

COMPARATIVE STUDY ON EFFECT OF HERBAL MEDICINE'S ON SERUM GLUCOSE LEVEL AMONG TYPE 2 DIABETIC PATIENTS AND HEALTHY VOLUNTEERS

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ABSTRACT

Introduction: Diabetes mellitus is a most common metabolic disorder with increase in burden throughout the world. Some combination of available anti-diabetic drugs in conventional medicine causes hypoglycemia and other adverse effect. Several medicinal plants are used in traditional medicines to treat diabetes. In this study we aimed to see the combined antiglycemic effect of selected four herbals in serum glucose among hyperglycemic and healthy volunteers. **Methodology:** 10 patients who were between the ages of 35-65 of both sexes with Type 2 Diabetes mellitus only, for more than a period of 1 year under conventional medicine was randomly selected in the hyperglycemic group and another 10 healthy volunteers were selected randomly between the ages of 19-25 in the normoglycemic group. After obtaining the written consent each participants was advised to take 5 grams of combined herbal medicines. The outcome measure was serum glucose level taken before and after for both the groups. **Results:** All the participants were completed the study. There was a 20% decrease in serum glucose ($p < .04$) after 2 hours of herbal medicine intake among the diabetic group but healthy volunteers was not significant. **Discussion:** Combination of four herbal medicines in this study shows significant effect in serum glucose level among type 2 diabetic patients and no significant effect among non-diabetic individuals may have a potential alternative method of treating type 2 diabetes mellitus. Large scale randomized control trials in type 2 diabetes mellitus patients over a longer period are needed to confirm the proof uncovered in this study.

KEYWORDS: Type 2 Diabetes mellitus, herbal medicines, anti-glycemic effect, hypoglycemic herbs.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disease with life-threatening complications. Chronic hyperglycemia is responsible for diabetes specific 'microvascular' complications affecting eyes (retinopathy), kidney (nephropathy) and feet (neuropathy).^[1] Estimates in 2017 indicate that 8.5% (6.5-10.7%) of the adult population aged 20-79 years has diabetes. This is equivalent to 82.0 (62.6 – 103.2) million people living with diabetes. About 45.8% of these are undiagnosed. In 2017, India is the largest contributor to the regional mortality, with nearly 1 million estimated deaths attributable to diabetes.^[2] In

conventional medicine some drugs combination used for diabetes cause hypoglycemia and other adverse effects.^[3] Traditional herbal medicines are used all over the world by diabetic patients. Medicinal plants form the main ingredients of the remedy suggested for antidiabetes and its complications like metformin from *Galega officinalis*.^[4] In our study we aimed to see the combined antiglycemic effect of selected four herbals in serum glucose among hyperglycemic and normal glycemic patients.

METHODOLOGY OF STUDY

The study was carried out in Sree Ramakrishna Medical college Hospital for Naturopathy and Yoga, Kulasekharam, Tamilnadu, India. This study was approved by Institutional ethics committee of SRKMCNYS (ApprovalNo:7 5/SRKMCNYS/IMR/IEC27/ 2018-19). For hyperglycemic group 10 patients who were between the ages of 35-65 of both sexes with Type 2 Diabetes mellitus only for more than a period of 1 year under conventional medicine was randomly selected after obtaining written consent. Another 10 healthy volunteers were selected randomly between the ages of 19-25 from the college who pursue Bachelor of Naturopathy and Yogic Sciences (B.N.Y.S) course. The commencement of the test was in the early morning with the patient in an empty stomach. The patients and healthy volunteers are asked to relax for the easy finding of a suitable vein to draw the blood sample and found their respective fasting blood sugar level. Then both the groups were asked to drink the herbal medicine of 5 grams which were mixed in 100 ml of water. The dry powder of herbal medicine was prepared from flowers of *Cassia auriculata*, leaves of *Aegle marmelos*, seeds of *Syzygium cumini* and leaves of *Gymnema sylvestre*. Each herbal powders were mixed in equal composition at a ratio of 1:1:1:1. All the four herbals were collected from the biological reserves of

Kanyakumari district, India. Botanical authentication was obtained by qualified siddha physician. After two hours again blood sample was drawn to see the blood sugar level. In between the patients was advised not to take any drinks or food except water. The blood sample was analyzed in Biochemistry semi auto analyzer using end point method. All the data was recorded in Microsoft excel 2007. Statistical analysis was done to evaluate the changes within the group using SPSS software.

RESULTS

A paired samples t-test was conducted to compare the blood sugar level in known diabetic group and non-diabetic group separately before and after the herbal medicine. The diabetic group shows a statistical significant reduction of blood sugar level after two hours of herbal medicine intake compare with fasting blood sugar level. There was a 20% decrease in serum glucose after 2 hours of herbal medicine intake (pre Serum Glucose level 191.694, SD \pm 72.2067; post Serum Glucose level 154.176, SD \pm 71.1175) among diabetic group. But in case of non-diabetic group there was no statistical significance ($P=.355$) between pre and post herbal medicine intake shown in Table.1. This shows that these herbal medicines are reducing serum glucose only in hyperglycemic individuals and not in case of normoglycemic individuals.

Table 1: Paired sample t test.

	Paired Differences					t	df	Sig (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre Dia Grp level-Post Dia Grp level	37.5180	49.4678	15.6431	2.1308	72.9052	2.398	9	.040
Pair 2 Pre Health Grp level- Post Health Grp level	-2.38900	7.74508	2.44921	-7.92950	3.15150	-.975	9	.355

This study shows that intake of 5 grams herbal medicine prepared from flowers of *Cassia auriculata*, leaves of *Aegle marmelos*, seeds of *Syzygium cumini* and leaves of *Gymnema sylvestre* on single dose results in reduction of serum glucose level only in hyperglycemic individuals and not in normoglycemic individuals.

DISCUSSIONS

A study shows that Oral administration of 0.45 g/kg body weight of the aqueous extract of the flower of *Cassia Auriculata* for 30 days resulted in a significant reduction in blood glucose and an increase in plasma insulin, but in the case of 0.15 and 0.30 g/kg, was not significant.^[5] Another study shows that 5 grams of *Aegle marmelos* leaves powder decoction for a period of 1 month in diabetic patients once a day shows hypoglycemic effects in the postprandial blood glucose level [6]. Mycaminose an isolated compound extracted

from *S. cumini* seed given to streptozotocin induced diabetic rats shows significant reduction in blood glucose level.^[7] The bioactive compounds like oleanines (gymnemic acid, gymnema saponins), dammarenes (gymnemasides), anthraquinones, flavones, hentriacontane, pentatriacontane, phytin, resin, tartaric acid, formic acid, butyric acid, lupeol, β -amyrene related glycosides and anthraquinones, alkaloid like gymnamine, flavonoids, cinnamic acid, folic acid, ascorbic acid present in *Gymnema sylvestre* has antidiabetic and antioxidant activity.^[8] This study suggests that combination of these four herbals may have a potential role in treating type 2 diabetes mellitus as an alternative method. This study also clearly exhibited the hypoglycemic effect of herbal powder in patient with type 2 diabetes mellitus. Hence the herbal powder plays an important role for reducing serum glucose level without any side effects.

CONCLUSION

Combination of four herbal medicines in this study shows significant effect in serum glucose level among type 2 diabetic patients and no significant effect among non-diabetic individuals may have a potential alternative method of treating type 2 diabetes mellitus. Large scale randomized control trials in type 2 diabetes mellitus patients over a longer period are needed to confirm the proof uncovered in this study.

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