

# Food knowledge is associated with fruit and vegetable intake among children aged 9–14 years in Ontario, Canada

L.W. McEachern<sup>1</sup>, M.R. Ismail<sup>1</sup>, J.A. Seabrook<sup>2</sup> and J.A. Gilliland<sup>1</sup>

<sup>1</sup>Department of Geography & Environment, Human Environments Analysis Laboratory, Western University, London, Ontario, Canada and

<sup>2</sup>School of Food and Nutritional Sciences, Brescia University College at Western University, London, Ontario, Canada

It is widely accepted that the consumption of fruits and vegetables (FV) is important for maintaining overall health. Food-based dietary guidelines and national recommendations such as Canada's Food Guide (2019) encourage the frequent intake of FV, but despite such recommendations, the intake of FV by school-age children in Canada remains suboptimal<sup>(1)</sup>. Attempts to improve dietary quality have had modest success<sup>(2)</sup> and it has been suggested that food knowledge could be key to improving diet quality outcomes<sup>(3)</sup>: previous intervention programmes have been criticised for insufficiently connecting food knowledge with food skills and decision making about dietary intake. The Canadian government has recently prioritised the development of strategies that improve healthy eating early in childhood<sup>(4)</sup>. To inform public health professionals, policy makers, and educators about the factors associated with inadequate intake of FV, the objectives of this study were to a) quantify the intake of FV as reported by elementary school children in Ontario, Canada, and b) investigate factors associated with FV consumption, including food knowledge, the food environment, socioeconomic status, and other sociodemographic characteristics. In 2017–19, a cross-sectional survey was administered to 2,443 students aged 9 to 14 years, at 60 urban and rural schools across Southwest Ontario, Canada. The self-report survey included 124 questions under four main topics: sociodemographic information, eating habits, nutrition and food knowledge, and food preferences. A parent survey was used to validate the sociodemographic variables reported by students. FV intake was obtained from two multiple component food frequency questions, developed by registered dietitians. Forty-six individual questions assessed food knowledge in the student survey; a total score was obtained by adding the correct responses. Multiple regression was used to analyse children's intake of FV with various predictor variables, including food knowledge, sociodemographic characteristics, and the food environment. The mean intake of fruits and vegetables reported by participants was 2.6 (SD 1.1) and 2.4 (SD 1.2) servings/day, respectively. A total FV intake below WHO guidelines ( $\leq 5$  servings/day) was reported by 40.7% of respondents. Mean total knowledge score was 29.2 (SD 7.1) out of a possible 46 points (63.5% correct responses). Knowledge score ( $\beta = 0.257$ ,  $p < 0.001$ ) and child age ( $\beta = -0.072$ ,  $p = 0.001$ ) significantly predicted higher reported intake of FV. This study shows that FV intake among this sample of school-aged children is low, and increased intake is associated with higher food knowledge. To encourage healthy eating, school-based food and nutrition programmes of sufficient duration, that incorporate multiple components and emphasise food knowledge have value among this young population.

## Acknowledgments

The authors gratefully thank the students, families, and school staff involved in this study. This work was supported by a Weston Seeding Food Innovation Grant, 2016.

## References

1. Jessri M, Nishi SK & L'Abbe MR (2016) *BMC Public Health* **16**, 1–14.
2. Waters E, de Silva-Sanigorski A, Burford BJ, *et al.* (2011) *Cochrane Database Syst Rev*.
3. Laska MN, Larson NI, Neumark-Sztainer D, *et al.* (2012) *Public Health Nutr* **15**, 1150–1158.
4. Government of Canada (2019) *Chapter 4: Delivering real change* [Available at <https://www.budget.gc.ca/2019/docs/plan/chap-04-en.html>].