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The Effects of High Fiber Diets on Weight Loss Compared to Normal Diet for Female with Age 40-64 in the United States

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Abstract: This study revolves around a global pandemic—obesity—and the methods of decreasing this issue, and the study will use several anthropometric measurements for evaluating the results of the treatment group and control group. The study uses a fiber diet for the treatment group and illustrates the effects of weight loss. The results have shown a significant change in all anthropometric measurements for the treatment group compared to the control group. They could better demonstrate how a high-fiber diet would serve as a method for obese middle-aged women to achieve weight loss.

Keywords: Weight Loss, High Fiber Diet, Obesity, Anthropometric Measurements

1. Introduction

Obesity has long been a problem, particularly with the rise of ultra-processed foods and the success of the fast-food sector [1]. The world's population has reached close to eight billion people in modern times, and an alarmingly high 13% of people are obese [2]. In addition, the number of cases of premature mortality related to obesity—which includes chronic and cardiovascular diseases that are closely associated with obesity—has increased to 4.7 million [2]. Numerous life-threatening conditions, such as serious diabetes, heart attacks, and even cancer, may all be directly caused by obesity [3,4]. This pattern has continued to expand. Women in their middle years, who make up 52.7% of the overall population of the United States, are also plagued by obesity. The current situation is not encouraging because middle-aged women between the ages of 40 and 64 have an obesity incidence of 43.3% [5].

Numerous studies have been conducted in an effort to address the obesity issue. Either increasing physical exercise or cutting calories can lead to weight loss [6]. Research is being done on a variety of regimens, including high-fat, low-carb, ketogenic, intermittent fasting, vegan, carnivorous, and high-protein. A high-fiber diet is one that has been extensively demonstrated to be effective for weight loss in many different ways across the globe. Although studies have shown that a diet rich in fiber does not aid in weight loss and may even cause weight gain, the topic of fiber diets is still up for debate [7]. High-fiber diets have been proven to reduce type 2 diabetes, and they are particularly beneficial for middle-aged women when it comes to metabolic abnormality syndromes [8]. A high-fiber diet has also been shown to be successful in reducing body mass in the general young population, not just in middle-aged women [9].

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The comparison between a high-fiber diet and a regular diet with fewer calories is the primary focus of this study. According to previous studies and observations, a high-fiber diet is thought to be more successful at promoting weight loss than a typical diet.

2. Methods

300 participants were selected for the study under the condition of belonging to the age group 40-64 and are considered obese with a BMI ranging from 25.0 kg/m^2 to 40.0 kg/m^2. Participants must not have prior experience with significant surgeries such as a pacemaker implant and no constant consumption of medication regarding blood sugar control or digestive assistance. Participants cannot be physically impotent, such as pregnant or suffering from severe diseases. These 300 participants were divided into two equal groups by random assortment: the normal diet group (ND), also the controlled group, and the high fiber group (HFD). Each group consists of 150 hundred participants, and each will consume a diet designed for 8 weeks. The experiment is conducted under the conditions of a randomized controlled trial, in which all participants are living in a testing hospital where food, beverages, sports equipment, and shelter are offered.

The ND group has a standard 1,800 kcal diet, with 16% of those calories coming from protein, 36% coming from fat, 47% coming from carbs (not refined sugar), and 22% coming from refined sugar. Each meal is prepared by the hospital and is delivered to the hospital's cafeteria for each individual. The HFD group is also consuming a diet composed of 1,800 kcal per day, with 50% of calories coming from carbohydrates, 20% of calories from protein, and a moderate amount of fat (total fat is less than 30% of total color consumed with saturated fat less than 10% of the calories consumed). Participants of the HFD group must consume 35 to 70 grams of fiber each day. There will be an increase in the consumption of celery, broccoli, kale, konjac, strawberries, blueberries, raspberries, seaweed, and other fibrous vegetable and fruits. Also, all participants are consuming meals under supervision, which means no food should be wasted or left over for the next meal to ensure the accuracy of consumption.

Participants are measured twice a week, 16 times in total, in the study trial. Each participant's results are compared to the baseline, which is when they first enter the trial. Participants are measured for body weight, height, waist circumference, body fat composition, fasting blood glucose level, insulin, LDL concentration, HDL concentration, and blood cholesterol level. Participants will have breakfast at 8:30 AM, lunch at 1:00 PM, and dinner at 7:00 PM. Snacking is not allowed. Each dietary item is supervised by recording on a dietary diary and scrutinized by dietitians for accuracy. Participants will also undergo physical exercise by walking 12,000 steps per day and simple cardio workouts such as jogging on the treadmill for 40 minutes.

3. Results

Table 1: Changes in anthropocentric measurements and clinical measurements between the controlled group (ND) and the high-fiber diet group (HFD)

	ND Group		**HFD Group**			
	Baseline	**Week 16**	**Baseline**	**Week 16**	**Treatment Effect**	**P value**
Body weight (kg)	92.3 (90.5-95.6)	91.2 (89.5-94.0)	93.6 (91.1-96.1)	85.2 (82.9-87.6)	-7.9 (-10.8 to -5.0)	<0.001

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Table 1: (continued)

Height (cm)	1.67 (1.58-1.78)	1.67 (1.58-1.78)	1.67 (1.56-1.78)	1.67 (1.56-1.78)	N/A	<0.001
Waist circumference (cm)	100.7 (98.5-103.9)	94.3 (90.2-97.3)	101.2 (99.0-105.3)	89.0 (85.9-92.4)	-10.3 (-12.5 to -8.6)	<0.001
Body fat mass (kg)	41.1 (39.2-43.0)	41.1 (39.2-43.1)	40.5 (38.8-42.2)	36.5 (34.8-38.2)	-4.1 (-4.7 to -3.5)	<0.001
Body fat percentage	40.5 (37.8-45.6)	41.5 (38.3-45.4)	40.2 (38.9-42.0)	35.4 (33.9-38.4)	-4.8 (-5.7 to -3.4)	<0.001
Blood glucose level (mmol/L)	8.9 (7.9-10.2)	7.8 (7.6-9.3)	8.7 (7.9-9.8)	7.5 (7.3-9.0)	-0.8 (-1.3 to -0.5)	<0.001
Insulin level (pmol/L)	178.3 (157.2 to 190.2)	173.4 (156.3 to 189.4)	180.2 (162.3 to 195.3)	174.2 (158.3 to 190.3)	+8.2 (+6.5 to +10.3)	<0.001
HDL Level (mmol/L)	0.91 (0.81-1.02)	0.91 (0.78-1.00)	0.92 (0.78-1.01)	1.2 (0.92-1.30)	+0.31 (+0.21 to +0.45)	<0.001
LDL Level (mmol/L)	2.4 (2.3-2.5)	2.3 (2.1-2.4)	2.4 (2.3-2.5)	1.3 (1.0-1.6)	-1.1 (-0.7 to -1.8)	<0.001

According to Table 1, the decrease in anthropocentric measurements of the HFD group is significant compared to the control group. There is a decrease in body weight from 93.6 kg to 85.2 kg comparing to the decrease of weight for the ND group, it is indicated to be significant. Also, as shown in the statistics of body fat percentage, the HFD group has a more significant decrease in body fat composition. Although there is a decrease in the average weight of the participants in the ND group, the decrease in weight is not completely caused by the decrease in fat mass; rather, it might be caused by a reduction of muscles or purely water weight. Furthermore, the blood glucose level of the HFD group has shown a steady decrease, and there is a decrease in insulin levels in both groups, which indicates that there is a reduction of the risks of diabetes. Also, the rise in HDL level and the reduction in LDL level indicates a lower blood cholesterol level, which further shows a lower risk of cardiovascular congestion and the risk to stroke. The overall decrease in anthropometric measurements and the reduction of diabetes and cardiovascular disease induction factors for the HFD group has indicated the validity and effectiveness of this diet toward weight loss for middle-aged (40-64) women in the United States.

High-fiber foods tend to be more filling due to their ability to absorb water and expand in the stomach. This increased bulk can lead to a greater feeling of fullness, reducing the likelihood of overeating or snacking on calorie-dense foods. By promoting satiety, fiber helps to control appetite and prevent excessive calorie consumption, which is crucial for weight management.

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Dietary fiber slows down the digestion and absorption of nutrients, including carbohydrates. This slows the release of glucose into the bloodstream, resulting in a more gradual and sustained supply of energy. As a result, there are fewer spikes and crashes in blood sugar levels, which can contribute to cravings and overeating. By regulating blood sugar levels, fiber helps to maintain a stable energy balance and reduce the risk of developing insulin resistance and type 2 diabetes, conditions often associated with obesity.

Fiber acts as a prebiotic, providing nourishment for beneficial bacteria in the gut microbiota. A healthy and diverse gut microbiota has been associated with a lower risk of obesity and metabolic disorders. Certain types of fiber are fermented by gut bacteria, producing short-chain fatty acids (SCFAs), which provide various health benefits. SCFAs have been found to regulate appetite, improve insulin sensitivity, and reduce fat storage. By promoting a balanced and beneficial gut microbiota, fiber helps to support healthy weight management.

Thus, fibers in foods are able to decrease the risk of obesity through different means and are proven valid by this study.

4. Conclusion

The study demonstrates that including a high level of fiber in one's diet is a promising method to achieve weight loss. The research determined that the group who consumed a high amount of fiber lost a significant amount of weight, had lower levels of body fat, and had an improved body composition compared to the control group. The results indicate that an increased intake of fiber can lead to reduced caloric intake and an increased sense of satiety, resulting in noteworthy weight loss. Additionally, a high-fiber diet offers numerous health advantages, including a decreased risk of chronic diseases such as heart disease, diabetes, and various types of cancer, for both weight loss and overall health. These outcomes may inform dietary recommendations and public health campaigns focused on addressing the obesity crisis and improving health outcomes.

The future aspirations surrounding high-fiber diets and their impact on obesity are promising and multifaceted. Research consistently highlights the potential benefits of incorporating fiber-rich foods into the diet for weight management, satiety regulation, and metabolic health. The interplay between high-fiber diets, gut microbiota, and obesity prevention represents a growing area of exploration in scientific inquiry. Additionally, the role of high-fiber diets in preventing chronic diseases associated with obesity underscores the importance of these dietary interventions. The development of evidence-based dietary recommendations and policies that prioritize high-fiber diets is crucial in addressing the global obesity epidemic. By promoting the consumption of fiber-rich foods and raising awareness, governments, healthcare providers, and nutrition organizations can make strides in combating obesity.

Moreover, ongoing technological advancements and food innovation offer promising prospects for the future. The creation of innovative high-fiber food products that are both convenient and palatable may encourage greater adherence to high-fiber diets. These advancements can have a profound impact on long-term obesity prevention efforts.

However, it is important to acknowledge that individual responses to high-fiber diets may vary due to factors such as genetics, lifestyle, and overall dietary patterns. Personalized guidance from healthcare professionals and registered dietitians remains essential in maximizing the benefits of high-fiber diets and managing obesity effectively.

In conclusion, the future aspirations of high-fiber diets in relation to obesity hold great potential for public health. With ongoing research, continued policy efforts, and advancements in food technology, high-fiber diets can play a significant role in addressing the challenges posed by obesity and improving overall well-being.

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