

# A Pilot Comprehensive School Nutrition Program Improves Knowledge and Intentions for Intake of Milk and Milk Alternatives Among Youth in a Remote First Nation

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## ABSTRACT

**Objective:** To evaluate the impact of a pilot comprehensive school nutrition program modeled on Social Cognitive Theory on knowledge, intentions, self-efficacy, and intake of milk and milk alternatives (MMA) in First Nations youth.

**Methods:** A pilot school nutrition program was implemented at Peetabeck Academy in Fort Albany, Ontario in May, 2010. The Knowledge, Self-Efficacy, and Intentions Questionnaire (KSIQ) and Waterloo Web-based Eating Behavior Questionnaire (WEB-Q) were used to assess change in attitudes and behavior from pre- to postprogram.

**Results:** The KSIQ preprogram (n = 26), postprogram (n = 19); WEB-Q preprogram (n = 30), postprogram (n = 10). Improved knowledge ( $6.0 \pm 1.5$  vs  $6.9 \pm 1.5$ ,  $P = .05$ ) and intention scores ( $9.6 \pm 4.4$  vs  $11.3 \pm 4.1$ ,  $P = .01$ ) were observed.

**Conclusions and Implications:** A comprehensive school nutrition program can improve knowledge and intentions for intake of MMA in First Nations youth. Environmental constraints beyond the school environment need to be addressed.

**Key Words:** indigenous, adolescent, milk, schools, health promotion, First Nations (*J Nutr Educ Behav.* 2013;45:455-459.)

## INTRODUCTION

Overweight and obesity prevalence in Canadian Aboriginal and American Indian youth is a public health concern, and the transition to a higher reliance on market food is a major contributor to the problem.<sup>1,2</sup> Among dietary concerns faced by Aboriginal Canadians is a low intake of milk and milk alternatives (MMA); in some regions, less than half of Aboriginal youth are meeting Canada's Food Guide (CFG) recommendations.<sup>3-5</sup> This is a problem because of the postulated rela-

tionship between dietary calcium and body weight,<sup>6</sup> as well as the high risk of bone fractures seen in Aboriginal populations.<sup>7</sup> For northern populations, MMA are a key source of dietary vitamin D, given that adequate sun exposure is unreliable.<sup>8</sup> There is a need for health promotion and education programs to address the issue.

The United States Centers for Disease Control and Prevention identify schools as an ideal setting to promote healthy eating via multicomponent, comprehensive programs.<sup>9</sup> Such programs have shown success in improv-

ing dietary behavior, knowledge, intentions, and self-efficacy in indigenous populations (eg, *The Sandy Lake Health and Diabetes Project*<sup>10</sup> and *The Pathways Program*<sup>11</sup>). To improve effectiveness in behavior change, interventions should have a theoretical basis.<sup>12,13</sup> Social Cognitive Theory (SCT) outlines a key set of interacting determinants for behavior change: knowledge, perceived self-efficacy, outcome expectations, health goals, and perceived facilitators and impediments.<sup>14</sup> Motivation is influenced by knowledge and self-efficacy; knowledge gives individuals a reason to change behavior, and personal self-efficacy allows individuals to believe that they can overcome barriers to the goals (intentions) that they set.<sup>14</sup> Personal and environmental facilitators and impediments strongly influence a person's self-efficacy.<sup>14</sup> In some behavior change theories, such as the Theory of Reasoned Action<sup>15</sup> and the Theory of Planned Behavior,<sup>16</sup> health goals may be called "intentions," which refers to concrete plans to change behavior.<sup>14</sup>

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The objective of this study was to describe the implementation of a pilot comprehensive school nutrition program over the 2009-2010 school year, and to evaluate its impact on dietary behavior, knowledge, intentions (goals), and self-efficacy regarding the intake of MMA among on-reserve First Nations (Cree) schoolchildren (sixth to eighth grade) in Fort Albany, Ontario, Canada.

## METHODS

### Study Design

The school program was guided by SCT and included policy, education, food provision, family and community involvement, and program evaluation components. Food policy guidelines and a sample shopping list were provided.<sup>17,18</sup> The nutrition education was adapted from the *Power4Bones* program developed by the Dairy Farmers of Canada.<sup>19</sup> Lessons including goal setting and peer modeling (influencing intentions and knowledge) were delivered by a University of Waterloo senior undergraduate student with teaching experience who acted as a positive role model for students.

Each grade was taught 1 30-minute class every week, for 5 weeks. An informative handout for parents was given to students to bring home after each class (influencing the home environment and role models, and influencing self-efficacy). Healthy breakfast and snacks were provided daily via a preexisting program (including vegetables or fruit, whole grains, protein sources, and milk or milk alternatives), which facilitated healthy eating (influencing perceived self-efficacy and the school environment). Students were involved in planning a community feast emphasizing healthy food (influencing the community environment and role models, and influencing self-efficacy). The evaluation component included formative evaluation of program materials and process evaluation including program integrity and attendance. Student outcomes related to SCT regarding knowledge, self-efficacy, and intentions were assessed pre- and postprogram using a pen-and-paper questionnaire adapted for this purpose, previously used in the *European Pro Children Project*.<sup>20</sup> Die-

tary behavior was assessed pre- and postprogram using the University of Waterloo Web-based Eating Behavior Questionnaire (WEB-Q).<sup>21</sup>

### Participants and Recruitment

This study was approved by the University of Waterloo Office of Research Ethics and conducted in collaboration with Peetabeck Academy (a First Nations-administered school) in Fort Albany, Ontario, Canada. Fort Albany First Nation is a remote Cree community located on the western shore of James Bay in northern Ontario. It is accessible only by plane year-round and has 1 school (kindergarten-12th grade) and 1 main grocery store. Passive consent for participation was assumed by sending an information letter home to parents. Active student consent was obtained at the beginning of the WEB-Q. All assessments were completed in the classroom setting and included all students attending sixth to eighth grade at Peetabeck Academy. No incentives for student participation were provided.

### Instruments

The Knowledge, Self-Efficacy, and Intentions Questionnaire (KSIQ) was adapted from a questionnaire used in the *European Pro Children* project.<sup>20</sup> Although it has been shown to be valid and reliable for a diverse population,<sup>20</sup> it has not been validated in First Nations youth. However, the adapted questionnaire underwent formative evaluation with the snack program coordinator at Peetabeck Academy (community member and former teacher) and was deemed culturally appropriate.

The WEB-Q was developed at the University of Waterloo to collect dietary data from diverse populations of students using a 24-hour recall and food frequency questionnaire.<sup>21</sup> It was initially validated by comparison to dietitian interviews in students in sixth to 10th grade from Ontario and Alberta (ICC = 0.56 for energy, 0.51 for calcium, and 0.47 for vitamin D).<sup>21</sup> The WEB-Q was more recently validated in First Nations children in sixth to 10th grade (n = 25) from

Fort Albany, Ontario. Moderate to good validity was found (ICC = 0.77 for energy).<sup>21</sup> It includes traditional food (eg, bannock) as possible contributors to calcium and vitamin D intakes. Only the 24-hour recall portion of the WEB-Q was used for this study.

### Data Analysis

The Wilcoxon signed-rank test was used to compare paired pre- and postprogram scores regarding knowledge, self-efficacy, and intentions. The test was 1-tailed, as an improvement was predicted based on findings from studies with similar outcome measures.<sup>22-24</sup> Nutrient analysis was based on Canadian Nutrient File data (version 2007)<sup>25</sup> using The Food Processor software (version 8.0, ESHA Research, Salem, OR, 2002). Food group servings were based on the 2007 version of the CFG for First Nations, Inuit, and Métis.<sup>3</sup> Descriptive statistics compared participants' intakes to Dietary Reference Intakes<sup>26</sup> and to intakes seen in the general population as described by the 2004 Canadian Community Health Survey Cycle 2.2: Nutrition.<sup>27</sup> The Mann-Whitney *U* test was used to compare pre- and postprogram energy-adjusted dietary intakes (per 1,000 kcal).<sup>28</sup> The test was 2-tailed, as no predictions were made in light of overriding community-level barriers. Analyses were performed using the Statistical Package for the Social Sciences (version 17.0, SPSS Inc, Chicago, IL, 2008), with significance set at  $P \leq .05$ .

## RESULTS

### Participant Characteristics

In all cases, 100% of students attending school on the day of the questionnaire/survey completed the assessments. Twenty-six participants completed the KSIQ at baseline, and 19 completed it postprogram. Participants who were missing a baseline or post questionnaire were excluded from the analysis, leaving 16 individuals in the paired analysis. Thirty participants completed the WEB-Q at baseline, and 10 completed it postprogram. Demographic characteristics are presented in [Table 1](#).

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