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BASIL SEEDS (OCIMUM BASILICUM) EFFICACY IN THE MANAGEMENT OF HYPERLIPIDEMIA.

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ABSTRACT

INTRODUCTION: Coronary heart diseases (CHD) are the leading cause of morbidity throughout the World irrespective of gender. CHD can be prevented by proper management of hyperlipidemia in aggregation with healthy diet and lifestyle. **OBJECTIVE:** The current study was designed to ascertain the effect of basil seeds (*Ocimum basilicum)* on hyperlipidemia. **METHODS:** The study was carried out at the University Institute of Diet & Nutrition Sciences, Faculty of Allied Health Sciences, University of Lahore and Major Aziz Bhatti Teaching Hospital (DHQ) Gujrat, Punjab, Pakistan for one year from April, 2021 to April, 2022. Sixty (60) cardiovascular patients from both genders, having cholesterol level ≥ 200 mg/dL were selected and divided into three groups, one group of twenty (20) patients was given no treatment (G_0), second group of twenty (20) patients (G_1) was given 5.0 g basil seeds per patient per day and third group of twenty (20) patients (G_2) was given 10.0 g basil seeds for ninety days. The data was recorded for bio mass index (BMI), total cholesterol (TC) and triglycerides (TG) at 0, 45 and 90 days of study period. **RESULTS:** Both the doses of basil seeds significantly decreased bio mass index (BMI) from 40.59 to 31.16 (23.22 %), total cholesterol (TC) from 267.77 to 223.64 mg/dl (16.48 %) and triglycerides level (TG) from 250.15 to 207.77 mg/dl (16.94 %) of cardiovascular patients with P value of < 0.001 during the whole span of study. The basil seeds (@ 5.0 and 10.0 g per patient per day significantly reduced bio mass index (BMI), total cholesterol (TC) and triglycerides (TG) of cardiovascular patients during 45 and 90 days. However, the effect of basil seeds was observed sharper in case of 2nd dose i.e. 10.0 g of basil seeds per patient per day. **CONCLUSION:** Basil seeds have significant effect on lowering bio mass index, total cholesterol and triglycerides levels of cardiovascular patients. **KEY WORDS:** Ocimum Basilicum, Basil Seeds, Hyperlipidemia, Cardiovascular Patients, Lipid Ameliorating Effect

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INTRODUCTION

Hyperlipidemia is a medical term for abnormally high levels of fats (lipids) in the blood. The two major types of lipids found in the blood are triglycerides and cholesterol [1]. Triglycerides are made when body stores the extra calories it doesn't need for energy. They also come directly from diet in foods such as red meat and whole-fat dairy. A diet high in refined sugar, fructose, and alcohol raises triglycerides [2]. Cholesterol is produced naturally in liver because every cell in body uses it. Similar to triglycerides, cholesterol is also found in fatty foods like eggs, red meat, and cheese. Hyperlipidemia is more commonly known as high cholesterol. Although high cholesterol can be inherited, it's more often the result of unhealthy lifestyle choices [3]. The most common existing treatments for lowering the cholesterol include statins, fibrates, niacin, bile-acid binders and PCSK9 inhibitors [4]. Migrant studies clearly show that individuals of South Asian (India, Pakistan and Bangladesh) descent are particularly vulnerable to hyperlipidemia when moving to affluent countries[5] The growing epidemic hyperlipidemia in middle and low-income countries is widely attributed to socio-economic changes, increase in life span and acquisition of lifestyle-related risk factors [6] and it is the world's leading killer disease in human beings [7]The American Heart Association's current statistics estimated that around half of the USA population is victimized due to this pandemic [8]. Pakistan is suffering from chief menaces of cardiovascular diseases ranging from 30 to 40% of all kinds of mortalities. It is estimated that every 9th Pakistani is suffering from different forms of cardiac diseases [9] The evidence obtained from in vitro and in vivo studies suggests that use of medicinal plants significantly modulate key cellular, molecular and metabolic mechanisms that control both cardiovascular diseases pathogenesis and pathophysiology [10]. The motivation behind this study is the current socioeconomic situation of our country and the possible side-effects of allopathic medications. There is a dire need to have an alternative therapy which should be cost-effective with lesser side effects on the human body. A number of studies helped in considering basil seeds (*Ocimum basilicum)* to be antioxidant, cardiac stimulant, hypoglycemic, anti-inflammatory, immunomodulatory, hepatoprotective and hypolipidemic [11, 12, 13]. The present study focused on cardiovascular patients regarding their treatment with *Ocimum basilicum* seeds. Therefore, this study aimed to conduct a clinical trial on cardiovascular patients to assess the lipid lowering properties of *Ocimum basilicum*.

METHODS

The study was carried out at University Institute of Diet & Nutrition Sciences, Faculty of Allied Health Sciences, University of Lahore and Major Aziz Bhatti Teaching Hospital (DHQ) Gujrat, Punjab, Pakistan for one year from April, 2021 to April, 2022.This study was designed to test the anti-hyperlipidemic potential of *Ocimum basilicum* seeds on hyperlipidemic human subjects. After detailed scrutiny process sixty (60) volunteer cardiovascular patients from both genders between the age group of 30 to 60 years having cholesterol level ≥ 200 mg/dL were selected. They were also non-diabetic and non-smokers. The cardiovascular patients with total cholesterol levels < 200 mg/dL, pregnant or lactating women, patients with allergy to medications, renal failure, liver cirrhosis, cancer, GIT disorders or unwilling to give written consent were excluded from the study. The selected sixty patients were divided into three groups one group of twenty (20) patients was given no treatment (G_0), second group of twenty (20) patients (G_1) was given 5.0 g basil seeds per patient per day and third group of twenty (20) patients (G_2) was given 10.0 g basil seeds for ninety days. The data was recorded for bio mass index (BMI), total cholesterol (TC) and triglycerides (TG) during 45 and

90 days of study period. The blood samples during fasting were taken to evaluate biochemical variables, total cholesterol (TC) and triglycerides (TG). The data was collected and subjected to statistical analysis using SPSS 22.0 software. The mean ± standard deviation was used for quantitative variables; frequency and percentages were used for qualitative variables.

RESULTS

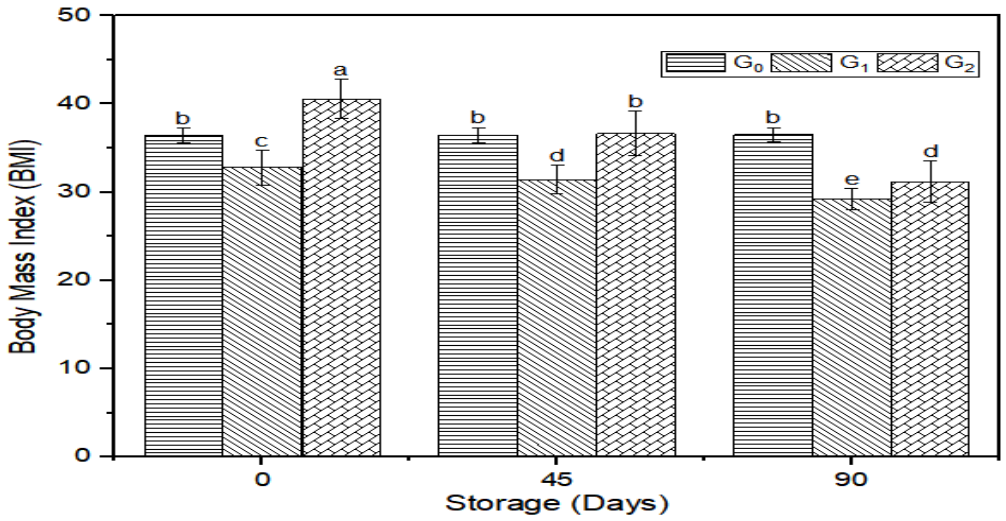

Figure 1: Effect of basil seed treatment on Body Mass Index (BMI)

The data pertaining to body mass index (BMI) of all groups of cardiovascular patients is described in Figure 1. The bio mass index (BMI) values of control patients increased from 36.40 to 36.47 (0.19 %) on 45th day and 36.51 (0.29 %) on 90th day. The BMI of 2nd group of 20 cardiovascular patients with treatment of 5.0 g of basil seeds per day per patient significantly decreased 32.79 to 31.42 (4.17 %) and 29.21 (10.58 %) after 45 and 90 days, respectively. The BMI of cardiovascular patients in 3rd group reduced from 40.59 to 36.65 (9.70 %) and 31.16 (23.22%) after 45 and 90 days, respectively. The decreasing trend of BMI of 20 cardiovascular patients was more prominent with the treatment of basil seeds @ 10.0 g per patient per day in case of 3rd group of cardiovascular patients during the whole study period of 90 days.

The data pertaining to total cholesterol (TC) shows that TC of 20 cardiovascular patients existing in group 1st with no treatment (G_0) increased from 232.36 to 237.37 mg/dl (2.16 %) and 241.19 mg/dl (3.83 %) after 45 and 90 days, respectively (Figure 2). Total cholesterol (TC) of cardiovascular patients in 2nd group with treatment of 5.0 g of basil seeds per patient per day significantly decreased from 238.01 to 231.35 mg/dl (2.80 %) and 222.44 (6.54 %) after 45 and 90 days, respectively. The data further reveals that TC of 3rd group of 20 cardiovascular patients decreased from 267.77 to 251.41 mg/dl (6.11 %) and 223.64 mg/dl (16.48 %) after 45 and 90 days, respectively.

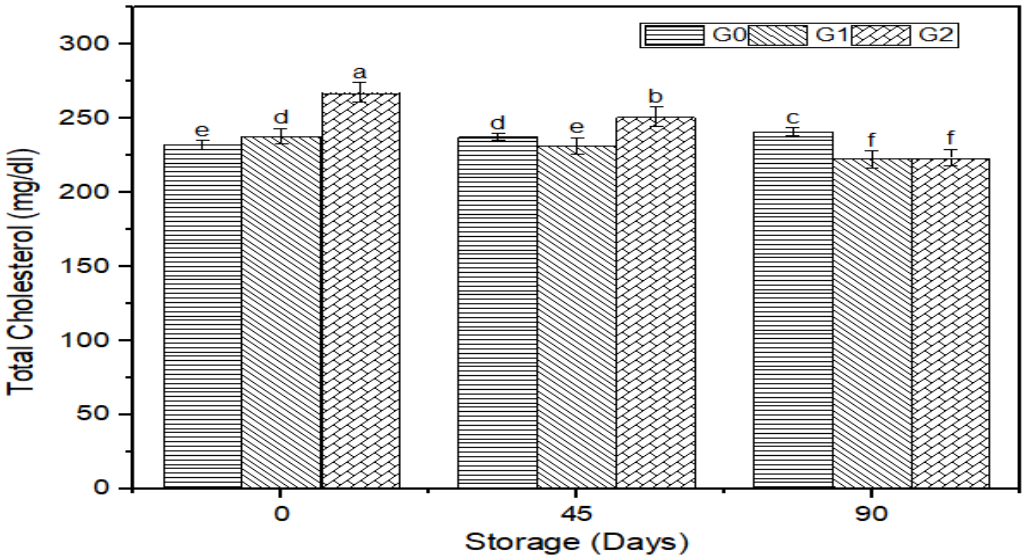

Figure 2: Effect of basil seed treatment on Total Cholesterol (TC)

The data in connection with triglycerides level (TG) of cardiovascular patients (Figure 3) shows that triglycerides level (TG) of 20 cardiovascular patients (G_0) present in group 1st (control) significantly enhanced from 207.79 to 210.27 mg/dl (1.19 %) after 45 days and 212.14 mg/dl (2.09 %) after 90 days of study period. The TG of second group of 20 cardiovascular patients (G_1 = basil seeds @ 5.0 g per patient per day) significantly decreased from 190.86 to 183.27 mg/dl (3.98 %) after 45 days and it further decreased to 178.55 mg/dl (6.45 %) after 90 days. The reduction of TG in patients of 3rd group (G2, basil seeds @ 10.0 g per patient per day) was noted from 250.15 to 225.57 mg/dl (9.83 %) after 45 days and 207.77 mg/dl (16.94 %) after 90 days

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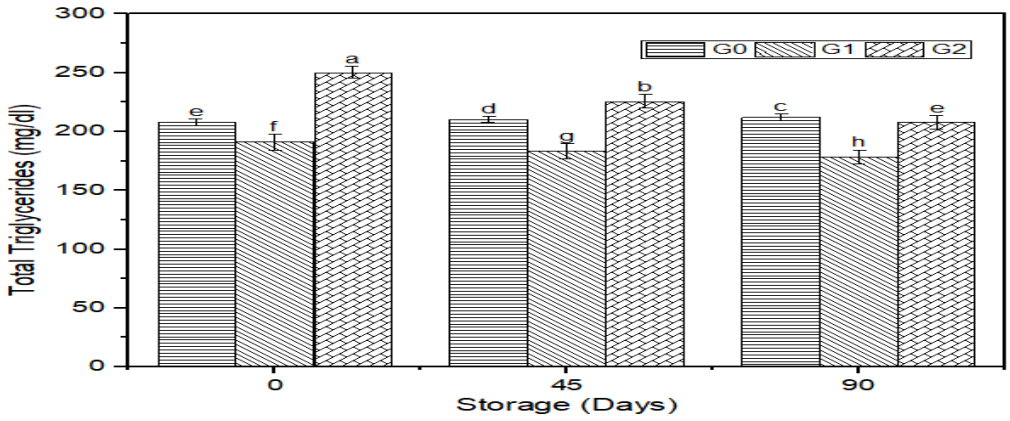

Figure 3: Figure 2: Effect of basil seed treatment on Total Triglycerides (TG)

DISCUSSION

Hyperlipidemia is a leading cause of death all over the worldwide. Itinerant studies clearly show that individuals of South Asian origin (India, Pakistan and Bangladesh) are particularly vulnerable to hyperlipidemia when moving to affluent countries, with rates at least 1.5- to 2-fold higher as compared with natives (Burkhardt, 2019). There are many interventions that has been introduced and approved by the health authorities to reduce hyperlipidemia. The results showed significant effect of basil seeds on the reduction of biomass of cardiovascular patients [14, 15, 16, 17, 18]. However, major influence is given to the dietary interventions. The results were very much promising in reduction of high levels of total cholesterol and triglycerides which are the major causes of cardiovascular diseases [19, 20]. In doing so, different herbal plants have been investigated for their pharmaceutical as well as nutraceutical potential to prevent and ameliorate hyperlipidemia. A similar study with 4 g of basil seeds per day for four weeks, has revealed BMI reduction in obese patients [21] previous studies have found basil seeds to exhibit multiple beneficial effects upon reducing BMI and lipid metabolism [5]. Elevated values of BMI have significantly related to obesity and thus stressing the probing relationship with coronary heart disease CHD and hyperlipidemia [22-23] In a survey, it was discovered that high BMI accounting for 4.0 million deaths in the year 2015, i.e. more than two-thirds of which were caused by cardiovascular disease (CVD) [24]. In the current study, it is evident that the 1st group where no treatment was given, BMI of cardiovascular patients slightly increased, while in 2nd and 3rd group of cardiovascular patients where 5.0 and 10.0 g basil seeds were given per patient per day, respectively. Therefore, significant reduction in BMI was observed after 45 and 90 days in these groups. The Figure 1 illustrates the reduction of BMI of cardiovascular patients under the influence of both doses of basil seeds i.e. @ 5.0 and 10.0 g per patient per day after 45 and 90 days. However, the reduction is more acute in case of 10.0 g basal seeds per patient per day.. The results of current investigation are also in accordance with the study by Obaid & Khalil (2021), who depicted that basil seed extracts significantly reduce the BMI of female rats following 56 days study [14]. In our current investigation, a positive association of BMI with Total Cholesterol (TC) can be observed. According to the data presented in Figure 2 and 3; 1st group, where no treatment was given, the total cholesterol (TC) and triglycerides level (TG) of cardiovascular patients increased significantly, whereas in case of 2nd and 3rd group of cardiovascular patients where 5.0 and 10.0 g basil seeds per patient per day were given, TC and TG statistically reduced after 45 and 90 days. The reduction of TC and TG were more prominent in case of 10.0 g basal seeds per day. Basil seeds exhibit a remarkable fatty acid profile from nutritional and functional point of view. Since basil seeds contains substantial amounts of α-linolenic acid (ALA) and linoleic acid (LA) which are essential fatty acids for humans, therefore, they are helpful in reducing the total cholesterol levels as well as total triglycerides [25].

CONCLUSION

The current study concluded that both doses of basil seeds (@ 5.0 and 10.0 g per patient per day) significantly reduced bio mass index (BMI), total cholesterol (TC) and triglycerides level (TG) of cardiovascular patients during 45 and 90 days of study period. It was also noted that the effect of basil seeds to lower the bio mass index (BMI), total cholesterol (TC) and triglycerides level (TG) of cardiovascular patients was more prominent in case of 10.0 g of basil seeds per patient per day than 5.0 g of basil seeds per patient per day.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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AUTHORS' CONTRIBUTIONS: All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST: No competing interest declared.

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