



Variety of Eating Patterns Consistent With Glycemic Control With Ongoing Support

Written by Wayne Kuznar

The need for medical nutrition counseling as a component of an overall management strategy to achieve treatment goals in adults with type 1 diabetes mellitus (T1DM) or type 2 diabetes mellitus (T2DM) was addressed by Marion J. Franz, MS, RDN, CDE, Nutrition Concepts by Franz, Inc., Minneapolis, Minnesota, USA. In general, a variety of eating patterns are acceptable for the management of diabetes, as long as follow-up encounters and ongoing support are implemented.

Medical nutrition therapy is defined by the Institute of Medicine as evidence-based application of the nutrition care process provided by registered dietitian nutritionists. Both medical nutrition therapy and nutrition therapy should involve a nutritional assessment, diagnosis, intervention, monitoring, and evaluation.

The role of the glycemic index (GI) and macronutrient composition of diets, as well as other aspects of nutrition therapy in diabetes, remain unclear, and professional organizations using similar review processes have reached different conclusions regarding their utility. As a result, current recommendations can be conflicting. For example, the level of evidence to support the efficacy of low-GI diets to improve glycemic control has received different recommendations by the Diabetes UK Nutrition Working Group (Grade A) [Dyson PA et al. *Diabet Med* 2011] and American Diabetes Association (ADA; Grade C) [Evert AB et al. *Diabetes Care* 2013]. In contrast, the Academy of Nutrition and Dietetics rates the level of evidence as fair [Academy of Nutrition and Dietetics *Evidence Analysis Library* 2008].

A systematic Cochrane Review of 11 randomized controlled studies (n=402) conducted in adults with diabetes not optimally controlled found a statistically and clinically significant decrease in HbA_{1c} with a weighted mean difference of -0.5% in both the parallel group of trials ($p=.02$) and crossover group of trials ($p=.03$) with a low-GI diet [Thomas D, Elliott EJ. *Cochrane Database Syst Rev* 2009]. The ADA concluded from its systematic review that differences in glycemic control and cardiovascular (CV) risk factors were small between low-GI and high-GI or other diets and that any improvement in glycemia from a low-GI diet may be confounded by higher fiber intake [Wheeler ML et al. *Diabetes Care* 2012]. The Academy of Nutrition and Dietetics concluded there were mixed effects of GI on HbA_{1c} [Academy of Nutrition and Dietetics *Evidence Analysis Library* 2008].

The utility of the GI concept therefore remains unknown. Franz explained that the GI is the relative area under the glucose curve of 50 g of digestible carbohydrate from a test food compared with 50 g of glucose. It does not measure how rapidly blood glucose levels increase after carbohydrate intake. The glucose response curve does not differ with the consumption of different foods. In an analysis of a database of > 1126 foods and glucose responses in individuals without diabetes, glucose peaks occurred at approximately 30 min regardless of the food's GI. Furthermore, low-GI foods did not produce an extended, sustained glucose response [Brand-Miller JC et al. *Am J Clin Nutr* 2009].

Medical nutrition therapy, however, is effective in reducing HbA_{1c} levels and improving CV risk factors in patients with diabetes [Evert AB et al. *Diabetes Care* 2013; Andrews RC et al. *Lancet* 2011; Coppell KJ et al. *BMJ* 2010; Knowler WC et al. *Lancet* 2009; Appel LJ et al. *JAMA* 2003]. The reduction in HbA_{1c} levels is approximately 1% to 2% depending on the type of diabetes and the duration and level of glycemic control, a level of improvement similar to that obtained with glucose-lowering medication.

There is no ideal percentage of macronutrients (carbohydrate, protein, and fat) for nutrition or weight loss in diabetes, said Franz. Reducing total energy intake while maintaining a healthful eating pattern should take precedence over the macronutrient composition when promoting weight loss

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for persons with T2DM. A variety of nutrition interventions (ie, reduced energy and fat intake, carbohydrate counting, and simplified meal plans) along with multiple individual or group sessions and follow-up encounters have been shown to be effective in improving glycemic control and CV risk factors.

Most people with diabetes report a moderate GI and carbohydrate intake. Franz recommended eating a moderate amount of carbohydrates from vegetables, fruits, whole grains, legumes, and low-fat dairy products.

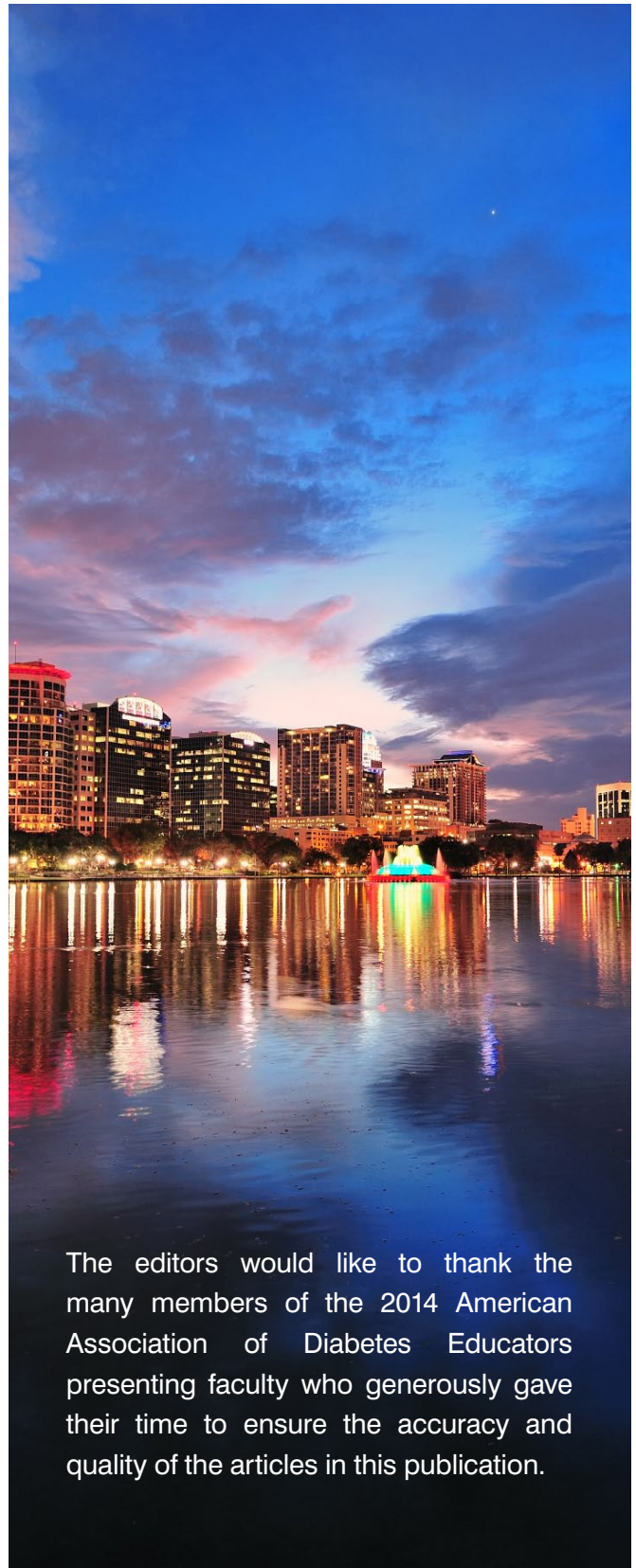
Modest weight loss, defined as about 5% of initial weight, and increased physical activity improve glycemic control, blood pressure, and the lipid profile while decreasing levels of circulating inflammatory markers, especially when used early in the disease process [Klein S et al. *Circulation* 2004]. A reduction in body weight can also prevent or delay the development of T2DM [Knowler WC et al. *N Engl J Med* 2002]. Weight loss may be difficult to maintain because weight is tightly regulated by neural, hormonal, and metabolic factors [Camps SG et al. *Am J Clin Nutr* 2013; Sumithran P et al. *N Engl J Med* 2011]. Ongoing support is crucial regardless of the type of intervention to promote weight loss, because weight gain occurs when treatment is discontinued.

If weight loss does not lead to improved glycemic control, the intervention may not have been intense enough or may have been implemented too late in the disease (when insulin deficiency has occurred).

For patients with T1DM, adjusting premeal insulin doses to planned carbohydrate intake is beneficial. The amount of carbohydrate in the meal does not affect acute glycemic control if premeal insulin is adjusted appropriately, said Jackie L. Boucher, MS, RDN, CDE, Minneapolis Heart Institute Foundation, Minneapolis, Minnesota, USA. Variations in the meal GI or intake of fiber or calories do not influence premeal insulin.

High amounts of fat in a meal may also affect the insulin bolus calculation; higher-fat meals require more insulin coverage than do lower-fat meals with the same carbohydrate content in patients with T1DM [Wolpert HA et al. *Diabetes Care* 2013]. Extra protein in the meal has also been found to add to premeal insulin requirements. For example, 50 g of protein added to a standard meal eaten by patients with T1DM increased the late postprandial glucose response and insulin requirements by 2 to 3 units. The ADA states that basal insulin covers fat and protein insulin needs, and the need to bolus for protein and fat is only necessary when excessive amounts are eaten.

Boucher concluded that a shift away from single nutrients to focusing more on the overall dietary pattern has occurred, and that a variety of eating patterns are acceptable for the management of diabetes.



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