If followed conscientiously, all weight loss diets regardless of macronutrient composition can be successful. Only the caloric intake level matters, not the source of the calories. However, in the real world the interrelationships determining caloric intake are far more complex. Taste, convenience, cost, variety, palatability, satiety and hunger triggers, metabolic responses elicited, and cultural and behavioural factors are all major determinants of the actual amount eaten and must be considered when evaluating diets that vary in composition.

Introduction

Obesity is a worldwide public health challenge. Over the past three decades, the prevalence of obesity has increased dramatically in both developed and developing countries. In the United States, for example, the prevalence of obesity increased from 13.4% in 1980 to 33.8% in 2008 among adults and from 5% to 16.9% among children in the same time period (1), (2). Sixty eight percent of all adults in the United States are either overweight or obese (1). Losing weight has become a multibillion-dollar business for the food industry. What is the optimal diet for weight loss? That is, what is the ideal macronutrient composition of a weight loss diet, the perfect percentage of fat, protein, and carbohydrate? Although there are numerous variations in the macronutrient content of diets, either low fat or low carbohydrate diets are by far the most popular strategies adopted in order to lose weight. This article compares the efficacy of these two widely used diets, which differ significantly in their macronutrient composition.

Low fat diets

These typically restrict the percentage of fat in the diet to less than 30% and have been supported and recommended by most governmental bodies, scientific and health organisations worldwide, including the World Health Organisation, American Heart Association, American Cancer Society, and the
United States Department of Agriculture. Low fat diets have been considered to be the ideal eating plan for lowering weight and promoting good health. The rationale has been that saturated fats and trans-fatty acids increase the blood lipid levels, which are an important risk factor for cardiovascular disease. A diet high in fat also contributes to obesity, since fat contains nine calories per gram, compared to carbohydrates and protein, each of which contain four calories per gram. In low fat diets high fat foods such as meat, fried foods and cheeses, are limited and replaced with foods higher in carbohydrate such as pulses, fruits, grains and vegetables. Logically limiting the amount of fat should help control body weight, reduce blood lipids and lower the risk of cardiovascular disease. The Ornish diet is an example of a well-known low fat diet (3).

Unfortunately, low fat diets seem to have done little to control the obesity epidemic. Newer nutritional approaches appear to be needed if obesity is ever going to be managed.

Low carbohydrate diets

These typically restrict carbohydrate consumption to 20 to 60 grams per day and became very popular with weight loss centres and the general public through the mid-1980s; they are still advocated by many doctors, health care professionals, researchers and dieters. Foods such as bread, potatoes, pasta, while rice and other starchy foods are replaced with foods containing a higher content of protein and fat, such as meat, nuts and dairy products. Processed sugar intake is especially minimised or forbidden. The rationale for these diets rests on the relationship between carbohydrate intake and its effect on blood glucose. Carbohydrates evoke insulin secretion. Diets with reduced carbohydrate intake evoke less insulin secretion, and increase the production of ketones as an energy source. Some practitioners believe that this leads to fat being eliminated from the body, although this theory is very controversial. The Atkins diet is among the best known of the low carbohydrate diets (4).

Comparison of low-fat versus low-carbohydrate diets for weight loss

Several trials and reviews have compared low-fat versus low-carbohydrate diets for weight loss (5), (6), (7). Typically these studies suggest that low-carbohydrate diets initially result in more weight loss than low fat diets; however, over time the differences tend to narrow as weights begin to return to baseline (8). There is no consensus regarding the initial greater weight losses achieved with low carbohydrate diets. These diets tend to be higher in protein, which some researchers believe to be more satiating than fat or carbohydrate. The decreased insulin plasma concentrations and the ketosis produced by the limited carbohydrate intake may reduce appetite. Food choices are limited on these diets, and their monotony may further reduce appetite, since many adherents report that the diets are relatively unpalatable over time. Low carbohydrate diets are frequently also low in fibre, calcium,
potassium, magnesium, iron and vitamins, and high in saturated fat. Although there do not appear to be short-term adverse effects of low-carbohydrate diets, their long-term effects on health are still controversial; additional studies are needed.

A recent paper by Sacks and colleagues compared four calorie-restricted diets differing in macronutrient content, including a low fat diet and a low carbohydrate diet (9). At a two year follow-up, weight losses were similar for all four diets. For example, the weight loss was the same for those assigned to a diet with 40% fat as for those assigned to a diet with 20% fat. Likewise weight losses were similar for those assigned to a diet of 65% carbohydrate as for those assigned to a diet with 35% carbohydrate. Satiety, hunger, satisfaction with the diet, and attendance at group sessions were similar for each of the diets. All of the diets improved lipid and fasting insulin levels. The authors concluded that reduced calorie diets result in clinically meaningful weight losses regardless of which macronutrients are emphasised. Behavioural factors such as commitment to achieving weight loss and attending the intervention classes were the main influences on weight loss rather than the macronutrient composition of a diet. According to the researchers, any type of weight loss diet that is followed with enthusiasm and persistence can be effective. Diets that emphasise a range of fats, proteins and carbohydrates can have beneficial effects on health. Such diets can have a tailored macronutrient composition on the basis of an individual’s personal preference, and thus have long-term success.

Fat % Protein % Carbohydrate % Mediterranean Diet 25-35 20 45-55 American Heart Association less than 30 10-30 40-60 NCEP-ATPIII * 25-35 15 50-60 Dietary Reference Intakes 20-35 10-35 45-65 Food Guide Pyramid 30 15 55-60 Atkins Low Carbohydrate Diet 56 33 11 Ornish Low Fat Diet 10 15 75 Table 1. Approximate macronutrient composition of popular diets. * National Cholesterol Education Program Adult Treatment Panel III.

The real world

If followed with persistence, all weight loss diets can be successful. Calories are calories; only the caloric intake level has an effect on weight loss, not the source of the calories. However, in the real world, the interrelationships determining caloric intake are far more complex. Taste, convenience, cost, variety, pleasure, satiety value, energy density, the metabolic responses elicited and other factors are major determinants of the actual amounts eaten and therefore the amount of calories ingested. Diets that tend to be high in fat are typically higher in energy density and may result in “mindless” over-consumption. There is concern about the potential long-term deleterious health effects of diets which are high in fat. Higher levels of protein tend to increase feelings of satiety”, frequently leading to a decrease in caloric consumption. Increasing the proportion of complex carbohydrates, such as those that may be found in fruits and vegetables, may reduce energy intake and increase weight loss.
Although in controlled situations, such as in metabolic units, calorie intake can be regulated, in the real world different diet related factors, including the palatability of food, various satiety and hunger triggers, as well as cultural and behavioural factors need to be considered when evaluating the efficacy of weight loss diets that differ in macronutrient composition (10).

Implications for the food industry

The study by Sacks and colleagues suggests that any type of diet with reduced calories can be effective for weight loss (9). The researchers conclude that diets can emphasise a range of fat, protein, and carbohydrate compositions and still have beneficial effects on cardiovascular disease risk. Weight loss, irrespective of the macro-nutrient content of the diet, lowers risk. Weight loss diets can therefore be tailored to cultural and personal preferences. Since all weight loss diets are able to work, the food industry should consider making a strong commitment to educating the consumer regarding the dangers of obesity, the benefits of losing even modest amounts of weight, and the choices consumers have to achieve weight loss through strategies that they, the consumer, find acceptable. Given a range of choices, it is then the consumers’ responsibility to make appropriate lifestyle changes for the benefit of their health.

References


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