Conventional medicine used for hyperlipidemia in allopathy include statins, fibrates, niacin and resins but are going to defame due to their adverse effects. Herbal medicine ginger has proved itself as one of the potent antihyperlipidemic and antiobesity herb with least adverse effects. We did try to compare its hypolipidemic effects with placebo effects when used in mild to moderate hyperlipidemic patients. It was placebo-controlled single blind research study. Research was conducted at National hospital, Lahore, from July to November 2019. Consent was taken from sixty hyperlipidemic patients age range from 25 to 60 years. Both gender male and female patients were enrolled. Patients were randomly divided in two groups, 30 patients were on drug ginger pasted-powder advised to take 5 grams in divided doses with their normal diet for the period of three months. Thirty patients were on placebo pasted-wheat powder, with same color as of ginger powder, advised to take 5 grams in divided doses with their normal diet for the period of three months. Their base line lipid profile and body weight was recorded at start of treatment and were advised to come for check-up, fortnightly. When duration of study was over, their lipid profile and body weight was measured and compared statistically with pre-treatment values. Three months treatment with 5 grams of ginger decreased total cholesterol from 233.11±1.53 mg/dl to 198.44±1.23 mg/dl, LDL cholesterol reduced from 202.21±1.88 mg/dl to 187.72±1.98 mg/dl, reduced body weight from 76.01±2.66 kg to 72.80±1.87 kg. Both plasma total cholesterol and LDL cholesterol reduction was statistically significant, but body weight decrease was non-significant when analyzed biostatistically.

Keywords: LDL, HDL, Body weight, CAD, fats, prevention

INTRODUCTION

There is proved link between serum lipids with coronary heart disease. In specific ethnic population, 1% increased lipids especially LDL-cholesterol in plasma increases 2% risk for development of CAD. Other risk factors for CAD include diabetes mellitus, cigarette smoking, hypertension and hyperthyroidism. Allopathic regimen for treating hyperlipidemia include use of statins, fibrates, niacin and resins. But all these medicines have low patient compliance due to their adverse effects. Medicinal herbs like ginger has been shown to exhibit antioxidant effects. Many research studies indicate that gingerols and the related shogaols exhibit cardiodepressant activity at low doses and cardiotonic properties at higher doses. Ginger is obtained from rhizomes of Zingiber officinale. The plant belongs to Zingiberaceae family. Since ancient times, it has been widely used as a medicinal herb and spice. Gingerol is the active constituent of fresh ginger. Chemically,
gingerol is a relative of capsaicin and piperine, the compounds which give chili peppers and black pepper their respective spicyness. It is normally found as a pungent yellow oil, but also can form a low-melting crystalline solid. Because of containing phytochemical ingredients and as a beneficial therapeutic agent, Zingiber officinale has been contributing pivotal roles against a broad range of diseases like dyslipidemia, asthma, diabetes, stroke, constipation etc, etc. etc. It is reported that 100,000 tons of gingers are annually produced, and 80% of this is produced in China. Both (6)-shogaol and (6)-gingerol, and the gingerdiones, are found in Zingiberaceae and are reportedly potent enzymatic inhibitors of prostaglandin, thromboxane, and leukotriene biosynthesis. 6-tingerol appears to be the antioxidant constituent present in ginger, as it was shown to protect HL-60 cells from oxidative stress. Ginger oil has domino-tive protective effects on DNA damage induced by free radicals i.e., H2O2. Ginger oil might act as a scavenger of oxygen radical and might be used as an antioxidant.

It is well understood in various studies that there are limitations to use phytochemicals due to their broad canvas of pharmacological actions in human population. Many studies are going to warn therapists about good compliance of medicinal herbs but with keeping in mind, these herbs’s potent human body’s vital organs humatory effects. Gingerol is a relative of capsaicin and piperine, the compounds which give chili peppers and black pepper their respective spicyness. It is normally found as pungent yellow oil, but also can form a low-melting crystalline solid.

MATERIAL/PATIENTS AND METHODS

Sixty patients with high lipid profile were included in the research work conducted at National hospital Lahore from July to November 2019. The study was single blind placebo controlled. Duration of study was four weeks. Already explained and written consent was taken from all participants. Research work on human beings and its objectives were approved from Ethical Committee of the Hospital. Exclusion criteria was alcoholics, chain smokers, patients suffering from any liver disease, renal disease, peptic ulcer, already on vital medicines for treating vital organs of the body. Gender of participants was both male and female patients, age range from 25 to 60 years. Patients were divided in two groups, i.e.; group-1 was advised to take 5 grams of ginger in divided doses as con ve-nant everyday for the period of 12 weeks. Group-2 was on placebo therapy. All pretreatment values of LDL-cholesterol, serum total cholesterol, and body weight were determined by laboratory investigations and clinical examination of patients. Serum total cholesterol was estimated by the enzymatic calorimatic method. Serum LDL-cholesterol was calculated by Friedwald formula

\[
\text{LDL-Cholesterol} = \frac{\text{Total Cholesterol} - \text{HDL-Cholesterol} - \frac{\text{Triglycerides}}{5}}{5}
\]

Body weight was determined by weight machine provided by Lipid Concerned Clinic of the hospital. Data were expressed as the mean ± SD and paired “t” test was applied to determine statistical significance as the difference. A probability value of <0.05 was considered as non-significance and P<0.001 was considered as highly significant change in the results.

RESULTS

In three months therapy by ginger, LDL-cholesterol of 27 hyperlipidemic patients reduced from 202.21±1.88 mg/dl to 187.72±1.98 mg/dl. Serum total cholesterol reduced from 233.11±1.53 mg/dl to 198.44±1.23 mg/dl. Body weight reduced from 76.01±2.66 kg to 72.80±1.87 kg. Changes in LDL cholesterol and total cholesterol are significant while body weight reduction is non-significant when analyzed statistically and compared with placebo group.

DISCUSSION

Incidence of coronary vascular disease (CVD) is increasing all over the world. The increase in these incidences is a major concern in developing countries like Bangladesh, Pakistan, Sri Lanka, Nepal, and India. It is well-established fact that high blood pressure and dyslipidemia are the two major causes of CVD. Various epidemiological studies have shown the prevalence of the co-existence of hypertension and dyslipidemia, in the range of 15 to 31%. The co-existence of the two risk factors has more than an additive adverse impact on the vascular endothelium, which results in enhanced atherosclerosis, leading to CVD. Allopathic drugs like statins and fibrates have limitations for their low compliance in hyperlipidemic patients. Nutaceutical term is getting popularity in cardiologists due to its good compliance and amazing results in hyperlipidemic patients. Ginger is proved nutraceutical agent having therapeutic effects in these patients. Phytochemicals present in ginger are extensively studied and proved their hypolipidemic, hypotensive, and weight reducing effects. A research conducted by Sitavan C et al proved 6 kg decrease in body weight of 108 hyperlipidemic patients by using 5 grams of ginger for 90 days. These results are matching with our results. It may be due to good sample size and ethnic effects of herb used in two different geographical environments for patients as well as climate for fertilization of mentioned herb. Cokava VI et al proved LDL cholesterol, TC and body weight reduction of 39 hyperlipidemic patients 19.87 mg/dl, 29.91 mg/dl, and 4.99 kg respectively, when they used 3 grams of ZO (zingiber officinale) for 8 weeks. These results augment our research study results. Johsin PT et al have
Table 1. Showing Effects of ginger on LDL-cholesterol, total cholesterol and body weight in three months therapy. (n=27)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>At day-0</th>
<th>At day-90</th>
<th>Change in mg/dl</th>
<th>SS/p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL-c</td>
<td>202.21±1.88</td>
<td>187.72±1.98</td>
<td>14.49</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>T-C</td>
<td>233.11±1.53</td>
<td>198.44±1.23</td>
<td>34.67</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Body weight</td>
<td>76.01±2.66</td>
<td>72.80±1.87</td>
<td>3.21</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

Table 2. Showing Effects of placebo on LDL-cholesterol, total cholesterol and body weight in three months (n=30)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>At day-0</th>
<th>At day-90</th>
<th>Change in mg/dl</th>
<th>SS/p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL-c</td>
<td>143.25±1.99</td>
<td>142.98±1.98</td>
<td>0.18</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>T-C</td>
<td>190.47±2.71</td>
<td>188.99±1.76</td>
<td>0.77</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Body weight</td>
<td>76.73±2.19</td>
<td>76.56±1.91</td>
<td>0.22</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

KEY: ± indicates standard error of mean, p-value >0.05 indicates non significant and P<0.001 indicates highly significant change in lipid profile. LDL-C means low density lipoprotein cholesterol mg/dl, T-C means total serum cholesterol mg/dl, HDL-C means high density lipoprotein cholesterol mg/dl, and body weight is measured in kg. GP (group) 1 is on drug and GP (group) 2 is on placebo. SS stands for statistical significance.

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