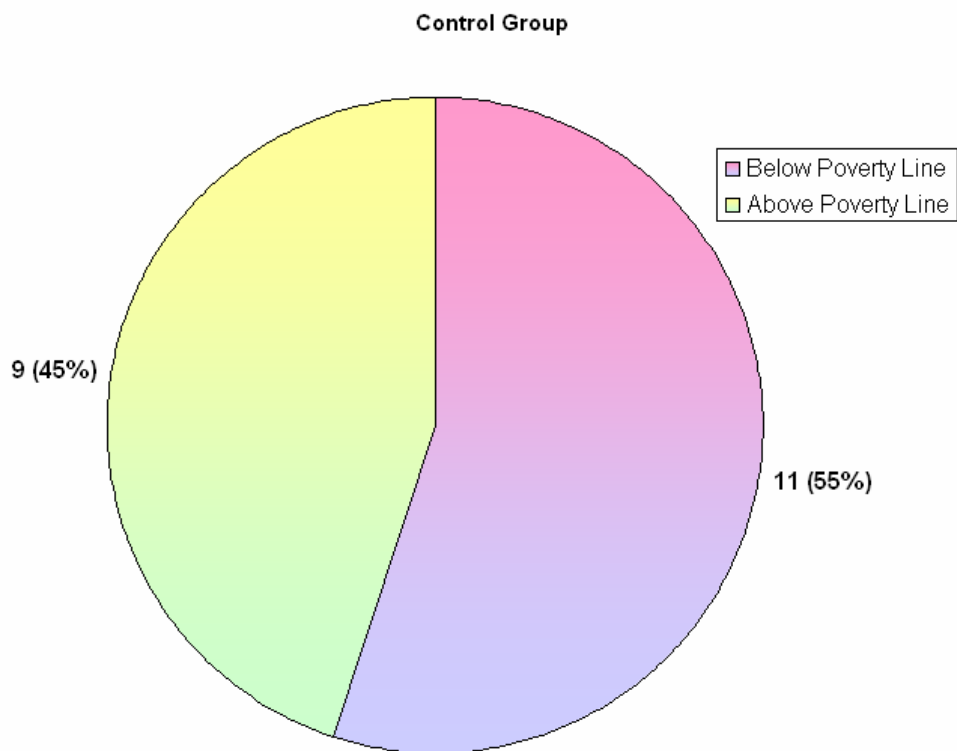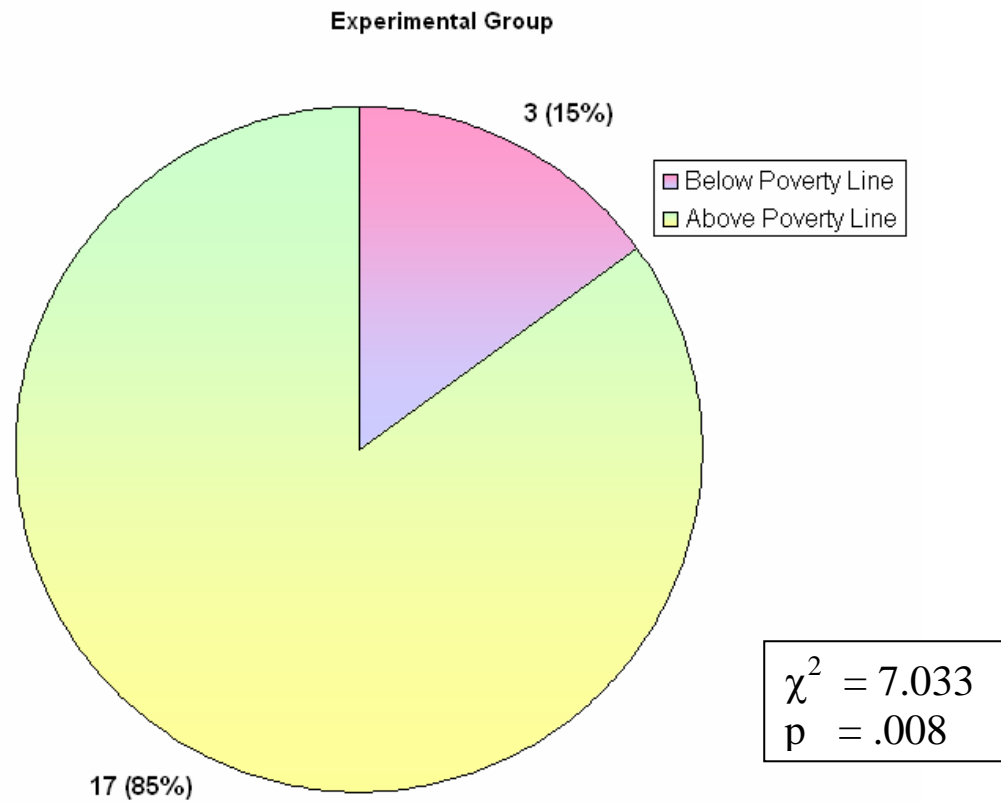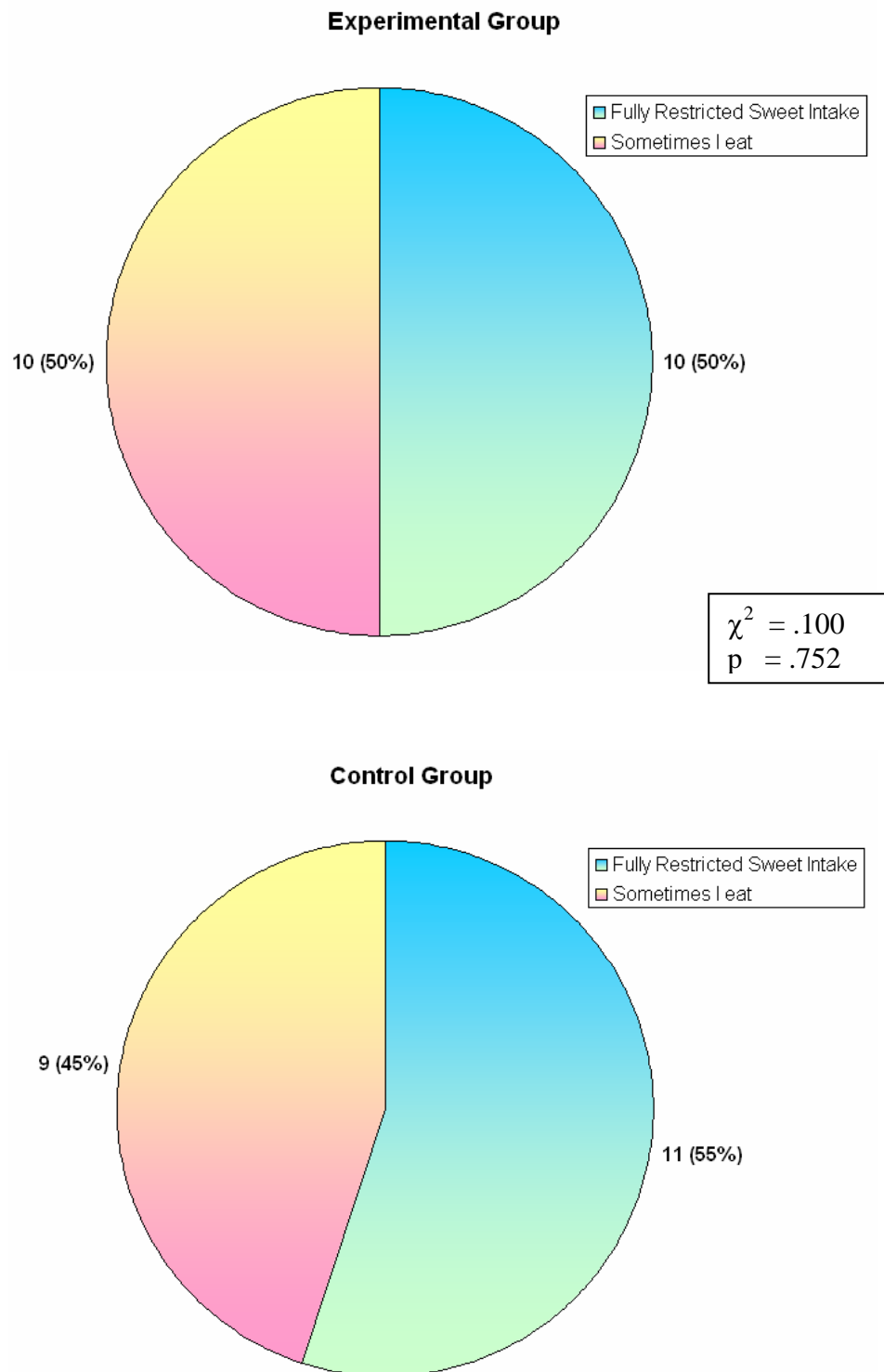
Fig 7 : Frequency and percentage distribution regarding sweet intake

Figure 8 shows frequency and percentage distribution of NIDDM patients according to hours of sleep.

Majority of patients had 8 hours of sleep in experimental group 9(45%) and control group8(40%) and the least patients had less than 8 hours of sleep in both experimental 3(15%) and control 5(25%) group . The obtained chi square value, χ^2 value is 2.351 (p= .309) was not significant
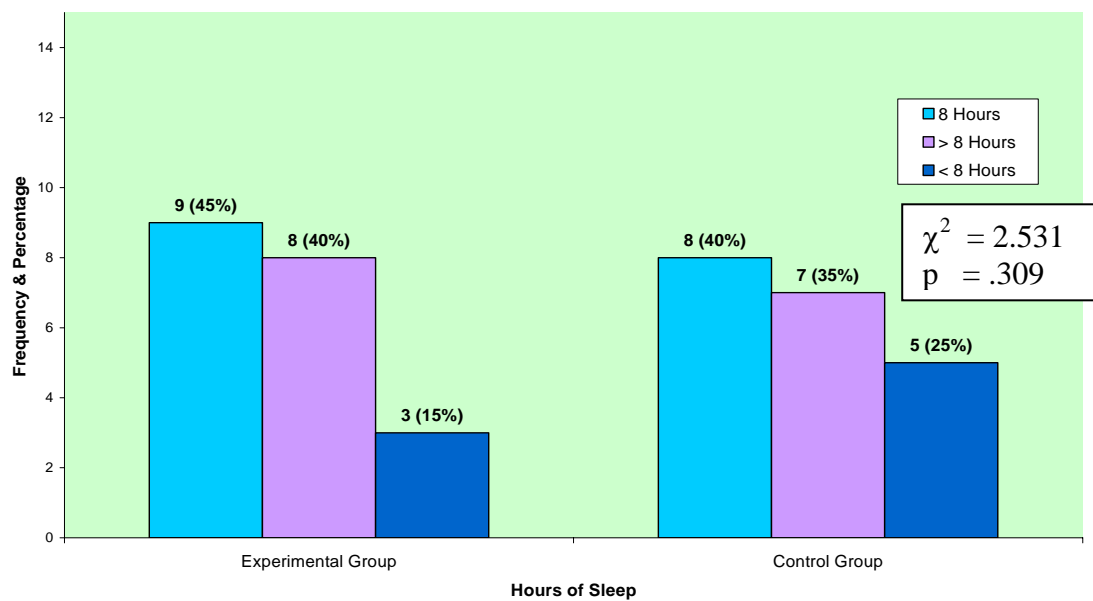
Fig 8 : Frequency and percentage distribution regarding hours of sleep

SECTION II: DATA ON FBS BEFORE AND AFTER ADMINISTERING ROASTED FENUGREEK SEED POWDER AMONG NIDDM PATIENTS IN EXPERIMENTAL GROUP.

For the purpose of this study the following null hypothesis were stated.

H_{01} : There will be no significant difference between fasting blood sugar before and after administering roasted fenugreek seed powder among NIDDM patients in experimental group.

TABLE – 2

Mean, range, SD, Mean difference and "t" value regarding pre and post test FBS among NIDDM patients in experimental group.

(n = 20)

Test	FBS of experimental group				
	Mean	Range	SD	Mean difference	"t" value (p)
Pre Test	155.7	123-246	33.28	16	7.575
Post Test	139.75	101-201	29.24		p = 0.001 S

S = Significant

Table-2 shows the mean, range, standard deviation and "t" value regarding the pre and post fasting blood sugar among NIDDM patients in experimental group.

The obtained post test mean fasting blood sugar 139.7 (SD=29.24) was less than the pre test fasting blood sugar 155.7 (SD = 33.28). The obtained mean difference was 16 and "t" value t= 7.57(p = .001) was significant. Therefore, the null hypothesis H_{01} was rejected.

It was inferred that the fasting blood sugar had significantly reduced after administering roasted fenugreek seed powder among NIDDM patients in experimental group. Roasted fenugreek seed powder was found be very effective.

SECTION III: DATA ON MEAN DIFFERENCE IN FBS AMONG NIDDM PATIENTS IN EXPERIMENTAL GROUP AND CONTROL GROUP

For the purpose of this study the following null hypothesis as stated.

H_{02} -The mean difference in fasting blood sugar among NIDDM patients between experimental group and control group will be equal.

TABLE 3

SD, Difference in Mean difference and "t" value regarding post test fasting blood sugar among NIDDM patients in experimental and control group.

Group	Post test fasting blood sugar				
	Pre Minus Post	Mean difference	SD	Difference in Mean difference	"t" value (p)
Experimental group n=20	155.7 - 139.7	15.95	9.4	-1.85	-6.525 (p=0.001) S
Control group n=20	186.9 - 204.7	-17.8	21.1		

S = Significant

Table 3 shows the mean, standard deviation and "t" value regarding mean difference in fasting blood sugar among NIDDM patients in experimental group and control group.

The difference in mean difference in FBS among control group was more – 17.8 (21.1) than the experimental group 15.95 (9.4) in reality, the post test FBS in control group had

increased. There was significant difference in the mean difference of FBS between experimental and control group t = -6.525 (p<.001). Therefore, the null hypothesis was rejected.

It was inferred that there was significant difference in mean difference of FBS among experimental group with roasted fenugreek seed powder administration.

SECTION – IV: DATA ON ASSOCIATION BETWEEN THE MEAN DIFFERENCE IN NIDDM AND BACKGROUND VARIABLES AMONG THE PATIENTS IN EXPERIMENTAL GROUP

TABLE 4

Linear regression regarding mean difference in NIDDM and background variables among the patients in experimental group

Background variables	Standardized coefficient (beta)	"t" value	Significance (p)
Age	-.299	-1.890	.609(NS)
Sex	-.484	-1.289	.420(NS)
Education	.639	10.816	.059(NS)
Nature of work	-.904	-1.427	.389 (NS)
Family income	-.352	-.986	.504(NS)
Non vegetarian	.272	1.092	.472(NS)
History of DM	.725	2.020	.293(NS)
Disease duration	.610	1.951	.302(NS)
Checking blood sugar	.295	1.699	.339(NS)
Exercises	-.520	-4.922	.128(NS)
Traveling	.304	-4.115	.152(NS)
Snacks	.428	8.001	.079(NS)
Tea or coffee/day	-.089	-1.095	.471(NS)
Medication	1.136	6.283	.100(NS)
Drugs& dosage	-.643	-2.400	.251(NS)
Sweet intake	.139	2.248	.266(NS)
Social habits	-.032	-.302	.813(NS)
Sleep per day	.741	2.143	.278(NS)

(NS) Non significant

Table 4 reveals the significant association between the mean difference in NIDDM and the background variables among NIDDM patients in experimental group.

None of the background factors were associated with the mean difference in fasting blood sugar among experimental group (p> .05) the selected variables such as age t = -1.890 (p = .609), sex t = -1.289 (p = .420), education t =10.816 (p = .059), nature of work t =-1.427 (p= .389), family income per year t= -.986 (p =.504), non vegetarian diet t = 1.092(p =.472), family history of DM t= 2.020 (p =-.293), duration of disease t= 1.951 (p= .302), checking blood glucose t= 1.699(p= .339), exercise t= -4.922 (p = .128), traveling t = - 4.115 (p = .152), snacks t = 8.001 (p= .079) , tea or coffee per day t = -1.095(p= .471), medication t = 6.283(p= .100), drugs & dosage t= -2.400(p= .251),drugs & dosage t =-2.400(p = .251)social habits t =-.302 (p= .813), hours of sleep per day t= 2.143(p = .278).

Therefore roasted fenugreek seed powder was independently effective in reduction of blood sugar among NIDDM patients in experimental group.

CHAPTER – V

SUMMARY, FINDINGS, DISCUSSION, IMPLICATIONS, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

This chapter deals with summary, findings, discussion, implications, limitations, recommendations and conclusion. The essence of any research project is based on study findings, limitations, interpretation of the research results and recommendations the incorporate the study implications. It also gives meaning to the results obtained in the study.

SUMMARY

The prime aim of the study was on FBS before and after administering roasted fenugreek seed powder among NIDDM patients in selected M.V.R diabetic clinic, Arakkonam.

The objectives of the study were,

- To compare the pre and post test FBS in relation to RFSP among NIDDM patients in experimental group

- To compare the mean difference in FBS among NIDDM patients in experimental and control group

- To find the association between the mean difference in FBS in relation to roasted fenugreek seed powder and demographic variables among NIDDM patients in experimental group.

The study attempted to examine the following research hypothesis

H_1 : There will be significant difference between pre and post FBS in relation to RESP among NIDDM patients in experimental group.

H_2 : There will be significant difference between the mean difference in FBS among NIDDM patients in experimental and control group.

H_3 : There will be significant association between mean difference in pre and post FBS in relation to administering RFSP and background factors among NIDDM patients in experimental group.

Literature review was done for the present study, and presented in the following headings, (1) Studies related to fenugreek seed, (2) Studies related to fenugreek seed powder and NIDDM patients, (3) Studies related to NIDDM on selected variables.

The investigator had developed a conceptual framework based on system model. Setting for the study were the selected in M.V.R Diabetic clinic. Arakkonam.

The present study design was a quasi experimental, pretest post test non equivalent control group design. The sample size was 40 NIDDM patients recruited in the study they were 20 experimental group and 20 in control group.The sampling technique used in the study was quota sampling technique.

The tool developed and used for data collection was a structured interview and observation schedule. The content validity of the tool was established by 6 experts. The tool was reliable and feasible. The reliability of the tool was established by inter rater reliability method. The obtained reliability coefficient was, high (r= 0.99). The pilot study was conducted M.V.R diabetic clinic Arakkonam among 10 NIDDM patients, who fulfilled sample selection criteria who were other than study samples. The study was found to be feasible.

The main study was conducted in the OPD of M.V.R Diabetic clinic,Arakkonam, Vellore district from month of October 3rd to October 30th prior permission from the authorities was sought and obtained. Individual informed consent was taken from study sample. The samples were selected by quota sampling technique based on sample selection criteria.

A total of 40 patients were recruited in the study, they were 20 in experimental group and 20 in control group. First data were collected from the experimental group and then followed by control group. Pre test fasting blood sugar was measured. The intervention 24 gm/ day of roasted fenugreek seed powder was administered both in morning and night 12 gms of RFSP in empty stomach for 15 days in experimental group. Post test fasting blood sugar was measured on 16th day for both experimental and control group. The gap between pre and post test was 15 days. Gathered data were analyzed using SPSS (version 10) package. The probability value of less than 0.05 was considered to be significant.

CHARACTERISTICS OF STUDY SAMPLES

Majority of NIDDM patients in experimental group between 51-60 years 10(50%), were female 12 (60%), had education of both elementary and higher secondary equally 6(30%), had both physical and mental demanding jobs8 (40%), had family history of paternal grand parent 7(35%), took non vegetarian few days in a week 13(65%), traveled few days in a month 11(55%), took snacks sometimes15(75%) they were not having any other bad habits 18(90%), belongs to above poverty line 17(85%), duration of disease less than 3 years 18(90%), checking blood sugar level once in 6 month 8(40%), took only one drug 17 (85%), fully restricted sweet intake10(50%),and they were had 8 hours of sleep 9 (45%).

Majority of NIDDM patients in control group between 51-60 years 11(55%), were female 11 (55%), had elementary education 11(55%),had both physical and mental demanding

jobs 7(35 %) had family history of paternal grand parent 7(35%), took non vegetarian few days in a week 17 (85%),traveled very rare 14(70%),took snacks sometimes 20(100%), not having any other bad habits 13(65%), belongs to below poverty line 11(55%), duration of disease less than 3 years 15(75%), checking blood sugar level once in 6 month 8(40%), took only one drug 15(75%), fully restricted sweet intake11(55%),and they were had 8 hours of sleep 8 (40%).

FINDINGS

The major findings of the study were classified under following headings on objectives

Objective 1: To compare the pre and post test fasting blood sugar in relation to administering RFSP among NIDDM patients in experimental group

- There was a significant reduction in the mean fasting blood sugar after administering roasted fenugreek seed powder among NIDDM patients in experimental group $t = 7.575$ (p=.01)

Objective 2: To compare the mean difference fasting blood sugar among NIDDM patients in experimental and control group

- The post test mean blood sugar among NIDDM patients in experimental group was significantly lower than control group $t= -6.525$ (p= .01)

Objective 3: To find the association between the mean difference in FBS in relation to roasted fenugreek seed powder and demographic variables among NIDDM patients in experimental group.

- None of the background factors were associated with the mean difference in fasting blood sugar among experimental group (p> .05) the selected variables such as age $t = -1.890$ (p = .609), sex $t = -1.289$ (p = .420), education $t =10.816$(p = .059), nature

of work t =-1.427 (p= .389), family income per year t= -.986(p =.504), non vegetarian

diet t = 1.092(p =.472), family history of DM t= 2.020(p =-.293), duration of disease

t = 1.951 (p= .302), checking blood glucose t= 1.699(p= .339), exercise t= -4.922

(p = .128), traveling t = - 4.115 (p = .152), snacks t = 8.001 (p= .079) , tea or coffee per

day t = -1.095(p= .471), medication t = 6.283(p= .100), drugs & dosage t= -2.400

(p= .251),drugs & dosage t =-2.400(p = .251)social habits t =-.302 (p= .813), hours

of sleep per day t= 2.143(p = .278).

DISCUSSION

The results of the study were discussed according to the findings of the study.

Finding 1: findings on fasting blood sugar before and after administering roasted fenugreek seed powder in experimental group.

- There was a significant reduction in the mean blood sugar after administering fenugreek seed powder t= 7.575 (p=.01) .

The above findings were supported by the studies conducted by **Amirthaveni,M., Thirumanidevi,A. (2006)** observed the Effect of supplementation of fenugreek seeds for NIDDM where they reported that after supplementation of fenugreek seed powder, the fasting and postprandial blood glucose levels were statistically significant (p<0.01) **Mitra.A(2006)**observed on Effects of Fenugreek in Type 2 Diabetes, after supplementation of fenugreek seed powder, the fasting blood glucose levels were statistically significant (p=0.025). **Sharma R.D et.al., (1996)** conducted on use of Fenugreek seed powder in the management of non-insulin dependent diabetes mellitus. Fenugreek seed powder administration was reduced significantly (p < 0.001).

Finding 2 : findings on mean difference FBS among NIDDM patients in experimental and control group.

- Post test mean blood sugar in experimental group lower M= 139.75 (SD= 9.4) than control group M= 204.7 (SD=21.1), t=-6.525 (p=.001).

The above findings were supported by the studies conducted by **Amirthaveni,M.,Thirumanidevi,A.(2006)**observed the Effect of supplementation of fenugreek seeds for NIDDM where they reported that after supplementation of fenugreek seed powder, the fasting and postprandial blood glucose levels were statistically significant (p<0.01) **Mitra.A(2006)**observed on Effects of Fenugreek in Type 2 Diabetes, after supplementation of fenugreek seed powder, the fasting blood glucose levels were statistically significant (p=0.025). **Sharma R.D et.al., (1996)** conducted on use of Fenugreek seed powder in the management of non-insulin dependent diabetes mellitus. Fenugreek seed powder administration was reduced significantly (p < 0.001).

Finding 3: findings on association between the mean difference FBS before and after taking roasted fenugreek seed powder and selected factors among NIDDM patients in experimental group.

- There was no significant association between age, sex, education, nature of work family income per year, non vegetarian diet, family history of DM, duration of disease, checking blood glucose, exercise, traveling, snacks, tea or coffee per day, medication, drugs & dosage, social habits, hours of sleep per day among NIDDM patients in experimental group.

IMPLICATION

The findings of the study have the following implication in nursing

Implication for nursing practice

- Roasted fenugreek seed powder helps in reducing the need for increasing the dose of drugs.
- Roasted fenugreek seed powder is an effective measure to reduce blood sugar.
- Roasted fenugreek seed powder is cost effective.
- Roasted fenugreek seed powder administration increasing general well being among diabetic patients.

LIMITATIONS

- Pilot study was done only for a week.
- Period of taking fenugreek seed powder was given for only for 15 days.
- Samples were not randomized.

RECOMMENDATIONS

- A similar study can be conducted in large group of NIDDM patients.
- A longer period of intervention can be studied for more reliability and effectiveness.
- Randomized trial may be done.
- If the post test was conducted during the date of checkup it would have been convenient to the patient and the researcher

CONCLUSION

The following conclusion were drawn from the findings of the study Roasted fenugreek seed powder is a simple and effective method to treat NIDDM. This will aid in reduction of blood sugar. It is a cost effective simple measure.

REFERENCES

BOOKS

1. Banister, Eric.W.etal " Contemporary Diabetes" ,Mienneapolic, first edition, Chronime publishing Inc., 1998

2. Beaser,Richard.S , "Out smarting Diabetes" , third edition, Minneapolis.,Chronimed publishing Inc., 1994

3. Brunner & Suddarth, "Textbook of Medical Surgical Nursing" 11th edition , Philidalephia, mosby company Inc, Vol.2,Pp 1403-1423

4. S.P.Gupta (2003), "Statistical Methods", Sultan Chand educational publishers, India, 31st revised edition, Pp: 181-183.

5. Gyton.c, "Textbook of Medical Physiology" , 3rd edition , philidalelphia, W.B Saunders company , 1996.

6. Jacobson Alab.M & Heibovich joan, "Diabetes Mellitus", 1st edition, Newyork , churchil Livingstone Inc 1995.

7. Joyce Black,Jane Hawks' "Text book of Medical Surgical Nursing",7th edition Vol. 1 Pp 1277 -1281.

8. Leslie & Robbins David, "Diabetes Clinical Science in practice" 3rd edition, Newyork, Cambridge university press ., 1995.

9. lefsky,Jerrold.M. "Diabetes Mellitus Management & Complications", 1st edition, Newyork, Churchill livingstone Inc ., 1985.

10. Park .K .,(2009) "Text book of Preventive & Social Medicine",20th edition, India, Banarsidas Bhanot publishers, Pp 389.

11. Polit , Denis.F& Hungler,(1999) "Nursing research Principles & Methods", 6th edition, Philadelphia, J.B Lippincott company Pp: 21-23.

12. Polit & Beck (2006), "Nursing Research Principles and Methods", lippincott publishers, Philadelphia,7th edition Pp: 93-103.

13. Sekar sha , **"Family book Diabetes made easy"**, 1st edition, Mumbai ,2000.

14. Seshiah V.A., "**A Handbook of Diabetes Mellitus**""1st edition, Mumbai All India publishers & distribution 1997.

15. Shrinandan Bansal **"Text book of Food and Nutrition"**, A.T.B.S publishers,2nd edition, Pp 164.

16. Shubhangini A , "**A Text book of Nutrition and Dietetics"**, Mc Graw publisher ,3rd edition, Pp 164.

17. undar Rao & Richard (1997), "**An Introduction to Biostatistics; a Manual for Students in Health Sciences**", 3rd edition, Prentice hall of India Pvt.Ltd, Pp: 16-17.

18. Swaminathan .M. "**Advanced text book on Food & Nutrition"** , 1st edition , Bangalore, Bappaco publication., Pp. 263

JOURNALS

1. Abusaleh etal(2006), "Effects of fenugreek on serum lipid profile in hypercholesteremic type2 diabetic patients", Bangaldesh **Journal pharmcol**; 1 Pp:64-67

2. Amirthaveni, M.,Thirumanidevi., A, (2006) "Effect of supplementation of fenugreek seeds for NIDDM" Indian Journal of Nutrition and Dietetics

3. Battula.U.S., (2008), "Diabetes Demystified", Health Action, vol. 21, No. 9,Pp : 7-1

4. Daly .F, "The role of the diabetic nurse specialist", Irish Medical time, 14 (17), 1997, Pp: 18.

5. Foster SA , Goal.J.V, "Home blood glucose monitoring", Diabetology, 33(3),March 1999,Pp 353-363.

6. Galiardino Jose,(2001) "A Model educational programme for people with type 2 diabetes", Diabetes care, 24(60), Pp1001-1007.

7. Gupta.A,Gupta.L,Gupta.R (2001), **"**Effect of Trigonella foenum-graecum (fenugreek) seeds on glycaemic control and insulin resistance in type 2 diabetes mellitus", Journal Assoc Physicians India 49: Pp :1057-1061.

8. International Diabetes Federation (IDF),(2009) "India is world Diabetes capital", <u>Nightingale Nursing Times</u>, Vol 5,No.8, Pp : 13.

9. John et.al., (2009), Fenugreek Bread: A Treatment for Diabetes Mellitus, <u>Journal of Medicinal Food</u>, Vol: 12 Issue 5: Pp : 1046-1049.

10. Kassian.A et.al (2009) ,"observed on the hypoglycemic and hypolipidemic effects of fenugreek seeds in type 2", <u>International journal vitamin national research</u>, Jan; 79(1)Pp:34-39

11. Kwakami.S et.al " Overtime, psychosocial working conditions, and occurrence of NIDDM", <u>Journal of epidemiology and community health,</u> Vol 53, Pp :359-363.

12. Kumari.M.J, Savarimuthammal.A.,(2009), "Exercises can Prevent Amputation in Diabetes", <u>Nightingale Nursing Times</u>, Vol 4,No.11, Pp :24-26.

13. Kumari.s,Sinha.M.,(2004), " Impact of fenugreek incorporated therapeutic food on blood sugar levels", <u>South Asian journal of preventive cardiology</u>.

14. Makol.N, Manisha.,(2005), "Diabetes the silent killer disease", <u>Health action</u>, Sept 2008 vol 18, no.6 Pp :4-8.

15. Mitra.A,Bhattacharya.D,(2006) ,"Dose-Dependent Effects of Fenugreek Composite in Diabetes with Dyslipidaemia", <u>Indian journal for the practicing doctor</u>, vol 3, no 4.

16. Nahas.R., (2009), "Complementary and alternative medicine for the treatment of type 2 diabetes" <u>Can Fam Physician journal</u>, 55(6)Pp : 591–596.

17. Dr.Neelam.M ,Manisha.,(2008) ,"An Emerging Health Problem in India" , <u>Health Action</u>, vol 21 No. 9 Pp 4- 7.

18. Priscilla K,Rose,Thomas.S., (2008) "Effectiveness of structured teaching programme on knowledge and practice of Diabetic patients on Prevention of Complications", <u>Indian journal of Continuing Nursing Education</u>, Vol.9, No.(2).Pp :41-42.

19. Ravinder.K.etal(2008) ,"Impact of Indigenous Fibre Rich Premix Supplementation on Blood glucose level", <u>American Journal of food technology</u>, Vol :3,iss.1, Pp: 50-55.

20. Sharma RD, et al. (1996) Hypolipidaemic effect of fenugreek seeds: a chronic study in non-insulin dependent diabetic patients. <u>Phytother Research</u>, 10,Pp: 332-334.

21. Sowmya P, Rajyalakshmi.P.,(1999), "Hypocholesterolemic effect of germinated fenugreek seeds in human subjects, <u>Journal plant foods for human nutrition</u>, iss vol 53, no.4, Pp :359-365

22. Suvarna vira .,(1999),   "Fenugreek seeds", <u>The Asian journal of Diabetology</u>, Vol 1,No.3

23. Swafford S, Berens.B .,(2000) " <u>Effect of fenugreek on breast milk production</u>", ABM news and Views; 6(3): Pp no:11-13.

24. Tashman.L., (2009), "Effects of fenugreek seeds on glycemic control and insulin in type 2 diabetes", <u>International journal of forecasting</u>, vol 25 issue 3, Pp: 431-638.

25. Thayil.G.,(2005) " Diabetes and Heart disease", <u>Health action</u>, vol 18 no.6 Pp ; 9- 11

NEWS LETTER

1. Mohan .V.,(1999), "Controlling Diabetes", The HINDU ,Chennai .

2. Mohan.V .,(2000), M.V.Diabetes centre- The centre which gives global standard of treatment of Diabetes",Chennai.

UN PUBLISHED THESIS

1. **Mrs.Shaini.G.S (2006)**, "Effectiveness of structured teaching programme on home care management of Diabetes Melitus , M.Sc (N) Dissertation, Dr.M.G.R Medical University.

2. **Miss Raji Raju (2008)**, "A study to assess perceived problems in maintaining diet control among NIDDM patients in selected hospitals at Kollam, M.sc (N) Dissertation, Dr.M.G.R Medical University.

SECONDARY SOURCES

1. www.yahoo.com

2. www.google.com

3. www.pubmed.com

4. www.medscape.com

APPENDIX – I

LETTER SEEKING PERMISSION FOR CONTENT VALIDITY

From

    30083631,
    II year M.Sc (Nursing),
    Annai J K K Sampoorani Ammal College of Nursing
    Komarapalayam,
    Namakkal district.

To

Through

    The Dean,
    Annai J K K Sampoorani ammal College of Nursing,
    Komarapalayam,
    Namakkal District.

Respected Sir/ Madam,

    Sub: Letter requesting consent to validate the tool.

    I am **30083631**, II year M.Sc., Nursing student of Annai JKK Sampoorani Ammal College of Nursing Komarapalayam, under the Tamil Nadu Dr. M G R Medical University, Chennai.

    As a partial fulfillment of M.Sc Nursing Programme, I am conducting "**A study on fasting blood sugar (FBS)before and after administering roasted fenugreek seed powder (RFSP) among NIDDM patients in selected M.V.R diabetic clinic, Arakkonam**"

    Herewith I am sending the tool for content validity for your expert opinion. I humbly request yourself to spare a little of your valuable time for me which I remain ever grateful to you. I would be very kind of you to return the same undersigned at the earliest.

Thanking you

Place: Yours sincerely

Date   30083631

APPENDIX – II

CONTENT VALIDITY CERTIFICATE

I hereby certify that I have validated the tool of **30083631**, II M.Sc (Nursing), student who is undertaking : "**A study on fasting blood sugar (FBS) before and after administering roasted fenugreek seed powder (RFSP) among NIDDM patients in selected M.V.R diabetic clinic, Arakkonam**"

Place: Komarapalayam   Signature of the expert

Date: Designation

APPENDIX – III

LIST OF EXPERTS

1. **Dr .J.PRIYA ,M,D**
   General Physician
   Govt Head Quarters Hospital
   Erode-638009

2. **Dr.JOHN BASKAR M.S**
   Medical surgeon,
   Joseph Hospital,
   Erode.

3. **Dr.VENKATA PRAKASAM , B.S.M.S,**
   Asst.Medical officer (siddha),
   Primary Health Centre ,
   Elandakuttai, Nammakkal Dist.

4. **Mrs. Dr. TAMIL MANI, M.Sc. (N), Ph.D.,**
   Principal,
   Annai Jkk Sampoorani Ammal College of Nursing
   Komarapalayam

5. **Miss.SHOBANA(Med Surg.) M.Sc (N)**
   Assistant Professor
   Annai Jkk Sampoorani Ammal College of Nursing
   Komarapalayam

6. **Mrs.PANDIMADEVI (CHN) M.Sc(N)**
   Assistant Professor
   Annai Jkk Sampoorani Ammal College of Nursing
   Komarapalayam

APPENDIX – IV

LETTER SEEKING PERMISSION TO CONDUCT RESEARCH STUDY

From

    30083631
II year M.Sc (Nursing),
Annai J K K Sampoorani Ammal College of Nursing,
Komarapalayam- 638183,
Namakkal District.

To

    DR. PRASANNA VIJAYA RAGHAVAN,
M.V.R CLINIC & DIABETIC CENTRE,
41, GANDHI ROAD,
PALANI PET,
ARAKKONAM,

Permitted.

Dr. V. PRASANA, M.B.B.S.,
Regd. Medical Practitioner
Reg. No:- 71097
M.V.R. CLINIC
No. 41. GANDHI ROAD
PALANIPET, ARAKKONAM-2

Through

    The Dean,
Annai J K K Sampoorani Ammal College of Nursing,
Komarapalayam- 638 183,
Namakkal District.

DEAN
Annai J.K.K.Sampoorani
Ammal College of Nursing
Komarapalayam - 638 183.

Respected sir/ madam,

Sub: Seeking permission to conduct the research study.

    I am   30083631   II year M.Sc., nursing student of Annai J K K Sampoorani Ammal College of Nursing, under the Tamil Nadu Dr. M G R Medical University, Chennai.

    As a partial fulfillment of university requirement for an award of Master of Science in Nursing Degree, I am conducting a research on the following topic: **"A study on fasting blood sugar (FBS) before and after administering roasted fenugreek seed powder (RFSP) among NIDDM patients in selected M.V.R. Diabetic Clinic, Arakkonam".**

    I would like to conduct the research in your esteemed institution. Please grant permission for the same.

Thanking you

Place: ARAKKONAM

Date: 19.9.09

yours sincerely,

30083631

APPENDIX – V

INFORMED CONSENT FORM

I _____ understand that I am being asked to participate in a research study conducted by **30083631**, M.Sc (N), 2nd year from Annai JKK Sampoorani Ammal College of Nursing on **"A study on fasting blood sugar (FBS) before and after administering roasted fenugreek seed powder (RFSP) among NIDDM patients in selected M.V.R diabetic clinic, Arakkonam."**. I realize that my participation in the study is entirely voluntary, and I may withdraw from this study at any time. I understand that all study data will be kept confidential and will not be utilized for any other purpose. Thereby, I agree to participate and would co-operate with the procedure.

_____   _____

Signature of the subject: Date:

_____   _____

Signature of the investigator: Date:

APPENDIX - VI

QUESTIONNARIE ON NIDDM PATIENTS AND FASTING BLOOD GLUCOSE

CODE NO:

SECTION A: BACKGROUND VARIABLES

INSTRUCTION

The following sections seek information about yourself and NIDDM .There is no right or wrong response. So please tick (✔) the most appropriate response which suits you best . The information you share will be kept confidential.

1. Age

    a) 31-40 years ☐

    b) 41-50 years ☐

    c) 51-60 years ☐

2. Sex

    a) Male ☐

    b) Female ☐

3. Educational status

    a) Elementary ☐

    b) High school ☐

    c) Higher secondary ☐

    d) Degree ☐

4. State the nature of your work ?

    a) Physically demanding job ☐

    b) Mentally demanding job ☐

    c) Both Physically &Mentally demanding job ☐

    d) No demands in job ☐

    e) No job ☐

5. Family income per year

    a) Below poverty line (<Rs.60,000) ☐

    b) Above poverty line (Rs.60,000 and above) ☐

6. Family history of diabetes mellitus

    a) Father ☐

    b) Mother ☐

    c) Sibling ☐

    d) Paternal grand parent ☐

    e) Maternal grand parent ☐

    f) Not applicable ☐

7. How often do you take non vegetarian food?

    a) Daily ☐

    b) Few days in a week ☐

    c) Few days in a month ☐

    d) Vegetarian ☐

8. Duration of disease [Diabetes mellitus]

    a)   < 3 years ☐

    b) 3 years & above ☐

9.How often do you check your blood glucose status ?

    a) Once a month ☐

    b) Once in 6 month ☐

    c) Once a year ☐

    d) Only when needed ☐

10. Are you doing any of the following exercise on daily basis ?

    a) Walking ☐

    b) Jogging ☐

    c) Exercise including yoga ☐

    d) Working in the field ☐

    e) None of the above ☐

11. How far traveling is important in your work?

    a) Every day ☐

    b) Few days in a week ☐

    c) Few days in a month ☐

    d) Very rare or nil ☐

12. Do you have the habit of taking snacks in between meals?

    a) Always ☐

    b) Sometimes ☐

    c) Never ☐

13. How many serving of tea/ coffee do you have per day ?

    a)   Two or less ☐

    b)   More than two ☐

    c)   Not applicable ☐

14. How regular are you in taking your medication?

    a)   Very regular ☐

    b)   Almost regular ☐

    c)   Irregular ☐

    d)   Very irregular ☐

15. Specify the drugs and dosage you take for diabetes?

    a) _____

    b) _____

16. How strict are you restricting sweets intake?

    a)   Fully restricted ☐

    b)   Sometimes I eat ☐

    c)   I take sweets as like ☐

17. Do you have any of the following habits?

    a)   Smoking ☐

    b)   Drinking ☐

    c)   Both ☐

    d)   Any other _____

    e)   None of the above ☐

18. State the hours sleep per day?

    a)   > 8 hours ☐

    b)   8 hours ☐

    c)   < 8 hours ☐

SECTION B: SCHEDULE ON FASTING BLOOD

SUGAR LEVEL

CODE NO:

PHONE NO:

Date	Pre test blood	Post test blood
Fasting blood sugar		

APPENDIX – VII

,d;#ypd; rhuhj rh;f;fiu tpahjp kw;Wk; czTf;F Ke;ija ,uj;j rh;f;fiu gw;wpa Nfs;tpfs;

Fwpg;gpL:

fPNo nfhLf;fg;gl;Ls;s tpdhf;fs; jq;fis gw;wpak; jq;fSila rh;f;fiu Nehia gw;wpak; mwptjw;Ffhf nfhLf;fg;gl;lit. ,jpy; rhp> jtW vd;W vJTk; ,y;iy. vdNt jFjpahd ,lj;jpy; (✓) rhp FwpaPl;bid ,lTk;. ePq;fs; jUk; ,e;j nra;jp ahUk; mwpahjgb gj;jpug;gLj;jg;gLk;.

1. taJ

     m. 31- 40 tUlk;   ☐

     M. 41- 50 tUlk;   ☐

     ,. 51-60 tUlk;   ☐

2. ghypdk;

     m. Mz;   ☐

     M. ngz;   ☐

3. fy;tpj;jFjp

     m. ,ilepy   ☐

     M. Nky;epy   ☐

     ,. cah;epy   ☐

     <. gl;lgbg;G   ☐

4. Ntiyapd; jd;ik

    m. cly; rhh;e;j ciog;G ☐

    M. kdhPjpahd njhlh;Gila Ntiyfs; ☐

    ,. Nkw;fz;l ,uz;Lk; ☐

    <. vijAk; rhh;e;jhfTk; ,y;iy. ☐

    c. Ntiyaw;wth; ☐

5. FLk;g Mz;L tUkhdk;

m. tWik Nfhl;bw;F fPNo(mjhtJ 60>000 Mapuj;jpw;Fs;) ☐

M. tWik Nfhl;bw;F Nky; (mjhtJ 60>000 Mapuj;jpw;Fs; NkNy) ☐

6. FLk;g egh;fspd; ahNuDk; rh;f;fiu tpahjp cilath;fsh?

    m. mg;gh ☐

    M. mk;kh ☐

    ,. cld; gpwe;jth; ☐

    <. mg;gh top> jhj;jh top ☐

    c. mk;kh top jhj;jh ghl;b. ☐

    C. Nkw;fz;l vJTkpy;iy. ☐

7. vj;jid ehl;fSf;F xUKiw mirt czT rhg;gpLtPh;fs;?

    m. jpdKk; ☐

    M. thuj;jpy; xU rpy ehl;fs; ☐

    ,. khjj;jpy; xU rpy ehl;fs; ☐

    <. irt czT gof;FKilath; ☐

8. vj;jid tUlkhf rh;f;fiu Nehapdhy; ghjpf;fg;gl;L cs;sPh;?

m. %d;W tUlq;fSf;F Fiwthf (< 3) ☐

M. %d;W tUlq;fshfTk; mjw;F NkYk;. ☐

9. vj;jid ehl;fSf;F xUKiw jq;fSila ,uj;jj;jpy; rh;f;fiu mstpid fz;lwpe;J nfhs;tPh;?

m. khjk; xUKiw ☐

M. MW khjj;jpw;F xUKiw ☐

,. tUlj;jpw;F xUKiw ☐

<. Njit Vw;gLk; nghjOJ. ☐

10. fPNo nfhLf;fgl;Ls;s VNjDk; xU clw;gapw;rpia ePq;fs; nra;gtuh?

m. eilg;gapw;rp ☐

M. nkJthd xl;lk;. ☐

,. clw;gapw;rp kw;Wk; Nahfh. ☐

<. tptrhak; nra;gtuh ☐

c. Nkw;fz;l VJkpy;iy. ☐

11. gazq;fs; cq;fs; Ntiyapy; vj;jid Kf;fpaJtk; tha;e;jJ?

m. jpdKk; ☐

M. thuj;jpd; rpy ehl;fs; ☐

,. khjj;jpy; rpy ehl;fs; ☐

<. vg;NghjhtJ xUKiw my;yJ vd;Wk; fpilahJ. ☐

12. czT cl;nfhs;Sk; NghJ rpW jpdpfs; cl;nfhs;Sk; gof;fKilatuh?

m. vg;nghOJk; ☐

M. vg;nghOjhtJ ☐

,. vd;Wk; ,y;iy/ vg;nghOJk; ,y;iy □

13. xU ehsy; vj;;jid Kiw B/fhgp mUe;JtPh;?

    m. ,uz;Lf;Fk; Fiwthf □

    M. ,uz;Lf;F Nky; □

    ,. Nkw;fz;l vJTkpy;iy □

14. vt;tsT rPuhf kUe;Jfis vLj;J nfhs;StPh;fs;

    m. njhlh;r;rpahf □

    M. fpl;ljl;l njhlh;r;rpahf □

    ,. xOq;fw;w □

    <. rPuw;w ,ilntspAld; □

15. ePhpopT Neha;fSf;F ePh; vLj;Jf; nfhs;Sk; kUe;jpd; ngah;/msT Fwpg;gpLf.

    m. _____
    M. _____

16. ve;j mstpw;F ,dpg;G tifia jtph;f;fPwPh;fs;

    m. Koikahf □

    M. rpy rkaq;fspy; □

    ,. gof;fk; rkaq;fspy; □

17. fPo;fhZk; gof;fq;fspy; NjitNaDk; cs;sth?

    m. Gifg;gpbj;jy; □

    M. Fbgof;fk; □

    ,. ,it ,uz;Lk;. □

<. NtW vitNaDk;. ☐

c. Nkw;fz;l vJTkpy;iy ☐

18. ,U ehspy; vj;jid kzp Neuk; J}q;FtPh;fs;?

m. 8 kzp Neuj;Jf;F Nky; ☐

M. 8 kzp Neuk; ☐

,. 8 kzp Neuj;Jf;F Fiwthf ☐

APPENDIX – VIII

PROCEDURE

1. Informed consent will be obtained

2. Fasting blood sugar level will be checked prior to the intervention (both control &experimental group)

3. 24 gram of roasted fenugreek seed powder

4. It will be given either in powder form or mixed with water

5. Administer 12 gms RFSP) in the morning before break fast and 12gms given in dinner for 15 days

6. A the end of intervention post fasting blood sugar will be checked both control & experimental group.

ABSTRACT

A study on fasting blood sugar(FBS) before and after administering roasted fenugreek seed powder(RFSP) among NIDDM patients in selected M.V.R diabetic clinic, Arakkonam was done by **30083631** as a partial fulfillment of the requirement of the degree of Master of science in nursing at Annai Sampoorani Ammal College of Nursing, under Tamilnadu Dr. MGR Medical University, Chennai, March-2009.

The objectives of the study were, To compare the pre and post FBS in relation to administering roasted fenugreek seed powder among NIDDM patients in experimental group, To compare the mean difference FBS among NIDDM patients in experimental and control group, To find the association between the mean difference in FBS in relation to administering of roasted fenugreek seed powder and demographic variables among NIDDM patients in experimental group.

The research hypothesis were: H_1: There will be a significant difference in pre and post FBS in relation to RFSP among NIDDM patients in experimental group. H_2: There will be a significant difference in mean difference fasting blood sugar among NIDDM patients in experimental and control group. H_3: There will be a significant association between mean difference in FBS in relation to RFSP and back ground factors among NIDDM patients in experimental group.

The investigator organized the review of literature under three sections as follows, studies related to fenugreek seed, studies related to fenugreek and blood sugar, studies related to NIDDM on selected variables.

The conceptual frame work for this study was based on conceptual frame work based on the Von Bertanlanffy's general system theory. The research design was experimental design. The samples for the study were chosen by quota sampling technique, 20 in experimental group and 20 in control group. Back ground factors of each sample was collected by interview technique from the NIDDM patients attending OPD at M.V.R diabetic clinic, Arakkonam. 24gms / day of Roasted fenugreek seed powder (RFSP) was administered in divided dose morning before breakfast and dinner to the experimental group. Data obtained were edited, organized, analyzed by using SPSS (Version 10) and interpreted by descriptive and inferential statistics.

The findings of the study showed that there was a significant (P <0.01) reduction in blood sugar after administering fenugreek seed powder. The implication limitations and recommendation of the study were clearly spelt. The conclusion of the study was that roasted fenugreek seed powder was effective in reducing blood sugar among NIDDM patients.