

THERAPEUTIC LIFESTYLE CHANGES DIET VS ATKINS DIET FOR EFFICACY OF CHOLESTEROL LOWERING

Millions of Americans have high cholesterol and are at increased risk for cardiovascular diseases. Patients and healthcare providers desire plans to help combat high cholesterol. Common diets include the Atkins and the Therapeutic Lifestyle Changes (TLC) diets. We hypothesized that the TLC diet should be better in lowering low-density lipoprotein (LDL) cholesterol levels than the Atkins diet. The TLC diet was designed for restricted fat and cholesterol whereas the Atkins diet contains high saturated fat that should place subjects at a greater risk for high cholesterol.

The investigator conducted a literature search through PubMed MEDLINE using the search terms: hypercholesterolemia/dh (diet therapy), dietary carbohydrates, and dietary fats. Two of the twenty-seven eligible articles directly compared cholesterol levels of low-carbohydrate and low-fat dieters at six and twelve months. We found: 1) at both 6- and 12-month periods LDL levels were lowered slightly in both diet categories; 2) subjects on the Atkins diet had an 11% increase in high-density lipoprotein (HDL) levels and a 49% drop in triglyceride levels whereas on the TLC diet, the HDL levels were unchanged and triglyceride levels only dropped 22%; and 3) After 12 months, users of the Atkins diet lost an average of 11.2 pounds while users of the TLC diet lost 6.8 pounds. The hypothesis of this research study was proven false. While these studies point to certain trends favoring the Atkins diet, further research is needed to understand the long-term benefits.

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INTRODUCTION

According to the American Heart Association, over 105 million American adults have total blood cholesterol values of 200 mg/dL and higher, and 36.6 million American adults have levels of 240 mg/dL or above. These levels place Americans at risk for numerous cardiovascular disorders such as heart disease, stroke, hypertension, arteriosclerosis, coronary artery disease, and myocardial infarction. Heart disease and stroke, the principal components of cardiovascular disease, are the first and third leading causes of death in America, accounting for nearly 40% of all deaths.¹ However a 10% decrease in serum cholesterol levels can result in a 30% reduction in the incidence of heart attacks and strokes.² As a result, patients and their health care providers desire appropriate diet regimens to help combat hypercholesterolemia.

Lowering serum and LDL cholesterol levels involves losing excess weight, exercising regularly, and following a healthy diet. Therapeutic Lifestyle Changes (TLC) and Atkins Nutritional Approach (Atkins) are two widely used diet programs. The TLC diet, which is endorsed by the American Heart Association (AHA), is a low-cholesterol, low-saturated-fat eating plan designed for adults whose hypercholesterolemia places them at high risk for cardiovascular disease. This diet therapy calls for less than 30% of total calories from fat and fewer than 200 mg of dietary cholesterol per day. Saturated fats, thought to increase heart disease risk, are limited to less than 7% of total calories. In addition, foods rich in complex carbohydrates, such as whole grains, vegetables, and fruits should comprise 50%–

60% of total calories, and proteins should be kept at 15%. Certain food products that contain plant sterols can also be added to the TLC diet to boost its low-density lipoprotein (LDL) lowering efficacy. The TLC follows the USDA food pyramid, encouraging patients to eat fruits, vegetables, and whole grains. In addition to this low-fat diet, the TLC treatment requires enough moderate exercise to expend 200 kcal/day. Studies have proven that regular physical activity can help lower LDL, raise HDL, and is vital for those with high triglyceride levels.

The Atkins Nutritional Advantage is another leading diet program. Atkins is a low-carbohydrate, high-fat, and high-protein diet designed for rapid weight loss. It involves the restriction of carbohydrates in order to switch the body's metabolism from burning glucose to burning stored fat. This process, known as lipolysis, begins when the body enters the state of ketosis because of running out of excess carbohydrates to burn. There are four phases of the Atkins diet: induction, ongoing weight loss, pre-maintenance, and lifetime maintenance. As a patient goes through each successive phase they are able to eat more fiber-rich carbohydrates. The Atkins diet is targeted to the 2/3 of US adults who are overweight. Weight loss in corpulent individuals can help lower LDL and triglyceride levels as well as improve low high-density lipoprotein (HDL) levels. As a result, the Atkins diet, which is designed for rapid weight loss, can also lower hypercholesterolemia. Those on the Atkins diet are encouraged to eat high protein, low carbohydrate foods such as poultry, fish, beef and pork. Low carbohydrate vegetables are also endorsed. Intake of whole grains, however, is limited.

Despite the popularity of both the low-carbohydrate, high-protein, high-fat Atkins diet and the conventional low-fat TLC diet, no randomized control trials have evaluated their long-term efficacy in reducing hypercholesterolemia. We conducted a meta analysis/systemic review research project to determine whether the TLC diet or the Atkins diet was better at lowering LDL cholesterol levels at 6- and 12-month periods, as well as to discover their long term health effects. The researcher initially thought the TLC diet would be better in lowering LDL cholesterol levels. The AHA TLC diet was designed for restricted fat and cholesterol whereas the Atkins diet contains high saturated fat that should place subjects at a greater risk for high cholesterol related issues.

METHODS

We first utilized the official website for the Atkins Nutritional Advantage³ and a web page on the American Heart Association's website⁴ concerning the TLC diet. The researcher used these websites for primary information concerning the purpose and dietary components of each diet program. Next, we used PubMed MEDLINE, a comprehensive literary database of biomedical information, to compile randomized control studies comparing the efficacy of both diet programs at lowering LDL levels at 6- and 12-month periods. We developed search strategies to identify studies that met the eligibility criteria. Searches were performed for review journal articles published between January 1, 2000, and July 1, 2007, pertaining to "Humans" and "English language." Search terms were limited to: hypercholesterolemia/dh (diet therapy), dietary carbohydrates, and dietary fats. Next, the search results for hypercholesterolemia were combined with search results for carbohydrates and then with search results for fats. Two of the twenty-seven eligible articles directly

compared cholesterol levels of low carbohydrate and low fat dieters at 6 and 12 months in a randomized control trial.

In the first study,⁵ 120 overweight and hyperlipidemic volunteers were randomly assigned to the low-carbohydrate diet (initially <20 g of carbohydrates daily) or the low-fat diet (<30% energy from fat, <300 mg of cholesterol daily, and deficit of 500 to 1000 kcal/d). This study measured the body composition, body weight, fasting serum lipid levels, and tolerability for each group after 24 weeks.

The second study⁶ conducted a 12-month, randomized controlled trial involving 63 obese men and women. The subjects were assigned to either a low-calorie, low-fat (conventional) diet or a low-carbohydrate, high-protein, high-fat diet. To imitate the technique used by most dieters, professional contact was minimal.

Finally, we searched the Internet for any additional online scientific journals that discussed the topic of low-fat diet vs low-carbohydrate diet for efficacy of cholesterol lowering. This produced the third eligible article.⁷ One hundred and twenty overweight volunteers were randomly assigned to the Atkins diet or the American Heart Association's TLC diet for six months. Participants in the Atkins category limited their carbohydrate intake to less than 20 grams per day, and 60% of their calories came from fat. Those on the TLC diet restricted total fat to no more than 30 percent of their total caloric intake.

RESULTS

Study #1

A greater proportion of the low-carbohydrate diet group than the low-fat diet group completed the study (76% vs 57%; $P=0.02$). At 24 weeks, weight loss was greater in the low-carbohydrate diet group than in the low-fat diet group (mean change,

-12.9% vs. -6.7%; $P<0.001$). Compared with the low-fat diet group, the low-carbohydrate diet group had greater decreases in serum triglyceride levels (change, -0.84 mmol/L vs -0.31 mmol/L [-74.2 mg/dL vs -27.9 mg/dL]; $P=0.004$) and greater increases in HDL cholesterol levels (0.14 mmol/L vs -0.04 mmol/L [5.5 mg/dL vs -1.6 mg/dL]; $P<0.001$). Changes in LDL cholesterol levels did not differ statistically (0.04 mmol/L [1.6 mg/dL] with the low-carbohydrate diet and -0.19 mmol/L [-7.4 mg/dL] with the low-fat diet; $P=0.2$). Minor adverse effects such as constipation were more frequent in the low-carbohydrate diet group.

Study #2

Subjects on the low-carbohydrate diet had lost more weight than subjects on the low-fat diet at 3 months (mean [\pm SD], -6.8 \pm 5.0 vs -2.7 \pm 3.7 percent of body weight; $P=0.001$) and at 6 months (-7.0 \pm 6.5 vs. -3.2 \pm 5.6 percent of body weight, $P=0.02$), but there was not as significant difference at 12 months (-4.4 \pm 6.7 vs. -2.5 \pm 6.3 percent of body weight, $P=0.26$). After three months, no significant differences were found between the groups in total or LDL cholesterol concentrations. The increase in LDL concentrations and the decrease in triglyceride concentrations were greater among subjects on the low-carbohydrate diet than among those on the conventional diet throughout most of the study. Both diets significantly decreased diastolic blood pressure and the insulin response to an oral glucose load. At a 12-month follow up, those in the low-carbohydrate diet group lost an average of 11.2 pounds while those in the low-fat diet group lost 6.8 pounds.

Study #3

After six months, subjects on the Atkins regimen lost an average of 31 pounds, compared with 20 pounds on the AHA TLC diet. Serum cholest-

terol fell slightly in both groups. There was a 49% drop in triglyceride levels and an 11% increase in HDL cholesterol on the Atkins diet. On the TLC diet there was not a significant change in HDL and triglycerides dropped 22%. There was not a substantial change in low-density lipoprotein LDL levels in this diet program.

CONCLUSION

A limitation of this systemic study was its inability to gather information on studies of a greater duration than 12 months. This would have helped discover the long-term efficacy of both diet programs. In this study, evidence

proved that compared with a low-fat diet, a low-carbohydrate diet program had better participant retention. The low-carbohydrate diet produced a greater weight loss than did the conventional diet for the first six months, but the differences were not significant at one year. The low-carbohydrate diet was associated with a greater improvement in some risk factors for coronary heart disease. Longer studies that exceed a 12-month period are required to determine the long-term health effects of both diet programs.

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