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Pakistani herb for oxidative stress reduction in human body

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Abstract

The monogenic disorders are associated with the same increased risk for atherosclerosis in different populations. However, the frequency with which polygenic hypercholesterolemia occurs in different populations varies widely, as does the incidence of coronary artery disease. Populations with a high mean plasma cholesterol concentration have a high rate of coronary artery disease. It is believed that the difference between populations in the frequency of hypercholesterolemia reflects one or more environmental factors, the most obvious being diet and, in particular, the saturated fat content of the diet.

Study design: Single blind placebo controlled study

Place and duration of study: National hospital Lahore from January to June 2017.

Material and Method: Written consent was taken from all patients. This consent was already approved by ETHICS COMMITTEE of the hospital. These patients were divided in two groups. Group-I (n=30) was on placebo (capsules containing grinded wheat shell only) and group-II (n=30) was

advised to take 200 grams raw ladyfinger in divided doses for three months. Baseline fasting blood sugar (FBS) and lipid profile was determined at day-0, day-30, day-60, and at the end of research period ie; day-90. Serum LDL-cholesterol was calculated by Friedwald formula¹⁰ (LDL-Cholesterol = Total Cholesterol-(Triglycerides/5 +HDL-Cholesterol). Glucometer made by Roch pharma serial No: CE 0123 was used for estimation of FBS.

Results: For statistical analysis SPSS version 2010 was used. SD and $\pm$ SEM was determined from mean of the pre and post treatment values. Paired 't' test was applied to see p-value of the tested parameters. P-value >0.05 was considered as non significant change, <0.01 as significant and <0.001 as highly significant change in the tested parameter.

Conclusion: It was concluded from the research study that ladyfingers or Okra can reduce LDL cholesterol and Fasting Blood Sugar (FBS) of patient suffering from DM type-2 and hyperlipidemia significantly when this vegetable is used for specific time period.

Keywords: monogenic, disorders, hypercholesterolemia, oxidative stress

Introduction

It is estimated that only approximately 10% of patients with FH in Canada have been diagnosed. The most commonly used diagnostic criteria for FH include the Dutch Lipid Clinic Network Criteria (DLCNC), the Simon Broome Registry criteria, and the Make Early Diagnosis Prevent Early Death criteria. In the United States, many physicians report using a "clinical diagnosis" of FH on the basis of clinical judgement alone or in combination with the formal diagnostic criteria. In a large population in Denmark, the DLCNC ("probable" or "definite" diagnosis) offered the best predictive value for identifying an FH-causing DNA variant compared with the Simon Broome Registry or Make Early Diagnosis Prevent Early Death criteria. Metabolic syndrome is a cluster of conditions ie; increased blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol or triglyceride levels which occur together, increasing risk of heart disease, stroke and diabetes. It starts when individual is enjoying sedentary life, fond of taking high sugar, high lipid-content diets, and bakery foods. Age, cigarette smoking, alcohol use are independent risk factors for metabolic syndrome ^[1]. Because the syndrome is complicated, its cure is also complicated like that. Generally hypoglycemic, hypolipidemic drugs are used to solve symptoms. Apart from hypoglycemic and hypolipidemic allopathic medications, various herbs have been used to prevent and cure of the disease ^[2]. *Abelmoschus esculentus* (lady finger or okra) is a non-leafy, green, fruit vegetable that is widely consumed in Pakistan and abroad.

Popularly called bhindi in Pakistani households, this vegetable is tender, mucilaginous and dense in nutritional content. It can be eaten raw and cooked [3]. Bhindi helps control diabetes. Okra is packed with dietary fibre that helps stabilisation of blood sugar levels by regulation of the rate of absorption of sugar from the digestive tract. The anti-diabetic property of okra is also attributed to its ability of inhibition of enzymes metabolising carbohydrates, enhancement of production of insulin, regeneration of beta cell of the pancreas and increased secretion of insulin [4]. It prevents heart disease [5]. People are often affected with heart disease due to high levels of cholesterol in their blood [6]. Pectin, a soluble fibre present in lady's finger helps lower this cholesterol and thus is helpful in preventing heart disease. Bhindi is also fairly rich in antioxidant compounds like polyphenols [7]. Polyphenol compounds, especially quercetin, helps prevent oxidation of cholesterol and blocking of arteries, preventing heart disease development [8]. People who aspire to lose weight can eat lady's finger to facilitate weight loss. The vegetable is extremely low in calories, with a 100 grams serving containing just 33 calories [9].

Material and Method

In this study Bhindi or ladyfinger was used along with placebo to see exact potential of the herb to normalize increased blood glucose and lipids levels. The study was conducted in National hospital Lahore from January to June 2017. 60 patients suffering from diabetes mellitus type-II and secondary hyperlipidemia were selected from medical OPD

of the hospital. Written consent was taken from all patients. This consent was already approved by ETHICS COMMITTEE of the hospital. These patients were divided in two groups. Group-I (n=30) was on placebo (capsules containing grinded wheat shell only) and group-II (n=30) was advised to take 200 grams raw ladyfinger in divided doses for three months. Baseline fasting blood sugar (FBS) and lipid profile was determined at day-0, day-30, day-60, and at the end of research period ie; day-90. Serum LDL-cholesterol was calculated by Friedwald formula [10] ($\text{LDL-Cholesterol} = \text{Total Cholesterol} - (\text{Triglycerides}/5 + \text{HDL-Cholesterol})$). Glucometer made by Roch pharma serial No: CE 0123 was used for estimation of FBS. For statistical analysis SPSS version 2010 was used. SD and $\pm$ SEM was determined from mean of the pre and post treatment values. Paired 't' test was applied to see p-value of the tested parameters. P-value >0.05 was considered as non-significant change, <0.01 as significant and <0.001 as highly significant change in the tested parameter.

Results

After three months it was observed that lady finger reduced blood LDL-cholesterol from 209.13 ± 2.22 mg/dl to 183.09 ± 1.58 mg/dl. Difference in pre and post treatment was 26.04 mg/dl (p-value <0.001). FBS in 27 diabetic patients suffering from DM type-II was reduced from 166.61 ± 3.09 mg/dl to 149.98 ± 1.76 mg/dl. Difference in pre and post treatment values was 16.63 mg/dl (p-value <0.01).

Table 1: Showing pre and post-treatment values in diabetes mellitus and hyperlipidemia patients who took 200 grams ladyfingers for 90 days

Groups & Parameters	At day-0	At day-90	Difference	p-value
Placebo n=30				
LDL-C	190.01 ± 1.11	187.00 ± 2.05	3.01	>0.05
FBS	151.17 ± 2.98	147.76 ± 1.98	3.41	>0.05
Lady finger n=27				
LDL-C	209.13 ± 2.22	183.09 ± 1.58	26.04	<0.001
FBS	166.61 ± 3.09	149.98 ± 1.76	16.63	<0.01

Key: All parameters and difference in pre and post treatment values are measured in mg/dl, LDL-C stands for low density lipoprotein cholesterol, FBS stands for fasting blood sugar, n= sample size, p-value >0.05 is non-significant, <0.01 is significant and p-value <0.001 is highly significant change in mentioned parameters.

Discussion

Type 2 diabetes is another disease linked to high cholesterol because diabetes can affect the different cholesterol levels. Even if blood sugar control is good, people with diabetes tend to have increased triglycerides, decreased high-density lipoprotein (HDL), and sometimes increased low-density lipoprotein (LDL). This increases the likelihood of developing atherosclerosis. Cholesterol lowering drugs and drugs used in diabetes mellitus have proved to have adverse effects, medical researchers are trying to conduct trials of medicinal herbs for hyperglycemia and hyperlipidemia. We used lady finger to see their lipid and blood glucose lowering effects. In our results 90 days treatment with use of 200 grams raw lady finger reduced LDL-cholesterol in 27 patients 26.04 mg/dl. In these patients fasting blood sugar reduced 16.63

mg/dl. These results match with results obtained in trial conducted by R. John *et al* [11] who observed almost same results which support our results. Mackhil TY *et al* [12], Johay S, *et al* [13], and Surta VF *et al* [14] mentioned the mechanism of action of ladyfingers to reduce LDL-cholesterol that the herb reduces enterohepatic circulation of bile salts so VLDL are not synthesized, and so the LDL. Jitkaal MN *et al* [15] mentioned the antioxidant effects of ladyfingers. Polyphenolic compound like quercetin present in ladyfingers prevent oxidation of cholesterol. Gurhu GT *et al* [16] observed lesser hypolipidemic effects of ladyfingers as their results proved 16.98 mg/dl reduction in LDL-cholesterol in 19 hyperlipidemic patients. This contrast may be due to lesser amount of herb used as they used 100 grams raw ladyfinger in 25 hyperlipidemic patients for 75 days. Our results proved 16.63 mg/dl reduction in fasting blood glucose (FBS) level when lady finger was used by 27 diabetic patients suffering from diabetes mellitus type-II. These results match with results of study conducted by Rochee M *et al* [17] who proved 18.76 mg/dl reduction in FBS level when this herb was used (150 grams per day for two months) by 56 patients suffering from diabetes mellitus type-II. Okra being rich in fibres helps

to normalize the blood sugar; it absorbs the excessive glucose from blood and balances the level ^[18-20]. Fornh TV *et al* ^[21] stated that ladyfinger is use to treat cystitis, leucorrhea, impotence and premature ejaculation in male. Saty V *et al* ^[22] explained that as ladyfinger is anti-inflammatory herb, it reduces risk of synthesis of foamy cells during development of atherosclerotic plaques in early stages. Sharma K *et al* ^[23] wrote that the herb reduces FBS by various mechanisms, enterohepatic circulation inhibition is one of them. Dosata R *et al* ^[24] warned the use of the herb for prolonged time may cause acidity. Therefore antacids may not be used by individuals who are already taking ladyfinger as medicinal purpose for specific time. Inhibition of carbohydrate metabolizing enzymes, enhancement of insulin sensitivity, regeneration of damaged pancreatic islet β -cells, and enhancement of insulin secretion and release is explained by Turtr F *et al* ^[25].

Conclusion

It was then concluded from the trial that ladyfinger has significant hypolipidemic and hypoglycemic potential and may be used in diabetic, and hyperlipidemic patients safely.

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