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Research Article

Effect of Green Coffee on Weight Management in Indian Population: A Pilot Study

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Abstract

Obesity and overweight are among the serious health problems that affects the population globally. Obesity can have a negative impact on quality of life and also significantly reduces life expectancy. Obesity might contribute to cardiovascular dysfunction by end organ damage and hypertension. Recently, green coffee is used as a strategy for weight loss and weight maintenance as they increase energy expenditure and the decrease in metabolic rate during weight loss. Green coffee extract (GCE) is present in both green/raw coffee and roasted coffee, but much of the GCE is destroyed during the roasting process. In human subjects, it has been reported that the larger the coffee intake lesser the weight gain. In older adults, coffee consumption alters several glycaemic markers. Consumption of caffeinated coffee reduces long-term weight gain, which might be due to thermogenic effects and other pharmacologically active substances present in coffee. GCE modifies hormone secretion and glucose tolerance by facilitating the absorption of glucose from the distal, rather than the proximal part of the gastrointestinal tract. The aim of this pilot study is to assess the effectiveness of green coffee on weight management in Indian population. A total of 60 subjects both male and female aged between 18-70 years were enrolled in this study. This analysis excludes those who were pregnant, breast feeding, family planning, under 18 and on medication or any other health related issues.

Keywords: Obesity; Weight Management; Green Coffee

Abbreviations

5-CQA: 5-caffeoylquinic acid; BMI: Body Mass Index; BMR: Basal Metabolic Rate; CGA: Chlorogenic acid; GCE: Green Coffee Extract; NIH: National Institute of Health; WHO: World Health Organization.

Introduction

Obesity, excess body fat accumulation, is one of the common medical condition that may have a negative impact on health. People are generally considered obese when their body mass index (BMI) is over 30 kg/m^2. The causative factors for obesity are excessive food intake, lack of physical activity, endocrine disorders and genetic susceptibility. To maintain an increased body mass, obese people have greater energy expenditure than their normal counterparts.

The World Health Organization (WHO) defines obesity was abnormal or excessive fat accumulation is present in many diseases. Incremental evidence suggests obesity is related to epidemiological diseases including diabetes, heart disease, stroke, arthritis, inflammation, and cancers. Therefore, the role of fat in obesity development is important to study to prevent and treat obesity. The main function of adipocytes is to store energy in the form of triglycerides and to convert triglycderides into free fatty acids when energy is required. Furthermore, adipocytes secretes a wide range of regulatory factors of lipid metabolism, it playa a major role in obesity and related disease. Remarkably, adipocytes regulates

lipid metabolism hormonally and effect insulin sensitivity, immune function, eating behavior, and most importantly regulate differentiation of preadipocytes into adipocytes [1].

The WHO classification for overweight and obesity has been adopted by National Institute of Health (NIH) for identification, evaluation, and treatment of overweight and Obesity in Adults. The WHO classification, which predominantly applied to people of European ancestry, assigns increasing risk for comorbid conditions—including hypertension, type 2 diabetes mellitus, and cardiovascular disease—to persons with higher a BMI relative to persons of normal weight (BMI of 18.5 - 25 kg/m^2). Asian populations are known to be at increased risk for diabetes and hypertension at lower BMI [1].

As obesity is often multi-factorial, based on both genetic and behavioral factors, obesity is treated with any of these options - dietary changes, exercise, counseling and support, and sometimes medication can supplement diet to help patients conquer weight problems. Extreme diets, on the other hand, can actually contribute to increased obesity [2]. The current conventional weight-management programs are not satisfactory, which indicates a need for safe, effective, and acceptable weight-management options. It is therefore not surprising to see the marketing of a plethora of over-the-counter slimming aids with claims of effectiveness [3]. The ingredients of weight-loss supplements differ and are found in many combinations.

The mechanisms of the weight loss supplements are reduce appetite, absorption of nutrients and increase the fat burning [4].

Chlorogenic acid (CGA) in green coffee regulates hypertensive, vasoreactivity, and glucose metabolism. Various studies have demonstrated that CGA decreases diabetes risks by decreasing glucose uptake in the small intestine. However, only the short-term effects were analyzed and more research is needed. The attenuation of obesity and lipid accumulation by green coffee bean extract might be due to CGA, a derivative of 5-caffeoylquinic acid (5-CQA) in diet-induced obesity and insulin resistance [5].

Several animal studies had provided evidence for the use of GCE as a weight loss supplement. In human subjects, it has been reported that the larger the coffee intake lesser the weight gain. In older adults, coffee consumption alters several glycaemic markers. Similarly, consumption of caffeinated coffee reduces long-term weight gain, which might be due to thermogenic effects and other pharmacologically active substances present in coffee. GCE modifies hormone secretion and glucose tolerance by facilitating the absorption of glucose from the distal, rather than the proximal part of the gastrointestinal tract. Hence, the present pilot study was designed to determine the effect of green coffee supplementation on weight management.

Materials and Methods

Study population

A total of 60 subjects both male and female age ranging between 18-70 years who visited during January and March, 2019 for weight management were enrolled in this study. Subjects who are pregnant, breast feeding, family planning, under 18 and on medication or any other health related issues were excluded.

The 60 subjects were randomly divided into two groups- Group I and Group II. Group I was supplemented with commercially available green coffee powder. Group II was supplemented with commercially available compound formulation that contained Green coffee as an ingredient. These compound formulations were used in this study. The choice of supplementation in Group II is as per the subjects enrolled. The study subjects of both the groups were followed their routine lifestyle with no extra exercises or diet restrictions.

Before subjecting to the use of any supplementations, the body weight (BW) of each subjects were measured for recommendation of right dosages of the supplementations. For a period of 3 months, the subjects are subjected to a regular intake of the supplements at proper recommended times.

Study supplements

The dietary supplement for weight management in Group I subjects is commercially available Green Coffee Powder – Neuherbs Green Coffee Powder. Take 10-15g (1 scoop) coffee beans powder twice a day - 30 minutes before breakfast and in between 4-6 pm.

Group II subjects were supplemented with any of these following commercially compound formulations that contain Green Coffee - Neuherbs Green Coffee Extract Capsules, Neuherbs Garcinia Cambogia Capsules, Neuherbs F8 Ultra Fat Burner Capsules, Neuherbs Green Coffee Extract Capsules.

Study parameters

Parameters like age, sex and height were collected from each subject. Also, weight were measured before using the supplementations. According to their initial and final weight, their respective initial and final BMI and BMR were calculated as per the standard formula. For BMI, the formula used is: BMI = weight (in kg) ÷ heigth^2 (m^2). For BMR, we used the formula:

- Women: BMR = 655 + (9.6 x weight in kg) + (1.8 x height in cm) - (4.7 x age in years)
- Men: BMR = 66 + (13.7 x weight in kg) + (5 x height in cm) - (6.8 x age in years).

Statistical analysis

All data are represented as Mean ± SD. The comparisons between two groups were analyzed used in independent and dependent T-Test using SPSS. A P-value <0.05 were considered to be significant.

Results and Discussion

From the data collected, a total of 60 study subjects were included: in which they are divided randomly into two groups - Group I and Group II. 30 subjects, 16 males and 14 females were in Group-I and in Group II 30 subjects (17 males and 13 females). In the 60 data collected, age range from 18 - 70 years. In Group I, the mean age was 31.8 ± 13.44 years, while in Group II, the mean age was 32.13 ± 11.61 years. For height distribution, in Group I; the mean height was 163.83 ± 6.32 cm while in Group II, the mean height was 166.73 ± 10.12 cm.

For weight distribution, in Group I, initial mean weight was 78.52 ± 11.68 kg and final mean weight was 75.56 ± 11.32 kg, while in Group II, initial mean weight was 83.08 ± 14.42 kg and final mean weight was 77.23 ± 12.43 kg. No significant change in weight reduction was observed in both the groups. For BMI, in Group I, the initial BMI was 29.32 ± 4.36 kg/m^2, and final BMI was 28.21 ± 4.20 kg/m^2. While in Group II, the initial BMI was 29.94 ± 4.67 kg/m^2, and final BMI was 27.86 ± 4.27 kg/m^2. For BMI difference, in Group I, the mean BMI difference was -1.11 ± 0.46 kg/m^2, while in Group II, the mean BMI difference was -2.08 ± 1.41 kg/m2. For BMR, in Group I, the initial BMR was 1577.67 ± 194.18 J/(h.kg) and final BMR was 1548.13 ± 189.29 J/(h.kg). While in Group II, the initial BMR was 1645.43 ± 233.45 J/(h.kg) and final BMR was 1586.93 ± 216.84 J/(h.kg). For BMR difference, in Group I; the mean BMR difference was -29.53 ± 11.79 J/(h.kg). While in Group II, the mean BMR difference was -58.50 ± 41.34 J/(h.kg).

The main purpose of this study was to assess the efficacy of green coffee as a weight loss supplement. The overall results revealed a change in body weight with the use of green coffee. Green coffee influence postprandrial glucose concentration and blood lipid concentration by reducing the intestinal absorption of glucose in the intestine and electrochemical gradient dispersal leading to an influx of glucose into the enterocytes [7]. Green coffee is also thought to inhibit hepatic glucose-6-phosphatase, which is involved in the homeostasis of glucose [8]. Reports from animal studies have suggested that green coffee mediates its anti-obesity effect possibly by suppressing the accumulation of hepatic triglycerides [7]. Green coffee exhibited anti-obesity effect by altering the plasma adipokine level and body fat distribution and down-regulating fatty acid and cholesterol biosynthesis, whereas upregulating fatty acid oxidation and peroxisome proliferator-activated receptor alpha expression in the liver [9].

Diets rich in polyphenols may help to prevent various kinds of diseases associated with oxidative stress. The anti-oxidant activity of green coffee is due its ability to scavenge free radicals in vitro, and to increase the antioxidant capacity of plasma *in vivo*. Certain dietary phenols, including green coffee, may modify intestinal glucose uptake that might affect the body weight. The weight loss effect of green coffee would have a protective effect against diabetes mellitus, via changes in gastrointestinal hormone secretion [7]. A few questions, however, arise which involve the use of green coffee as a weight loss aid.

This pilot study has several limitations. Firstly, this is an observational study, no control have been included in this study. Secondly, the small sample size and very short duration of this study increase the possibility of spurious or false positive results and also the efficacy for weight reduction on long-term. Although none of the subjects identified reported any adverse events, the safety of this weight loss aid is to be studied. These factors prevent us from drawing firm conclusions about the effects of green coffee on body weight.

Conclusion

The evidence from the subjects seems to indicate that the intake of green coffee can promote weight loss. However, further studies with large sample size and longer duration is required to assess the efficacy and safety of green coffee as a weight loss supplement as the size of the effect is small, and the clinical relevance of this effect is uncertain in this pilot study.

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Conflict of Interest

The authors declare no conflict of interest.

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