



Effect of cumin powder on body composition and lipid profile in overweight and obese women



Roghayeh Zare ^a, Fatemeh Heshmati ^b, Hossein Fallahzadeh ^c, Azadeh Nadjarzadeh ^{a, b, *}

^a Nutrition and Food Security Research Centre, Shahid Sadoughi University of Medical Sciences, Iran

^b Department of Nutrition, Shahid Sadoughi University of Medical Sciences, Iran

^c Department of Epidemiology and Biostatistics, Shahid Sadoughi University of Medical Sciences, Iran

A B S T R A C T

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Introduction: This study aimed to determine the effect of cumin powder on body composition and lipid profile in overweight and obese women.

Materials & methods: In this randomized clinical trial, 88 overweight/obese women were randomly assigned into two groups. The experimental group was asked to have 3 g/d cumin powder with yogurt at two meals for 3 months. The same amount of yogurt minus cumin powder was prescribed for the control group. All patients received nutrition counseling for weight loss in a similar manner. Anthropometric and biochemical parameters were determined before and after the intervention.

Results: Cumin powder reduced serum levels of fasting cholesterol, triglyceride, and LDL and increased HDL. Weight, BMI, waist circumference, fat mass and its percentage significantly reduced. It has no effect on FBS and fat-free mass.

Conclusion: Cumin powder in a weight reduction diet showed improvement in anthropometric and biochemical parameters in overweight/obese women.

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1. Introduction

Obesity is the most important nutritional disease in developed countries and has rapidly spread in the past two decades. On the other hand, overweight and obesity are among the most important predisposing factors of morbidity and mortality. Obesity can be accompanied by the abnormalities of blood glucose and blood lipoproteins which exposes people to many diseases including diabetes, hyperlipidemia, hypertension, and cardiovascular diseases [1]. Previous studies have suggested that body fat distribution may play a role in the risk of some diseases [2]. Nowadays, many pharmaceutical treatments have been used to control blood lipids and lose weight; but, they have little effects and often induce several side effects [3]. Given that nowadays use of traditional medicine and medicinal plants has become prevalent in the treatment of many diseases. Using of medicinal plants can be a viable alternative for synthetic drugs [4]. Extensive studies have been performed on the effects of different medicinal plants on plasma

lipids and weight loss. Cumin, as one of these medicinal plants, contains more than 100 different chemicals, including essential fatty acids and volatile oils [5]. Some studies have shown that cumin may have decreasing effects of blood lipids and weight [6]. However, to the best knowledge of us, the majority of these studies have been done on animals and the published human studies have been conducted on patients suffering from diabetes or hypercholesterolemia [7]. Hence, the present study aimed to determine the effect of cumin powder on body composition and lipid profile in overweight and obese women.

2. Materials & methods

In this randomized clinical trial, overweight and obese women (BMI > 25) were invited to a Nutrition Research Center using a call for research and then topic, objectives, and method of the study were explained to them. After obtaining a written consent, 100 participants who met the inclusion criteria for the study including having 20–60 years old with BMI > 25, lack of any history of diseases and special drug consumption, no previous treatment regimens in the past three months, and lack of weight change by more than 2 kg in the last month were included. Exclusion criteria were as follows: having allergic reactions to cumin, consuming less than

* Corresponding author. Shahid Sadoughi University of Medical Sciences, Iran. Tel.: +98 3516240691, +98 912 218 5325; fax: +98 3516238555.

E-mail address: azmm1383@yahoo.com (A. Nadjarzadeh).

80% of the prescribed cumin, and failure to follow the prescribed diet. Using a computer random selection, these people were divided into two groups; the control group and the group receiving cumin powder. After 12 h of fasting, 5 ml blood was taken from all the people to Measure fasting blood glucose, triglycerides, total cholesterol, LDL-C, and HDL-C concentrations. Fasting plasma glucose test was performed using the assay kit (Pars Azmoon Co., Tehran, Iran) by glucose-peroxidase method and auto-analyzer device made in Echoplus Company, Italy. Triglyceride and total cholesterol were measured using assay kits (Pars Azmoon Co., Tehran, Iran) by glycerol oxidase and cholesterol oxidase enzymatic methods by the auto-analyzer device made in Echoplus in Company, Italy. HDL cholesterol was measured after the precipitation of beta-lipoproteins by dextran sulfate and chloride magnesium using oxidase cholesterol method and the auto-analyzer device. LDL cholesterol was calculated by Friedewald's formula. Weight (kg) (no shoes, minimum clothing) was measured on a calibrated scale (with accuracy of 0.1 Kg), and height (within 0.1 cm) was measured by stadiometer. Waist circumferences were measured using an anthropometric tape measure with accuracy of 0.1 cm. Body composition parameters were assessed using BIA, TANITA Body Composition Analyzer (Model BC-418 MA, Japan) at Nutrition and Food Security Research Centre. Stepping on the weighing platform with bare feet, anterior and posterior electrodes touched subject feet. The hand grips were squeezed by the subject, after stabilizing the body weight figure on the display. The measured parameters included fat mass, fat-free mass, total body fat percentage and the percentage of fat-free mass. Body mass index (BMI) was calculated by dividing weight by square of height.

Single blinding was done as follows: cumin powder along with a diet was prescribed by a dietitian considering the random codes obtained from a random number table. The researcher was blind to the receiver group and another person had the codes. When a participant was visited, her group was announced to the dietitian. Energy calculation was performed for all the participants using Harris–Benedict equation and reduced-calorie diet (500 kcal less than the required level) was prescribed by the dietitian. The experimental group was asked to have 3 g cumin powder [6] along with yogurt at two meals of lunch and dinner (each time 1.5 g cumin + 150 ml low-fat yogurt) on a daily basis. The same amount of yogurt minus cumin powder was prescribed for the control group. Dosage of cumin was selected based on previous study [6] and also its palatability and tolerability by the participants. Length of the study period was 3 months. This period was a bit short but it was enough to show moderate weight loss. We could not extend this period due to possible high attrition rate. In fact, the packages containing cumin powder for one month consumption were given to the patients and the required follow-ups with an emphasis on taking them and getting aware of the probable side effects were done over phone calls. After one month, the participants were asked to return the remaining bags. If more than 20% of them were left, the participant would be excluded from the study.

All patients received nutrition counseling in individual sessions every two weeks in the first month and every month thereafter until 3 months, with biological reevaluation at 3 months. Three day dietary records were used to calculate food and beverage intake at baseline and during intervention for each visit. Each three day record consisted of two weekdays and one weekend. Foods were measured using standard measuring cups and spoons; to maximize the accuracy of the dietary records and corrected by dietitian. No supplements were used by the participants during the study. Participants who consumed less than 80% of cumin packages or did not complete the dietary records were considered noncompliant and were excluded from final analysis. Each food and beverage was analyzed for nutrient intake using Nutritionist IV software (Version

4.1, First Databank Division, The Hearst Corporation, San Bruno, CA) to assess macronutrient and micronutrient contents of foods. The Iranian food composition table (FCT) was used as an alternative for traditional Iranian food items which are not included in the Food Composition Tables for USA (USDA FCT). During the 16-week intensive dietary treatment, the amount of attention given to the groups was exactly the same, in order to reduce the risk of measurement bias.

In a per-protocol analysis, 12 subjects were excluded during the intervention (Fig. 1); in the group receiving cumin powder, three subjects were emergence of cumin allergy. At the end, 88 participants completed the study. Data collected during baseline and weeks 12 of the intervention were compared. The Kolmogorov–Smirnov test was used to test the normal distribution of variables. Descriptive statistics are presented as mean \pm SD. For the primary analysis, we used an independent sample *t*-test and paired samples *t*-test. Analysis of covariance (ANCOVA) was used to adjust mean differences on fasting blood sugar for its baseline concentration. All tests were two-sided and *P*-values less than 0.05 were considered significant. All statistical analyses were performed using SPSS 13. The present study was approved by the Ethics Committee of Shahid Sadoughi University of Medical Sciences and Iranian Registry of Clinical Trial (registration no. IRCT2013021112429N1).

3. Results

The current study was a single blind clinical trial, which was performed on 100 overweight and obese women. Among the participants, 88 women completed the study and others were excluded due to not following the diet, traveling, or emergence of cumin allergy. Mean age of the people receiving cumin was 38.06 ± 7.97 years old and mean age of the control group was 36.37 ± 9.01 ; according to independent *t*-test, it was homogeneous and the groups did not have any significant age differences.

In Table 1, mean intake of energy and macronutrients before and after the study in both groups of receiving cumin powder and control is shown.

According to Table 2, basic data of anthropometric factors including body weight, BMI, waist circumference, weight of fat-free mass, weight of fat mass, and percentage fat mass were not significantly different in the group receiving cumin powder and control group ($p > 0.05$).

According to Table 3, basic data of biochemical factors including concentration of triglyceride, cholesterol, LDL-c, and HDL-c had no significant difference in cumin receiving group and control group ($p > 0.05$). But, concentration of fasting blood glucose was different between groups at the beginning of the study.

As Table 4 shows, at the end of the study, significant body weight reduction was observed in both groups ($p > 0.005$); but, weight loss in the cumin group was higher than that in the control group (-6.20 kg in the experimental group versus -4.19 kg in the control group, $p = 0.005$). In terms of BMI, there was a significant reduction in both groups at the end of the study ($p = 0.005$); but, this reduction was more tangible in the cumin group (-2.35 Kg/m² in the experimental group versus -1.31 Kg/m² in the control group, $p = 0.005$). Waist circumference had significant reduction at the end of the study in both groups ($p = 0.005$), which was 8.22% in the cumin and 5.51% in the control groups; this reduction was significantly higher in the cumin group ($p = 0.005$). There was no significant change in terms of fat-free mass (ffm) at the end of the study in both groups ($p = 0.48$). Fat mass index (fm) had a significant reduction in both groups ($p = 0.005$); however, this reduction was 18.12% in the cumin group and 10.66% in the experimental group, which was significantly higher in the former

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