

Body Composition and Dietary Intake Patterns among Barbadian School Students: Relationships to Known and Postulated Dietary Factors for Obesity in Childhood

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As a part of the Barbados Interdisciplinary Tropical Studies (BITS) program, and under the mentorship of Pamela Gaskin Ph.D. (University of the West Indies, Cave Hill Campus) and Stan Kubow, Ph.D. (McGill University), we undertook a 14-week-long pilot study and research project. The objective of this project was to assess body composition such as weight status and fat mass distribution and food intake patterns among 5 to 11-year-old Barbadian students in both a rural and urban school. This information will be used to validate practical methods of data collection in children in a larger research study in Fall of 2009 that is aimed at describing the underlying factors related to nutritional and health concerns of the school aged population.



Project Investigators and Helpers: (left to right) Stacey Carter (McGill), Dr. Pamela Gaskin (UWI), Lindsay Vyvey (Volunteer, McGill), Sarah Levesque (McGill)



Hillaby-Turner's Primary School: Plate waste preparation and student volunteer note takers

[Photos by D.J Donnelly & Stacey Carter, June 2009]

Why all the concern?

Malnutrition, whether in the form of over or under-nutrition is prevalent in many regions of the world. Obesity and overweight are very common in developed countries among both children and adults. This trend is also becoming more noticeable in developing countries, where the number of underweight people rivals the number of overweight people worldwide, displaying great disparities in nutritional intake (FAO, 2003). In addition to genetic and environmental factors, lifestyle choices including an unbalanced food intake with large portion sizes, increased caloric, fat, and sugar intake, a reliance on pre-packaged food, increasing amounts of imported foods, and decreased physical activity have been linked with the rising epidemic of overweight, obesity, and adult-onset diseases in adolescents (Isabela da Costa et al., 2005; Dehghan et al., 2005; Martorell et al., 2000). A national survey on food consumption in Barbados in 2000 showed increased proportion of animal protein, dietary energy supplies, and calories from vegetable oil, fat, and sugar that may contribute to the prevalence of overweight and obesity in the population (FAO, 2003). Classifications of weight status are of importance as childhood overweight and obesity are thought to persist throughout life, impacting all facets of health and wellbeing. These childhood weight status categories are associated with development of hyperlipidaemia, hypertension, abnormal glucose tolerance, infertility, cardiovascular, digestive diseases, and depression (Dehghan et al., 2005), some of which have been increasing in the Caribbean, where 10 % and 20% of the population has diabetes and hypertension, respectively (Sharma et al., 2008).

The primary schools in Barbados have a school lunch program, which provides meals such as chicken pelau, macaroni with corned beef and a small apple or orange half. Typically, meals eaten during the school day are recommended to provide a significant percentage of total daily energy intake, with school lunch providing 33 %, of recommended daily energy requirements (Baxter, 2002).

Anthropometric (weight, height, waist girth, body composition) measures provide information and insight into eating patterns, especially when used in conjunction with food recalls and observations. The Caribbean has a high prevalence of adult obesity and associated diseases. However, there is limited literature on current levels of weight status, dietary intake, and associated illness among school-aged children in Barbados and the Eastern Caribbean. Additionally, accurate standards to determine body composition of children and adolescents are essential and require experimentation to determine if they are related with a higher chance of suffering from chronic diseases (Cole et al., 2000). With rising levels of overweight, disparities, and rapid changes in dietary patterns and lifestyles, close monitoring of the prevalence of childhood overweight is warranted.

The Project



Measurement and Dietary tools:

Weigh scale (top left), BIA machine (bottom left), stadiometer height measure (middle), food models (right)

[Photos by Stacey Carter, June 2009]

The objective of assessing body composition and food intake was met using anthropometric measures (weight, height, waist girth, and body composition measures), activity level assessment, 24-hour food recalls and lunchtime plate waste audits. Following data collection, analysis of reported intake (24-hour recall, top 10 foods consumed, school lunch menu, common snacks and traditional Caribbean food) and recorded anthropometric measures were performed to investigate the relationship between dietary intake and body composition measures in school aged children, determine nutritional quality of food intake, potential health effects, validity of assessment methods, and confounding factors.

The project began on May 29, 2009 with preparation of forms, assessment tools, protocols and approval applications. From June 5, 2009 to June 23, 2009, two public primary schools were visited for anthropometry, activity, and dietary assessment

collection for an overall assessment of 97 children. An urban primary school, St. Paul's Primary School, St. Michael, Barbados was visited on four separate occasions. The relatively rural primary school, Hillaby-Turner's Primary School, St. Andrew, Barbados was visited on two separate occasions. The 'concrete playground' at St. Paul's was in drastic contrast to the wide open fields at Hillaby-Turner. However, children at both locations were lively, active, and curious about the project during data collection and break times. During breaks and lunch, children were observed to see what kinds of snacks were eaten and the type of school-yard games played. The students were very interested in the project tools and investigators, often playing with food models and inquiring about life in Canada.

Student break time activities.

[Photos by Stacey Carter, June 2009]



Hillaby-Turner's Primary School: Lunch Break



St. Paul's Primary School: Hand clapping game

The students' anthropometric measures were taken, followed by an activity assessment that asked about games that were played, with the most popular game reported being the national sport of cricket. Of the sample, rates of 'underweight', 'overweight', and 'obesity' were comparable to published estimates (Ogden et al., 2006), with the majority of children falling within the 'normal weight' category.

Dietary intake assessment via a 24-hour recall inquires about all the foods eaten in the pervious day. Results indicated that children were meeting the recommended distributions of protein, carbohydrates and fat, with slightly higher sugar intake and low fiber intake (Food and Nutrition Board, 2005). The most commonly reported foods and drink items included juice, chicken, bread, chips, rice, and chocolate tea. As shown by reported intake and previous studies, consumption patterns and nutritional recommendations are different compared

to Canada. Unlike Canada's Food Guide, the Caribbean recommendations consists of six food groups, comprised mostly of staples or starches, such as rice, flour, and tubers, while vegetables and fruits account for less than a quarter of the recommended intake (CFNI, 2009). These dietary patterns of traditional and imported foods have been observed and 'tested' by Stacey and Sarah during meals provided during their stay at Bellairs Research Institute and touring the island, grocery, and convenience stores.



CFNI 2009. http://new.paho.org/cfni/images/stories/CFNI/cfni_img.jpg

The final results indicated no significant association between dietary intake and weight status. However, the results presented some insight into eating patterns, the influence of the environment and changing economy on lifestyle and dietary habits, weight status, and provided information to improve on future methods of data collection in children. There were two important limitations to this project, including the short data collection period and small sample size of children. In the beginning, Sarah and Stacey had limited knowledge about local culture, traditional foods, and foods available in the market. This made recall interviews a challenging task! However, complete emersion into the culture, traditions, tastes and sounds of Barbados during the course of the project, increased our knowledge, understanding, appreciation, and skill set for future international and culturally different experiences in dietetics and research was obtained. Information and recommendations obtained from this pilot project will be valuable for future projects of this sort in Barbados.

We would like to thank all those who volunteered, mentored, and made this project possible. Good luck to those who partake in the Fall 2009 project!

Contributors included Meschelle Carrington, Danielle Donnelly, Pamela Gaskin, Stan Kubow, Brian Payne, Lindsay Vyvey, staff and students from both primary schools in Barbados.

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