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HYPOLIPIDEMIC ACTIVITY OF SIDDHA FORMULATION KARUM JEERAGA CHOORANAM IN HYPERLIPIDEMIC MODELS OF WISTAR ALBINO RATS

Dr. Arivoli D.[1]*and Manoharan A.[2]

[1*]PG Scholar, [2]Professor,
Head of the Department Department of Pothu Maruthuvam, GSMC, Palayamkottai, Tamilnadu, India.

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***Corresponding Author**
Dr. Arivoli D.
PG Scholar, Head of the Department Department of Pothu Maruthuvam, GSMC, Palayamkottai, Tamilnadu, India.

ABSTRACT

Introduction: Dyslipidemia is one of the metabolic disorders due to food and lifestyle modifications. It raises the risk of atherosclerosis especially among young people with obesity and diabetes. Dyslipidemia is the common feature of people with type 2 diabetes. The diabetic dyslipidemia is the combination of hyperglycemia, high triglycerides and low level of high-density lipoprotein (HDL) level. **Aim:** In the present study, the effect of siddha formulation *karunjeeraga chooranam* was analyzed on level of cholesterol, Triglycerides, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein(VLDL) and Atherogenic Index(AI) and LDL-C/HDL-C ratio in Wister Albino rat models. **Materials and Methods:** The Siddha formulation *Karunjeeragm chooranam* was prepared at GSMC, Palyamkottai. The Wister Albino rats were used in this study, weighted and divided into five groups and each group having six rats. In group I, rats were normal control, in group II, fed the cholesterol to the rats at a dose of 400 mg/kg body weight for 30 days. In group III, atorvastatin was fed to rats at a dose of 1mg/kg body weight from day 15 to 30. In group IV, siddha formulation of *karunjeeraga chooranam* was fed to rats at a dose of 100 mg/kg from 15 days to 30 days. In group V, siddha formulation of *karunjeeraga chooranam* was fed to rats at a dose of 200mg/kg body weight from days 15 to day 30. At end of the day, all the rats were sacrificed and the blood was collected. **Discussion:** The results revealed that serum of hyperlipidemic rats showed significant reduction in the higher level of Cholesterol, Triglycerides, LDL - C when compared with normal rats. *Karunjeeragan chooranam* showed an improvement in the cardio vascular risk level by decrease of Atherogenic Index in the treated group by more than 73% and 63% ($p < 0.01$), when compared to the cholesterol control group. **Results:** The result were concluded that, the Siddha formulation *karunjeeragan chooranam* has the potential effect to reduce the cholesterol, triglycerides, Low Density Lipoprotein(LDL),Very Low Density Lipoprotein(VLDL) and LDL-C/HDL-C ratio.

KEYWORDS: Hypolipidemic activity, Karunjeeraga chooranam, Atherosclrosis, Obesity.

1. INTRODUCTION

Recent years, many people having diabetes related vascular and other related complications. These includes high blood pressure, morbid obesity and high blood glucose level. Dyslipidemia occurred commonly in type-2 diabetes more often than that of type-1 diabetes. The most common dyslipidemia in diabetes is the combination of high triglycerides elevated low density lipoprotein (LDL) cholesterol. Among the drugs available to treat dyslipidemia, statins is the first choice for lowering total and LDL cholesterol level. Other drugs have been used for lower cholesterol including cholesterol-adsorption blockers, bile acids, sequestrants, and nicotinic acids. Similarly, combination of drugs have also being used to treat dyslipidemia, whereas, single drug is not effective in reaching target level. Fibrates and extended release niacin may use to lower triglycerides (or) raise HDL cholesterol level.[1]

Hyperglycemia and Hyperlipidemia are significant and independent risk factors for the vascular complications, and other cardio vascular pathological changes in diabetic states through the following molecular mechanism such as formation and accumulation of advanced glycation products, increased oxidative stress, activation of proto 5 kinase C pathway, increased activity of hexosamine pathway and vascular inflammation and the impairment of insulin action in the vascular tissues.[2] In the present study has been made to evaluate the effect of siddha formulation karum jeeraga chooranam for the hypolipidemic activity. Hence, present study the Karunjeerega chooranam is changed in total cholesterol,

triglycerides, low density lipoprotein, Atherogenic index and LDL-C/HDL-C ratio.

2. MATERIALS AND METHODS

The raw drug was purchased from country shop at Tirunelveli, Tamilnadu. The raw drug was purified and makes a fine powder. Wister albino rats were procured from central animal house, K. M. College of pharmacy, Madurai, Tamil Nadu, Inida. Water and food were fed until end of study. In the present investigation, the rats were tested as per the guidelines given by National Institute of Nutrition; Indian council for Medical Research, Hyderabad, India and the study was approved by Institutional Animal Ethical Committee.

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3. Experimental procedure

Initially, all the animals were weighed and divided into five groups and each group having six rats. In group I, rats were normal control, in group II, fed the cholesterol to the rats at a dose of 400 mg/kg body weight for 30 days. In group III, atorvastatin was fed to rats at a dose of 1mg/kg body weight from day 15 to 30.[3] In group IV, siddha formulation of karumjeeraga chooranam was fed to rats at a dose of 100 mg/kg from 15 days to 30 days. In group V, siddha formulation of karumjeeraga chooranam was fed to rats at a dose of 200mg/kg body weight from days 15 to day 30. At end of study (30 days) all the rats were sacrificed and the blood was collected and allowed to clot the blood and serum was obtained using centrifuge machine through centrifugation process. The collected serum samples were analysed under biochemical and statistical analysis.

4. Biochemical and statistical analysis

The data were analyzed statistically by using analysis of variance (ANOVA). P value was lesser than 0.05, therefore model was considered to be statistically significant. The values were found out through one way ANOVA followed by Newman Keul's multiple range tests.

** (a) values were significantly different from normal control at P< 0.01.
** (b) Values were significantly different from hyperlipidemic control at P< 0.01.

Table 1: Effect of Siddha Formulation Karunjeeraga Chooranam in lipid Profile.

GROUPS	Total cholesterol (mg/dl)	Triglycerides (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	VLDL (mg/dl)	AI	LDL/HDL
Normal Control	48.65 ± 1.65	58.22± 0.88	27.48 ± 1.21	15.25 ± 0.78	32.85 ± 1.15	0.86 ± 0.50	0.55 ±
Cholesterol Control	118.45±1.58**(a)	163.2 ± 1.72**(a)	12.85 ± 0.66**(a)	30.95 ± 1.30**(a)	12.12 ± 0.72**(a)	8.50 ± 1.33**(a)	2.40 **(a)
Standard Control	73.55± 1.35**(b)	83.25 ± 1.84**(b)	22.4 ± 0.46**(b)	21.15 ± 0.78**(b)	25.80 ± 0.76**(b)	2.35 ± 2.33**(b)	0.94 **(b)
Treatment control	93.75 ± 1.20**(b)	115.26 ±1.92**(b)	18.3 ± 0.52**(b)	24.30 ± 0.58**(b)	16.80 ± 0.45**(b)	4.40 ± 1.48**(b)	1.32**(b)
Treatment control	84.80 ± 0.92**(b)	95.8 ± 1.08**(b)	21.35 ± 1.30**(b)	23.26 ± 0.74**(b)	22.28 ± 0.50**(b)	3.12 ± 0.24**(b)	**(b)

5. RESULTS AND DISCUSSION

Table 1 showed that the level of Serum cholesterol, Triglycerides, HDL, LDL and VLDL was significantly increased. It was compared to Standard (Group III) and Treatment Control groups (Group IV, V). Rats were feed 100 to 200mg/KJC and atorvastatin 1mg/kg were treated in Standard control groups (Group III) with both doses of siddha formulation and here was significant decrease in cholesterol, The TGs, LDL-C, and VLDL and increases HDL-C when compared with cholesterol control rats. Table 1 showed the changes of Atherogenic Index and LDL-C / HDL-C ratio in control and treated rats. The test results revealed that the cholesterol induction significantly affects the cardio vascular risk markers.

Indeed, AI was statistically increased in cholesterol control group 90% compared with the values found in their normal control group. Besides there were significant further increase of LDL – C / HDL – C ratio in cholesterol control group compared to normal control group. Promising results in lowering of AI by siddha formulation Karunjeeraga chooranam was noticed in Table 1.The siddha formulation Karunjeeraga chooranam showed an improvement by decrease of AI in the treated group by more than 73% and 63% ($p < 0.01$), when compared to the cholesterol control group. The ratio of LDL – C to HDL – C is also a protective indicator of cardio vascular disease incidence. The cholesterol induction produced a significant increase of this marker. In contrast, elevated ratio in treated group and Atorvastatin group returned to basal value when the data were compared in the same period to the data found for cholesterol rats.

The reduction of plasma total cholesterol was associated with a decrease in its LDL fraction, which is a major, potentially modifiable risk factor of cardio vascular disease and the target of drug. Many researchers suggest that the cholesterol lowering activity of this product

appears due to the enhancement of LDL – C catabolism through hepatic receptors.[4]

In addition, siddha formulation Karum jeeraga chooranam showed protective action which is reported to have a preventive function against atherogenesis since an independent inverse relationship between blood HDL – C levels and cardio vascular risk incidence is reported.[5] The possible pharmacological mechanism of this activity may result from the enhancement of lecithin cholesteryl acyl transferase (LCAT) and inhibition of Hepatic Triglyceride Lipase (HTL) on HDL which may lead to a rapid catabolism of blood lipids through enterohepatic tissues.[6]

The higher plasma TG levels have been attributed mainly to increase population of small, dense LDL deposits which are very atherogenic and enhanced cholesteryl ester mass transfer from apolipoprotein B containing lipoproteins (VLDL and LDL).[7] TG has also been proposed to be major determinant of cholesteryl esterification, its transfer and HDL remodeling in human plasma.[8] Siddha formulation Karum jeeraga chooranam significantly suppress the elevated blood concentration of TGs. This result suggests that the product is able to restore the catabolism of TG. The restoration of catabolic mechanism of TGs would be due to an increased stimulation of the lipolytic activity of Plasma Lipoprotein Lipase (LPL).[9]

Administration of siddha formulation Karum jeeraga chooranam provides a beneficial action on rat lipid metabolism with regard to the reduction of AI. Infect, the AI was decreased in all treated groups. Similar results were reported by others when studying the hypolipidemic effects of natural products.[10] The administration of siddha formulation of Karunjeeraga chooranam is significantly suppress the higher values of LDL – C / HDL – C ratio showing the beneficial effect of this formulation in preventing atherosclerosis incidence.

6. CONCLUSION

The antihyperlipidemic effect on siddha formulation Karunjeeraga chooranam is considered to reduced major risk factor for the premature atherosclerosis and atherosclerotic plaque formation.

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