

A Comparison of Dietary Practices at or En Route to School between Elementary and Secondary School Students in Vancouver, Canada



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ARTICLE INFORMATION

Article history:

Submitted 1 November 2013

Accepted 12 February 2015

Available online 29 April 2015

Keywords:

Dietary intake
Food purchasing
Youth
School health
Socioeconomic status

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<http://dx.doi.org/10.1016/j.jand.2015.02.030>

ABSTRACT

Background There is evidence that dietary quality declines as children age in North America, but few studies have explored whether food environment exposures in secondary schools as opposed to elementary schools are associated with changes in students' school-day food choices.

Methods This study examined differences in dietary practices (at or en route to and/or from school) between students in their last years of elementary school (grades 5 to 7) and first year of secondary school (grade 8) in Vancouver, Canada, controlling for sociodemographic characteristics and school-level socioeconomic status. Demographic characteristics and dietary data were collected through a cross-sectional survey (n=950 from 26 schools) and combined with school-level socioeconomic data derived from the 2006 Canadian Census.

Results Multilevel logistic regression analyses indicated that secondary school students were significantly more likely to report daily consumption of fast foods (odds ratio=1.92; 95% CI 1.18 to 3.12) and minimally nutritious packaged snacks (eg, candy or chocolate bars) (odds ratio=1.60; 95% CI 1.05 to 2.45), and to report regular purchases from off-campus retailers (odds ratio=1.63; 95% CI 1.10 to 2.42). Gender, food insecurity, lower acculturation to Canada, and access to more weekly spending money were associated with nutritionally poor practices. Students attending schools drawing from lower-income neighborhoods were also significantly more likely to consume fast foods and packaged snacks daily. The majority of students sampled did not report consuming healthy foods, such as fruit and vegetables, daily at or en route to and/or from school. Intake of fruit, vegetables, and low-fat milk did not differ significantly between elementary and secondary school students.

Conclusions Findings suggest that research and intervention strategies should address modifiable school-level exposures and policies to improve dietary practices for both elementary and secondary school-aged youth, while at the same time addressing sociocultural factors associated with eating behavior.

J Acad Nutr Diet. 2015;115:1308-1317.

LIKE AMERICAN YOUTH, MOST CANADIAN SCHOOL-children and adolescents do not meet national dietary recommendations,¹⁻³ and the prevalence of adverse nutrition-related outcomes, including obesity and type 2 diabetes, is rising.^{4,5} Consequently, improving the eating habits and nutritional health of children and adolescents is a priority area for international public health efforts. Recent initiatives, including the Institute of Medicine's strategies for enhancing obesity prevention⁶ and the World Health Organization's Health Promoting Schools framework and Nutrition Friendly Schools initiatives,⁷ now emphasize the importance of schools as key institutions for nurturing healthy habits. Yet, in-depth understanding is still lacking about the factors that shape food practices in schools where

children and adolescents spend a substantial portion of their time.

To inform emerging school-based intervention strategies, a small but growing number of researchers have begun investigating whether and how characteristics of school food environments impact dietary behaviors.⁸⁻¹⁴ Several studies have examined associations between characteristics of the school environment and obesity outcomes, or impacts of specific school-based interventions. However, few have carefully evaluated whether nutrition-related outcomes differ after students transition from elementary school to secondary school, where they may have more autonomy over food choices; or how differences in these two contexts shape specific dietary practices. In addition, most studies have been

conducted in the United States and may not be generalizable to other developed countries, including Canada, where the school food setting differs.

Unlike the United States, Canada does not have a nationally funded school lunch program. And while school environment research is in its infancy in Canada, there is evidence that food environment exposures differ between elementary and secondary contexts.¹⁵ In Canadian schools, foods are generally available from a variety of sources, including cafeterias (some of which include subsidized meal programs for vulnerable students), vending machines, school stores, fundraisers (eg, pizza lunches, bake sales), and special food days or food provided or sold by parents or community groups, which vary widely among and between elementary and secondary schools. For instance, in the province of British Columbia, Canada's westernmost province, 82% of elementary schools report hosting food-based fundraisers in the last month, compared with only 39% of secondary schools.¹⁵ On the other hand, vending machines are common in secondary schools, but are found in <2% of British Columbia elementary schools.¹⁵

School food environments are thought to be promising settings for nutrition-related programs, with emerging research suggesting that school-based interventions can improve dietary quality.⁸⁻¹¹ Recent school food policy changes proposed in both Canada and the United States seek to improve diet-related outcomes for youth.¹⁶⁻¹⁹ In British Columbia, the provincial government has initiated several programs, including Action Schools! BC, Sip Smart! BC, Farm to School, and the School Fruit and Vegetable Snack Program, to improve access to nutritious foods and to reduce exposures to foods of low nutritional quality.²⁰ In addition, revised province-wide guidelines now restrict the sale of foods and beverages with poor nutritional quality across all settings where foods are sold inside schools, including cafeterias, vending machines, fundraising efforts, and school events.^{21,22} Despite these efforts, little is known about whether and why students' dietary practices differ across educational settings. Identifying school-level exposures that influence dietary behaviors might help to inform nutrition-intervention strategies and food policy changes.

Sociocultural factors, including gender, socioeconomic status, and food security are also established determinants of dietary practices.²³⁻²⁶ For example, dietary practices and concerns related to eating and body image differ by gender,^{27,28} and boys report greater energy and nutrient intakes than girls. Overall, boys choose foods both higher (eg, grains, milk products, and meat/alternatives) and lower (eg, soft drinks, salty snacks, and french fries) in nutritional quality.²⁹ Students from low-income and food-insecure households may consume fewer milk products, fruit, and vegetables, and more fast food and sugar-sweetened beverages than food-secure youth.³⁰⁻³³ In addition, while research from the United States has examined differences in dietary intake among youth who are more or less acculturated,³⁴ relatively little is known about whether children who immigrate to Canada acquire or reject the dietary norms encountered at school.

There is also growing interest from researchers with regard to the roles of socioeconomic conditions within and surrounding schools and their neighborhoods in shaping nutrition-related outcomes.^{35,36} At least two Canadian studies of youth have reported positive associations between

area-level socioeconomic status (SES) and intake of fruit, vegetables, and fiber, and negative associations with intake of minimally nutritious choices.^{37,38} There is some evidence from both the United States and Canada that secondary schools and schools in neighborhoods characterized by lower SES are more likely to have access to nearby fast-food vendors.³⁹⁻⁴¹ While the mechanisms through which area-level SES impacts students' diets remain unclear, examining and controlling for differences in school SES may help clarify understanding about the broader contextual factors associated with dietary practices.

Clearly, the multiple levels of influence on food choice are complex. More evidence is needed to understand the dynamics of school-day dietary intake and food purchases and whether varied policies and food environment exposures in secondary schools are associated with the declining dietary quality reported for older children. The primary objective of this study was to assess whether dietary practices at or en route to and from school differ among students in their final years of elementary school and first year of secondary school in Vancouver, Canada.

METHODS

This study draws on cross-sectional data from the 2012 Individual Eating Assessment Tool survey. Sampling was based on a two-stage cluster approach described previously,³³ which sampled schools from all six geographic sectors within the Vancouver Board of Education,²² with a school-level participation rate of 74%. Classes were recruited through invitations to teachers and school administrators and all students in the selected classes were invited to participate.

The survey was completed online, in class by 964 students from 20 elementary schools (grades 5 to 7) and 6 secondary schools (grade 8), between March and June 2012 (student-level response rate=81%). The sample included sociodemographically diverse public school students in their last year(s) of elementary school or first year of secondary school. The survey protocol was informed by previous studies with adolescents⁴²⁻⁴⁴ and was pilot tested with 10 content experts and 54 students from grades 7 to 12 to ensure face and content validity. A field test was then carried out in one grade 6/7 split classroom to ensure comprehension of core questions and feasibility in the school context. All protocols were approved by the Behavioural Research Ethics Board at the University of British Columbia and the Vancouver Board of Education. Active student assent was required to commence in-class surveys and consent forms were sent home to parents who could indicate dissent to their child's participation by returning signed forms.

Dietary Practices, Dependent Variables

Food frequency questions were informed by a tool used previously with Canadian students in grades 5 to 12,⁴⁵ adapted to focus on usual intake of foods consumed at or en route to and from school ("on school-days"). Questions asked about typical intake of food or beverage items during the past 30 days to capture usual dietary practices, including some that are typically reported only sporadically over the course of a month. Dependent variables were selected to represent categories of foods recommended or discouraged by regional (Province of British Columbia) and national guidelines^{22,46} and that are at

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