Controlled Snacking and Peanut Consumption Reduces Caloric Intake in Adolescents

Written by Phil Vinall

The Family Lifestyle and Overweight Prevention Program [FLOW; NCT00454610] reported that Mexican American children who snacked on peanuts at least once a week were less likely to be overweight or obese, had lower body mass indices (BMI), and had lower levels of total blood cholesterol. Craig A. Johnston, PhD, Baylor College of Medicine, Houston, Texas, USA, presented some of the details from the FLOW program as well as other weight management strategies.

The FLOW study compared intensive intervention with a self-help approach. Intensive intervention consisted of daily contact, weekly nutrition education sessions, 4 weeks of physical activity sessions, and daily snack intervention at school consisting of 1 oz of peanuts or ¾ oz of peanut butter. The self-help group received a book to read and spent intervention time in study hall/health class.

BMI was significantly reduced ($p = .001$) at 3 and 6 months in the intensive treatment group as compared with the self-help group (Figure 1) [Johnston CA et al. *Pediatrics* 2007]. The reduction was sustained up to 2 years (Figure 2) at which time the BMI of 62.1% of children in the intensive intervention program was either maintained or decreased as compared with 35.3% of children in the self-help group [Johnston CA et al. *Obesity (Silver Spring)* 2010].

A follow-up study showed that decreases in BMI were incrementally smaller in children with higher weight classifications [Johnston CA et al. *J Pediatr* 2011]. Adherence to the FLOW program

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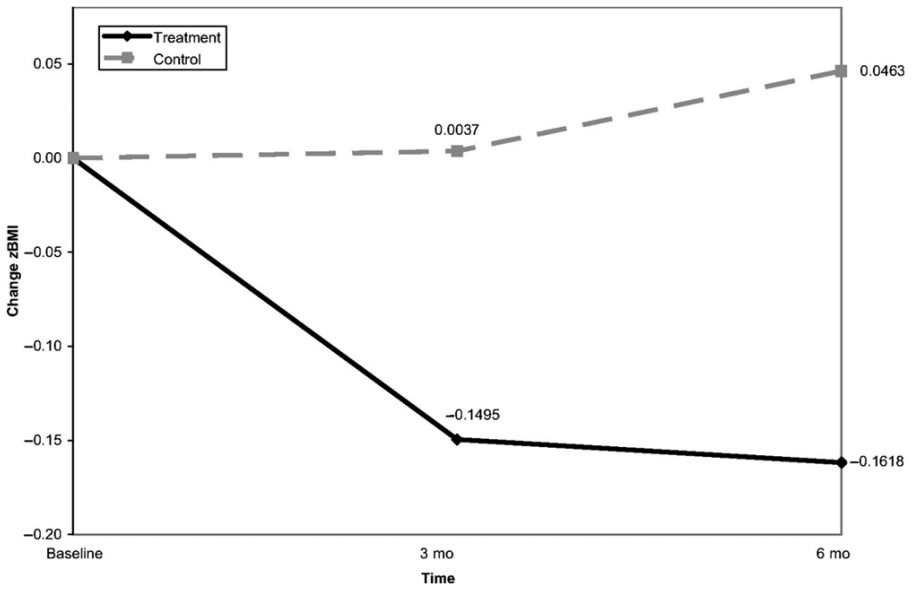
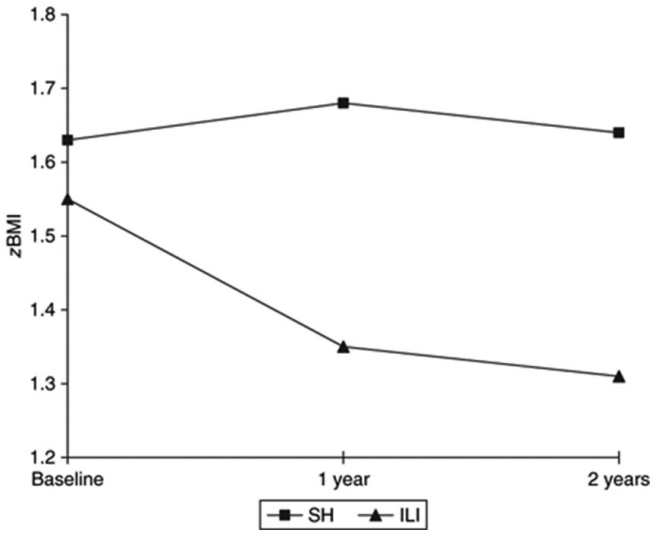
Figure 1. Percent Change in Standardized BMI at Baseline, 3, and 6 Months



zBMI=standardized body mass index.

Johnston CA et al. Weight Loss in Overweight Mexican American Children: A Randomized, Controlled Trial. *Pediatrics*. 2007;120:1450-1457. Reproduced with permission from *Pediatrics*, 120, 1450-1457, Copyright © 2007 by the AAP.

Figure 2. Sustained Benefits in BMI at 2 Years



BMI=body mass index; ILI=instructor-led intervention; SH=self-help.

Johnston CA et al. Effects of a School-based Weight Maintenance Program for Mexican-American Children: Results at 2 Years. *Obesity*. 2010;18:542-547. Reproduced with permission from John Wiley & Sons, Inc.

was relatively high compared with that of adult programs, which have reported compliance to be as low as 2% to 13% [Wing RR, Phelan S. *Am J Clin Nutr* 2005].

The role of snacking is integral to weight control. In the FLOW program, a reduction in the number of snacking episodes was associated with a significant decrease in BMI ($p < .05$). Furthemore, adolescents in the intervention group had significantly reduced their snacking episodes as compared with the control group ($p < .05$), with a focus on snacks, such as peanuts, which promoted satiety and nutrient density [*Palcic et al. Proceedings of the North American Association for the Study of Obesity, 2010*). Despite being energy dense, peanuts have a high satiety value, and chronic ingestion evokes strong dietary compensation and little change in energy balance [Alper CM, Mattes RD. *Int J Obes Relat Metab Disord* 2002].

Over the past 3 decades, there has been a steady increase in the number of snacks consumed on a daily basis in the United States; snacks now account for up to 27% of daily caloric intake [Piernas C, Popkin BM. *Health Aff (Millwood)* 2010]. The number of individuals who snack daily has also increased from 48% to 78%. In the FLOW study, children reported eating snacks 15.5 times a day, mainly between 2 and 11 PM.

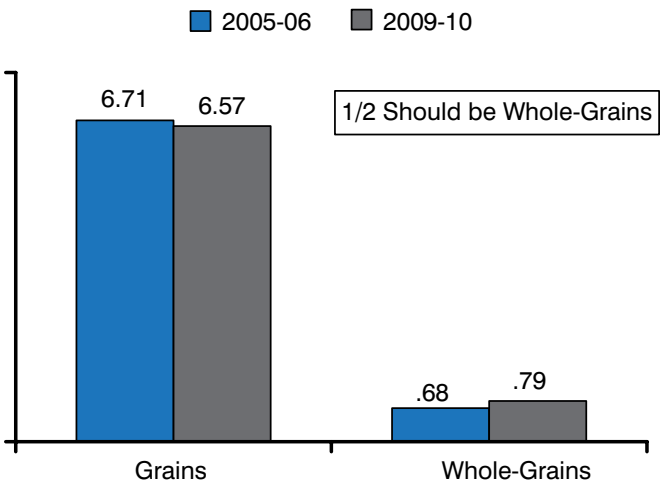
Snacking is frequently associated with rates of obesity, a growing adolescent problem in the United States [Nicklas TA et al. *Am J Prev Med* 2003]. Projections to 2020 suggest that obesity could eventually affect 43% of US men and 42% of US women, whereas impaired fasting glucose/diabetes is projected to affect 77% of men and 53% of women. Strategies to prevent and manage obesity are needed to avoid the projected dramatic increases in the incidence of diabetes [International Diabetes Federation. *IDF Diabetes Atlas*. 6th ed. 2013].

Dr. Johnston added that inclusion of the family is an important part of the process. Family members are able to create a healthy home environment and allow children to model good behaviors such as appropriate eating, adequate physical activity, and reductions in sedentary habits such as TV viewing.

Kathleen Zelman, MPH, RD, LD, WebMD, Marietta, Georgia, USA, continued the discussion of the role of snacking in weight control by highlighting the possibility of replacing carbohydrates with protein and good fats.

As noted previously, the intake of snacks are on the rise whether it be as a meal replacement, eating on the go, or an indulgence. Snacks now provide as many calories as lunch and are the source of about 24% of nutrient intake and about 25% of daily caloric intake for adults and children [United States Department of Agriculture (USDA). Agricultural Research Service. *What We Eat in America*, NHANES 2007-2008; *Snacking Occasions Consumer Trend Report* 2014]. The American diet falls far short of the goals for vegetables, fruit, dairy, seafood, and, in particular, whole grains (Figure 3) but

Figure 3. Mean Intake of Grains and Whole Grains (Ounce Equivalents)



Source: USDA. Agricultural Research Service. *What We Eat in America*, NHANES 2005-2006 and 2009-2010.

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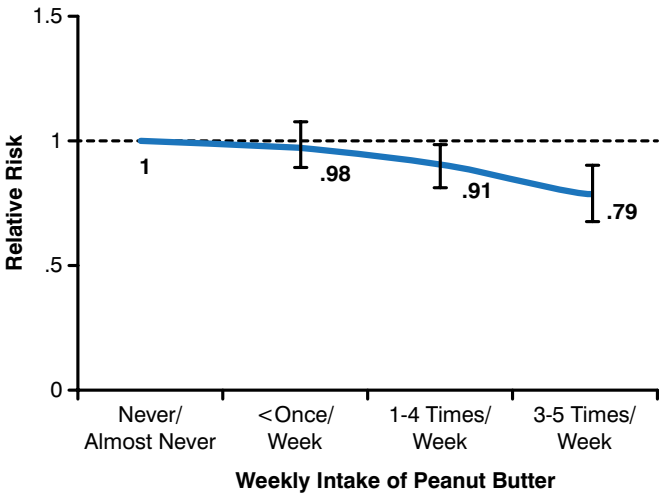
Figure 4. Peanuts and Peanut Butter Reduce T1DM in Women



T1DM=Type 1 Diabetes Mellitus
Source: Jiang R et al. *JAMA* 2002.
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reaches 280% of the limit for food rich in solid fats and added sugars. Peanuts, which are nutrient dense, have been recommended as an appropriate snack. Ms. Zelman reported that daily peanut consumption is associated with longer life and the reduced incidence of diseases such as coronary artery disease and diabetes. Peanut ingestion also improves satiety and weight management.

The frequency of nut consumption is inversely and independently associated with total and cause-specific mortality. Daily consumption of peanuts/nuts is associated with a 20% reduced risk of death, whereas its twice-weekly consumption reduces the risk of death by 12% [Bao Y et al. *N Engl J Med* 2013; Guasch-Ferré M et al. *BMC Med* 2013]. A number of health studies (eg, the Adventist, Iowa Women's, Nurses', and Physicians') have shown a relationship between the frequency of peanut consumption and a reduced risk of heart disease. Peanuts and peanut butter are associated with reductions in the risk of diabetes for women, although the association between peanuts and diabetes remains unknown (Figure 4) [Sabaté J, Ang Y. *Am J Clin Nutr* 2009].

Ms. Zelman noted that, in one study, peanuts and peanut butter caused a significant reduction in hunger for up to 12 hours in obese women with a high risk of type 2 diabetes mellitus (T2DM) (p = .01). This is possibly due to a significant increase in the secretion of the hormone peptide YY, which promotes satiety and feelings of fullness [p = .006; Reis CE et al. *Br J Nutr* 2013].

In another study from Purdue University, consumption of any type of peanut resulted in reductions in diastolic blood pressure (BP), cholesterol, and triglycerides in individuals with elevated serum lipids and BP as compared with individuals at a lower risk of cardiovascular disease (CVD) [Jones JB et al. *Am J Clin Nutr* 2014]. Nuts in general contain high amounts of vitamins, minerals, antioxidants, and phytoesterols, which may confer health benefits for CVD and T2DM [Jackson CL, Hu FB. *Am J Clin Nutr* 2014], as well as aid in the prevention of inflammation [Ley SH et al. *Am J Clin Nutr* 2014].

Both the American Heart Association and the United States Food and Drug Administration (FDA) suggest eating peanuts to reduce the risk of heart disease. New nutritional standards for Smart Snacks in Schools highlight peanuts as a healthy snack with zero empty calories. Despite these recommendations, peanuts do not make the list of top 10 foods reported to be consumed as snacks by children aged 9 to 12 years [USDA. Agricultural Research Service. *What We Eat in America*, NHANES 2005-2006].

Ms. Zelman concluded that small changes in snacking behavior could improve the future health of adolescents.