

The low glycemic index diet: new way of eating for all?

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Overweight and obesity are significant and growing problems throughout the developed world. In 2005, World Health Organization (WHO) estimated that 1.6 billion adults were overweight and at least 400 million were obese and this is expected to increase to 2.3 billion overweight adults and more than 700 million obese adults by 2015 [1]. At least 20 million children under the age of 5 years are also overweight.

Overweight and obesity lead to serious health consequences, increasing the risk of chronic diseases including cardiovascular disease, type 2 diabetes and some types of cancer. Preventing and managing excess weight is therefore of high priority with respect to reducing chronic disease risk and the significant morbidity and mortality associated with being overweight or obese.

While dietary modification is central to weight loss and prevention of weight gain, there is a lack of consensus regarding the optimal nutritional management of obesity. To date, much of the focus has been on reducing fat intake although recent years have seen the re-emergence of high protein diets. Evidence has also been mounting, however, for the benefits of a low glycemic index diet for weight management and in this issue of the journal, Thomas et al. [2] bring together the results of current research in this area.

Their findings, published in the *Cochrane Database of Systematic Reviews*, support the use of a low glycemic index (GI) diet in weight management, with the combined results of six studies showing significantly greater reductions in body mass, fat mass, body mass index (BMI), total cholesterol and low-density lipoprotein (LDL) cholesterol with a low GI diet [2]. Even when ad-libitum low GI diets were compared to conventional low fat energy-restricted diets, the low GI dieters achieved the same or better results.

The concept of GI was introduced in 1981 as a method for classifying carbohydrate foods according to their effect on postprandial glycemia [3]. The GI is calculated as the blood glucose response of a 50 g (or 25 g) carbohydrate portion of food, expressed as a percentage of the same amount

of carbohydrate from a reference food – either glucose or white bread [4]. Essentially, the GI ranks the glycemic potential of the carbohydrates in different foods, gram for gram or weight for weight of carbohydrate.

There is now a significant body of evidence demonstrating the benefits of low GI diets and the problems associated with higher GI diets. It has become clear that not all carbohydrates are the same and that low and high GI foods have significantly different effects on metabolism [5].

High GI meals result in a rapid increase in blood glucose and insulin levels followed by reactive hypoglycemia, counterregulatory hormone secretion and elevated free fatty acid concentrations which may then lead to excessive food intake, beta cell dysfunction, dyslipidaemia and endothelial dysfunction [6]. Over time this could be expected to increase the risk of obesity, type 2 diabetes, cardiovascular disease and some types of cancer and there is now an increasing amount of evidence from both clinical and epidemiological studies to support this hypothesis.

While the GI predicts the potential of a food's carbohydrate to raise blood glucose levels, the overall blood glucose response to a food or meal is determined by both the quantity and quality (GI) of the carbohydrate consumed [7]. Thus the concept of glycemic load (GL; defined as the GI \times amount of carbohydrate in grams) was introduced as a measure of the overall effect a food on blood glucose and insulin levels. Dietary GL can be reduced in two ways – either by lowering the GI of the carbohydrate or by reducing the total carbohydrate in the diet, but the metabolic effects of these changes are likely to be different.

In the current paper, Thomas et al. assess the effects of a low glycemic index or glycemic load diets for weight loss in overweight or obese individuals. They found 6 randomized controlled trials which met their inclusion criteria, incorporating 202 participants with interventions ranging from 5 weeks to 6 months and follow-up for up to 6 months after the intervention finished. Overall, the low GI dieters lost more weight (1.1 kg); more body fat (1.1 kg) and reduced their BMI to a greater extent (1.3) than a control group. Total and LDL cholesterol levels were also reduced to a greater extent (0.22 mmol/l and 0.24 mmol/l, respectively) in the low GI diet group.

These results are clinically significant, particularly over the relatively short time duration of the studies. The actual

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Received: March 13, 2008. Accepted in final form: May 5, 2008.

Conflict of interest: none declared.

Pol Arch Med Wewn. 2008; 118 (6): 332-334

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weight loss achieved amongst the studies varied, but in some it was of the magnitude which has been shown to have significant health benefits, including reducing the risk of type 2 diabetes.

While further research is needed to determine the long-term effects of a low GI dietary intervention, the findings of Thomas et al. are supported by an increasing number of clinical and observational studies. Research in humans and animals provides convincing evidence that low GI diets may assist in weight management via effects on appetite and fuel partitioning.

In a review of 16 studies, Ludwig [8] found that low GI foods increased satiety, delayed return of hunger or reduced ad libitum food intake in all but one, while two studies have found that low GI or low GL weight loss diets result in a smaller decrease in energy expenditure when compared to higher GI diets, despite similar weight loss [9,10]. A low GI meal prior to exercise, has been found to increase the rate of fat oxidation and lower oxidation of carbohydrate compared with a higher GI meal [11-14]. In rats, a high GI diet resulted in significantly more body fat and less lean body mass than the macronutrient-matched low GI diet over 18 weeks [15], while a number of human clinical studies have found greater loss of body fat with a lower GI diet [16-19].

Clinical research is also supported by the findings of a number of observational studies showing a relationship between dietary GI and body weight, waist circumference, body fat levels and weight gain [20-22]. In the Nurses Health Study, weight gain was inversely associated with the intake of high fibre, wholegrain foods (reflective of a low GI diet) but positively associated with the intake of refined grains [23].

What do these findings mean and how should they be incorporated into current practice?

As the review by Thomas et al. reveals, there are now a number of randomized controlled trials showing superior weight loss on a low GI diet. There is also a growing body of evidence supporting the health benefits of a low GI diet, particularly in chronic diseases associated with obesity and insulin resistance including type 2 diabetes, cardiovascular disease and some cancers [5,6,24].

Some have expressed concern that the concept of GI is too difficult for the average person to understand, yet for most people applying the GI simply means substituting one food for another rather than making major dietary changes. Two studies, one in children with type 1 diabetes and another in pregnant women, found that a low GI diet was easier to follow compared to a conventional diet [25,26].

Like any other dietary recommendations, the GI shouldn't be used in isolation but should be used to select foods within a healthy diet which is also low in saturated fat and high in dietary fibre. When used in this way, a low GI diet is consistent with general healthy eating recommendations including eating more fruits, vegetables and wholegrain breads and cereals. And unlike some other weight loss diets, such as high protein or very low fat high carbohydrate diets, there is no evidence of any adverse health outcomes from following such an eating plan.

With all of this considered, there appear to be many reasons to, and few reasons not to encourage people to adopt a low GI eating plan.

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From the Editor

Synopsis: Thomas DE, Elliott EJ, Baur L. Low glycaemic index or low glycaemic load diets for overweight and obesity (review). *Cochrane Database Syst Rev.* 2007; 3: CD005105.

In this systematic review of 6 randomised controlled trials the authors asked the question if in overweight or obese people low glycemic index or load diet compared to other types of diet is more efficacious in reducing weight and total fat mass and improving metabolic profile. In the analysis including 202 participants it was found that using low glycemic index or load diet for 5 weeks to 6 months is more efficacious in reducing weight (WMD -1,09 kg), body mass index (WMD -1,27 kg/m²), total fat mass (WMD -1,13 kg) and total cholesterol (WMD -0,22 mmol/l) and LDL-cholesterol (WMD -0,24 mmol/l).

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