EFFECTIVENESS OF FENUGREEK ON BIOPHYSIOLOGICAL PARAMETERS IN HYPERLIPIDEMIC TYPE II DIABETES MELLITUS PATIENTS

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ABSTRACT

Diabetes Mellitus is a chronic systemic deficiency characterized by either a deficiency of insulin or a decreased ability of a body to use insulin. The prevalence of diabetes for all age group worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. Therefore the investigator planned to assess the effectiveness of fenugreek seed power in reducing the fasting blood glucose level among the patients with type 2 diabetic mellitus in SMVMCH at Kalitheerthalkuppam, Puducherry. A Quasi Experimental Research Design and quantitative research approach was adopted and 25 Type II Diabetic mellitus patients were selected for the study by using convenient sampling technique and the study done at Sri Manakula Vinayagar Medical College and Hospital Puducherry by using Bio-physiological measure for assessing the level of fasting blood glucose, HbA1C and Lipid profile (Total Cholesterol, HDL, Triglycerides, LDL, VLDL). A standardized glucometer was used for the study purpose. The study conducted among the 25 Hyperlypidemic type II diabetes Mellitus patients by administering fenugreek seed powder. The intervention helps in reducing the level of blood glucose and find to be one of the helpful interventions in reducing the levels of blood sugar for the type 2 diabetes mellitus patients**.**

Keywords: Fenugreek, Biophysiological parameters, Hyperlypidemic, Type II diabetes mellitus

Introduction

Diabetes is a lifelong condition that causes a person's blood sugar level to become too high. Diabetes Mellitus is a chronic multisystem disease related to abnormal Insulin production, impaired insulin utilization, or both. Diabetes Mellitus is a serious health problem throughout the world and its prevalence is increasing rapidly. The incidence of type 2 diabetes is increasing worldwide, resulting in large measure from the increasing prevalence of obesity (Yale, 2000). Diabetes mellitus is a pandemic disease and is one of the main threats to human health (Narayan, 2005). Globally, 366 million people have diabetes in 2011; by 2030 this will have risen to 552 million. The greatest numberof people with diabetes are between 40 to 59 years of age. Diabetes caused 4.6 million deaths in 2011.

The first phase of the Indian Council of Medical Research's INDIAB (India-diabetes) study found that Tamil Nadu has the highest number of diabetics in the country, with 9.8 per cent of the state's population (42 lakh people) living with the disease. It also showed that 30 lakh people in the state are at high-risk of developing diabetes.

Chronic diabetes leads to Heart disease, Kidney disease (nephropathy) Nerve Disorders (Neuropathy), Foot Ulcers and Amputations, Retinopathy and Eye Complications and Mental disorders. Considering the chronic nature of type 2 diabetes, it makes sense to explore herbal remedies that have traditionally been used in India to control this condition. All herbal remedies are easily available and they can provide a simpler, more natural way of controlling diabetes without any unpleasant side effects.

There are some herbal remedies that are being explored for type 2 diabetes like Fenugreekor Methi, Bitter Gourd, Gymnema or Gurmar, Pterocarpus or Vijaysar & Guduchi or Amrit. Fenugreek-Trigonella foenum graecum is an annual herb belonging to family Leguminosae found wild and extensively cultivated in many parts in India.

In recent times, clinical trials on people with type 2 diabetes show that fenugreek has the valuable property of reducing the rate at which sugar is absorbed from the stomach during the process of digestion; it also appears to be capable of stimulating the pancreatic cells to increase insulin production. Both these actions are believed to be a result of the action by an amino acid present in fenugreek called 4-hydroxyisoleucine. Fenugreek seeds also lower serum triglycerides, total cholesterol (TC), and low-density lipoprotein cholesterol (LDL-C) and increase the HDL. Fenugreek seeds contain compounds that inhibit both cholesterol absorption in the intestines and cholesterol production by the liver.

Statement of the problem:

"A study to assess the effectiveness of fenugreek seed powder on reducing the blood glucose level among the patients with Hyperlypidemic type ii diabetes mellitus in SMVMCH at Kalitheerthalkuppam, Puducherry

Objectives of the study:

1. To assess the level of Blood Glucose & Lipid Profile before administration of Fenugreek seed powder among Hyperlypidemic Type II diabetes patients in Experimental and Control group.
2. To evaluate the effectiveness of Fenugreek seed powder orally among Hyperlypidemic Type II diabetes patients in Experimental group.
3. To compare the Pre & Post test level of blood glucose & Lipid Profile among Hyperlypidemic Type II diabetes patients in Experimental group and control group.
4. To associate the Pre and Post test level of Blood Glucose & Lipid Profile among Type II diabetes mellitus patients in experimental group with their selected demographic variables

OPERATIONAL DEFINITIONS

1. **Assess:** Refers to measurement of Blood Glucose level & Lipid Profile among Control and Experimental group before and after administration of fenugreek powder.
2. **Effectiveness:** It refers to determining the extent to which administration of fenugreek seed powder has brought about the result intended and is measured in terms of control in Blood Glucose level & Lipid Profile among Hyperlypidemic type II diabetes Mellitus patients.
3. **Fenugreek seed powder:** In this study, fenugreek seed (Trigonella foenum graecum) refers to roasted and powdered which contain alkaloids, including trigonelline, gentianine and carpaine compounds contain fiber, 4-hydroxyisoleucine, and fenugreekine, which has hypoglycemic activity by slowing down digestion and absorption of carbohydrates, also lower the serum triglycerides. It will be administered in the form of Powder from 25 gms daily mixed with hot water 2-4 divided doses per day.
3. **Blood Glucose Level:** Refers to the level of glucose in the blood. Fasting blood sugar (FBS) Normal 70-100 mg/dl & HbA1c (Glycated Hemoglobin) Normal 6%.

4. **Lipid profile:** Refers to a pattern of lipids in the blood, includes normal level of total cholesterol **less than 200 mg/dl**, high-density lipoprotein (HDL)- **greater than 40 mg/dl** , triglycerides **10 to 150 mg/dl**, and low-density lipoprotein (LDL) **60 to 130 mg/dl**.
5. **Hyperlypidemic Type II Diabetes Mellitus Patients:** Refers to patients those who are diagnosed as hyperlipidemic Type II Diabetes Mellitus by the Physician, aged between 40-60 years, whose fasting Blood sugar level will be more than 126 mg/dl , HbA1c – more than 6.5% and Lipid Profile In Type II DM total cholesterol- > **200 mg/dl**, high-density lipoprotein (HDL) < **40 mg/dl**, triglycerides > **150 mg/dl** , and low-density lipoprotein (LDL) >**130 mg/dl**

Hypothesis:

H_1: There will be significant difference in Pre & Post test level of Blood glucose and Lipid Profile among Hyperlipidemic type II Diabetes Mellitus patients in Experimental group.

H_2: There will be significant association between Pre test Blood glucose level and Lipid Profile among Hyperlipidemic type II Diabetes Mellitus patients in Experimental group with their selected demographic variable

Research methodology:

A True experimental research design and quantitative research approach was adopted for this study and 25 Hyperlypidemic Type II Diabetes Mellitus patients were selected for the study by using Systematic Random Sampling and the study done at Sri Manakula Vinayagar Medical College and Hospital Puducherry by using bio-physiological measure for assessing the level of fasting blood glucose, HbA1C and Lipid profile (Total cholesterol, Triglycerides, HDL, LDL, VLDL). Experimental group consumed the fenugreek powder for 8weeks apart from their routine treatment protocol prescribed by the Physician and the client has take 25grms of fenugreek seed powder with hot water 2-4 divided dose per day. Control group was received routine treatment in hospital.

Inclusion criteria

1. Both Male and Female
2. Aged 40-60 years
3. Diagnosed as Hyperlipidemic Type II Diabetes Mellitus by Physician
4. Willing to comply with the treatment protocol
5. Patients with all Medical care prescribed by the Physician irrespectively Medications, Diet & Exercise.

Exclusion criteria

1. Patients with chronic complications like Neuropathy, Nephropathy, Retinopathy & Cardiac complication.
2. Age less than 40 years
3. Pregnant and lactating Women
4. Taking any chronic medication more than a year
5. Patients with Chronic uncontrolled Diabetes Mellitus
6. Patients with Insulin treatment
7. Not willing to comply with treatment protocol.

Description of data collection instruments:

The tool consists of three parts

Section-A:

Demographic data of the Age, gender, Weight, occupation, education, income of the family, Religion, Type of Family, Marital Status.

Section-B:

Duration of diabetes mellitus, family history of DM, bad habits, and medications used for treatment for Type II DM, Blood Glucose level, Lipid Profile, Diabetic habits & diet, Sleeping hours, Exercise

SECTION C: Biophysiological measures like Blood Glucose Level & Lipid Profile for Hyperlipidemic Type II Diabetes Mellitus Patients.

SCORE INTERPRETATION OF THE INSTRUMENTS:

Fasting Blood Glucose:

70-100mg/dl = Normal

101-125mg/dl =Desirable

126-140mg/dl = Borderline

Above 140mg/dl = High risk

HbA1C:

5.7-5.9mg/dl = Desirable

6-6.4mg/dl = Borderline

6.5-7 = High risk

TOTAL CHOLESTEROL:

Less than 200mg/dl = Desirable

200-239mg/dl = Borderline

240mg/dl = High risk

HDL:

60mg/dl = Desirable

35-45mg/dl = Borderline

Less than 35mg/dl = High risk

LDL:

60-130mg/dl = Desirable

130-159mg/dl = Borderline

160-189mg/dl = High risk

VLDL:

15-35mg/dl = Desirable

36-45mg/dl = Borderline

Greater than 45 mg/dl = High risk

Data Analysis:

Descriptive statistics:

Frequency, percentage, mean difference and standard deviation were used for analysis of pre test and post test level of Fasting blood glucose.

Inferential statistics: Paired "t" test, chi square test in the form of table and figure

Results and discussion

The study findings revealed that among the samples majority 8(32%) were 51 to 60 years of age, were in the age group of 41 to 40 years and above 60 years 6 (24 %), were in the age group of 5 (20%). Considering the gender majority of the subjects 16 (64%) were male and 9 (34%) were in female with respect to educational status 14 (56%) samples were illiterate, 7 (28%) samples were schooling, 4 (16%) samples were graduate. Regarding the type of family 20 (80%) samples were nuclear family, 4(16%) samples were joint family and 1 (4%) sample were extended family, regards marital status 16 (64%) samples were married, 4(16%) samples were unmarried, 3(12%) were divorced, 2(8%) samples were extended family, regards type of work 6(24%) samples were sedentary workers, 10 (40%) samples were moderate workers and 9 (36%) samples were heavy workers. Regards monthly income 8(32 %) samples were < 5000 income, 6 (24%) samples were 5000 to 10000 income, 3 (12%) were above 20000. Regards personal habits 6(24%) samples were having the habit smoking, 10 (40%) samples were having tobacco chewing, and 6 (24%) samples were having alcohol habit.

Table 4: t – test for bio-physiological parameters

Parameters	Pre-test		Post-test		t-test	p value*
	Mean	SD	Mean	SD		
FBS	142.6	17.6	126.6	20.5	-0.53	<0.001*
HbA1c	6.4	0.38	6.3	0.41	-5.42	<0.001*
TC	234.7	22.1	220.8	48.5	-9.79	<0.001*
HDL	35.6	6.6	39.7	14.5	-5.76	<0.001*
LDL	160.9	17.1	143.5	27.5	-5.14	<0.001*
VLDL	48.3	8.5	49.7	22.2	-7.44	<0.001*
TG	227.4	83.8	184.4	64.2	-5.41	<0.001*

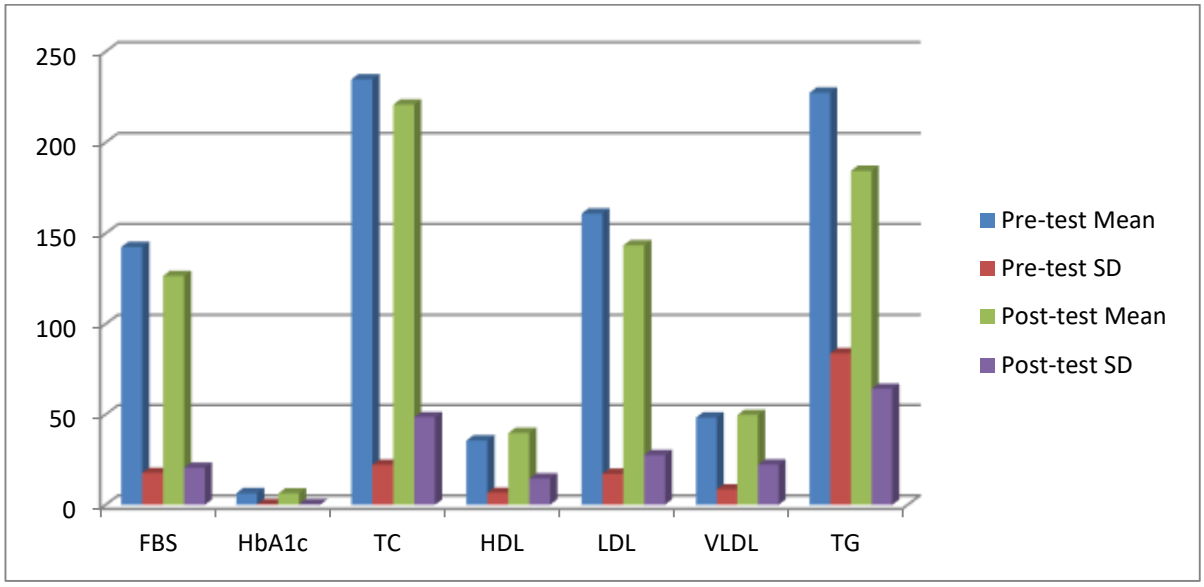

FIGURE: 4 t-test biophysiological parameters

Figure 4: The above table depicts biophysiological parameters that indicates fasting blood sugar mean and standard deviation of pretest mean value 142.6 and SD value is 17.6, post test value of mean score is 20.5 and SD is 20.5 obtained t-test value -0.53was significant at $p < 0.001$*. The pretest mean and standard deviation score of HbA1C is 6.4 ± 0.38, the post test value of mean and SD for HbA1C is 6.3 ± 0.41the obtained t value -5.42 was significant at $p<0.001$*, The pretest mean and standard deviation score of TC is 234.7 ± 22.1, the post test value of mean and SD for TC is 220.8 ± 48.5the obtained t value -9.79 was significant at $p<0.001$*, The pretest mean and standard deviation score of HDL is 35.6 ± 6.6, the post test value of mean and SD for HDL is 39.7 ± 14.5the obtained t value -5.76 was significant at $p<0.001$*, The pretest mean and standard deviation score of LDL is 160.9 ± 17.1, the post test value of mean and SD for LDL is 143.5 ± 27.5the obtained t value -5.14 was significant at $p<0.001$*, The pretest mean and standard deviation score of VLDL is 48.3 ± 8.5, the post test value of mean and SD for VLDL is 49.7 ± 22.2the obtained t value -7.44 was significant at $p<0.001$*, The pretest mean and standard deviation score of TG is 227.4 ± 83.8, the post test value of mean and SD for TG is 184.4 ± 64.2the obtained t value -5.41 was significant at $p<0.001$*,

CONCLUSION:

The study conducted among the 25 hyperlipidemic type 2 diabetes mellitus patients by administering fenugreek powder consumption shows that the intervention helps in reducing the level of blood glucose and lipid profile and find to be one of the helpful interventions in reducing the levels of blood sugar level and lipid profile among hyperlipidemic type 2 diabetes mellitus patients**.**

RECOMMENDATIONS:

Based on findings of the present study, the following recommendations have been made,

1. Similar study can be conducted in other parts of the country with a large sample.

2. The same study can be conducted in different settings.

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