

A randomized controlled trial of food diets to test the difference between effects of the high protein diet and the Mediterranean diet on weight loss

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Abstract. There are many different diets for weight loss for people to choose to follow. The effect of different diets on weight loss is not clear enough. This paper makes comparison between the benefits of the high protein diet and the Mediterranean diet. An 8-week experiment is carried out with subjects to show the difference in effect of the two diets. Subjects that had been divided in two group were asked to follow specific eating plans that are designed by the professional dietitian. The result of the experiment shows that high protein diet is more beneficial to weight loss. Since obesity has become a serious problem in Chinese society, and many people are sick or even dying because of obesity, losing weight is tough and difficult for people to stick on especially by taking exercise. An efficient and healthy diet can be helpful to solve the problem of obesity or overweight.

Keywords: weight loss, high protein diet, the Mediterranean diet.

1. Introduction

In China, obesity is becoming a serious social problem with increasing number of people getting overweight. Based on Chinese criteria, 34.6% of adults (aged over 18) are overweight, and 16.4% of adults are obese [1]. Being overweight is harmful to our body. It can cause serious disease including type 2 diabetes, hypertension, coronary disease.

Protein is an essential nutrient which can be found everywhere in human body. We need to take in protein make enzymes and build muscles. Since the first advocacy of benefit of high protein diet on weight loss by Dr. Maxwell Stillman [2], much research has been carried out to the effect of high protein diet on weight loss. However, taking in too much protein, especially animal protein, can increase inflammation in human's body and is deter mental to your health [3]. The Mediterranean diet profile focuses on whole grains, good fats (fish, olive oil, nuts etc.), vegetables, fruits, fish, and very low consumption of any non-fish meat [4]. In order to discover the difference between high protein diet's and the Mediterranean diet's effect on weight loss, we set up this research in Shenzhen, China. It is hypothesized that the high protein diet has more beneficial effect on losing weight compared to the Mediterranean diet.

2. Method

2.1. Subjects

The study was conducted between September 2022 and November 2022 in Shenzhen, China using randomized clinical trial. 214 regularly exercised female participants aged \pm SD 20 years old with BMI ranged from 25.0 kg/m² to 27.0 kg/m² were enrolled through advertisements placed online. One criterion for entering the study was that subjects must have kept strength exercise for at least 3 years (training 2-4 days per week with at least 2 years' experience in split training routines). The subjects should be life-long steroid free, with no clinical problem that could be aggravated by study procedure or affect the generality of the experiment.

2000 subjects signed up for the experiment and were screened over phone. The number of subjects who came to in-person meetings is 534, but 53 of them were outside BMI range, 6 of the were diagnosed with diabetes; 10 of them were excluded because of medial reason; 39 of them were not willing to be in the high protein group or the common diet group; 4 of them were unable to attend weekly classes for diet planning. 422 subjects signed the consent form. 208 subjects were excluded because of several reasons. 214 subjects underwent baseline assessment and were randomized. The subjects were divided into 2 group: one using the Mediterranean diet (MD, n =107), one using high protein diet (HPD, n = 107). During the 8 weeks of research, 3 subjects of MD dropped out, and 10 subjects of HPD dropped out. 104 of subjects in the MD finished the final assessment with 8 weeks food record, while 97 of subjects in the HPD finished the final assessment with 8 weeks food record.

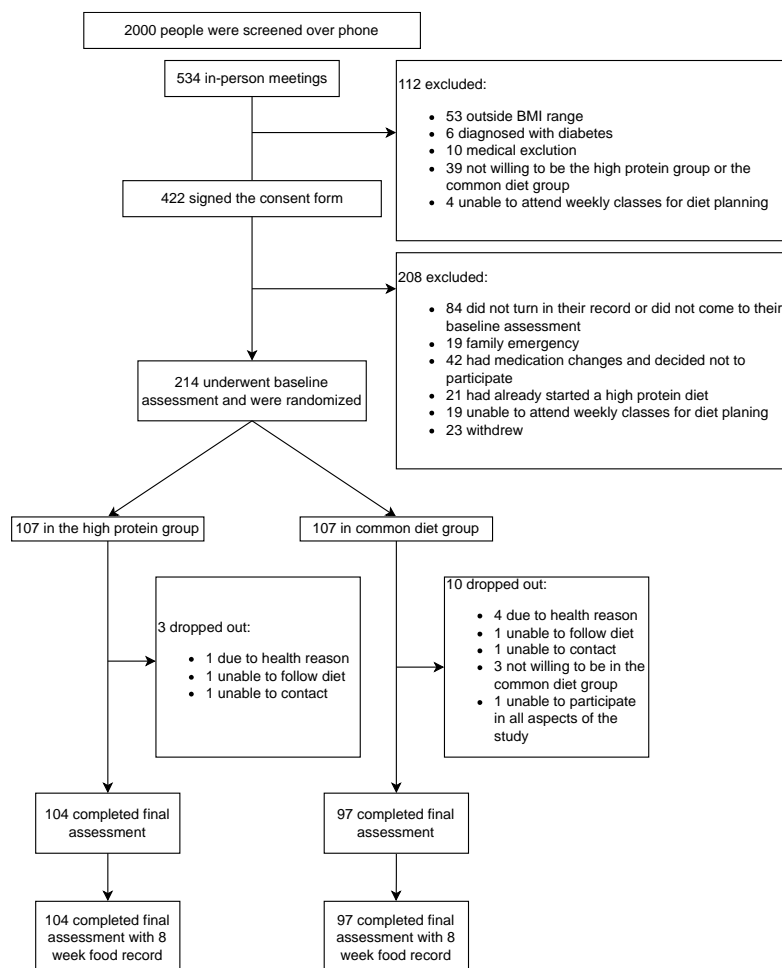


Figure 1. Flow diagram of enrollment of participants in a 8-week clinical trial of 214 overweight adults comparing a high protein diet with the Mediterranean diet

2.2. Diet

Two quarters of the food the subjects in MD eat are respectively vegetables and fruits. In the remaining half of the amount of food, a quarter of the food is whole grains, and the other quarter of them is legume. Subjects are not allowed to drink sugary drinks [5]. They can drink one or two serving of milk and a small glass of juice per day. For the subjects in HPD, half of the amount of the food they eat should be protein. In the rest of the amount of food, one quarter of them should be vegetables and fruits, the other quarter of it should be whole grain. Subjects are not allowed to drink sugary drinks. They can only drink 1 cup of skim milk. Juice should be limited to a small glass per day. On every Monday, subjects are suggested to take in protein only, for example, 2 eggs and a small glass of milk for breakfast, fish, tofu and beef for lunch, and chicken breast and crab for dinner. There are professional dietitians who are responsible for diet of every subject. They designed the whole-day diet for the subjects on everyday morning.

2.3. Measurement

The experiment will last for 2 months. Subjects will do clinical examinations before the experiment, after every 2 weeks of experiment, and after the experiment. Body weight was measured to the nearest 0.1 kg using an electronic weight scale (Shanghe SH-200 Ultrasonic Height and Weight Scale, PRC), and height to the nearest 1 cm using a ultrasonic height and weight scale (Shanghe, PRC) (height is only measured at baseline test). Body mass index (BMI) was calculated in kg/m². Fat mass (FM) and fat-free mass (FFM) were assessed by dual energy X-ray absorptiometry (DXA) (QDR 4500 W, Hologic Inc., Arlington, MA, USA) [6]. Blood pressure was tested by blood pressure meter (Omron HEM-7124 blood pressure meter, PRC)

Table 1. Subject characteristics at baseline

	HPD	MD
Age	25.33±3.02	24.98±2.79
Weight(kg)	70.02±8	71.32±10.1
Height(cm)	163±5	164±4
BMI (kg/m ²)	26.35±1.29	26.51±2.33
FM (kg)	8.4±3.6	9.2±4.7
FFM (kg)	62.37±6.1	64.01±3.9
SBP (mmHg)	132±5	131±4
DBP (mmHg)	84±4	82±5

3. Results

After 8 weeks, a significant decrease in FM was observed in the HPDG (-20% vs. -3.2% in CDG), while FFM showed no big difference between both groups (+0.72% vs +0.62%). The BMI of subjects in HPDG decrease dramatically (-3.28% vs 1.29% in CDG). There is no dramatic change in SBP and DBP in both GPDG and CDG (-2.27% vs -0.76% and 1.19% vs 1.22%)

Table 2. Subject characteristics at results

variable	HPD baseline	HPD final	change in percentage for HPD	MD baseline	MD final	change in percentage for MD
Weight(kg)	70.02±8	67.72±8.6 ₉	-3.28%	71.32±10.1	72.24±10.4	1.29%
Height(cm)	163±5	163±5	0	164±4	164±4	0
BMI (kg/m ²)	26.35±1.29	25.49±1.5 ₈	-3.26%	26.51±2.33	26.86±2.4 ₂	1.32%

Table 2. (continued).

FM (kg)	8.4±3.6	4.9±2.1	-41.70%	9.2±4.7	8.9±4.6	-3.20%
FFM (kg)	62.37±6.1	62.82±6.5 ₉	0.72%	64.01±3.9	64.41±3.9 ₂	0.62%
SBP (mmHg)	132±5	129±6	-2.27%	131±4	130±4	-0.76%
DBP (mmHg)	84±4	85±4	1.19%	82±5	83±4	1.22%

It can be concluded from the table that high protein diet has more beneficial effect on losing weight.

4. Conclusion

The experiment shows the effectiveness of the high protein diet on weight loss. The high protein diet can be a good choice for those people who are seeking a healthy way to lose weight in a short time. The high protein diet is not only effective for weight loss, but also good for human's health. People can strengthen their body by eating more protein. Eating protein and vegetable contribute to smoother skin. At the same time, the risk of sickness and death because of malnutrition decreases. This experiment had professionally designed eating plan for each subject which ensured that the subject followed the diet appropriately.

The problem of obesity can be more seriously in the future. Therefore, it is essential for scientists and experts to carry out research on advanced ways to deal with this problem. There should be more researches on different diets and their effect on obesity.

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