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EFFECTIVENESS OF CASSIA AURICULATA FLOWER (AVARAM POO) EXTRACT IN REDUCING BLOOD GLUCOSE AMONG PRE DIAGNOSED TYPE 2 DIABETES MELLITUS CLIENTS IN SELECTED AREA OF PUDUCHERRY, INDIA

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Abstract

A study to evaluate the effectiveness of Cassia auriculata (Avaram poo) Flower extract in reducing blood glucose among pre diagnosed Type 2 Diabetes Mellitus clients in selected area of Puducherry. Objectives of the study are to assess the pretest level blood glucose among the control and experimental group. To administer the Cassia auriculata (Avaram poo) flower extract to the study group, To assess the post test level blood glucose among the control and experimental group, To evaluate the effectiveness of Cassia auriculata Flower (Avaram poo) extract in reduction of blood glucose level among type2 Diabetes Mellitus subjects, To associate the effectiveness of Cassia auricular Flower (Avaram poo) extract with demographic variables in experimental group. The research approach selected for the study was Quantitative approach, quasi Experimental design (pre-test and post test with control group). The study was conducted in selected PHC Kalapet, at Puducherry. Sample size was 60, 30 in experimental and 30 in control group were randomly assigned. The standardized glucometer was used to assess the blood glucose

level. Pretest was done to assess the level blood glucose (FBS and PPBS) for both the groups. Experimental group received Cassia auriculata Flower (Avaram poo) extract for 30 days and control group did not receive any measures. Post test level of blood Glucose (FBS and PPBS) was evaluated on 30th day for both experimental and control group. The results of the study were the result revealed that the pretest mean score of fasting blood glucose was 133.50±37.43 and after the administrations of Cassia auriculata flower extract the post test mean score was 109.93±18.14. The mean difference score was 23.57. The calculated paired't' value of t =5.478 was found to statistically highly significant at p<0.,001 level. This clearly indicates that the Cassia auriculata flower extract was found to be effective in reducing the fasting blood glucose level among type 2 diabetes mellitus clients in the experimental group.

The pretest mean score of post prandial blood glucose was 262.40±73.18 and after the administrations of Cassia auriculata flower extract the post test mean score was 193.43±45.99. The mean difference score was 68.97. The calculated paired 't' value of t = 8.103 was found to statistically highly significant at p<0.001 level. This clearly indicates that the Cassia auriculata flower extract was found to be effective in reducing the post prandial blood glucose level among pre diagnosed type 2 diabetes mellitus clients in the experimental group. The demographic variable of marriage had shown significant association with the post test level of fasting blood glucose among the study group.

Keywords

Cassia Auriculata Flower, Blood Glucose, Pre Diagnosed Type 2 Diabetes Mellitus

1. Introduction

Health problems are becoming more common than ever in the world today. Despite incredible improvements in health since 1950, there are still a number of challenges, in the past, communicable ailments were the major issues, non-communicable diseases are the primary issues today. Globally, the rate of deaths from non communicable is growing. While communicable diseases are slowly getting controlled in low and middle income countries (LMIC), such as India, there is a significant increase in the burden of non communicable diseases.

Diabetes Mellitus is a major health problem throughout the world and is the third most common disease in the world next to cardiovascular disease and oncological diseases (WHO, 2005),As per the IDF(2013), approximately 50% of all people with diabetes live in just three countries: China (98.4 million), India (65.1 million) and the USA (24.4 million).

In 2015, India, like other developed countries, had more number of deaths caused by non-communicable diseases. India, the second most populous country of the world, has been severely affected by the global diabetes epidemic.

India has the largest number of diabetic individual in the world, Since last 25 years it has acquired pandemic form particularly in the urban areas. There were approximately 31.7 million individual in India in 2000 and it is expected to touch 79.4 million in 2030. The increasing prevalence of diabetes mellitus is probably a price we are paying for the progress, urbanization, fast paced life, rapid globalization and industrialization.

According to World Health Organization projections, the prevalence of diabetes is likely to increase by 35%. Currently there are over 150 million diabetic patients worldwide. Recent estimates project that the number of diabetic patient will more than double to 300 million before 2020. Statement of the problem is a study to evaluate the effectiveness of *Cassia auriculata (Avaram poo)* flower extract in reducing blood sugar among pre diagnosed type2 diabetes mellitus clients in selected area of Puducherry, India.

1. To assess the pre-test level blood sugar among the control and experimental group of selected subjects.
2. To administer *Cassia auriculata(Avaram poo)* flower extract to the study group only.
3. To evaluate the effectiveness of *Cassia auriculata* flower extract in study group.
4. To compare the post test blood glucose level among control and study group.
5. To associate the effectiveness of *Cassia auriculata* flower extract with selected demographic variables of study group.

2. Methods

Research methodology is a way to systematically solve the research problem by logically adopting various steps. The methodology of research indicates the general pattern of organizing the procedure for gathering valid and reliable data for the purpose of investigation. This phase of study includes research approach, research design, variables, setting, population, sample & sample size, sampling techniques, criteria for sample selection, development and description of tool, scoring procedure, pilot study, data collection procedure and plan of statistical analysis of the data (Kothari. C.R. 2004) [1].

2.1 Research Approach

Research approach gives a way for solving the research problem; it is based on the

objectives of the study (Polit & beck- 2008) [4]**.** The research approach adopted for this study is quantitative research approach.

2.2 Research Design

The research design adopted for this study was Quasi experimental design (Pre & post-test control group)

The study intended to evaluate the effectiveness of *Cassia auriculata (avaram poo)* flower extract in reducing blood glucose among pre diagnosed type 2 diabetes mellitus clients. Pretest was conducted for the subjects to assess the blood glucose level. The researcher manipulated the dependent variable and administering *Cassia auriculata (avaram poo)* flower extract for 30 days and to the same group post test conducted to evaluate the effectiveness of *Cassia auriculata (avaram poo)* flower extract upon dependent variable i.e., blood glucose level.

Table 1: *Schematic Representation of Research Design*

Group	Measurement of dependent variable Pre-test	Manipulation of independent variable	Measurement of dependent variable Post-test
Experimental	O1	X	O2
Control group	O1	-	O2

E= Experimental group consists of 30 clients with type2 Diabetes mellitus

C= Control group consists of 30 clients with type2 Diabetes mellitus

O1= Pre test assessment of blood glucose level

X= Oral administration of *Cassia auriculata (avaram poo)* flower extract.

O2= Post test assessment of blood glucose level with Glucometer

2.3 Dependent Variable

The dependent variable in this study is blood glucose level.

2.4 Independent Variable

The independent variable in this study is *Cassia auriculata (Avaram poo)* floer extract.

2.5 Research Setting

Research setting refers to the physical location and conditions in which the data

collection takes place in a study Park K (2014) [4].

The study was conducted in the primary health centre, Kalapet, Puducherry. It is situated in the east-cost part of Puducherry and 17 KM away from MTPG&RIHS. The Kalapet primary health centre covers about 2subcentre under it and population of About 21685.

2.6 Population

Population of this study was clients with type2 Diabetes mellitus who are residing in Kalapet PHC area, Puducherry.

2.7 Target Population

Pre diagnosed type 2 Diabetes mellitus clients taking oral anti diabeties drugs who are residing at Kalapet, Puducherry.

2.8 Accessible Population

Type2 Diabetes mellitus clients who met inclusion criteria.

2.9 Sample

Sample of this study is type2 Diabetes mellitus clients visiting Kalapet PHC during the study period and those met sampling criteria.

2.10 Sample Size

Sample size selected for this study was 60 subjects with type2 Diabetes mellitus among them 30 clients in experimental group, and 30 clients in control group.

2.11 Sampling Technique

The researcher has chosen the subjects those who are meeting the inclusion criteria from type2 Diabetes mellitus register maintained at Kalapet PHC by simple random sampling technique.

2.12 Data Collection Method and Tool

2.13 Selection of the Tool

Tool is an instrument used by the researcher to collect the data. In this study Demographic Performa, blood glucose monitoring table, Glucometer were used to measure and observe accurately.

2.14 Development and Description of Tool

2.14.1 Base Line Data of type2 Diabetes Mellitus Clients

The investigator constructed this tool to collect the demographic data of the study subjects and to identify the influence of sample characteristics with the increased blood glucose. The data such as age of the patient, gender, religion, education, marital status, Type of work, family income, family history of DM, food habit, personal habit, BMI,

number of years diagnosed as diabetes mellitus, Alternative management for pre diagnosed type2 Diabetes mellitus and type of medication followed.

2.14.2 Observation Schedule on Blood Glucose

Blood glucose was monitored with standardized glucometer and readings are recorded in the observation schedule. The blood glucose recording table consisted of three columns to record the time, pre assessment of fasting and post prandial blood glucose, intervention was given to study group. The post test of fasting and post prandial blood glucose was monitored by the researcher on 30th day for both study and control group and entered the readings in the specified column.

2.14.3 Blood Glucose Measurement

Glucometer is a device used to monitor blood glucose. It provides the instant feedback and let you know immediately what your blood glucose is. This can give the valuable information about whether the blood glucose is too low, too high or in a good range.

2.14.4 Description of Intervention Preparation of *Cassia auriculata (Avaram poo)* Flower Extract

In this study *Cassia auriculata (Avaram poo)* flowers were dried under shade and were finely powdered in a mixer, Take 100 ml of Luke warm water add one table spoon of *cassia* flower powder mix it well. The diabetes mellitus clients are instructed to consume the *Cassia auriculata(Avaram poo)* flower extract water for twice a day (before breakfast & dinner) up to 30 days.

2.14.5 Administration of *Cassia auriculata* Flower Extract

In this study *Cassia auriculata* flower extract are consumed by the client in the early morning before breakfast and evening before dinner for 30 days. The flower extract of this *cassia auriculata* plant have cooling and dehydrating effects. So diabetics are advised to use this plant extracts instead of tea and coffee. The properties of this plant help to reduce the sugar level in the blood effectively.

3. Results

The study findings and compares with appropriate review of literature, statistical analysis based on the objectives of the study. The aim of the present study is *Cassia auriculata (Avaram poo)* flower extract in reducing blood glucose level among diabetes mellitus clients in selected area of Puducherry. The study was conducted based on quantitative approach by using pre & post-test with experimental and control group design, Simple random sampling technique was used to select the samples among pre diagnosed

type2 Diabetes mellitus clients in Kalapet Puducherry.

The investigator explained the study to the type2 Diabetes mellitus clients and evaluated the effectiveness of *Cassia auriculata (Avaram poo)* flower *extract* among diabetes mellitus clients. The effectiveness of *Cassia auriculata (Avaram poo)* flower extract was analyzed using descriptive statistics (Frequency, mean and standard deviation) and inferential statistics ("t" test and chi-square test) [7]. The data was analyzed and discussed based on the objectives of the study.

3.1 Distribution of Demographic Variables of the Sample in the Study

Regarding to demographic variable of age in experimental group the majority 10(33.33%) of type 2 Diabetes mellitus client were in the age group of 46 -50 years, 17(56.67%) were Female, 24 (80.00%) were Hindu religion, 14 (46.67%) were Illiterate/Primary school, 16 (53.33%) were Sedentary worker, were as similarly the control group majority 15(50%) were in the age group of 51-55 years, 16 (53.33%) were male, 29(96.67%) were Hindu religion, 18(60.00%) were Illiterate/Primary school, 16(40.00%) were Sedentary worker.

Regarding to demographic variable of family income in experimental group the majority 23(76.67%) were earning <5,000, 14(46.67%) were in the family history of nobody has, 28(93.33%) were both veg & non-vegetarian, 25 (83.33%) were none of the above in personal habits, similarly in the control group, 28(93.33%) were belongs to earning <5,000, 18(60.00%) were in the family history of nobody has, 25(83.33 %) were both veg & non-vegetarian, 25(83.33%) were none of the above in personal habits.

Regarding to demographic variable 21 (70.00%) were Normal weight, were as in control group 23(76.67) were in Normal weight, both the study and control group majority 30 (100.00%) were taking Allopathic treatment.

3.2 The Data was analyzed as per Objectives Stated

The first objective of the study to assess pre-test levels of blood glucose among experimental group and control group .The results exhibits that for the analysis of pre test level of blood glucose in experimental group and control group shows that in the experimental group, majority 16(53.33%) had early diabetes (Fasting Blood Sugar), 11(36.67%) had established diabetes (Fasting Blood Sugar) in the pretest in the control group, majority 15(50%) had early diabetes (Fasting Blood Sugar), 13(43.33%) had established diabetes (Fasting Blood Sugar) and 2(6.67%) were normal in the pretest.

Second objective of the study was to administer *Cassia auriculata (Avaram poo)* flower extract to the study group only. In this study *Cassia auriculata (Avaram poo)* flowers

extract prepared by mixing 1 table spoon powder with 100ml of Luke warm water and this extract is administered to the study group only. The diabetes mellitus clients are instructed to consume the *Cassia auriculata (Avaram poo)* flower extract water for twice a day before Breakfast and before Dinner for 30 days.

Third objective to evaluate the effectiveness of Cassia *auriculata (Avaram poo)* flower extract in study group. *Cassia auriculata (Avaram poo)* flower extract was given to the study group after the pretest had significant effect in the reduction of blood glucose level in the post test among pre diagnosed type2 Diabetes mellitus clients than the clients in the control group who carried on with normal procedure.

The result in the experimental group, the pretest mean score of fasting blood sugar was 133.50±37.43 and after the administration of *Cassia auriculata flower* extract the post test mean score was 109.93±18.14. The mean difference score was 23.57. The calculated paired 't' value of t = 5.478 was found to statistically highly significant at p<0.,001 level. This clearly indicates that the *Cassia auriculata* flower extract was found to be effective in reducing the fasting blood sugar level among pre diagnosed type 2 diabetes mellitus clients in the experimental group.

Fourth objective To compare the post test blood glucose level among control and study group. The experimental group, the post test mean score of fasting blood sugar was 109.93±18.14 and in the control group the post test mean score was 143.10±24.21. The calculated unpaired 't' value of t = 6.005 was found to be statistically highly significant at p<0.001 level which implies that there was significant difference in the level of fasting blood sugar level among pre diagnosed type 2 diabetes mellitus clients between the experimental and control group.

The experimental group, the post test mean score of post prandial blood sugar was 183.43±45.99 and in the control group the post test mean score was 281.93±42.24. The calculated unpaired 't' value of t = 7.762 was found to be statistically highly significant at p<0.001 level which implies that there was significant difference in the level of post prandial blood sugar level among pre diagnosed type 2 diabetes mellitus clients between the experimental and control group.

Hypothesis (H1): From the above result, it is clear that there was significant difference between the pre & post-test level of blood sugar among Diabetes clients in experimental group was accepted. **Hence the research hypothesis H1 is accepted.**

Fifth objective To associate the effectiveness of *Cassia auriculata* flower extract with selected demographic variables of study group. The demographic variable marital status

had shown statistically significant association with post test level of fasting blood sugar among type 2 diabetes mellitus clients at $p<0.01$ level and other demographic variables had not shown statistically significant association with post test level of fasting blood sugar among pre diagnosed type 2 diabetes mellitus clients in the experimental group.

The demographic variables had shown statistically significant association with post test level of post prandial blood sugar among type 2 diabetes mellitus clients in the experimental group.

Hypothesis (H2): The study results shows that there was a significant association in post test level of fasting blood glucose with demographic variable of marriage among type2 Diabetes mellitus clients in experimental group was accepted. **Hence the research hypothesis H2 is accepted.**

4. Summary

The prime aim of this study was "A study to evaluate the effectiveness of *Cassia auriculata (Avaram poo)* flower extract in reducing blood glucose among pre diagnosed type2 Diabetes mellitus clients at selected PHC in Puducherry."

4.1 The Objectives of the Study

1. To assess the pretest level blood glucose among the control and study group of selected subjects.
2. To administer *Cassia auriculata(Avaram poo)* flower extract to the study group.
3. To evaluate the effectiveness of *Cassia auriculata (Avaram poo)* flower extract in study group only.
4. To compare post -test blood glucose level among control and study group
5. To associate the effectiveness of *Cassia auriculata (Avaram poo)* flower extract with selected demographic variable of study group.

The review of related literature and previous studies enabled the investigator to develop the conceptual frame work, tools, methodology of this study. Literature review was done for this study and presented under the following headings.

5. Future Scopes and Implication

5.1 Nursing Service

The study findings indicate the benefit of *Cassia auriculata (Avaram poo)* flower extract to pre diagnosed type2 Diabetes mellitus clients with high blood glucose level. To emphasize the present study findings to the care giver of the pre diagnosed type2 Diabetes mellitus clients, encourage them to demonstrate to the type2 Diabetes mellitus clients.

Cassia auriculata (Avaram poo) flower extract is cost-effective. So, it can be implemented in nursing practice in all the settings.

5.2 Nursing Education

The study findings emphasize that the effect of *Cassia auriculata (Avaram poo)* flower extract on blood glucose level. The importance of *Cassia auriculata (Avaram poo)* flower extract among the pre diagnosed type2 Diabetes mellitus clients can be taught to the nursing students and graduate nurses and this can be incorporated in the care of type2 Diabetes mellitus patients. This will help the peoples to cope with reducing blood glucose level.

5.3 Nursing Administration

The study findings can be used as a basis of in – service education for nurses to make them aware about the importance of teaching and demonstrate to the pre diagnosed type2 Diabetes mellitus about the effectiveness *Cassia auriculata (Avaram poo)* flower extract. Plan and conduct nursing conferences, seminars, and workshops and also provide opportunity for the nurses to participate in the same, related to diabetes mellitus and its alternative management. Procuring and disseminating same material for their health education.

5.4 Nursing Research

Since clinical researches are lacking in this area, much work is required with the *Cassia auriculata* to investigate their medicinal properties. Many Newer ideas and techniques can be explored for further studies. The findings of this study may be taken as reference material for further studies in this area.

5.5 Recommendations

Based on the study findings and personal experience of the investigator during the study the following recommendations are made [3].

- The study can be replicated on a larger sample for generalization of the findings.
- The study can be conducted in different settings.
- A similar study can be done with the comparison of other alternative method.
- A similar study can be conducted for other symptoms of Diabetes mellitus, Hyperlipidemia.
- Comparative study can be conducted to find out the effectiveness of *Cassia auriculata (Avaram poo)* flower extract with other drugs.
- Clinical studies are lacking in the alternative management (cassia auriculata (Avaram poo) flower extract) So many clinical researches can be done in this area.

5.6 Conclusion

This study was to evaluate the effectiveness of *Cassia auriculata (Avaram poo)* flower extract administration on blood glucose level in patients with pre diagnosed type2 diabetes mellitus in selected centers. The result showed that the *Cassia auriculata (Avaram poo)* flower extract is effective in reducing blood glucose level in clients with pre diagnosed type 2 Diabetes mellitus. There was significant association between the blood glucose level and demographic variable marital status in experimental group.

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