



MARKHOR

THE JOURNAL OF ZOOLOGY

<https://www.markhorjournal.com/index.php/mjz>

Volume 1, Issue 2 (July-Dec 2020)



Original Article

Potential Role of *Sesamum Indicum L.* Supplementation on Body Mass Index Among Mild to Moderate Hyperlipidemic Patients

Misbah Arshad^{1*}, Shanai Basharat¹ and Shahid Bashir¹

¹University Institute of Diet and Nutritional Sciences, The University of Lahore, Lahore, Pakistan

Keywords:

Sesamum indicum, BMI, Hyperlipidemic, Patients

How to Cite:

Arshad, M. ., Basharat, S. ., & Bashir, S. . (2020). Potential Role of *Sesamum Indicum L.*

Supplementation on Body Mass Index Among Mild to Moderate Hyperlipidemic Patients: *Sesamum indicum* and BMI in hyperlipidemic patients. MARKHOR (The Journal of Zoology), 1(2). <https://doi.org/10.54393/mjz.v1i2.42>

Corresponding author:

Misbah Arshad
University Institute of Diet and Nutritional Sciences, The University of Lahore, Lahore, Pakistan
fatimamishbah10@gmail.com

Article History

Received Date: 28th November, 2022

Acceptance Date: 11th December, 2022

Published Date: 30th December, 2020

ABSTRACT

Hyperlipidemia is the term used to describe abnormally high levels of lipids (fats) in the blood. Cholesterol and triglycerides are the two main types of fat found in blood.

Objectives: To investigate the therapeutic potential of *Sesamum indicum L.* supplementation on BMI among mild to moderate hyperlipidemic patients. **Methods:** For the four weeks of the trial, 30 mild to moderate hyperlipidemic patients between the ages of 25 and 40 were chosen. The University of Lahore Teaching Hospital in Lahore served as the source of the sample. In a hot air oven, *Sesamum indicum L.* seeds were roasted for 15 minutes at 200°C. After roasting, seeds were finely powdered using a professional blender. Patients were instructed to follow a 4-week baseline diet regimen and take a daily supplement of 40 mg of *Sesamum indicum L.* Data on anthropometric measurements, lipid profile biochemical analysis, BMI and nutritional intake were gathered. **Results:** The mean age of the hyperlipidemic study participants was 32.66 years, with an SD of 4.89 years. The mean weight of study participants before and after therapy were 75.2 ± 1.31 and 73.5 ± 1.10 with a significant difference of 1.7. A striking difference (24%) in the obesity rate between pre and post-treatment was observed.

Conclusions: A significant difference in BMI and obesity was observed upon administration of *Sesamum indicum* seeds in hyperlipidemic patients.

INTRODUCTION

The word "hyperlipidemia" refers to unusually high amounts of lipids (fats) in the blood. Triglycerides and cholesterol are the two primary fats found in blood [1]. When the body accumulates additional calories that it doesn't use for energy, triglycerides are generated. Additionally, they are derived directly from diet in foods like whole-fat dairy and red meat. Triglycerides rise when a person consumes a lot of alcohol, fructose, and refined sugar [2]. The most prevalent hyperlipidemic conditions include atherosclerosis, angina, poor lipid metabolism, and myocardial infarction [3]. With 16.7 million fatalities per year, hyperlipidemia is the world's biggest cause of death in both industrialised and developing nations [4]. To prevent and treat hyperlipidemia, many pharmacological plants are utilised. One of these medicinal plants is the sesame seed plant. Sesame (*Sesamum indicum L.*), a member of the Pedaliaceae family, is grown in both subtropical and tropical climates. Sesame seeds are around 3–4 mm long, 2 mm broad, and 1 mm thick. White, black, brown buff, golden brown, and reddish grey are the common colours of sesame seeds. White and black sesame seeds are the most widely used ones. For many years, seeds have been utilised for many purposes [5-7]. Sesame seeds are utilised for several therapeutic and preventive purposes as well, because of the increasing importance of nutraceutical products [8]. Due to their high nutrient content, these seeds are receiving increased attention in the field of nutraceuticals [9]. Carboxylic acids, which serve as antioxidants and slow the spread of a number of malignancies, are also abundant in sesame seeds [10]. Sesamol, sesamol, glycerol, myristic acid, and glycerol esters are a few more components that also function as anti-oxidants [11]. Sesamin, the active ingredient in sesame seeds, is a vasodilator that has been proven to lower the risk of heart disease [12]. Sesamol is another active ingredient found in sesame seeds. Due to its many favourable impacts on health, sesamol also



functions as a biological active ingredient. Sesamol's potential as an anti-obesity drug and its ability to lessen the buildup of lipid droplets in the body have recently come to light. Sesamol is also in charge of enhancing liver lipid metabolism [13]. Hyperlipidemia is now significantly more common in emerging nations like Pakistan. Sesame seed oil and supplements, which are regarded as very acceptable with a good safety profile as an anti-hyperlipidemic treatment, are organic components that lower hyperlipidemia in addition to the drugs for the condition. In Pakistan, no such work has been done, despite the fact that numerous studies have been published internationally. Consequently, the primary goal of the current study was to determine how supplementing with *Sesamum indicum* L. affected body mass index (BMI).

METHODS

A quasi-experimental interventional study to examine the therapeutic effects of *Sesamum indicum* L. supplementation. For the four weeks of the trial, 30 mild to moderate hyperlipidemic patients between the ages of 25 and 40 were chosen. The University of Lahore Teaching Hospital in Lahore served as the source of the sample. *Sesamum indicum* L. white sesame seeds were bought at a nearby market. Sesame seeds were cleaned of physical impurities such dirt, dust, and foreign grains before being roasted in a hot air oven for 15 minutes at 200°C. After roasting, seeds were finely powdered using a professional blender. Then, the ground sesame was transferred into airtight jars. The study enrolled the participants who met the inclusion requirements. Anthropometric measurements, 24-hour dietary recall, blood lipid profile (HDL, LDL, TC, TG), and anthropometric measurements made up the baseline data. The subjects were then instructed to take a 40g supplement of *Sesamum indicum* for four weeks. Over the course of the trial, participants were also encouraged to adhere to the provided 7-day food plan. Patients underwent follow-up visits twice a week. In each follow-up, the anthropometric measurements were taken. Participants were questioned about any difficulties they had following the study's protocol. The identical baseline visit protocol was followed four weeks into the trial. To evaluate the study hypothesis, the pre- and post-test study data were compared. SPSS version 22.0 was used to tabulate and analyse the data. Statistics that were both descriptive and inferential were used to present the findings. The mean and standard deviation were used to report the quantitative information, such as age, BMI, etc. By applying frequency and percentages, the qualitative characteristics like gender and study group were evaluated. The paired sample t-test was used to compare baseline and post-study data. Wilcoxon test was used for the same purpose with non-normal data.

<i>Sesamum</i> Seed Dose	40g
Frequency	Daily
Duration	4 weeks
Target Group	Hyperlipidemic Patients

Table 1: *Sesamum indicum* L supplement Dosage

RESULTS

The mean age of Hyperlipidemic patients enrolled in study are presented in the Table 2. The mean age of participants was 32.66 years with SD \pm 4.89. In this study total 43.3% participants were male and 56.7% were female as represented in Table 3. The mean weight of participants before and after treatment enrolled in study are presented in the Table 4. The mean weight of participants before treatment was 75.2 ± 1.31 and post treatment was 73.5 ± 1.10 with a difference of 1.7. The figure 1 shows a remarkable difference between pre and post treatment obesity rate with a difference of 24%, while number of overweight participants increased after study and percentage of normal participants remained constant.

	Mean \pm SD	Minimum	Maximum
Age	32.66 \pm 4.89	25	39

Table 2: Average age distribution of Hyperlipidemic patients enrolled in study

Gender	Percentage %	Cumulative percentage
Male	43.3	43.3
Female	56.7	100

Table 3: Gender distribution of Hyperlipidemic patients enrolled in study

	Mean ± SD	Minimum	Maximum
Pre	75.2 ± 1.31	63 kg	112 kg
Post	73.5 ± 1.10	63 kg	109 kg

Table 4: Average level of weight pre and post Treatment among hyperlipidemic patients

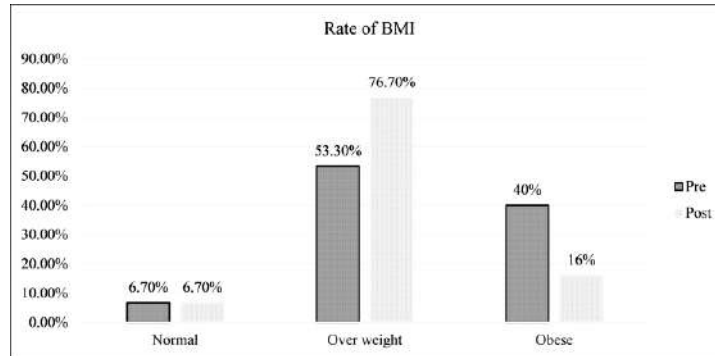


Figure 1: Average BMI status pre and post Treatment among hyperlipidemic patients

DISCUSSION

With 16.7 million deaths per year worldwide, hyperlipidemia is the greatest cause of death in both industrialised and developing nations. According to migrant studies, rates of hyperlipidemia are at least 1.5 to 2 times higher among people of South Asian (India, Pakistan, and Bangladesh) heritage than among native whites when they move to wealthy nations [14-16]. A considerable influence is given to dietary therapies among the numerous that have been introduced and approved by the health authorities to lower hyperlipidemia. To prevent and treat hyperlipidemia, many pharmacological plants are utilized. One of these medicinal plants is the sesame seed plant. Shishehbor et al., also looked into the therapeutic effects of sesame consumption when combined with a balanced diet, however they found no real difference in BMI, lipid profiles, triglyceride levels, or lipid accumulation products. As demonstrated in tables 5.8 and 5.15, the study's findings revealed a striking decrease in total cholesterol levels, which went from 228.502.12 mg/dl to 220.361.68 mg/dl with a p-value of 0.015 [17]. Another study confirms the supplementation of sesame seeds' ability to reduce weight. The results of this study showed a decrease in weight and BMI from 80.7 ± 13.6 to 79.1 ± 16.2 and 32.7 ± 4.2 to 32.0 ± 4.0 kgm-2 and 32.7 ± 4.2 to 32.0 ± 4.0 kgm-2, respectively, with p-values less than 0.05 [18]. The BMI decreased in the current study from 27.97 ± 1.93 to 27.32 ± 0.82 kgm-2 with a p-value of 0.000. Participants' mean weights before treatment were 75.2 ± 1.31 and after treatment were 73.5 ± 1.10, a difference of 1.7 and a p-value of 0.0001 respectively. Evidence from recent studies indicates a stunning 24% difference between the obesity rate before and after therapy. While the percentage of normal participants stayed stable and the number of overweight persons rose following the research, while there was a significant finding with regard to waist circumference and a robust connection between sesame consumption and BMI with a p-value of 0.000, (p-value 0.002) [19, 20].

CONCLUSIONS

According to the results of the current investigation, patients with mild to moderate hyperlipidemia can improve their BMI by taking supplements of Sesamum indicum L.

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