

Effect of Curry Leaves in the Control of Blood Sugar among Diabetic Clients in Selected Urban Areas of Mangalore

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Glucose is one of the primary molecules which serve as energy sources for plants and animals. Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycaemia).

Diabetes is one of the oldest known diseases anciently called as sweet urine disease or 'madhumeha'. It is a multi-system disorder related to abnormal insulin production, impaired insulin utilisation, or both. Diabetes mellitus (DM) is a syndrome of many aetiologies and abnormalities that shares hyperglycaemia as a common characteristic.

Glycaemic control is a medical term referring to the typical levels of blood sugar in a person with diabetes mellitus. Management of this disease may include carefully managing diet, exercising, taking oral diabetes medication, using some form of insulin, maintaining proper circulation in extremities and may be further complicated by other external factors such as stress, illness, menses, injection site scarring, and other physiological factors unique to individual patients.

According to the International Diabetes Federation estimates, 366 million people had diabetes in 2011 worldwide and by 2030 this will have risen to 552 million. Eighty percent of people with diabetes live in low and middle income countries. The largest number of people with diabetes is between 40 to 59 years of age. Further, 183 million people (50%) with diabetes were undiagnosed.

The curry leaves were mostly used as a flavouring agent in all the currys so that it got this name. It grows widely in the house backyard and does not require much care. It has a good smell and is considered as a useful plant. In South India most of the houses have curry leaves in their surroundings. Even though it is easily available most of the people are not aware regarding the medicinal qualities of the plant.

Objectives

The study had the following objectives:

1. To identify the blood sugar level in diabetic patients by routine blood sugar examination.
2. To evaluate the effectiveness of curry leaves among the client in the experimental group.
3. To compare the effectiveness of curry leaves in control of blood sugar levels in post-test result between control and experimental group.

Hypotheses: All hypotheses will be tested at 0.05 level of significance.

H₁: The mean post-test blood sugar value will be lesser than that of the mean pre-test blood sugar in the experimental group.

H₂: There will be a significant difference between the post-test blood sugar values in the experimental and the control group.

Review of Literature

Literature review was undertaken with respect to studies related to prevalence of diabetes mellitus, effectiveness of herbal remedies on diabetes, and beneficial effects of curry leaves. Thirty diabetic clients, 16 male and 14 female, were provided 2 packets of 6 gm powder of curry leaves each and were asked to consume 6 gm of powder along with lunch and 6 gm along with dinner. The parameters monitored at 1, 15 and 30 days were fasting and 2 hr post-prandial blood sugar levels, serum total cholesterol and its lipoprotein fractions, triglycerides, total amino acids, uronic acid, glycosylated serum proteins and glycosylated low-density lipoprotein cholesterol fraction. Paired 't' test was used for finding out the significant differences between the two means. All tests were considered significant at $p < 0.05$ level. Curry leaves supplementation at 12 gm per day providing 2.5 gm fibre resulted in a significant reduction in fasting blood sugar level at 15 day period.

The effectiveness of Karuveppila (curry leaves) as hypoglycaemic agent was determined in diabetic clients in Tamil Nadu. The samples were assigned randomly according to the result of blood glucose level. The Karuveppila was dried in the sunlight and made in the form of powder and kashaya which was given to the diabetic patients, 5 ml thrice a day by withholding the insulin for a period of one month. The result shows a significant reduction ($p < 0.05$) in the blood glucose level (83%).

In another study, curry leaves powder supplementation (12 gm providing 2.5 gm fibre) was given to 30 non-insulin dependent diabetes mellitus patients for one month. The parameters monitored at 1, 15 and 30 days were fasting and 2 hr post-prandial blood sugar levels, serum total cholesterol and its lipoprotein fractions, triglycerides, total amino acids, uronic acid, glycosylated serum proteins and glycosylated low-density lipoprotein cholesterol fraction. The results indicated a transient reduction in fasting and post-prandial blood sugar levels at 15-day period with no appreciable changes in serum glycosylated protein levels (17 ± 8) / ($p < 0.05$), glycosylated low-density lipoprotein cholesterol fraction, serum lipids, lipoprotein cholesterol levels, uronic acid and total amino acids were observed during the supplementation period, i.e. either at 15 days or 30 days.

Methodology

Research design: Quasi-experimental multiple time series design is adopted for the present study in selected urban areas of Mangalore.

E	O ₁	X	O ₂	X	O ₃
C	O ₄	-	O ₅	-	O ₆

Setting: This study was conducted at Kavoar, Devinagar and Kunjathbail under AJ Urban Health Centre.

Population: Population for the study consists of clients with diabetes mellitus residing at Kavoar, Devinagar and Kunjathbail, Mangalore.

Sample: Sample comprised of 43 clients above 40 years who has diabetes mellitus (21 clients in the experimental group and 22 in the control group) meeting the inclusion criteria, were selected from the selected urban areas of Mangalore.

Sampling technique: Purposive sampling was used; informants who could give their responses for the purpose of meeting the objectives selected.

Data collection

Data was collected from 1-30 September 2011. Permission was obtained from the concerned authority to conduct the study. A total of 25 samples were selected for the experimental and the control group. Before administering the tool, self-introduction and purpose of data collection was explained to the sample and informed consent was obtained. On the first day, pre-test was conducted on the experimental and control group by using the tool structured interview schedule. The baseline data were collected and the 1st day blood sugar values were obtained from the glucometric readings from both the experimental and control group. After that curry leaves powder (2.5 gm morning and night daily) was administered to the experimental group. The daily intake of curry leaves powder was recorded in the diary that was provided for the clients. Post-tests were conducted on both 15th and 30th day of curry leaves powder intake. The glucometric blood sugar values were obtained for the 1st, 15th and 30th day. The clients were told to record their curry leaves powder intake in the diary provided with the date and time. The time taken to complete the tool was 5 minutes.

Results

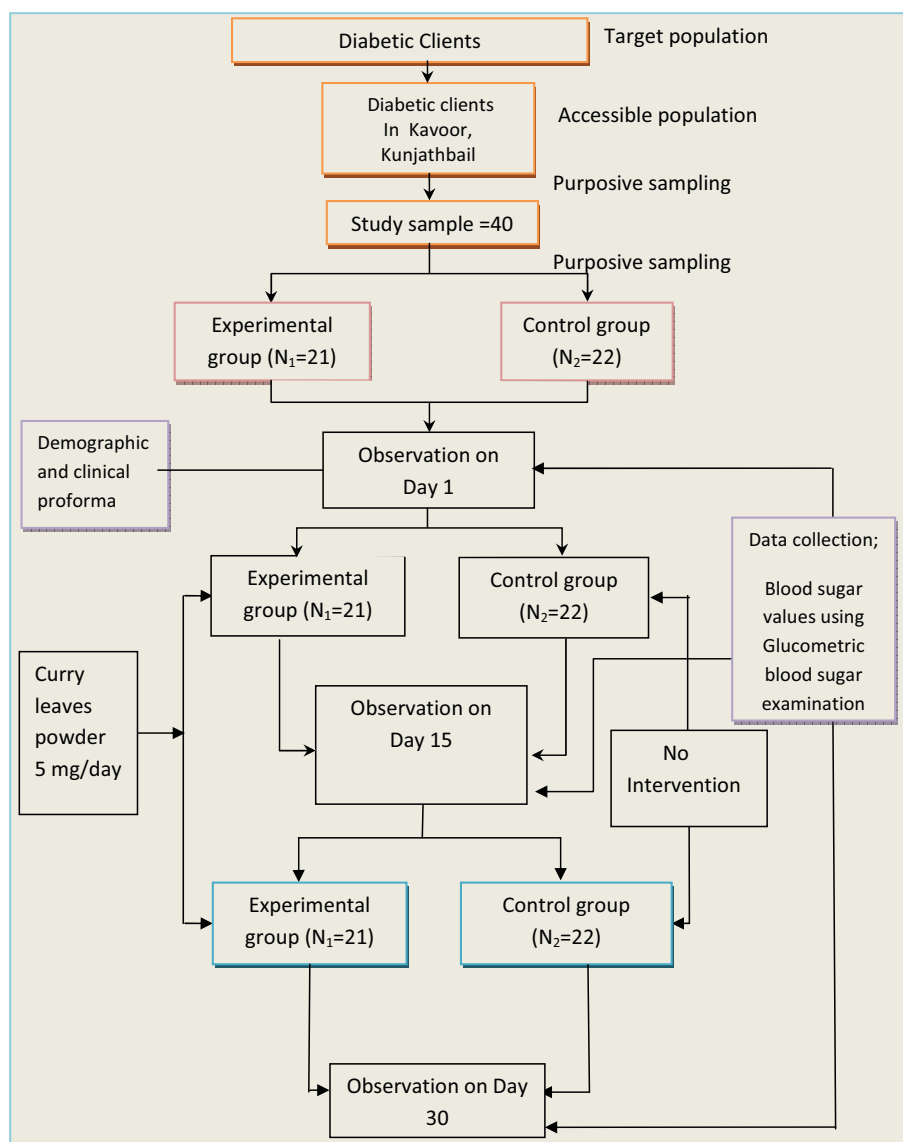
Frequency and percentage distribution of sample characteristics

Highest percentage of subjects in the experimental group (47.61) and control group (45.45%) were above 60 years. The majority of the subjects in the experimental (52.38%) and control group (54.55%) were female. A highest percentage of subjects in the experimental group (47.62%) and control group (40.90%) had no formal education. Maximum of subjects from both experimental (85.72%) and control group (86.35%) were non-vegetarians. Almost half of subjects from the experimental group (52.38%) and the control group (54.55%) preferred walking as their method of exercise. In experimental group 20 percent of subjects were alcoholic whereas majority (81.81%) of subjects in the control group were non-alcoholic.

Duration of disease: Thirty eight percentage of the subjects in the experimental group and 36 percent of subjects in the control group had history of DM for 7-9 years.

Treatment followed: A majority of subjects from the experimental (81%) and the control group (63.64%) were taking oral hypoglycaemic agents as their mode of treatment.

Fig 1: Schematic representation of research design



Family history: Majority from both experimental (76.20%) and control (72.72%) group said they have no family history of DM.

Mean blood sugar value of the subjects with DM in experimental and control group:

There was a consistent decrease in mean blood sugar level from day 1 (249.045) to day 15 (219.95) to day 30 (197.05) in the experimental group. Whereas in control group the mean blood sugar remained almost at a same level on day 1 (214.68), day 15 (213.86) and day 30 (210).

Comparison of pre-test and post-test blood sugar values in the experimental group:

H_{01} : There will not be any significant difference between the mean pre-test and post-test blood sugar values in the experimental group.

The calculated 'F' value (4.072) was greater than

the tabled value ($F(2, 60)=3.15$) at 0.05 level of significance. Hence null hypothesis H_{01} was rejected and research hypothesis was accepted (Table 1). This shows that curry leaves powder is effective for reducing blood sugar levels in clients with diabetes mellitus.

Comparison of post-test blood sugar levels of experimental and control group

H_{02} : The mean post-test blood sugar in the control group will not be significantly lower than the mean post-test blood sugar in the experimental group.

The mean post-test blood sugar value (197.04) of the experimental group after regular intake of 5 gm of curry leaves for diabetes mellitus was lower than the mean post-test blood sugar value (210) of control group.

The calculated t-value (14.16) was greater than the tabled value ($t_{42} = 2.018$) at 0.05 level of significance. Hence null hypothesis H_{02} was rejected and research hypothesis was accepted. This shows that regular intake of 5gm of curry leaves for 30 days was effective in reducing the blood levels in diabetic clients. Overall finding suggests that the daily intake of 5 g of curry leaves powder were effective in reducing the blood sugar.

Recommendations

- A similar study can be conducted (a) for longer duration with larger sample size, (b) by administering the curry leaves powder up to 3 months to find its effectiveness.
- The study can be conducted by modifying it in the form of a three group study.
- A comparative study can be conducted to evaluate the effectiveness of curry leaves supplementation against fenugreek powder in controlling the blood sugar.
- The study can be replicated in different settings with similar facilities.

References

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Table 1: Range, Mean, median and F value blood sugar of the subjects in the experimental group (N=21)

Group	Test	Range of blood sugar	Mean	Median	F value
Experimental Group	1 st day	156 -385	249.045	258	4.072*
	15 th day	150-324	219.95	204	
	30 th day	142-285	197.05	190	

$F_{(2,60)} = 3.15, p < 0.05$; * significant

Table 2: Mean, SD, mean difference and 't' value of 30th day blood sugar values in the experimental group and control group (N1=21, N2=22)

Group	Mean blood sugar value	SD	Mean Difference	't' value
Experimental	197.04	46.81	12.96	*14.16
Control	210.00	44.91		

$t_{42}=2.02, p < 0.05$; *significant

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