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Research Paper

Effectiveness of Lady's Finger Juice in the Control of Blood Sugar Among Type 2 Diabetes Mellitus Clients Aged 45-60 Years in Selected Areas of Mangalore

Medical Science

KEYWORDS : Effectiveness, Lady's finger juice, Blood sugar.

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ABSTRACT

Diabetes Mellitus is a multi-system disorder characterized by abnormal insulin production, impaired insulin utilization, or both. In India, the increase in type 2 diabetes was estimated to be 58%, from 51 million people in 2010 to 87 million in 20302.This study aims to assess the effectiveness of lady's finger juice in the control of blood sugar among type 2 diabetes mellitus clients aged 45-60 years in selected areas of Mangalore. A quasi experimental research approach with purposive sampling technique was used. Data collection was done by baseline proforma, compliance diary and fasting blood sugar monitoring chart. The results revealed the mean FBS value of the experimental group in the pretest (219.3±69.3), post test 1 on 7th day (199±67.9),and post test 2 on the 11th day (189.45±67.2) .This shows the decline in the mean FBS value in the experimental group due to the administration of lady's finger juice .

Introduction:
Glucose is a source of energy for living organisms. Glucose is one of the primary molecules which serve as energy sources for plants and animals. It is found in the sap of plants, and in the human bloodstream where it is referred to as "bloodsugar".[1]

Diabetes Mellitus is known to Indians from Vedic period onwards by the name Asrava (Prameha) and anciently called as sweet urine disease or 'madhumeha'in Ayurveda.[2]Diabetes is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced or a combination of both factors.[3]

The prevalence of Type 2 diabetes worldwide has more than doubled since 1980, climbing from an estimated 153 million three decades ago to about 347 million in 2008.According to estimates by World Health Organization in March 2013 ,approximately 347 million people worldwide have diabetes by 2030 ,438 million people (7.8%)of the adult population ,is expected to have diabetes. About one in every 10 men around the world and one in every 11 women suffers.[4]According to the Diabetes Atlas 2012published by the International Diabetes Federation5, the number of people with diabetes in India is currently around 63million.[5]. India tops the list of 10 countries in numbers of suffers.[6]

Many patients try complementary/alternative medicine for diabetes control[3] .Lady finger is one of the good herbal remedy and also one of the most popular complementary therapy for type 2 diabetes mellitus.[7] Lady's finger is a member of the family Malvaceae, and is believed to originate from south eastern part of North America.[1] The mucilage and superior fibre found in lady's finger is believed to stabilize blood sugar as it curbs the rate at which sugar is absorbed from the intestinal tract[7] .It is extensively used globally as a vegetable for its nutritional and health benefits.[7]

Review of the Literature
In an in-vitro study of the effects of viscous soluble dietary fibres of Abelmoschus esculentus L (Lady's finger) in lowering intestinal glucose absorption, found out that there is a substantial reductions of diffusion of glucose from water soluble portion of the pods of Abelmoschus esculentus L and Na-Carboxy methylcellulose (Na-CMC) and viscous soluble dietary fibres (VSDF) of the fruits of Abelmoschus esculentus L on intestinal glucose absorption using in vitro model. Diffusion systems were observed compared to control in a concentration-dependent manner ($P<0.05$) which implicates a possible potential role of viscous soluble dietary fibres (VSDF) of fruits of Abelmoschus esculentus L in lowering postprandial serum glucose.[8]

A study was conducted on glucose, insulin, and non-esterified fatty acid responses to ladies finger and pointed guard in type 2 diabetes mellitus. Glycaemic index (GI) and insulin (as measured by C-peptide) responses of lady's finger (abelmoschus esculentus) and pointed guard from Bangladeshi origin were investigated to help in creating a better food exchange table for diabetic patients. Ten diabetic subjects, under a cross-over design, consumed equicarbohydrate amount (25 gram of total carbohydrate) of the vegetables and white bread with a run in period of seven days between the consecutive items. The serum level of glucose were estimated at 0.0, 15, 30, 45, 60, 90, 120, 150 and 180 min, respectively, NEFA and C-pepticide levels were at 0 and 180 min, only. GI and GL were calculated by standard formula. Both LF and PG showed significantly lower serum glucose value than that of white bread. This study shows that blood sugar in type 2 DM patients after consuming ladies finger was significantly lower when compared with white bread and pointed guard[9].

A literature review was done on nutritional properties of Abelmoschus esculentus (AE) as remedy to manage diabetes mellitus by Malaysian Diabetes Association in 2009 reported that diabetes may affect 1.2 million Malaysian and this disease can be developed from as early as seven years old. Many of the side effects of diabetes can be prevented if glucose levels at normal range are being controlled. This is possible by using natural plants and herbal supplements' as the alternative way to manage end control diabetes. It was also reported that in South East Asia region, herbal medicines such as Ampalaya leaves and lady's finger were commonly used to treat diabetic patients. This study shows that lady's finger has a hypoglycaemic effect.[10]

Objectives:
1. To identify the blood sugar level in type 2 diabetic client by blood sugar examination.
2. To evaluate the effectiveness of lady's finger juice in the control of blood sugar level of type 2 diabetic clients in the experimental group.
3. To compare the difference between the mean post test value in the experimental and control group.
4. To determine the association of mean blood sugar levels with the selected demographic variables in the experimental group.

Methodology:
Setting: The study was conducted in selected three areas under A.J Urban Health Centre, Mangalore.

Population: Diabetic clients aged 45-60 years residing in selected areas of A.J Urban Health Centre, Mangalore.

Sample size: 40
Sampling technique: purposive sampling technique
Research design: Repeated measure research design

Tools:
- Baseline proforma .

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- FBS monitoring chart.
- Compliance diary

Data collection method:

- Prior to data collection, permission was obtained from the concerned authority for conducting the study.
- Subjects were selected according to the selection criteria of the study.
- Informed consent was obtained from the samples and confidentiality was ensured
- Purpose of the data collection was explained to the subjects
- Base line data was obtained by administering the structured interview schedule.
- The glucometric blood sugar values were obtained on the 1st, 7th and 15th day.
- The time taken to complete the tool was 5 minutes.

Result of the study:

Most of the clients in the experimental group (45%) and control group (50%) were above 55 years. An equal number (65%) of the clients were males in both the experimental and control group. Most of the clients in the experimental group (45 %) had higher primary education whereas in the control group (40%) had primary education. Maximum number of clients from the experimental (70 %) and control (80%) group were Hindus. Most of people in the experimental group (40%) and control group (35 %) were unemployed. A majority of clients in the experimental (60%) and the highest percentage of clients in the control group (55%) had an income of Rs.3001-6000. Majority from both the experimental (70%) and control (65 %) group had family history of DM. Most of the clients in the experimental group (45 %) had history of DM for <3 years whereas in the control group (35%) had 7-9 years. An equal number (50%) of the clients were taking oral hypoglycemic agents in the experimental group where the control group had dietary modification as their mode of treatment.

The study also revealed that lady's finger juice is effective in reducing in blood sugar level as computed using unpaired 't'test (t_{38}=1.96,p<0.05) and repeated measure ANOVA (F=11.025,188.331) was computed by using SPSS 16.0 statistical software.

Figure 1: A line diagram showing the effectiveness of lady's finger juice in reducing blood sugar in the experimental group.

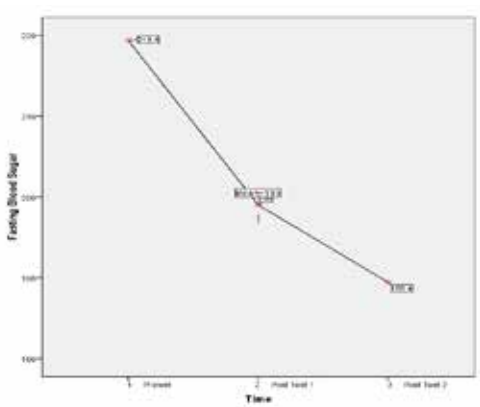

Figure 1 shows the mean FBS value of the experimental group in the pretest (219.4), post test 1 on 7th day (199), and post test 2 on the 15th day (189.5). This shows the decline in the mean FBS value in the experimental group due to the administration of lady's finger juice.

Table 1: Mean, SD, Mean difference and't' value of blood sugar in the experimental group and control group
N_1=20, N_2=20

	Group	Mean	SD	Mean difference	't' value
Post 1	Experimental	199	67.9	37	2.14*
	Control	236	36.92		
Post 2	Experimental	189.4	67.2	48.7	2.83*
	Control	238.1	37.27		

t_{38}=1.96, p<0.05 *Significant

Data in **table 1** shows that that the mean blood sugar in post-test 1(119±67.9), post-test 2(189.4±67.2) of the experimental group was significantly lower than the mean post-test 1 (236±36.92), post-test 2(238.1±37.2) in the control group ie, t_{38}=1.96 at 0.05 level of significance respectively. Hence the null hypothesis $H0_2$ was rejected. This shows that lady's finger juice was effective in reducing blood sugar in the experimental group.

Table 2: Association of pre-test blood sugar value of the experimental group and control group with the selected demographic variable.
N_1=20 N_2=20

Variables	Chi-square	p-value	Inference
1. Age	12.2	>0.05	Significant
2. Gender	3.6	<0.05	Not significant
3. Education	10.2	>0.05	Significant
4. Religion	0.8	>0.05	Significant
5. Occupation	0.2	<0.05	Not significant
6. Income	16.8	>0.05	Significant
7. Family history of DM	0.60	>0.05	Significant
8. Duration of DM	0.87	<0.05	Not significant
9. Treatment followed	9.8	>0.05	Significant

Table value: χ^2=3.84, p<0.05

Data in **table 2** shows that there was a significant association of pre-test blood sugar value of the experimental and control group with selected demographic variables such as age, χ^2 = 12.2 (P ≤ 0.05), education (χ^2=10.2, p<0.05), religion (χ^2=0.83, p<0.05), income (χ^2=16.8, p<0.05), family history of DM (χ^2=0.60, p<0.05), treatment followed (χ^2=9.8, p<0.05)

Conclusion:

The present study proves that lady finger juice is effective in reducing the blood glucose level thus acting as a simple but effective method for diabetes control. This knowledge of the use of lady's finger juice which is economical, effective and easily available would help the general public in taking care of themselves with minimum side effects.

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