

Diet in the Prevention and Control of Obesity, Insulin Resistance, and Type II Diabetes

American College of Preventive Medicine Position Statement American College of Preventive Medicine

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Purpose

The American College of Preventive Medicine (ACPM) presents this position statement on the use of diet to prevent and control obesity, insulin resistance, and type II diabetes. ACPM recognizes that factors other than diet, including but not limited to physical activity, genetics, environmental exposures, and public policies influence these conditions. This statement is limited to consideration of dietary pattern, specifically in response to the promotion and popularity of unconventional dietary regimens for weight control. The College position is intended to lend guidance and clarity to practitioners and the public alike. The position espoused is subject to change as new scientific evidence accrues.

Introduction

Obesity, insulin resistance, and type II diabetes mellitus are epidemic in the United States. Over 97 million adults are overweight (BMI>25),¹ and the associated morbidity, mortality, and economic costs are enormous. Over 300,000 deaths each year are attributable to obesity.¹ The direct and indirect cost of medical treatment for obesity and its sequelae was \$117 billion in 2000. Overweight and obesity (particularly excess abdominal fat) are closely associated with insulin resistance and the metabolic syndrome (i.e., the insulin resistance syndrome), an important risk factor for type 2 diabetes and cardiovascular disease;^{2,3} the risk of type 2 diabetes attributable to obesity is estimated to be as high as 75%. As the prevalence of obesity continues to increase, it is expected that the prevalence of diabetes will rise concomitantly.⁴ Epidemic overweight has already shifted the age distribution of type 2 diabetes mellitus downward, so that it, too, is considered an epidemic of children.⁵ High rates of insulin resistance in adults⁶ and children⁵ have recently been documented.

Against this backdrop, various diets stipulating alternative distributions of macronutrient classes (carbohydrate, protein, fat) have been promoted to the general public for weight control. The competing and largely unsubstantiated claims of such diets threaten to confuse and distract the large population affected by these epidemics. The American College of Preventive Medicine issues its official position on diet in the prevention and control of obesity, type II diabetes, and insulin resistance in response to this hazard.

Background

Whether weight gain causes insulin resistance, insulin resistance contributes to weight gain propensity, or both, remains controversial.⁷ Abdominal obesity is an integral feature of the insulin

resistance syndrome, 2 and weight gain over time is considered a strong predictor of diabetes risk. 8 The role of insulin in the pathogenesis of both obesity and diabetes is well established. 9

A variety of competing dietary patterns have been promoted to the general public as potential means of controlling weight. Among the more popular are those advocating restriction of carbohydrate to levels well below prevailing guidelines, in conjunction with liberal intake of total fat, protein, or both.^{10,11} Such diets typically invoke the role of insulin in weight gain as a rationale for restricting carbohydrate, citing the glycemic index as the link between carbohydrate and insulin levels. 12

Popular, or "fad" diets often imply that insulin is involved in the metabolism of only carbohydrate. Insulin is actually integral to the metabolism of all macronutrient classes. 12 Limits to the glycemic index as a basis for food selection in either diabetes management⁴ or weight control have been noted. Perhaps most important, carbohydrate is a highly heterogeneous category, a fact obscured by fad diet claims. Highly processed carbohydrate tends to have a high glycemic index, low satiety index, low fiber content, and limited nutritional value; grains, vegetables, and fruits, however, are carbohydrate sources that tend to have exactly the opposite characteristics. 13,14 There is evidence that high-fiber carbohydrate sources evoke modest insulin release, can help reduce post-prandial glucose and insulin levels, and can even attenuate glycemic responses to high-glycemic index foods. 15

Cereal grain intake is inversely associated with diabetes risk.¹⁴ High dietary fiber intake, 15 and high intake of monounsaturated fat, 16 have been shown to ameliorate metabolic control in diabetes; there is no such evidence for saturated or trans fat, or protein. The best available data regarding sustainable weight loss come from the National Weight Control Registry, and indicate that a diet abundant in grains, vegetables, and fruit, and restricted in fat, together with regular physical activity, is most useful.¹⁷ Clinical trial data pertaining to blood pressure control, 18 cardiovascular disease prevention, 19,20 and diabetes prevention²¹ all support a diet rich in grains and plant foods, along with either restriction of fat intake, or a shift from saturated and trans fat to monounsaturated and polyunsaturated fat. There is widespread consensus that abundant intake of fruits and vegetables is inversely associated with cancer risk.²²

On the basis of its review of evidence linking dietary pattern to health outcomes, The United States Preventive Services Task Force advises clinicians to endorse to all patients over the age of 2 a diet restricted in fat, particularly saturated fat, and abundant in fruits, vegetables, and grains.²³ The USDA recommendations, depicted in the food guide pyramid, emphasize abundant intake of grains, vegetables, and fruits, with restricted intake of both simple sugars and total fat.²⁴ The National Cancer Institute sponsors the "5-a-day" program encouraging fruit and vegetable intake, and endorses dietary guidelines that include 20-35 grams of fiber per day, with 30% or less of calories from fat.²⁵ The American Heart Association offers dietary guidelines that call for 55% or more of calories from carbohydrate, 30% or less from fat (7-10% saturated/trans fat, 10% polyunsaturated and 15% monounsaturated fats), and 15-20% from protein.²⁶ The American Dietetic Association supports the USDA Dietary Guidelines for Americans 2000 and recommends a variety of grains, at least 5 servings of fruits and vegetables daily, restriction of saturated fat and cholesterol, and limited sugar and sweet consumption.²⁷ The American Diabetes Association advocates 55% of calories from carbohydrate, up to 30% from fat (10% saturated/trans fat, 10% polyunsaturated fat), and 15-20% from protein.⁴

Finally, in 2002, The National Academy of Sciences' Institute of Medicine (IOM) released dietary guidelines calling for 45-65% of calories from carbohydrate, 20-35% from fat, and 10-35% from protein, in conjunction with 60 minutes each day of moderately intense physical activity.²⁸ The IOM guidelines further emphasize the restriction of saturated and trans fat, linked to cardiovascular disease risk, and their replacement with monounsaturated and polyunsaturated fat.

Statement

On the basis of available evidence, the American College of Preventive Medicine takes the position that a diet rich in complex carbohydrate from unrefined cereal grains, vegetables, and fruits; moderate in total fat and restricted in saturated and trans fat; and moderate in protein is advisable for weight control, diabetes prevention, and health promotion. The College specifically recommends a macronutrient distribution within the newly released IOM ranges, with approximately 55% of calories from carbohydrate, approximately 25% of calories from fat, and approximately 20% of calories from protein. Saturated and trans fat intake should be restricted, with the bulk of fat calories derived from monounsaturated and polyunsaturated fat. The College further recommends a fiber intake of at least 24 grams per day, with additional benefit likely from levels up to 50 grams per day in adults with diabetes.

The College notes that there is currently a lack of evidence for the claims of popular diets that unrestricted intake of all varieties of dietary fat, or of protein, are conducive to weight control.

Further, the College advises against such diets, and all diets advocating restricted intake of grains, vegetables, or fruits, as they are incompatible with the aggregate evidence linking dietary pattern to human health. Given the large population with, or at risk for, obesity, insulin resistance, and diabetes, dietary intake recommended for the control or prevention of these conditions must be consistent with recommendations for health promotion in the public at large. Fad diets generally emphasize short-term weight loss while neglecting considerations of long-term health, and are to be discouraged.

Rationale

Available evidence indicates that diets abundant in grains, vegetables, and fruit; restricted in highly processed foods; moderate in fat and restricted in saturated and trans fat; and moderate in protein are associated with a wide range of health benefits. This same basic dietary pattern is linked with weight control and sustainable weight loss; with regulation of serum insulin levels; and with the prevention and amelioration of diabetes mellitus. The College invokes this evidence, and the importance of considering the overall influence of diet on health, to justify its position.

"This is an official Position Statement of the American College of Preventive Medicine and does not reflect the position of the American Journal of Preventive Medicine. This statement has been edited for clarity and consistency of style but has not otherwise been subjected to the Journal's editorial or peer-review process"

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