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An Experimental Study to Assess the Effectiveness of Holy Basil Leaves on Type II Diabetic Patient in Selected Area of District Patiala, Punjab

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Abstract: ***Diabetes mellitus, a chronic metabolic disorder characterized by hyperglycemia, poses a significant global health burden. The condition leads to severe complications such as cardiovascular diseases, neuropathy, nephropathy and retinopathy, therefore significantly reducing the quality of life and increasing healthcare burden. The main aim of the study is to assess the effectiveness of holy basil leaves on type II diabetic patient in selected area of district Patiala, Punjab. A quantitative research approach and experimental research designed was used in this study. Sample of the 60 clients (30 Control group, 30 Experimental group) with type II diabetes mellitus of selected area of district Patiala, Punjab was used by using Random Sampling Technique. The effectiveness of holy basil leaves was assessed based on structured interview and observation. Permissions were taken from the competent authorities. A written consent will be taken from the study participants. Anonymity and confidentiality will be maintained while reporting the study. The analysis of data will be done by using descriptive and inferential statistics.***

Keywords: Assess, Effectiveness, Holy basil leaves, Blood sugar level, Type II diabetes mellitus

1. Introduction

Diabetes presents a significant public health burden. Individuals with diagnosed diabetes are at an increased risk for vascular diseases, including micro vascular complications (example retinopathy, neuropathy and nephropathy) and macro vascular complication (example coronary heart disease and stroke), and lower extremities amputation.

The long term effects of diabetes mellitus include progressive development of the specific complications of retinopathy with potential blindness, nephropathy that may leads to renal failure, and neuropathy with risk of foot ulcers and amputation.

Herbal extracts, teas, and powders have been used for a long time to treat pre diabetes and diabetes. They are thought to work in a number of different ways to help normalized blood sugar levels, including by improving pancreatic function and increasing the availability of insulin, a hormone that regulates blood sugar level.

In the last few years, there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity among people because of their natural origin and less side effects. India is the largest producer of medicinal herbs and is called as botanical garden of the world.

Alternative medicine is also advantageous in term of the affordability and feasibility. Alternative medicine plays a vital role in the better control of the blood sugar. Holy basil is the relative of the more familiar species used in cooking. Its many specific uses have included cough, cold and other respiratory disorders, fever, headache, stomach disorders and heart diseases.

The stem and leaves of holy basil contain a variety of constituents that have antioxidant and anti - inflammatory properties according to test tube studies.

The extracts of holy basil leaves have also lowered blood sugar. So, the investigator took this study to assess the effectiveness of holy basil leaf extract on lowering blood sugar level.

Diabetes mellitus is a major problem and effective management of blood sugar is a major task. Alternative medicine has various advantages in term of affordability and availability, fewer side effects, not being addicted to prescribed drugs and the amount of medicines. It also believes in gentle, long term support to enable the bodies on innate powers to do the healing.

The research is carried out in order to support the other studies suggesting the combination of alternative medicine and allopathic medicine in the effective management of blood sugar. And generating the various usefulness of alternative medicine among diabetic patients in improving the quality of life is the theme of the study.

2. Objectives

1) To assess the pretest blood sugar level among type II diabetic clients in experimental and control group.
2) To assess the posttest blood sugar level among type II diabetic client in experimental and control group.
3) To assess the effectiveness of holy basil leaves extract among type II diabetic client in experimental group.
4) To associate the findings with the selected demographic variables among type II diabetic clients in experimental and control group.

3. Methodology

An experimental study was conducted based on structured interview and observation to assess the effectiveness of holy basil leaves on type II diabetic patients.

Research approach: Experimental research approach. Research design: Two group pre test post test design. Setting of this study: this study was conducted at district Patiala, Punjab, India. Target population: Client with type II diabetes mellitus with oral hypoglycemic agent. Sample size: the total sample size is 60 clients (30 experimental group and 30 control group). Sample technique: Random Sampling Technique was used for this study. Research tool technique: Research tool consist of two parts: Part 1: It consists of structured interview and observation related to the socio demographic data of the clients. Part 2: it consist of clinical related information of clients along with their blood sugar level, which we used to assess the effectiveness of holy basil leaves on type II diabetic patients.

4. Ethical consideration

Prior to the study, ethical clearance was obtained from the concerned authorities to conduct the study among people in district Patiala, Punjab, India and also the research ethical committee of Adarsh College of Nursing, Patiala, Punjab. Necessary permission to conduct the study was requested and obtained from the City Health Officer of Punjab.

The effectiveness of holy basil leaves was categories as:
Assessment of blood sugar level in:

Experimental group:
Pre test (O1) → treatment (X) → post test (O2)

Control group:
Pre test (O1) → routine care (●) → post test (O2)
*O=Observation of blood glucose level

5. Tool validation and reliability

The content validity of tool was done by 8 experts opinion on relevance of items, as per their suggestions, needed amendments were done. The tool was found to be reliable and valid. The language editing of the tool was done by English expert.

Reliability of the tool was established by using Karl Pearson's Correlation Coefficient formula (split - half method) which measures the co efficient of internal consistency. The tool was found to be internally consistent and reliable for the study as reliability obtained was **r=0.8.**

6. Data Collection Procedure

Initially demographic data was collected which includes data related to age, sex, religion, educational status, monthly family income, dietary habits, exercise routine and knowledge of basil leaves benefits.

For pre test data collection, participants were instructed to remain in fasting state and blood was drawn for estimation of blood glucose level of both experimental and control group. Then, the clients of experimental group were administered 50ml/day of Holy Basil leaves extract (15 grams basil leave + 50 ml of hot water) for 15 days after breakfast. Clients were allowed to continue their oral hypoglycemic drugs. Control group was allowed to follow their normal routine. Fasting blood was withdrawn at the end of 15 days for both groups. The result was then analyzed and compare for both experimental and control group.

7. Data analyses and interpretations

The collected data was tabulated, organized, analysis and interpreted by using descriptive and inferential statistics based on the objectives of the study and the hypothesis to be tested. The data is presented into three sections.

Section A: Frequency and percentage distribution of clients with type II diabetes mellitus according to socio demographic variables of both experimental and control group.

About age, majority 9 (30%) of client in control group and majority 10 (33%) of client in experimental group were 50 years and above.

Regarding gender, majority 17 (57%) of client in control group and majority 17 (57%) of client in experimental group were females.

For religion, majority 27 (90%) of client in control group and majority 26 (88%) of client in experimental group were Hindu.

About education, majority 15 (50%) of client in control group and majority 15 (50%) of client in experimental group did secondary.

For occupation, majority11 (37%) of client in control group and majority 12 (40%) of client in experimental group were home maker.

Regarding income, majority 12 (40%) of client in control group and majority 12 (40%) of client in experimental group had family income between 10000rs. to 15000rs.

About dietary habit, majority 26 (87%) of client in control group and majority 27 (90%) of client in experimental group were no vegetarian.

For exercise routine, majority 22 (73%) of client in control group and majority 20 (67%) of client in experimental group did not do exercise daily.

For knowledge regarding benefits of basil leaves, majority 18 (60%) of client in control group and majority 17 (57%) of client in experimental group uses basil leaves for respiratory problems.

Section B:

1) Findings related to comparison of pre test and post test assessment score of blood glucose level among control and experimental group.

Table 1: Comparison of pre and post test blood glucose level

Type of test	Group	Mean	SD	t value	p value
Pre test	Experimental	164.23	8.61	t=4.56	p=0.001
	Control	160.17	10.69		
Post test	Experimental	132.22	13.52	t=5.04	p=0.001
	Control	158.30	10.71		

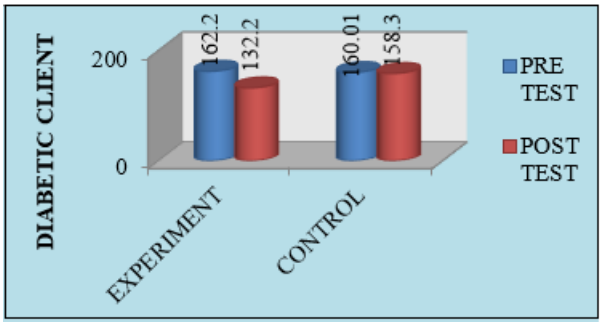

Figure 1: Comparison of Pre- Test and Post Test Blood Glucose Level

Table 1 and figure 1 shows that the significant difference between the pre - test and post - test blood glucose level score among diabetic clients. The data further represent that obtained 't' value 4.56 (at 58 df, p 0.001) in pre test and 5.04 (at 58 df, p 0.001) in post test is significantly higher than the table value. Hence the researcher hypothesis is proven.

2) Findings related to effectiveness of Holy Basil leaves on blood glucose level

Table 2: Effectiveness of Holy Basil leaves on blood glucose level

Blood test	Group	Mean difference with 95% CI	Reduced % of blood glucose level	Benefit of study
Fasting	Experimental	31.06 (25.75±34.12)	20.5%	21.30%
	Control	2.44 (1.4±1.76)	1.12%	

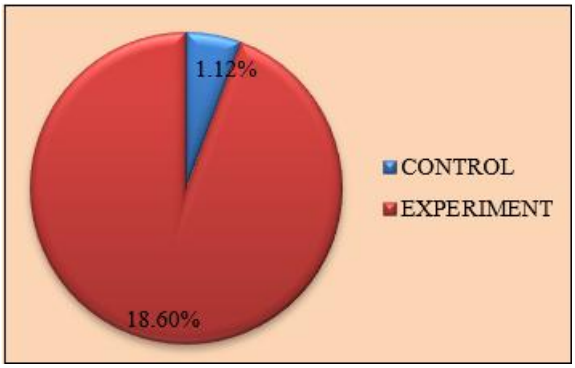

Figure 2: Reduced Blood Glucose Level

Table 1 and figure 2 shows that the effectiveness of the study. It reveals that there is 20.5% of reduction found in experimental group but in control group there is only 1.12%. Around 21.30% of reduction of blood glucose level in experimental group when compared with the control group. Thus, the hypothesis was proven.

Section C:

1) Findings related to association of blood glucose level reduction among diabetic clients with their socio demographic variables in experimental group.

Table No.3: Association of blood glucose level reduction among diabetic clients with their selected socio demographic variables (Experimental Group)

Socio Demographic Variables	Blood Glucose Level				
	Decrease <10mgs in %	Decrease <11 - 19mgs in %	Decrease <30mgs or more in %	Chi Square	P value
1. AGE (In Years)				3.38	0.009
a) 40 - 45 years	0	3.3	13.3		
b) 46 - 50 years	3.3	3.3	20		
c) 51 - 55 years	0	0	13.3		
d) Above 55 years	0	3.3	16.7		
2. GENDER				2.30	0.005
a) Male	0	3.3	23.3		
b) Female	3.3	3.3	40		
3. RELIGION				2.18	0.009
a) Hindu	3.3	10	53.3		
b) Muslim	0	0	6.7		
c) Sikh	0	1	3.3		
d) Christian	0	0	0		
4. Education				14.14	0.002
a) Primary	0	3	16.7		
b) Secondary	0	4	33.3		
c) Higher secondary	0	0	0		
d) Graduate	0	0	0		
5. Occupation				15.12	0.008
a) Home maker	0	0	33.3		
b) Private job	0	3.3	0		
c) Govt. job	3.3	3.3	3.3		
6. Monthly family income				15.82	0.002

a) <5000	0	0	6.7		
b) 5000 - 10000	0	3.3	3.3		
c) 10000 - 15000	3.3	3.3	26.3		
d) >15000	0	3.3	3.3		
7. Dietary habit					
a) Vegetarian	3.3	0	6.7	10.11	0.001
b) Non vegetarian	0	7	56.7		
8. Exercise routine					
a) Yes	3.3	3.3	16.7	2.70	0.004
b) No	0	6.7	46.7		
9. Knowledge of Basil leaves benefits					
a) Respiratory problems	0	10	30	14.54	0.001
b) Gastric problems	0	0	10		
c) Improve immunity	3.3	0	3.3		

*Significant – p=≤0.05
**Highly Significant – p=≤0.001
***Very high Significant – p=≤0.0001

Table No.3, represents the association of blood glucose level reduction among diabetic clients with their socio demographic variables in experimental group. It was obtained, the chi - square value for age ($\chi2$=3.38, p=0.009), gender ($\chi2$=2.30, p=0.005), religion (**$\chi2$**=2.18, p=0.009), occupation ($\chi2$=15.12, p=0.008), income ($\chi2$=15.82, p=0.002) and knowledge ($\chi2$=14.54, p=0.001), is less than table value, which indicates non significant association between reduction of blood glucose level with their age, gender, religion, occupation, income and knowledge, whereas the chi - square value for education ($\chi2$=14.14, p=0.002), dietary habit ($\chi2$=10.11, p=0.001) and exercise routine ($\chi2$=2.70, p=0.004) is more than table value, which indicates significant association between reduction of blood glucose level with their education, dietary habit and exercise routine.

2) Findings related to frequency and percentage distribution of post test reduction of blood glucose level among type II diabetes mellitus in both experimental and control group.

Table 4: Frequency and percentage distribution of post test reduction of blood glucose level among type II diabetes mellitus in both experimental and control group

S. No.	Score	Group				Total		Chi Square	p value
		Experimental		Control					
		N	%	N	%	N	%		
1	Decrease 30 mgs & above	19	63.3	0	0	19	31.7	44.141	0.001
2	Decrease 20 - 29 mgs & above	7	23.3	2	6.7	9	15		
3	Decrease 11 - 19 mgs & above	3	10	3	10	6	10		
4	Decrease <10 mgs & above	1	3.3	10	33.3	11	18.3		
5	No Decrease	0	0	15	50	15	25		

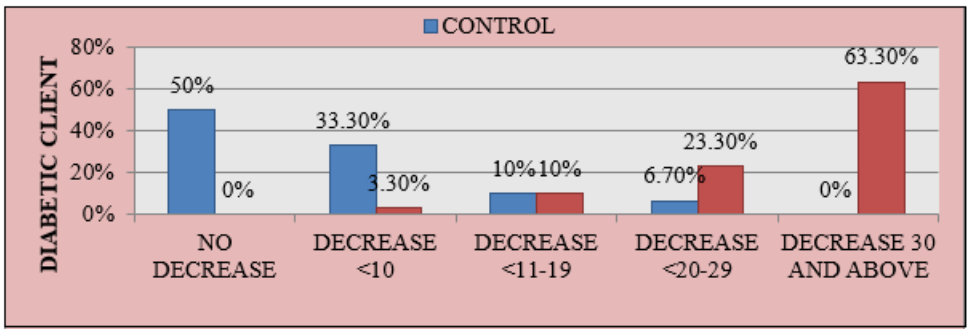

Figure 3: Association of Blood Glucose among Experimental and Control Group

*Significant p=≤0.05
**Highly significant p=≤0.001
*Very high significant p=≤0.0001

Table 4 and figure 3 shows that majority of control group 15 (50%) has no reduction in blood glucose level, whereas majority of experimental group 19 (63%) has decrease 30 mgs & above in their blood glucose level. The above findings reveals statistically significant reduction of blood glucose level among experimental and control group (p=0.001) in type II diabetes mellitus.

8. Major findings

In this study, the analysis reveals the pre test level of blood glucose among type II diabetic patients in experimental and control group. In experimental group the mean value of blood glucose level is 164.23 and in control it is 160.17, statistical calculation was assessed using paired t test.

Whereas, the analyses reveals the post test level of blood glucose among type II diabetic patients in experimental and control group. In experimental group the mean value of blood glucose level is 132.22 and in control it is 158.30, statistical calculation was assessed using paired t test.

Finally, the study reveals that there is 20.5% of reduction found in experimental group but in control group there is only 1.12%. Around 21.30% reduction of blood glucose level in experimental group when compared with control group. Thus hypothesis was proved.

9. Conclusion

From the findings o the study, the following conclusion was drawn:

An experimental study with pre test post test control group research design was used to evaluate the effectiveness of holy basil leaves extract to reduce blood glucose level among type II diabetic patients. The study proved that holy basil leaves are effective in controlling blood glucose level in type II diabetic clients and prevent them from developing complications. Holy basil leaves are cost effective and easily available in all parts of India and can be used by people on daily basis and helps to improve their general well being. It also prevents in developing further complications in diabetic clients and helps to reduce the dose of their drugs. Hence, it is one of the best alternative sources of reducing blood glucose level among type II diabetic clients in the community.

Authors Acknowledgement

The author (Archna) has actively participated in the study. Necessary approvals for conducting study had been taken from concerned authority.

Conflicts of Interest

This article is the independent work of the author and did not face any conflicts of interest.

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