

Improving Blood Sugar Level of Non Insulin Dependent Diabetics with Indian Gooseberry Powder and Curcumin Powder

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ABSTRACT

Non-insulin dependent diabetes is a global crisis that threatens the health and economy of all nations. This epidemic is primarily driven by rapid urbanization, Transition in nutritional habits, and increasing sedentary lifestyle. The present study was conducted to study the improvement in blood sugar level of non- insulin dependent diabetics with Indian gooseberry powder and curcumin powder. Snowball sampling technique was used in the present study. For sample selection door to door survey was conducted in Moti Katra and Sheetla Gali areas of Agra, Uttar Pradesh. The total sample size of the study was 18 non-insulin dependent diabetic respondents. The respondents were divided in two groups (Experimental $n_1=9$ and control group $n_2=9$). Indian gooseberry powder and Curcumin powder was supplemented to experimental group diabetic respondents for 45 days. Fasting blood sugar level of experimental group was significant on 15th day, 30th day and 45th day while post prandial blood sugar level was significant on 30th and 45th day. On 45th day both fasting and post prandial blood sugar level were statistically significant ($p<0.05$) in experimental group.

Keywords: Fasting blood sugar level, Post prandial Blood sugar level, non-insulin dependent diabetics, Indian gooseberry powder, Curcumin powder

INTRODUCTION

Diabetes mellitus is a metabolic disorders of carbohydrate, protein and fat metabolism. It affects the functions of pancreatic beta cells which leads to the development of diabetes. It is associated with the long term complications of retinopathy, nephropathy and neuropathy. Diabetics are also diagnosed with the higher risk of heart disease, obesity, cataracts and cerebrovascular diseases. Diabetics have various symptoms like polydipsia, polyuria, polyphagia, fatigue, weight loss, nausea and blurred vision (Kazi & Blonde, 2001). Insulin dependent diabetes is also known as juvenile and childhood onset diabetes. It results from the deficient insulin production. Non- insulin diabetes is adult onset diabetes. It occurs due to the improper use of insulin by the body. It is the result of physical inactivity and excess body weight. There are some recommendations to cure diabetes such as healthy

meals, maintaining healthy body weight and regular exercise (WHO, 2020).

Phyllanthus emblica Linn. or Emblica officinalis also known as Indian Gooseberry or Amla belongs to the family of Euphorbiaceae. Indian gooseberry holds a special place in Ayurveda and Unani system of medicine. It is the richest source of vitamin C and contains gallic acid, ellagic acid and flavonoids. It acts as an antioxidant, anti hyperlipidemia and anti hyperglycemic (Santhi *et al.*, 2017). It is very helpful to prevent the various diseases such as cancer, diabetes, liver diseases, heart diseases, ulcer, anemia and others diseases (Khan, 2009). Blood sugar level of non-insulin dependent diabetics is improved by the supplementation of Indian gooseberry powder (Walia *et al.*, 2015). Curcuma Longa belongs to the family of Zingiberaceae. It is a perennial herb with a hard rhizome (Lutra *et al.*, 2001). It is widely used in Indian kitchen as a spice. It has the properties of anti- diabetic, anti-cancer and antiviral (Nabavi *et al.*, 2014; Perrone *et al.*, 2015). Supplementation of fenugreek, Indian Gooseberry and Curcumin is seen to reduce the blood sugar level of non-insulin dependent diabetics (Chawda & Sharma, 2017).

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MATERIALS AND METHODS

Phase I

2.1. Selection and procurement of the herbs

- a. Fresh Indian gooseberry was procured from Vegetable Market of Moti Katra in Agra, Uttar Pradesh. Total raw Indian gooseberries procured was 10kg.
- b. Dehydrated Curcumin was procured from Rawat Pada market of Agra, Uttar Pradesh. Total dehydrated Curcumin procured was 1.25kg.

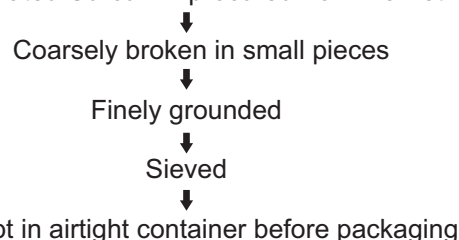
2.2. Dehydration of herbs

a. Dehydration of Amla:



b. Dehydration of turmeric:

Dehydrated Curcumin procured from market



Phase II

2.3. Locale of the study

An experimental study was carried out in two areas of Agra (Uttar Pradesh) namely, Moti Katra and Sheetla Gali. The reason of selecting these areas was convenience for the investigator.

2.4. Sample Selection

- Snowball sample technique was used for the present study.
- List of middle aged (40-59years) non-insulin dependent diabetics were made by door to door survey.
- Total number of diabetic respondents were twenty two. Out of twenty two diabetic respondents, four diabetic respondents dropped out.
- Total sample size of the study was eighteen.
- Selected diabetic respondents were divided in two groups (experimental group and control group). Nine respondents (n1=9) were assigned to experimental group and remaining nine diabetic respondents (n2=9) were assigned to control group.
- Sample selection period completed within ten days.

2.5. Packaging of Indian gooseberry powder and Curcumin powder for the supplementation among experimental group respondents:

	Indian Gooseberry Powder	Curcumin Powder
No. of Packets(45packets for each experimental group respondents) $45 \times 9 = 405$ packets	405	405
Weight of each packet	2.5gm	2.5gm

2.6. Supplementation of Indian gooseberry powder and Curcumin powder:

STEPS	DAYS	SUPPLEMENTATION
1	Before 15th day	Stability period without supplementation of Indian gooseberry powder and turmeric powder
2	0 day	Starting the supplementation of selected experimental respondents
3	15th day	2nd part of supplementation
4	30th day	3rd part of supplementation
5	45th day	4th part of supplementation

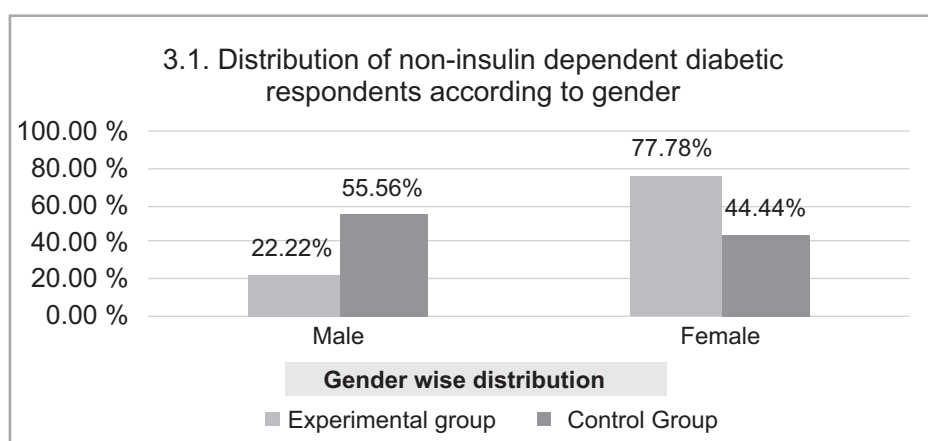
2.6.1. Stability Period –Investigator visited the residence of the experimental and control group respondents 15 days before starting the supplementation. Fasting and post prandial blood sugar level was taken with the help of glucometer.

2.6.2. Supplementation Period –Investigator visited the residence at early morning and provided 2.5gm Indian gooseberry and 2.5gm Curcumin powder packets to the experimental group respondents. Those packets were given on empty

stomach to the respondents. Supplementation period started after 15 days of stability period and continued for 45 days. Fasting and Postprandial blood sugar level was taken with the help of glucometer on every 15th day of supplementation.

RESULTS AND DISCUSSION

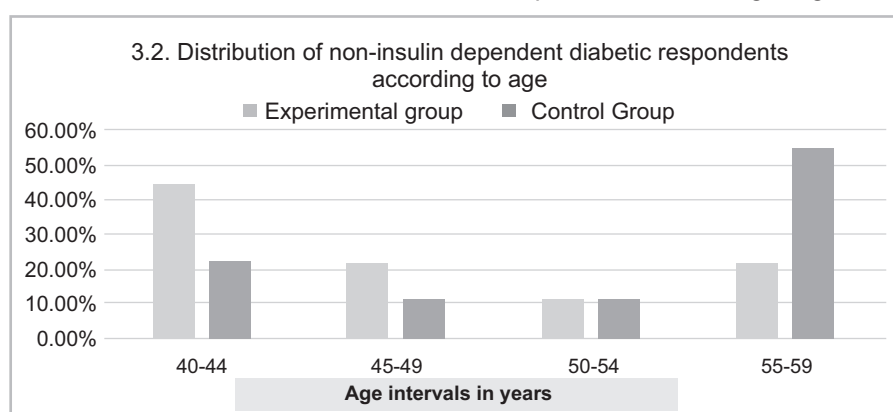
3.1. Distribution of non-insulin dependent diabetic respondents according to gender:



The above data shows the distribution of non-insulin dependent diabetics according to gender. In experimental group, male and female diabetic respondents were 22.22% and 77.78% respectively.

In control group, male and female diabetic respondents were 55.56% and 44.44% respectively.

3.2. Distribution of non-insulin dependent diabetic respondents according to age:



The above data shows distribution of non-insulin dependent diabetic respondents according to age. Non – insulin diabetic respondents from experimental group, 44.44%, 22.22%, 11.11% and 22.22% were in the age group of 40-44 years, 45-49 years, 50-54 years and 55-59 years respectively.

In control group, 22.22%, 11.11%, 11.11% and 55.56% were in the age group of 40-44 years, 45-49 years, 50-54 years and 55-59 years respectively.

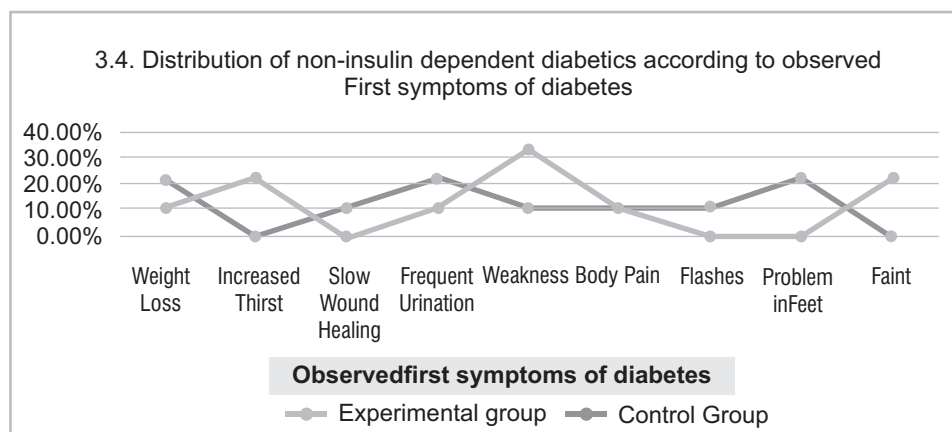
3.3. Distribution of non-insulin dependent diabetics according Body Mass Index(BMI):

BMI(kg/m ²)	Experimental Group	Control Group
Average BMI $\pm$ SD	29.07 $\pm$ 4.76	28.67 $\pm$ 7.5

The above table 3.3 highlights that the body mass index of experimental and control group non-insulin dependent diabetics were $29.07 \pm 4.76 \text{ Kg/m}^2$ and

$28.67 \pm 7.5 \text{ Kg/m}^2$.

3.4. Distribution of non-insulin dependent diabetics according to Observed First symptoms of diabetes:



Above data highlights distribution of non-insulin dependent diabetics according to observed first symptoms of diabetes. In experimental group, majority of them 33.33% observed weakness as a first symptom, followed by 22.22% who observed increase in thirst and problem in feet as a first symptom and minimum 11.11% observed weight loss, frequent urination, body pain and flashes as a

first symptom. In control group respondents, majority of them 22.22% observed weight loss and frequent urination as a first symptom and slow wound healing, weakness and body pain observed as a first symptom by 11.11% respondents each.

3.5. Distribution of the non-insulin dependent diabetics according to comparison of blood sugar level of experimental and control group:

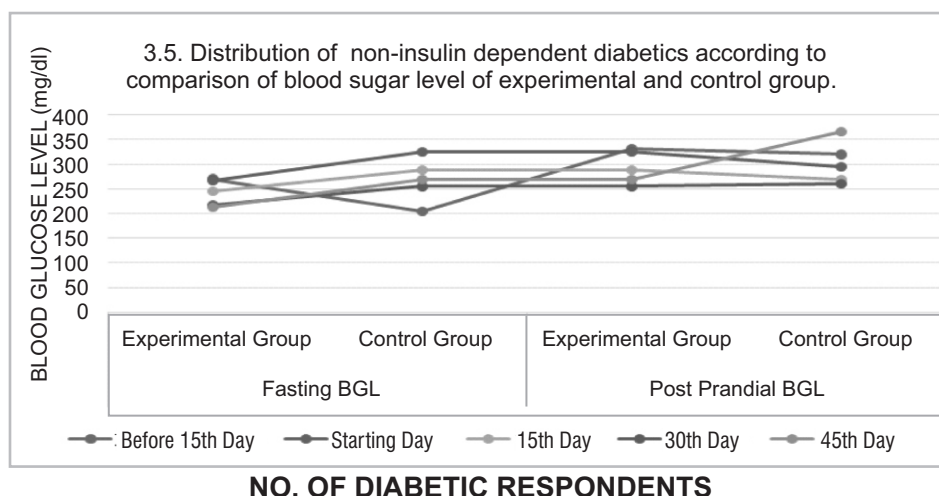
Fasting Blood Glucose Level	Experimental Group Mean±SD (mg/dl)	Control Group Mean±SD (mg/dl)	t-Test	p-value
Before 15th Day	270.00±92.52	205.33±64.06	0.3010	0.3204
Starting Day	267.89±90.30	198.78±98.27	2.2250	0.7594
15th Day	245.33 ±9.64	152.56±74.28	3.7104	0.0260*
30th Day	217.56±94.53	162.89±58.59	5.3292	0.0101*
45th Day	213.56±85.84	212.11±68.15	4.4510	0.0100*

*This result is Statistically significant at $p < .05$.

Post Prandial Blood Glucose Level	Experimental Group Mean±SD (mg/dl)	Control Group Mean±SD	t-Test	p-value
Before 15th Day	331.11±93.90	319.56±128.26	0.2740	0.5790
Starting Day	326.11±72.62	295.11±101.89	2.0209	0.4392
15th Day	288.78±85.05	269.22±95.84	1.5623	0.1093
30th Day	255.22±83.31	260.56±99.87	3.6906	0.0141*
45th Day	269.33±91.94	365.44±77.78	3.9781	0.0124*

Above table 3.5 reveals distribution of the non-insulin dependent diabetics according to comparison of blood sugar level of experimental and control group, statistically significant comparison of fasting blood sugar of both group was observed at 15th day, 30th day and 45th day of the supplementation. Statistically significant comparison of post prandial blood sugar of both group was observed at 30th day

and 45th day of supplementation. Sri KVS *et al.* (2013) reported that Supplementation of Indian Gooseberry significantly decreased the fasting blood glucose level and post prandial blood glucose level of experimental group respondents. There were no significant changes in the control group respondents.



3.6. Distribution of the non-insulin dependent diabetics according to correlation between fasting and post prandial blood sugar level of experimental group)

Fasting blood sugar level (mg/dl)				
	Mean $\pm$ St. Deviation (mg/dl)	Correlation Coefficient	R-Test Value	p-value
Before 15th Day	270 $\pm$ 92.52			
0 Day	267.89 $\pm$ 90.3			
15th Day	245.33 $\pm$ 97.64	0.979	0.950	0.001
30th Day	217.56 $\pm$ 94.53	0.951	0.933	0.002
45th day	213.57 $\pm$ 85.31	0.901	0.867	0.002

fasting and post prandial blood sugar level of experimental group:

* Statistically significant at $p < 0.05$

Post Prandial blood sugar level (mg/dl)				
	Mean $\pm$ SD. Deviation (mg/dl)	Correlation Coefficient	R-Test Value	p-value
Before 15th Day	331.11 $\pm$ 93.9			
0 Day	326.12 $\pm$ 72.62			
15th Day	288.78 $\pm$ 85.05	0.901	0.783	0.001
30th Day	255.22 $\pm$ 83.31	0.857	0.816	0.007
45th day	269.33 $\pm$ 91.94	0.856	0.971	0.001

* Statistically significant at $p < 0.05$

Above table 3.6 explains, by normal standards, the association between the reading of Fasting and Post Prandial Blood glucose with 15th, 30th and 45th days would be considered statistically significant and positive.

CONCLUSION

On the basis of the result obtained from the present study entitled "Improving blood sugar level of non-insulin dependent diabetics with Indian gooseberry powder and Curcumin powder" it can be concluded

that prevalence of Type 2 or non-insulin dependent diabetes was very high. More females suffered from non-insulin dependent diabetes than males. Out of the eighteen diabetic respondents, twelve females suffered from type 2 diabetes. Fasting and post prandial blood sugar level was lowered with the supplementation of Indian gooseberry powder and turmeric powder for 45 days. Fasting blood sugar level was significant at 15th day, 30th day and 45th day while post prandial blood sugar level was significant at 30th and 45th day. On 45th day both fasting and post prandial blood sugar level were statistically significant ($p < .05$).

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