Implementation of an Intervention Programme To minimize The Blood Sugar Level in Non-Insulin Diabetic Patients with the Intake of Methi Dana in Tertiary Care Hospitals

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KEYWORDS

Key words: - Dialysis, DM, NIDDM, Kidney Disease, pregnant.

ABSTRACT

Purpose of the Study: The study effort to answer the question; do the intake of methidana has a role to minimize in minimizing the blood sugar in the patients of Non-Insulin Diabetic Patients.

Design/Methodology: the intake of methi dana was used to explore the aim of the study through paired sample correlations statistical analysis.

Findings: The results indicate that the intake of methi dana have a relatively evident relationship to Non-Insulin Diabetic patients. These results indicated that the effects of methidana in the amount of 5 grams have a role in reducing the fasting and postprandial patients in those patients who are suffering from Non-Insulin Diabetes.

Practical Implications: Leveraging the world values survey, this study shows that patients who are suffering from non-insulin diabetes mellitus had methi dana of 5 grams 15 minutes before breakfast and 15 minutes before dinner. This indicates a reduction of sugar levels in experimental and control groups of the patients.

Originality/value: The existing study brands a considerable involvement to the present literature on the non-insulin diabetes. It disrupts ground by existing the first tract that inspects, by a paired sample correlations that comprises paired sample test with the alterations and p values with respect to null hypothesis and alternate hypothesis.

Paper type: Research paper

INTRODUCTION

The term Diabetes mellitus is shaped from the Greek word *Diabetes*, which incomes to permit through, and *mellitus* is occupied from the Latin word which incomes sweet ***(Sapra &Bhandari, 2020).*** Diabetes is a degenerative condition of glucose metabolism and is a common reason of heart diseases and end-stage renal disease (ESRD). India is known to be the diabetes capital of the world having approximate 62 million cases of diabetes ***(****Kaveeshwar& Cornwall, 2014).* Non- insulin dependent diabetes mellitus is the leading health issue amongst

population. Approximations of 425 million persons worldwide were diagnosed with non-insulin dependent diabetes in year 2017. It is expected that by 2045, approx 629 people would be suffering with the disease *(IDF, 2017).*

This has been found motivating facts that reflects upon the rural population. The rural population has three fourth lesser chances of affected by Diabetes in comparison to urban population ***(****Wild et al, 2004).* However, the people who belong to southern parts were more perilous to have diabetes ***(Morgan et al., 2000).***Diabetes mellitus (DM) is one of major ailment considered in non-communicable disease. This disease is considered among the middle of the top five of the world's mainly important diseases in the developing and developed countries. Currently there are 171 million Diabetics worldwide and this is expected to increase 340 million or more by the year 2030 *(WHO, 2011).* There are some drugs like synthetic hypoglycaemic agents that have been used against this disease can cause severe side effects. These agents are also not secure throughout pregnancy. Therefore, the mission is continued to find active research in lieu of more efficient and safer hypoglycaemic agents ***(Sharma, 1986).***

This paper has completed on the basis of role of methi dana or fenu Greeks in case of Non Insulin Diabetes Mellitus patients. The practice of ingestion of Methi Dana is very common to control diabetes. This study was done on two types of people, one is on control group and another is on experimental group. It has been analysed from the study that there is a role of methi dana if it is consumed during lunch and dinner at least 15 minutes before in the amount of 5 grams. Active compounds of fenugreek include soluble fibre, saponins, diosgenin, trigonelle and 4-hydroxyisoleucine ***(CSIR, 1976).*** The hypoglycemic activities have mainly been attributed to the dietary fibres and saponin contained in fenugreek in many studies. Fenugreek is a commonly used as herbal medicine for diabetes, but its effectiveness for glycemic control has not been rightly studied.The soluble dietary fiber like galactomannan works by lowering blood sugar level by reducing the absorption and digestion of carbohydrates.

Review of Literature

In countries with low-income population, the individuals often do not have access to suitable medications and do not have a healthy lifestyle due to the lack of financial resources and hence could not be given treatment for diabetes properly ***(Spangler et al.,*** 2012***)***

Non-Insulin Dependent diabetes is linked with the diseases like coronary artery diseases, diabetic nephropathy and diabetic retinopathy. These diseases are the variables of genetic risk, behavioural factors plus environmental factors ***(Murea & Freedman, 2012).***Although, herbal medicines and plants have been used effectively for a long time in treating many diseases especially in the Asian countries and throughout the world. Many traditional plant treatments for diabetes are also used, but most of the evidence of their beneficial effects have not been properly researched and supported scientifically. A meta- analysis study was completed. The treatment group and controlled group was approached with the action of results. In order to establish the impact of herbal supplements on glycemic regulations of non-insulin dependent diabetes, a systematic review and meta-analysis was conducted. Further, it was done with the support of electronic searches like Medline, Embase and Cochrane Central Registry of Controlled Trials up tin the month of February and in the year 2011. This was done with the existing exploration of related articles and contacting personally with the professional in this area was performed in the trials ***(Suksomboon et al., 2011).***

It was also noticed that there are numerous methods to decrease the unfriendly properties of diabetes and its minor problems, herbal formulations are preferred due to smaller side effects and little price ***(Joseph & Jini, 2011).*** Non-Insulin Dependent Diabetes Mellitus is a chronic metabolic disorder whose affect has been increasing progressively throughout the globe. Due

to the result of this increase in diabetes cases, it is in the verge of becoming an epidemic in some countries of the world. The number of people are being affected with this disease are predicted to increase two folds in the next few years and increasing the load of managing the disease on the healthcare workers, especially in undeveloped/ developing nations. The most probable reason for this is the rise in the aging population ***(Olokoba et al., 2012).***

In countries with low-income population, the individuals often do not have access to suitable medications and do not have a healthy lifestyle due to the lack of financial resources and hence could not be given treatment for diabetes properly ***(Spangler et al.,*** 2012***).***

The two main factors which are together accountable for the reason of Non-Insulin Dependent diabetes are linked with coronary artery diseases, diabetic nephropathy and diabetic retinopathy. The variables of genetic risk, behavioural factors and/or environmental factors are the constituents of these paradigms ***(Murea & Freedman, 2012).***Although, herbal medicines and plants have been used effectively since a long time in treating many diseases especially in Asian countries and throughout the world. Many traditional plant treatments for diabetes are also used, but most of the evidence of their beneficial effects have not been properly researched and supported scientifically. Studies between, 2005-2020 were reviewed and established that the modification in diet benefited the patients who were suffering from Type 2 Diabetes Mellitus.Though, it is not easy to specify which supplement or factors have role in treatment of the disease because there are many research paradigms known. A compilation of reviews was performed to analyse the dietary elements and role of diet in preventing type 2 diabetes mellitus.Databases like Medline and Scopus was explored to review related research and studies. It was concluded from the studies that the modification in diet, for example intake of diet with whole grains, dairy products with less fat, fiber rich food, yoghurt, flavanoid, Mediterranean, DASH (Dietary Approaches to Stop Hypertension) diets, etc decreased the chances of non- insulin dependent diabetes particularly in people with high-risk of diabetes ***(Lam et al., 2020).***

Animal studies have shown that the extract of fenugreek seeds not only reduce the enzymatic digestion of carbohydrates but also reduces the absorption of glucose from gastrointestinal route ***(Hannan et al., 2007).*** Further it has been found that the thefenugreek enhances the glucose level in peripheral tissues***(Vijayakumar et al., 2005).***

Fenugreek was also originated to contain insulinotropic description in the isolated pancreatic cells of rat***(Broca et al., 2000).***In a developing country like India, a big fraction of population belongs to poor socioeconomic background. In addition to this, cost is the main obstruction for the compliant treatment because health-care outgoings are low; therefore, it is possible to use the herbal medicines like Fenugreek all along with the systematic use of anti diabetics to manage fasting blood glucose levels and HbA1C levels ***(Ranade &Mudgalkar, 2017).*** Further, it has been found that there are more number of drugs that are commercially available for management of Diabetes. However, many side effects are also associated with the usage of these drugs and the elevated expenses of these drugs stresses upon the maintenance for the option herbal drugs which are low cost. Fenugreek (Trigonella foenum graecum) is one of the broadly used herbal supplements that are used efficiently for the management of disorder of diabetes mellitus ***(Geberemeskel et al., 2019).***

Further, it has been reported that the reason of diabetes is sedentary life style. The habits like deprived eating habits, consumption of unhealthy food, etc. Therefore, exercising regularly, adopting healthy lifestyle and eating healthy has become very important in the countries to defeat diabetes. In addition to this, the dietary supplements and regular treatment has made important in the treatment of this disease. By doing this, it helps to overcome the disease and

adjustment of glucose homeostasis and also lowers the lipid parameters ***(Ansari, 2011).*** According to American Diabetic Association (ADA) which was published in 2015, the plan of action in the treatment of Non-Insulin dependent Diabetes (NIDDM) needs modification in way of living, addition of dietary and at least 2.5 hours of weekly exercise. Many herbal medications have also shown noticeable effects in controlling the diabetes. In addition to the above all, further it is seen that targets are not achieved, and the speed of problems are advanced all through the globe ***(Litwak et al., 2013).*** At the universal level it has been found that one out of eleven adults is suffering from Diabetes ***(Felner et al., 2005).*** Bestowing to the International Diabetes Federation approximations, one out of eleven adults among the ages of twenty to seventy are suffering from Diabetes since year 2015 throughout the world. It has also been evaluated from the experts that the division of Diabetes would increase from four hundred fifteen to six hundred forty two million by the year 2040 with the increase of population **(*Zheng et al., 2018).*** As a long time, Fenugreek (Trigonella foenumgraceum) is used all through the world for many of its important medicinal properties. It is in the main used in the problems like loss of appetite, inflammation of the stomach, constipation, etc. It is also helpful in the conditions which affect heart like hardening of arteries (atherosclerosis) or for controlling the high blood cholesterol levels and triglycerides level ***(Hasan & Rahman, 2016).*** It is also used in some of the systemic disease like ailments of kidney, Beriberi disease, ulcers in the mouth, cellulites, tuberculosis etc. Lactating mothers enhance the flow of milk and get a noticeable result with the ingestion of fenugreek seeds. The extracts of fenugreek as well as the raw fenugreek is used in manufacturing of soaps and cosmetics products like shampoo and hair oil ***(WebMD, 2014).***

There are many studies that have been used to study the effects of fenugreek on diabetes. Further it has been reportedly shown that fenugreek seeds help in the reduction of blood sugar level of the non-insulin dependent diabetes patients. It has been also observed that when 500 mg of fenugreek were administered once or twice a day alone or with some antidiabetic drugs like glipizide or metformin, showed to control the plasma glucose level in the diabetic patients ***(Goel, 2010).***

Materials and Methods:-

Aim and Purpose:

The major ambition of the study is to evaluate the result of Fenugreek (Methi) seeds on Non-Insulin Diabetic Patients and teach them the nutritional values.

Purpose of the Study-

1) To assess the efficiency of Methi Dana on the patients who are suffering from Non-Insulin Dependent Diabetes (NIDD).
2) To quantity the level of fasting Blood Sugar (FBS) and post prandial blood sugar (PPBS) in type 2 diabetic patients at the commencement of day 1 and end day 30 of the study by routine blood examination.
3) To compare the effectiveness of Methi Dana in control of blood sugar levels in post test results between controlled and experimental groups and to measure its significance.

SAMPLE

The sample was selected from Majeedia Hospital New Delhi. The Patients who was suffering from the disease of type II diabetes mellitus were selected.

SAMPLE SIZE

The subjects who were chosen was 30 in number and were with type II diabetes mellitus. Out of them, 20 patients were selected in the experimental group. However, 10 patients were selected in the control group.

CRITERIA FOR SAMPLE SELECTION

Samples were selected on the basis of inclusion and exclusion criterias. This is more elaborative on below mentioned.

Criteria for Inclusion.

1 The subjects based on Type II diabetes mellitus were kept only on oral hypoglycaemic agent.
2. Those subjects whose fasting blood glucose level was more than110mg/dl were considered.
3. In inclusion criteria both genders male and female were involved.
4. The subjects were chosen on the basis of speaking and understanding both languages viz English and Hindi.
5. Subjects were selected on the basis of voluntarily participation in the study.

Exclusion criteria

1. Subjects who were on insulin administration were excluded.
2. Apart from those who were suffering from diabetes, subjects who were suffering from other associated diseases like cardiovascular disease,ulcers specifically on foot paralysis, gastrointestinal issues, and coronary obstructive pulmonary diseases were not selected for the study.
3. Those who were beyond 60 years of age were not considered.

DATA COLLECTION PROCEDURE

Before collection of the procedure of the data the researcher took prior permission for the conduction of this study from consultant of the hospital. This study was conducted for six weeks. The researcher introduced herself to the subjects who were selected. In addition to this, an oral consent was taken from each and every subject for the maintenance of confidentiality. Each and every day on an average, the data was collected from four to five samples at least for 15 to 20 minutes.

The patients were satisfied and took interest after the consent of the physician. Afterwards, subjects were split into experimental group with twenty in number and control group with ten in numbers.

An instrument known as Glucometer was used to measure Pre-test fasting blood glucose level. In this chapter it has been found that the investigator has assumed to measure the efficiency of fenugreek. This chapter has approached the research design, study setting, and the type of population. The criteria's that were required for the selection of the sample and the techniques of sample. Additionally, it was also assumed by the researcher that what kind of tools are approached to get the reliability and validity. In addition to this what kind of procedure was used for data collection, what kind of plan for data analysis and also findings of results? Moreover, the action applied by the investigator to evaluate the efficiency of fenugreek was applied.

RESEARCH METHOD

Quantitative method was used for this study.

RESEARCH PROJECT

Interventional teaching was used.

The project is characterised underneath:

Name of the Group	**Before Test**	**interference**	**After Test**
Experimental Group	Level of FBS (Fasting Bloor Sugar) O1	Five gms of fenugreek seeds soaked in 200 ml of water fifteen minutes before breakfast and same amount to be given fifteen minutes before dinner	Level of FBS (Fasting Bloor Sugar) O2
Control Group	Level of FBS (Fasting Bloor Sugar) O3	Oral hypoglycaemic agent	Level of FBS (Fasting Bloor Sugar) O4

SETTING OF THE STUDY
The research work was conducted at Majeedia Hospital, South East Districts, and New Delhi.
Sample selection
From the diabetic patients registered at the OPD, the sample was selected based on the below mentioned criteria:

- Patients those in the age group of 31-55 years.
- Patients who had mild to moderate diabetes.
- Patients who were hyperglycaemic without any other major Diabetic complications
- Patients who had stable glycaemic control with oral hypoglycaemic drug (OHD) with Fasting Blood sugar (FBS) ranging from 120-180mg and Post-Prandial Blood Sugar (PPBS) less than 250 mg.
- Patients willing to participate.

Subject Size: - 30
Sampling Techniques: - Simple Random Sampling.
Alternate patients will be allocated into the intervention and control arms.

Tools and Techniques: -
This study will include the personal interview, structured questionnaire which will include socioeconomic details, general history dietary details and anthropometric measurement. Then the blood sugar fasting and postprandial will be measured using a Glucometer.

Data Analysis
Once the data is collected then it will be entered in the excel afterwards the suitable analytical test would be applied.

Study Procedure
The patients who were diagnosed with Type-2 Diabetes and attending the Medicine OPD in Majeedia Hospital will be explained and written informed consent will be taken from those interested to participate. A closed questionnaire will be filled by an interview. Alternate

patients will be allocated into the experimental and controlled arms. There in the experimental group will be advised to consume Methi Dana 5 grams with 200 ml water twice a day 15 minutes pre Breakfast and pre Dinner for a month.
At the end of one month the patients will be called to the OPD for follow up under end lying investigations.

Organization of Data:

Part A	Allocation of the subjects according to the demographic profile.
Part B	Comparison between before and after blood glucose level in experimental group.
Part C	Comparison between blood glucose level before and after in control group.
Part D	Comparison between the levels of blood glucose in experimental and control group.
Part E	Associated between selected demographic variables.

The study of effect of Methi Dana (Fenugreek seeds) on non-insulin dependent type diabetes was conducted at the Majeedia Hospital, Jamia Hamdard Campus, and New Delhi. The study was conducted for a period of 30 days and the following data was collected in the form of questionnaire from the subjects who took part in the study. The data collected was then prepared in the form of tables and charts and thereby, the analysis and interpretation of the result was done.

General Information:

Table1 Age distribution

S.No.	**Age(years)**	**Experimental Group (n=20)**		**Control Group (n=10)**	
		N	**%**	**N**	**%**
1	31-35	8	40	1	10
2	36-40	3	15	3	30
3	41-45	2	10	2	20
4	46-50	6	30	3	30
5	51-55	1	5	1	10
	Total	**20**	**100**	**10**	**100**
	Mean	**40.25**		**43**	

The range of the age of the subjects was from 31 years to 55 years. Out of the 20 subjects in experimental group, the greatest number of people were in age group 31 to 35 years which included 8 subjects (40% of the total experimental group), followed by 6 people in age group 46 to 50 i.e., 6 people (30% of the total). Age group of 36 to 40 years and 41 to 45 years have

almost equal number of subjects i.e., 3 (15%) and 2 (10%) respectively. The mean of experimental group's age was calculated to be 40.25 and that of the control group.

S. No.	**Fasting blood sugar (FBS) level of the subjects (mg/dl)**	**Experimental Group (n=20)**		**Control Group (n=10)**	
		N	**%**	**N**	**%**
1	<110	0	0	0	0
2	110-126	2	10	1	10
3	>126	18	90	9	90
	Total	**20**	**100**	**10**	**100**

Table-2. Method of investigation by the Subjects for measuring blood sugar

It was observed that the subjects belonging to both the groups that are 20 in experimental group and 10 subjects of the control group relied on the laboratory testing for the blood sugar. Though 17 (85%) subjects from the experimental group and 9 (90%) subjects from the control group, self-tested their sugar level through glucometer as well and didn't rely completely on the laboratory testing.

Table 3. Present treatment amongst the Subjects

S. No.	**Present treatment of the Subjects**	**ExperimentalGroup (n=20)**		**Control Group (n=10)**	
		N	**%**	**N**	**%**
1	Tablets (OHA) only	10	**50**	4	40
2	Diet only	0	0	0	0
3	Both	10	50	6	60
	Total	10	50	**10**	**100**

It was observed that all the subjects consumed oral antihyperglycemic agents to control the diabetes. In the experimental group 10 subjects (50%) depended only upon the OHA to control the diabetes while the other 50% included a balanced diet also in their routine in addition to their regular treatment. Amongst the control group, out of 10 chosen subjects, 40% used only OHA tablets for diabetes, while a larger proportion i.e., 6 (60%) subjects consumed healthy food as well along with the OHA tablets. From this data it can be concluded that a balanced and healthy diet plays a crucial role in the management of diabetes.

Table 4 Fasting blood sugar (FBS) level

During the study, when the fasting blood sugar (FBS) levels of the subjects were recorded, it was found that 100% of both the experimental group and control group had more than the normal fasting blood sugar level. 10% of the experimental and control group had fasting blood sugar level in the range of 110 mg/dl to 126 mg/dl, which is a sign of prediabetes. 90% of the subjects from both the groups i.e., 18 subjects from the experimental group and 9 subjects from the control group were tested to have more than 126 mg/dl fasting blood sugar level, even though they were taking regular treatment of diabetes.

Table 5 Post Prandial Blood Sugar level of the Subjects

Group of subjects	Fasting Blood Sugar (FBS) levels mg/dl	
	Day 1	Day 30
Experimental (N=20)	129.9±4.51	97.9±7.9
Control (N=10)	130.4±3.20	130±5.22

S. No.	Post Prandial Blood Sugar (PPBS)level of the Subjects (mg/dl)	Experimental Group (n=20)		Control Group (n=10)	
1	<140	N	%	N	%
2	>140	0	0	0	0
	Total	20	100	10	100
		20	100	10	100

This was measured two hours post meal. The results had shown that both experimental and control group subjects had abnormal values of post prandial blood sugar levels. Further it was observed that all the subjects i.e., 100% of the experimental subjects and 100% of the control subjects had more than 140 mg/dl post prandial blood sugar level, despite the undergoing treatment.

Table 6 Effect of Methi Dana (fenugreek seeds) on FBS (Fasting Blood Sugar) levels of the Subjects

The above table shows that the FBS levelsof the experimental group (comprising of 20 subjects) on the 30th day shows a remarkable 24.60% of reduction in the FBS levels as compared from 1st day, whereas the reduction for the control group (comprising of 10 subjects) shows as low as 0.30% of reduction in FBS levels within same span of time.

Table 7Comparison of pre and post FBS levels in Experimental and Control Group

S. No.	Fasting blood sugar (FBS) level of the subjects (mg/dl)	Experimental Group (n=20)		Control Group (n=10)	
		Day 1	Day 30	Day 1	Day 30
1	<110	0	20	0	0
2	110-126	2	0	1	9
3	>126	18	0	9	1
	Total	20	20	10	10

From the above table, it can be seen that in the experimental group, the FBS level of all the subjects came down to normal i.e., below 110mg/dl on the 30th Day, while none of the subject in control group showed this change. Hence, it can be concluded that Methi Dana has positive

impact on the patients suffering from non-insulin dependent diabetes and is effective in lowering the Fasting Blood Sugar level.

Table 8 Effect of Methi Dana (fenugreek seeds) on PPBS (Post prandial Blood Sugar) levels of the Subjects

Group of subjects	Post Prandial Blood Sugar (PPBS) levels mg/dl	
	Day 1	Day 30
Experimental (N=20)	148.15±5.11	129.1±6.99
Control (N=10)	149.6±3.71	143.3±6.68

During the study, Post Prandial Blood Sugar (PPBS) levels of the subjects was recorded, and it was observed that the experimental group having 20 subjects shown 12.80% of reduction in PPBS on the 30th day of experiment as compared from the 1st day, while the control group comprised by 10 subjects shows a 4.20% of reduction in PPBS for the same duration of time.

Table 9 Comparison of pre and post PPBS levels in Experimental and Control Group

S. No.	Post Prandial Blood Sugar (PPBS)level of the Subjects (mg/dl)	Experimental Group (n=20)		Control Group (n=10)	
		Day 1	Day 30	Day 1	Day 30
1	<140	0	20	0	3
2	>140	20	0	10	7
	Total	**20**	**20**	**10**	**10**

The above table clearly shows the effect of Methi Dana supplementation. On the 30th Day, when the PPBS levels of the experimental group subjects and the control group subjects were measured, it was found that the subjects in the experimental group, consuming Methi Dana along with the regular treatment showed impressive results. The PPBS level of all the experimental subjects came to normal (<140 mg/dl). However, in the control group only 3 subjects showed this change. This shows the positive effect of Methi Dana (fenugreek seeds) in lowering the PPBS levels in the patients with non-insulin dependent diabetes.

Paired Sample Statistics

		Mean	N	Standard Deviation	Standard Error Mean
Pair1	FBSD1	129.9	20	4.51	1.008466658

	FBSD30	97.9	20	7.9	1.766493702
Pair2	PPBSD1	148.15	20	5.11	1.142630737
	PPBSD30	129.1	20	6.99	1.563011516

Paired Samples Correlations

	N	Correlation	Significance
Pair 1 FBSD1 & FBSD30	20	0.931771159	6.12E-19
Pair 2 PPBSD1 & PPBSD30	20	0.801643197	1.29E-14

Paired Sample Tests

		Paired Differences					**t**	**df**	**Sig. (2-tailed)**
		Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**				
					Lower	Upper			
Pair 1	FBSD1 - FBSD30	32.00000	4.12948	0.92338	30.06734	33.93266	34.655	19	0.000
Pair 2	PPBSD1 - PPBSD30	19.05000	4.21120	0.94165	17.07910	21.02090	20.230	19	0.000

Null Hypothesis: - There is no significant difference among Fasting Blood Sugar Levels (FBS).

Alternate Hypothesis: - There is no significant difference between Fasting Blood Sugar Levels.

Null Hypothesis: - There is no significant difference among Post Prandial Blood Sugar Levels (PPS).

Alternate Hypothesis: - There is a significant difference between Post Prandial Sugar Levels.

Null hypothesis: $\mu=0$

Alternative hypothesis: $\mu > 0$

The calculation of the t-value (t-test) was done by using Microsoft Excel and SPSS software. As it can be seen that the t- value doesn't fall in 95% Confidence Interval of difference, therefore the null hypothesis is rejected which says that there is no significant difference between the Fasting Blood Sugar levels of Day 1 and Day 30. Also, the null hypothesis of Post Prandial Blood Sugar levels is also rejected, i.e., there is no significant difference between the Post Prandial Blood Sugar levels. The alternative hypothesis in both the cases is accepted i.e.,

there is a significant difference between the FBS levels and PPBS levels on Day 1 and Day 30 after involvement of Methi Dana (fenugreek seeds) in the diet of diabetic patients.

Through this it can be concluded that the regular intake of Methi Dana along with the usual treatment of Oral Hypoglycaemic Agents (OHA) is extremely beneficial for the patients suffering from non-insulin dependent diabetes mellitus.

The null hypothesis stands wrong that there is no significant difference in the FBS levels and PPBS levels, while the alternative hypothesis is accepted and the effect of Methi Dana can be clearly seen on the experimental group.

Discussion and Findings

Effectiveness of Methi Dana on Blood Sugar levels on Non-Insulin Dependent Diabetes Patients

A significant change of 24.6% was observed in the FBS levels of Experimental Group when Day 1 (129.9±4.51) level was compared to Day 30 (97.9±7.9) levels. Whereas, in control group subjects, this change was as less as 0.3%, this is insignificant.

Similarly, the change in PPBS levels was observed as 12.80% in the subjects supplemented with Methi Dana along with the Oral hypoglycaemic Agents on 30th Day (129.1±6.99) when compared to 1st Day (148.15±5.11).

Studies between 2005-2020 were reviewed and established that the modification in diet benefited the patients with type 2 diabetes mellitus. Though, it is not easy to specify which supplement or factors have role in treatment of the disease because there are many research paradigms known. A compilation of reviews was performed to analyse the dietary elements and role of diet in preventing type 2 diabetes mellitus.Databases like Medline and Scopus was explored to review related research and studies. It was concluded from the studies that the modification in diet, for example intake of diet with whole grains, dairy products with less fat, fiber rich food, yoghurt, flavanoid, Mediterranean, DASH (Dietary Approaches to Stop Hypertension) diets, etc decreased the chances of non- insulin dependent diabetes particularly in people with high-risk of diabetes ***(Lam et al., 2020).***

CONCLUSION

This study was done to find out the results of fenugreek on the patients who were suffering from fasting blood sugars and post prandial blood sugars Further the study was completed when 5 grams Methi Dana was given to the patients who were having breakfast and dinner before and after for 30 days. A total number of thirty subjects were scheduled and divided into experimental and control group .Their clinical and biochemical changes were observed on Day 1 and on Day 30 till the end of the study. All the subjects were being treated with Oral Hypoglycaemic Agents and no changes were made on their daily dose. Since the double blinded study was not possible, hence the subjects were informed about who were in the experimental group and who the part of control group were. The patients were likely to continue with their normal dietary routine. There was a visible and significant change in the blood sugar levels of the experimental subjects who were supplemented with Methi Dana in their regular diet as compared to the control group subjects.

The blood sugar levels (FBS and PPBS levels) were measured at the starting of the study (Day 1) and at the end of the study (Day 30).

The mean FBS levels on Day 30th (97.9±7.9) and mean PPBS levels on Day 30th (129.1±6.99) was lower than the mean FBS level on Day 1st (129.9±4.51) and mean PPBS level on Day 1st

(148.15±5.11), where 24.6% reduction was observed in FBS levels, and 12.8% reduction was seen in PPBS levels of the subjects being supplemented with Methi Dana.

The statistical significance difference between 1st Day and 30th Day blood sugar (FBS and PPBS) values in the experimental group t-test was done using SPSS paired test and the difference between Day 1 and Day 30 blood sugar level was found to be significant ($p<0.01$).

With this study, it was found that the twice a day consumption of 5 grams of Methi Dana by the non-insulin dependent diabetes patients showed reduction in their blood sugar levels.

Therefore, it has been concluded that supplementation of Methi Dana has a positive impact in lowering the blood sugar levels in the patients suffering from non-insulin dependent diabetes.

Limitation and Future Research: - This study was done during lockdown. Therefore, the patients were difficult to approach or consult during that period. This study can be easily extended on a greater number of patients to check the role of methi dana in minimizing the levels of blood sugar in non-insulin diabetic patients.

Conflict of Interest: - NilSource of funding: - Nil

Author Contributions—already mentioned.

Abbreviation.

ADA- American Diabetes Association
BMI- Basal Metabolic Rate
CSIR- Council of Scientific and Industrial Research
DASH- Dietary Approaches to Stop Hypertension
dl- Deciliter
DM- Diabetes Mellitus
ESRD- End-Stage Renal Disease
FBS- Fasting Blood Sugar
gm/gms- Gram/s
HbA1C- Hemoglobin A1C
HOMA- Homeostatic Model Assessment
IDF- International Diabetes Federation
IJVNR- International Journal for Vitamin and Nutrition Research
mg- Milligrams
NIDDM- Non-Insulin Dependent Diabetes Mellitus
OHA- Oral Hypoglycaemic Agent
OHD- Oral Hypoglycaemic Drug
OPD- Out Patient Department
%- Percent
PPBS- Post Prandial Blood Sugar
T2D- Type 2 Diabetes
VLDL- Very Low-Density Lipoprotein
WHO- World Health Organization
Ethical Approach—yes

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