



Comparative effectiveness of plant-based diets for weight loss: A randomized controlled trial of five different diets

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Abstract

Methods: Participants were enrolled in a 6-mo, five-arm, randomized controlled trial in 2013 in South Carolina. Participants attended weekly group meetings, with the exception of the omnivorous group, which served as the control and attended monthly meetings augmented with weekly e-mail lessons. All groups attended monthly meetings for the last 4 mo of the study. Diets did not emphasize caloric restriction.

Results: Overweight adults (body mass index 25–49.9 kg/m²; age 18–65 y, 19% non-white, and 27% men) were randomized to a low-fat, low-glycemic index diet: vegan, vegetarian, pesco-vegetarian, semi-vegetarian, or omnivorous. At 6 mo, the weight loss in the vegan group was significantly different from the omnivorous, semi-vegetarian, and pesco-vegetarian groups (P=0.03). Vegan participants decreased their fat and saturated fat more than the pesco-vegetarian, semi-vegetarian, and omnivorous groups at both 2 and 6 mo (P < 0.05).

Conclusions: Vegan diets may result in greater weight loss than more modest recommendations.

Subjects: overweight adults who were interested in losing weight. Stable medical condition.

Baseline Subject Data						
Characteristic	Average	vegan	vegetarian	Pesco-vegetarian	Semi-vegetarian	omnivorous
n	13	11	13	13	13	12
Age (y)	49	48.2	53.0	48.8	42.7	51.0
BMI (kg/m ²)	35	32.5	35.1	35.8	35.1	36.3

Dietary group	Definition of diet patterns
Vegan	Does not contain any animal products (meat, fish, poultry, eggs, or dairy) but emphasizes plant-based foods, such as fruits, vegetables, whole grains, and legumes/beans
Vegetarian	Does not contain meat, fish, or poultry but does contain eggs and dairy, in addition to plant-based foods, such as fruits, vegetables, whole grain and legumes/beans
Pesco-vegetarian	Does not contain meat or poultry but does contain fish and shellfish, eggs, and dairy, in addition to plant-based foods, such as fruits, vegetables, whole grain, and legumes/beans
Semi-Vegetarian	Contains all foods, including meat, poultry, fish, and shellfish, eggs, and dairy, in addition to plant-based foods, such as fruits, vegetables, whole grains, and legumes/beans. However, red meat is limited to once per week and poultry is limited to ≤ 5 times per week
Omnivorous	Contains all food groups

Changes in weight, energy from fat, saturated fat and carbohydrates, and cholesterol among five diet groups at 2 mo and 6 mo.

	weight loss (%)		Energy from fat (%)		Energy from saturated fat (%)		Energy from carbohydrate (%)		Cholesterol (mg)	
	2 mo	6 mo	2 mo	6 mo	2 mo	6 mo	2mo	6mo	2mo	6mo
vegan	-4.8	-7.5	-11.3	-9.4	-8.2	-5.3	14	11.7	-311.3	-240.5
vegetarian	-4.8	-6.3	-3.7	-6.6	-1.5	-2.4	5.2	6.7	-146.1	-172.8
pesco-vegetarian	-4.3	-3.2	-2.8	-0.7	-1.9	-1.4	3.1	4	-62.8	-60.8
semi-vegetarian	-3.7	-3.2	-3.4	-0.2	-0.4	-1.3	2.9	0.3	-62	-111.1
omnivorous	-2.2	-3.1	1.4	-0.6	-0.5	-0.7	-3.5	-1.1	-33.2	-38.5

Introduction

Several studies have shown that vegan and vegetarian diets are beneficial for health, and they prevent many diseases. Also, they are successfully used for weight loss and its maintenance. However, vegans tend to have lower body mass, and they gain less weight over time, in comparison with other plant-based groups. There are different diets that people follow to achieve their “perfect” body mass including vegan, vegetarian, pesco-vegetarian, semi-vegetarian diet and omnivorous. So far most studies have been conducted based on the participants’ preferences to diet, and there have not been studies based on randomized assignment to diet.

Objectives

Since introduction of plant-based diet might equate with higher consumption of fiber, and high-fiber diets are associated with lower body mass, we hypothesize that a vegan diet would have the highest weight loss, and vegetarian, pesco-veg, semi-veg, and omnivorous diets would follow.

Methods

Design: Random assignment of five different diets using a computerized random-number generator and stratified by BMI and sex. Participants were selected through worksite listserv messages and newspaper ads. The study was a 2-mo weight loss intervention with a 4-mo follow-up period. Participants received a \$20 incentive payment for completion of the 2-mo period, but did not receive any payments for completion of 6-mo assessments.

Diet: Participants had to follow the dietary guidelines and take multivitamins or other forms of vitamin B12

Diet restriction: Participants in the vegan group were excluded from all animal products, while the omnivorous group did not have any restriction. The semi-vegetarian group could consume meat occasionally, while the pesco-vegetarians were excluded from consumption of meat, but they could eat seafood. The vegetarians were allowed to eat eggs and dairy products, but no meat and seafood.

Result summary

Subject weight loss:

Figure 3 shows the result of weight loss after 2-mo and 6-mo periods.

- ❖ Participants on a vegan diet noted the highest weight loss (-7.5%) as compare to the omnivorous group (-3.1%)
- ❖ The weight loss among five groups were significant at both 2-mo and 6-mo periods (P<0.01)
- ❖ At 2-mo, weight loss for vegan diet was not much different than other plant-base diets (P=0.24-0.60). However, it was significant in comparison with omnivore group (P=0.03).

Dietary Intake:

At 2-mo and 6-mo period there was no significant trend for changes in energy intake among groups. The difference was only between vegan and omnivore group at 6-mo period.

There was a significant difference between vegan group and pesco-veg, semi-veg and omnivorous group in consumption of fat, saturated fat and cholesterol level at 2-mo and 6-mo.

Vegan subjects had the greatest decrease in cholesterol intake in comparison with other groups.

Conclusion

Subjects randomly assigned to a vegan diet experienced greater body mass loss and improved their macronutrient, cholesterol and fiber intake in comparison with subjects assigned to other groups. However, study on long term body mass effects and maintenance are necessary.

Weight loss among five groups at 2-mo and 6-mo (Fig 3)

