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The VA Beach Diet Study: A comparison of the effects of Plant-based, Mediterranean, Paleolithic, and DASH Diets on cardiovascular disease risk

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The VA Beach Diet Study: A comparison of the effects of Plant-based, Mediterranean, Paleolithic, and DASH Diets on cardiovascular disease risk

Keywords

DASH, Paleo, Mediterranean, vegan, hypertension, weight loss, lipid

Cover Page Footnote

the authors acknowledge the invaluable help of Holly Buchanan in the design and supervision of the study

BACKGROUND

One of the greatest health threats that Americans face today is cardiovascular disease (CVD). According to the American Heart Association (AHA), heart disease is the leading cause of death in the United States for both men and women [1]. The majority of heart disease deaths were among people 65 years of age and over; however, disease prevalence can be found among people of all ages and backgrounds [2]. Furthermore, there is substantial evidence that cardiovascular disease, begins in early life further emphasizing the importance of early prevention before the end organ effects manifest [3].

Fortunately, prevention and control of heart disease is largely achievable by modifying risk factors. Risk factors for heart disease include high blood pressure, diabetes, physical inactivity, obesity, and tobacco abuse [1]. It is critical to address all these risk factors early in life to prevent the potentially devastating complications of chronic CVD [4]. All of these risk factors can be reversed and even prevented by making lifestyle changes that improve health habits [5, 6]. Multiple trials have demonstrated that dietary change alone can prevent the majority of the risk factors that lead to heart disease [7, 8, 9].

We examined the impact of four diet programs [plant-based (Vegan), Mediterranean (MED), Paleolithic (Paleo) and DASH diets] on the CV risk factor profile of adults in a cardiology practice in suburban Virginia.

METHODS

Nondiabetic adults with one or more risk factors for CVD were invited to choose 1 of the 4 diet arms. Participants underwent a comprehensive nutrition education program prior to a 60-day diet intervention. Subjects kept a daily food log and met with a multi-disciplinary study team weekly for 9 weeks. BMI, blood pressure (BP), fasting glucose (FBS), hemoglobin A1C (HgA1C), LP-IR (a measure of insulin resistance), and lipid profiles were studied at baseline, after 60 days on the diet and at 6-months follow-up (no intervention for 4 months). ANOVA analyses comparing baseline, 60 days and 6 months were done using SigmaPlot 12.5 (Systat Software, Inc). Significance values for two-tailed alpha 0.05 are $p < 0.05$.

RESULTS

279 subjects completed the 60-day dietary intervention (58 Vegan, 80 Mediterranean, 76 Paleo, 65 DASH), and 199 returned for 6-month follow-up. At baseline, 85% of subjects were female, 80% Caucasian, mean age 56 ± 10 years (range 33-85), mean BMI 33 ± 7 kg/m², with an average mean arterial pressure (MAP) 97 ± 14 mmHg (range 69-137).

After 60 days

Weight: All groups lost weight; group means -4-12 lbs

Blood pressure: All groups had significant declines in systolic (-11-14 mmHg) and diastolic (-5-8 mmHg) BPs.

Glucose control: All groups had decreases in LP-IR (-1-9 units); this was significantly lower in the MED and Paleo diets. Changes in FBS and HgA1C were variable.

Lipid profiles: All groups had decreases in total (-9-35 mg/dL) and LDL (-2-24 mg/dL) cholesterol; these were significantly lower in the MED and Vegan diets. All groups except the Vegan group had decreases in triglycerides; this was only significant for the Paleo group, (-23±5 mg/dL, p=0.01).

Compliance: Many subjects missed at least one group meeting, and/or did not turn in a food diary for one week.

At 6 months

Weight: All groups continued to lose weight, compared to day 60 (-1-11 lbs). None of the group changes reached statistical significance.

Blood pressure: Systolic BPs increased in the MED and DASH group, compared to day 60, and remained stable in the Paleo and Vegan group. Diastolic BPs increased only in the DASH group, and decreased significantly only in the Paleo group (-7±4 mmHg, p=0.002)

Glucose control: LP-IR continued to decrease in all groups (-2-4 units). Changes in FBS and HgA1C were variable.

Lipid profiles: Total cholesterol continued to improve in all groups (-7-9 mg/dL). LDL cholesterol decreased in all but the Vegan group (-4-8 mg/dL). Triglycerides increased in all but the Vegan group (+4 to +19 mg/dL).

Compliance: Compared to day 60, 44% considered themselves mostly or completely compliant, 47% considered themselves somewhat or more/less compliant.

DISCUSSION

To our knowledge, this is the first trial to directly compare these four diet interventions using the same study format. The primary outcome variable was weight loss, and on average, all groups lost weight, but this was statistically significant only for the WFPB group with a favorable trend in the Paleo group. Of perhaps more interest is that these two groups also demonstrated less recidivism in terms of weight maintenance and blood pressure control than the subjects in the DASH or Med groups.

This study had some limitations. For one, this was not a randomized study; subjects were allowed to choose the diet arm they wanted to be in. But, the investigators believed this might help retain subjects and help compliance with the diets. Also, approximately one in three subjects did not return for the six month follow up examination. Whether their data would have changed the six month outcome results is unknown. Finally, the sample size was estimated based on a 20% change in LDL-C. The average change was less than that, with a lot of variability. Despite that, we still saw significant decreases in many study parameters after sixty days.

CONCLUSION

All four diets promoted weight loss and improved BP control after 60 days. Weight loss continued for up to 6 months. Measures of insulin resistance also improved after 60 days and continued for up to 6 months, with variable effects on FBS and HgA1C. Lipid profiles generally improved in all groups after 60 days, but were more variable in the follow-up period. Effects were greater and more sustained in those subjects with better attendance at the regular diet support group meetings.

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