https://doi.org/10.24095/hpcdp.46.9.01

# Original quantitative research

# Social determinants of adolescent eating behaviours: findings from the 2019 Canadian Health Survey on Children and Youth

*Gyselle de Geus, MSc (1); Jean-Philippe Chaput, PhD (2,3); Rita Al Kazzi, MSc (1); Claire N. Tugault-Lafleur, PhD, MA, RD (1,2,3)*

**This article has been peer reviewed.**

**Recommended Attribution**
Research article by de Geus G et al. in the HPCDP Journal licensed under a Creative Commons Attribution 4.0 International License

## Abstract

**Introduction:** Limited evidence is available on the eating behaviours of Canadian adolescents. We examined how eating behaviours vary by social factors in a large nationwide sample of Canadian adolescents.

**Methods:** This cross-sectional study used data from the 2019 Canadian Health Survey on Children and Youth (n = 13 605 adolescents aged 12–17 years). Gender-stratified multivariable regression models were used to test for differences in the likelihood of breakfast consumption, evening family meals, sugar-sweetened beverages (SSB) intake and restrictive eating by gender, age, racial/cultural background, parental education, household income, and food security status.

**Results:** Compared to boys, girls were more likely to consume breakfast infrequently, have fewer evening family meals, engage in restrictive eating, but were less likely to consume SSB frequently. Adolescents aged 14 to 17 demonstrated a higher likelihood of infrequent breakfast consumption, reduced participation in family meals, engagement in restrictive eating behaviours, and frequent consumption of SSB compared to those aged 12 to 13. Black adolescents were more likely to report infrequent breakfast, lower participation in evening family meals and frequent SSB consumption compared to their White peers. Adolescents whose parents had a high school degree or lower education were more likely to report infrequent breakfast consumption and frequent SSB consumption compared to adolescents whose parents had a college degree or higher. Lower household income and food insecurity were linked to adolescents' frequency of breakfast consumption, evening family meals, and SSB intake, but showed no association with restrictive eating behaviours.

**Conclusion:** Disparities in eating behaviours exist among Canadian adolescents, underscoring the need for social policies that address structural determinants shaping dietary behaviours in this population.

***Keywords:*** *dietary behaviours, youth, social factors, population-based surveys*

### *Highlights*

- Nationally representative data from the 2019 Canadian Health Survey on Children and Youth were used to examine how eating behaviours vary by social factors among adolescents.
- Compared with boys, girls were more likely to report infrequent breakfast consumption, fewer family meals, and restrictive eating, but less likely to consume sugar-sweetened beverages frequently.
- Older adolescents exhibiting less healthful behaviours overall than younger adolescents.
- Racial/cultural differences were observed, with Black adolescents more likely to report less desirable eating behaviours compared with White peers.
- Socioeconomic indicators were associated with three of four eating behaviours examined, suggesting disparities in eating behaviours.
- Findings underscore the need for interventions to address the structural determinants shaping adolescent eating behaviours in Canada.

## Introduction

Adolescence is a critical developmental period when lifelong dietary habits are formed and nutritional needs peak due to rapid growth and cognitive maturation.[1] Healthy eating behaviours established during this stage, such as regular meals, limited sugary drink intake, and shared family meals, have cumulative effects on long-term health and well-being.[2] Yet, not all adolescents have equitable opportunities to adopt or maintain these habits.[3]

National nutrition surveys indicate that many Canadian adolescents do not meet dietary guidelines, characterized by inadequate intakes of fruits, vegetables, and key nutrients, alongside excessive consumption of ultra-processed foods, which now account for more than half of their

**Author references:**

1. School of Nutrition Sciences, Faculty of Health Sciences, University of Ottawa, Ottawa, Ontario, Canada
2. Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada
3. Department of Pediatrics, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada

**Correspondence:** Claire N. Tugault-Lafleur, School of Nutrition Sciences, Faculty of Health Sciences, University of Ottawa, 200 Lees Ave., Ottawa, ON K1S 5S9; Email: ctugault@uottawa.ca

total daily energy intake.[4] Research also highlights gaps in specific eating behaviours, including breakfast consumption and family meals. Regular breakfast intake is linked to improved cognitive and academic performance;[5,6] yet missing breakfast is common, with international prevalence estimates ranging from 10% to 35%.[7] Similarly, family meals are linked to better diet quality, improved well-being, and lower engagement in other risk behaviours.[8,9] However, participation declines with age, often due to competing schedules and reduced family time.[10,11] Sugary drink consumption, a leading source of added sugars among adolescents in Canada,[12] has declined modestly in recent years but remains high. In 2015, a little over half of Canadian children and adolescents reported consuming a sugar-sweetened beverage (SSB) on a given day.[12] An emerging concern is the rising purchase of newer categories of SSB (such as energy and sports drinks) among Canadians over time,[13] a trend that parallels patterns documented in the United States.[14] Additionally, unhealthy restrictive eating behaviours such as dieting and fasting for weight control are also common among adolescents, with recent Canadian data indicating that nearly one-third of adolescents report changing their eating habits for weight management. Recognizing these challenges, Health Canada's *Healthy Eating for Teens* guidance emphasizes the importance of developing healthy eating habits early in life by getting involved in meal preparation, planning meals and snacks, eating with your family and making healthy drink choices.[15]

Evidence suggests that diet-related social inequities exist among adolescents, though Canadian-specific data remain limited. In a large cross-sectional study of adolescents attending secondary schools in four Canadian provinces, eating behaviours differed by gender, race, and socioeconomic status.[16] For example, Black and Latin American adolescents were more likely than their White and Asian peers to engage in restrictive eating and to consume purchased snacks and fast food, while being less likely to drink water daily. Daily breakfast consumption was highest among Latin American students, whereas Black students were least likely to eat breakfast regularly or consume fruits and vegetables. Lower socioeconomic status was associated with lower odds of eating breakfast, drinking water daily, and consuming fruits and vegetables, as well as higher odds of restrictive eating and purchasing snacks.

To our knowledge, the study by Patte and colleagues[16] is the only Canadian research to date documenting inequities in adolescents' eating behaviours.[12] Nationally representative estimates are thus needed to inform health promotion interventions targeting adolescents. The 2019 Canadian Health Survey on Children and Youth (CHSCY)[19] offers a unique opportunity to address this knowledge gap, as it is the most recent nationwide survey capturing a broad range of eating behaviours among Canadian children and adolescents. In the present study, we examined the prevalence of four eating behaviours (breakfast consumption, evening family meals, sugar-sweetened beverages, and restrictive eating) in a nationwide sample of Canadian adolescents, and assessed how engagement in these behaviours varied by social factors.

## Methods

### *Study design and data source*

This study used data from the 2019 CHSCY, a nationally representative survey of children and adolescents between the ages of 1 and 17 years living across all 13 provinces and territories, collected between February and August 2019.[17] The total sample size for the 2019 CHSCY was 47 871 participants (response rate of 53%). For this study, the analytical sample was restricted to adolescents aged 12 to 17 years because this developmental period is critical for shaping eating behaviours, aligns with prior literature,[18] and reflects the availability of adolescent-specific measures in the CHSCY.

Data were collected via online or telephone questionnaires completed by both adolescents and their parents or guardians. Adolescents provided self-reports on eating behaviours and demographics, while parents or the household member most knowledgeable about the family provided socioeconomic information. Additional details regarding study methods can be found elsewhere.[17]

### *Measures*

Eating behaviour variables were dichotomized to align with public health guidelines and ensure interpretability,[15,19,20] while also meeting Statistics Canada's disclosure requirements and maintaining stable estimates given subgroup sample sizes.

#### Eating behaviours

*Frequency of breakfast consumption* was measured using the single item "In the past 7 days, how many days did you eat breakfast?" (response options 0–7 days, or "don't know"). Consistent with previous research,[21] data were dichotomized as to whether participants were "regular breakfast eaters" (≥ 5 days during the previous week or more) or "irregular breakfast eaters" (< 5 days during the previous week).

*Frequency of evening family meals* was measured using the single item "In the past 7 days, how many days did [he/you] eat the evening meal with [his/your] family sitting at the dinner table together?" This variable was recoded and dichotomized, classifying adolescents as having frequent family dinner (≥ 5 days during the previous week) or infrequent family meals (< 5 days during the previous week).[22,23]

*Sugar-sweetened beverage (SSB) consumption* was a composite measure using the items from the question "How many times during the past 7 days have you consumed the following sugary beverages?" Respondents were asked to report the frequency of consumption for each of the following beverages: fruit flavoured drinks, regular soft drinks, sports drinks, energy drinks, chocolate milk or hot chocolate beverages, milkshakes or ice cream sodas and sweetened coffee or tea. Responses across all beverage categories were summed to create a composite measure of the frequency of different types of SSB (excluding 100% fruit juice) over the past week. Participants were then dichotomized as low consumers (< 5 SSB/week) or high consumers (≥ 5 SSB/week). This threshold was selected a priori to identify frequent consumption, consistent with recommendations to limit added sugars and sugary beverage intake, while ensuring adequate distribution across categories for meaningful group comparisons and stable estimates.[24-27]

*Restrictive eating* was measured by asking participants how often, in the past 12 months, they had changed their eating habits to manage their weight, and the response options were: "never," "a few times," "monthly," "weekly," "daily" or "don't know." Respondents were dichotomized into two groups based on whether

they engaged in any level of restricted eating in the past 12 months versus none ("never").

### Social factors

Social factors included self-reported measures of gender, age, racial/cultural background, and parent-reported measures of parental education, household income and food security status. *Gender* was a measure where adolescents were asked "What is your gender?", with response options of "male gender," "female gender," or "gender diverse." "Gender diverse" responses were excluded from the analyses because the small sample size (n = 45) produced estimates with coefficients of variation (CVs) equal to or greater than 35%, which, according to the CHSCY data user guide (Table 9.1: Sampling variability guidelines), are considered too unreliable for publication.[28] The item explicitly stated that gender referred to current gender identity, which could differ from sex assigned at birth or from that indicated on legal documents. *Age group* was derived from participants' self-reported continuous age. Because the CHSCY youth sample includes participants aged 12 to 17 years, participants were classified as younger (12–13 years) and older adolescents (14–17 years) to reflect earlier versus later adolescence, which may differ in autonomy, social influences, and eating behaviours.[29] *Racial/cultural identity* was initially classified into multiple groups (South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean, Japanese, and other visible minorities). To address small cell sizes and disclosure constraints, categories were combined into a recoded variable comprising five groups: White (not a visible minority), Asian, Black, Arab, and Latin American/mixed-race adolescents. *Parental education* was recoded as a dichotomous variable. The "high school degree or less" category included individuals with less than a high school diploma, its equivalent, or a high school equivalency certificate. The "college degree or higher" category included those with a trades certificate or diploma, college/CEGEP or other non-university credentials, a university certificate or diploma below the bachelor's level, a bachelor's degree, or a university credential above the bachelor's level. *Total household income* was reported by the person most knowledgeable. The income ranges were recoded to be consistent with Statistics Canada's standard reporting thresholds.[30] The final categories were: ≤ $40 000; $40 001–$60 000; $60 001–$80 000; and > $80 000. *Food security status* was measured using the validated Household Food Security Survey Module, which is an 18-item questionnaire that includes 10 specific questions for the adult household members, and eight items specific to children in the household.[31] Household-level food security status was classified into four different levels (food secure, marginally food insecure, moderately food insecure, and severely food insecure) and scored based on the number of positive responses to the questionnaire. To facilitate comparison with previous research,[32,33] the variable was dichotomized into food secure versus food insecure (combining all three levels of food insecurity).

### *Covariates*

Models controlled for age (in years), gender (boy, girl), body mass index (BMI) z-scores (defined according to World Health Organization growth reference standards),[34] cultural/racial background (5 groups), urbanicity (urban area vs. rural area), parental education (high school degree or less vs. college degree or higher), household food security status (secure vs. insecure) and total household income (4 groups), as they have been previously found in the literature to be associated with eating behaviours among adolescents.[16]

### *Statistical analysis*

Descriptive analyses were first conducted to characterize the sociodemographic characteristics and the prevalence of eating behaviours between boys and girls in the study sample. Chi-square tests were used to test for significant differences in the prevalence of eating behaviours between boys and girls. Multivariable logistic regression models were then applied to examine associations between each independent variable (gender, age, race/ethnicity, parental education, household income, and food security) and the likelihood of engaging in a given eating behaviour. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were estimated. Benjamini-Hochberg adjusted *p* values were used to control the false discovery rate across multiple regression tests.[35] Post-estimation analyses included Wald tests, estimation of marginal effects, and Bonferroni-adjusted pairwise comparisons where relevant. Missing data were handled using a complete case analysis approach, as the proportion of missing data across covariates was relatively low (< 7.9%). All analyses incorporated Statistics Canada's survey and bootstrap weights to account for the complex sampling design and to ensure nationally representative, robust variance estimates. Analyses were performed in Stata 13[36] with a significance set at a *p* value of less than 0.05.

### *Ethics approval*

This study used confidential microdata from the 2019 CHSCY, collected by Statistics Canada with prior ethics approval and informed consent. Data access was granted through the Ottawa Research Data Centre (ORDC) under Statistics Canada's confidentiality and data use agreements. All analyses complied with ORDC and Statistics Canada's ethical and privacy requirements.

## Results

After excluding individuals aged 1 to 11 years, our final analytical sample included 13 605 participants. Tables 1 and 2 summarize the sociodemographic characteristics and prevalence of eating behaviours of the study sample. Over 70% of adolescents identified as White and about 80% had parents with some post-secondary education (college degree or higher). Around 60% reported total household incomes above $80 000 while approximately 10% experienced some level of food insecurity. A higher proportion of girls reported infrequent breakfast consumption (33%), evening family meals (37%) and restrictive eating (21%) compared to boys (26%, 31% and 12% respectively). However, boys reported consuming SSB (50%) more frequently compared to girls (42%).

Associations between gender and eating behaviours are shown in Table 3. Girls had higher odds of reporting infrequent breakfast consumption, infrequent evening family meals, engaging in restrictive eating but reported lower odds of frequent SSB consumption compared to boys.

Table 4 shows associations between age group and eating behaviours. Adolescents aged 14 to 17 years were more likely than those aged 12 to 13 years to report infrequent breakfast consumption, infrequent evening family meals, frequent SSB consumption, and engage in restrictive eating behaviours.

**TABLE 1**
**Sociodemographic characteristics of the analytical sample, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| | % | n |
|---|---|---|
| **Gender**[a] | | |
| Boys | 49.7% | 6 760 |
| Girls | 49.8% | 6 780 |
| Gender diverse | 0.3% | 45 |
| **Cultural/racial background**[b] | | |
| White | 73.8% | 10 045 |
| Asian | 17.7% | 2 410 |
| Black | 3.6% | 490 |
| Arab | 1.8% | 245 |
| Latin American and mixed-race adolescents | 2.5% | 340 |
| **Urbanicity** | | |
| Urban area | 75.9% | 10 325 |
| Rural area | 24.1% | 3 280 |
| **Highest parental education**[c] | | |
| High school degree or less | 20.8% | 2 830 |
| College degree or higher | 78.8% | 10 720 |
| **Total household income** | | |
| ≤ $40 000 | 11.3% | 1 540 |
| $40 001–$60 000 | 14.4% | 1 965 |
| $60 001–$80 000 | 11.4% | 1 550 |
| > $80 000 | 62.8% | 8 550 |
| **Food security status**[d] | | |
| Food secure | 87.1% | 11 845 |
| Food insecure | 10.6% | 1 450 |

**Note:** Percentages are weighted estimates based on survey sample weights; counts are unweighted sample sizes.
[a] Missing data on gender for 20 youth (0.2% of the sample).
[b] Missing data for 70 youth (0.5% of the sample).
[c] Missing data for 50 youth (0.4% of the sample).
[d] Missing data on household food security status for 305 youth (2.2% of the sample).

**TABLE 2**
**Prevalence of eating behaviours in the analytical sample, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| | Girls | | Boys | | Pearson chi-square | *p* value |
|---|---|---|---|---|---|---|
| | % | n | % | n | | |
| **Breakfast consumption** | | | | | | |
| < 5 days/week | 33.5% | 2 263 | 26.6% | 1 788 | 90.06 | < **0.001** |
| **Evening family meals** | | | | | | |
| < 5 days/week | 37.2% | 2 525 | 31.3% | 2 115 | 53.67 | < **0.001** |
| **Frequency of SSB consumption** | | | | | | |
| ≥ 5 times/week | 42.1% | 2 855 | 50.8% | 3 435 | 104.17 | < **0.001** |
| **Restrictive eating** | | | | | | |
| Yes | 21.2% | 1 435 | 12.9% | 870 | 173.06 | < **0.001** |

**Abbreviation:** SSB, sugar-sweetened beverage.
**Notes:** Percentages are weighted estimates based on survey sample weights; counts are unweighted sample sizes. Estimates for gender diverse youth are not shown due to large coefficients of variation. Differences in the prevalence of eating behaviours between genders were tested using chi-square test. Statistically significant associations ($p < 0.05$) are **bolded**.

**TABLE 3**
**Associations between eating behaviours and gender among adolescents, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| Outcomes and contrasts | AOR | 95% CI | *p* value* |
|---|---|---|---|
| **Infrequent breakfast (< 5 times/week)** | | | |
| Boys (reference) | 1.00 | | |
| Girls | 1.44 | 1.30–1.61 | < **0.001** |
| **Infrequent evening family meals (< 5 days/week)** | | | |
| Boys (reference) | 1.00 | | |
| Girls | 1.27 | 1.15–1.40 | < **0.001** |
| **Frequent SSB consumption (≥ 5 times/week)** | | | |
| Boys (reference) | 1.00 | | |
| Girls | 0.73 | 0.66–0.80 | < **0.001** |
| **Restrictive eating (> than once/year)** | | | |
| Boys (reference) | 1.00 | | |
| Girls | 1.86 | 1.63–2.10 | < **0.001** |

**Abbreviations:** AOR, adjusted odds ratio; CI, confidence interval; SSB, sugar-sweetened beverage.

**Notes:** Models are adjusted for age (in years), body mass index Z scores, cultural/racial background, parental education, household food security status, urbanicity and total household income. Survey sample weights and 1000 bootstrap weights were applied to generate nationally representative rates and robust standard errors.

* Benjamini-Hochberg adjusted *p* values. Statistically significant associations ($p < 0.05$) are **bolded**.

Table 5 summarizes associations between racial/cultural groups and eating behaviours. Asian adolescents had lower odds of reporting infrequent breakfast compared to their White peers. Compared to White adolescents, Asian, Latin American and mixed-race adolescents had lower odds of infrequent evening family meals. In contrast, Black adolescents were more likely to report infrequent breakfast consumption, infrequent evening family meals, and frequent SSB intake. Arab adolescents had higher odds of reporting infrequent breakfast consumption and restrictive eating compared to White peers.

Table 6 presents the results of the associations between eating behaviours and indicators of socioeconomic position (parental education, income and food security status). Adolescents with parents with a high school degree or less were more likely to report infrequent breakfast and more frequent SSB consumption compared to their peers with parents who had a college degree or higher. Individuals in the lowest income bracket (total household

**TABLE 4**
**Associations between eating behaviours and age group among adolescents, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| Outcomes and contrasts | AOR | 95% CI | *p* value* |
|---|---|---|---|
| **Infrequent breakfast (< 5 times/week)** | | | |
| Younger adolescents (12–13 years) (reference) | 1.00 | | |
| Older adolescents (14–17 years) | 2.09 | 1.85–2.35 | < **0.001** |
| **Infrequent evening family meals (< 5 days/week)** | | | |
| Younger adolescents (12–13 years) (reference) | 1.00 | | |
| Older adolescents (14–17 years) | 2.34 | 2.10–2.61 | < **0.001** |
| **Frequent SSB intake (≥ 5 days/week)** | | | |
| Younger adolescents (12–13 years) (reference) | 1.00 | | |
| Older adolescents (14–17 years) | 1.62 | 1.47–1.78 | < **0.001** |
| **Restrictive eating (> than once/year)** | | | |
| Younger adolescents (12–13 years) (reference) | 1.00 | | |
| Older adolescents (14–17 years) | 2.26 | 1.96–2.60 | < **0.001** |

**Abbreviations:** AOR, adjusted odds ratio; CI, confidence interval; SSB, sugar-sweetened beverage.

**Notes:** Models are adjusted for gender, body mass index Z scores, cultural/racial background, parental education, household food security status, urbanicity and total household income. Survey sample weights and 1000 bootstrap weights were applied to generate nationally representative rates and robust standard errors.

* Benjamini-Hochberg adjusted *p* values. Statistically significant associations ($p < 0.05$) are **bolded**.

**TABLE 5**
**Associations between eating behaviours and racial/cultural identity among adolescents, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| Outcomes and contrasts | AOR | 95% CI | *p* value* |
|---|---|---|---|
| **Infrequent breakfast consumption (< 5 times/week)** | | | |
| White (reference) | 1.00 | | |
| Asian | 0.68 | 0.59–0.79 | < **0.001** |
| Black | 1.40 | 1.09–1.81 | **0.009** |
| Arab | 1.41 | 1.00–1.99 | **0.047** |
| Latin American and mixed-race | 0.92 | 0.67–1.25 | 0.599 |
| **Infrequent evening family meals (< 5 days/week)** | | | |
| White (reference) | 1.00 | | |
| Asian | 0.78 | 0.68–0.90 | < **0.001** |
| Black | 2.05 | 1.61–2.62 | < **0.001** |
| Arab | 0.84 | 0.59–1.20 | 0.353 |
| Latin American and mixed-race | 0.72 | 0.54–0.96 | **0.028** |
| **Frequent SSB intake (≥ 5 days/week)** | | | |
| White (reference) | 1.00 | | |
| Asian | 0.90 | 0.79–1.05 | 0.852 |
| Black | 1.59 | 1.25–2.01 | **0.001** |
| Arab | 1.19 | 0.83–1.68 | 0.470 |
| Latin American and mixed-race | 1.05 | 0.79–1.39 | 0.789 |
| **Restrictive eating (> than once/year)** | | | |
| White (reference) | 1.00 | | |
| Asian | 1.15 | 0.98–1.35 | 0.074 |
| Black | 1.14 | 0.82–1.57 | 0.416 |
| Arab | 1.89 | 1.29–2.77 | **0.001** |
| Latin American and mixed-race | 1.27 | 0.90–1.80 | 0.165 |

**Abbreviations:** AOR, adjusted odds ratio; CI, confidence interval; SSB, sugar-sweetened beverage.

**Notes:** Models are adjusted for age (in years), gender, body mass index Z scores, parental education, household food security status, urbanicity and total household income. Survey sample weights and 1000 bootstrap weights were applied to generate nationally representative rates and robust standard errors.

* Benjamini-Hochberg adjusted *p* values. Statistically significant associations ($p < 0.05$) are **bolded**.

income ≤ $40 000) had higher odds of reporting infrequent breakfast consumption, fewer evening family meals, and frequent SSB intake when compared to their peers in the highest income bracket (total household income > $80 000). Adolescents living in food insecure households were more likely to report infrequent breakfast consumption, infrequent evening family meals, and frequent SSB intake.

## Discussion

This study examined the prevalence and social factors associated with four eating behaviours (breakfast consumption, evening family meals, SSB intake and restrictive eating) among Canadian adolescents in 2019. Our findings confirm those from prior research,[16,37] suggesting socioeconomic disparities in eating behaviours. Overall, less favourable behaviours were more common among girls, older adolescents, and those from racialized and socioeconomic disadvantaged backgrounds. Socioeconomic indicators were associated with several eating behaviours, underscoring the role of structural and social conditions in shaping adolescents' dietary practices.

Gender was associated with all four eating behaviours examined, supporting previous

**TABLE 6**
**Associations between eating behaviours and indicators of socioeconomic position among adolescents, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| Outcomes and contrasts | 2019 | | |
|---|---|---|---|
| | AOR | 95% CI | *p* value* |
| **Parental education** | | | |
| **Infrequent breakfast (< 5 times/week)** | | | |
| College degree or higher (reference) | 1.00 | | |
| High school degree or less | 1.19 | 1.05–1.36 | **0.006** |
| **Infrequent evening family meals (< 5 days/week)** | | | |
| College degree or higher (reference) | 1.00 | | |
| High school degree or less | 1.03 | 0.91–1.17 | 0.601 |
| **Frequent SSB intake (≥ 5 days/week)** | | | |
| College degree or higher (reference) | 1.00 | | |
| High school degree or less | 1.25 | 1.11–1.40 | < **0.001** |
| **Restrictive eating (> than once/year)** | | | |
| College degree or higher (reference) | 1.00 | | |
| High school degree or less | 1.12 | 0.92–1.37 | 0.231 |
| **Household income** | | | |
| **Infrequent breakfast (< 5 times/week)** | | | |
| > $80 000 (reference) | 1.00 | | |
| $60 001–$80 000 | 1.24 | 1.05–1.46 | 0.496 |
| $40 001–$60 000 | 1.16 | 0.98–1.34 | 0.952 |
| ≤ $40 000 | 1.25 | 1.05–1.49 | **0.012** |
| **Infrequent evening family meals (< 5 days/week)** | | | |
| > $80 000 (reference) | 1.00 | | |
| $60 001–$80 000 | 1.06 | 0.90–1.26 | 0.455 |
| $40 001–$60 000 | 1.12 | 0.95–1.32 | 0.151 |
| ≤ $40 000 | 1.20 | 1.01–1.42 | **0.034** |
| **Frequent SSB intake (≥ 5 days/week)** | | | |
| > $80 000 (reference) | 1.00 | | |
| $60 001–$80 000 | 1.05 | 0.90–1.26 | 0.824 |
| $40 001–$60 000 | 1.18 | 0.95–1.32 | 0.190 |
| ≤ $40 000 | 1.20 | 1.01–1.42 | **0.016** |
| **Restrictive eating (> than once/year)** | | | |
| > $80 000 (reference) | 1.00 | | |
| $60 001–$80 000 | 1.01 | 0.84–1.23 | 0.386 |
| $40 001–$60 000 | 1.09 | 0.91–1.28 | 0.783 |
| ≤ $40 000 | 0.98 | 0.81–1.19 | 0.816 |

**Continued on the next page**

**TABLE 6 (continued)**
**Associations between eating behaviours and indicators of socioeconomic position among adolescents, Canadian Health Survey on Children and Youth 2019 (n = 13 605)**

| Outcomes and contrasts | 2019 | | |
|---|---|---|---|
| | AOR | 95% CI | *p* value* |
| **Food security status** | | | |
| **Infrequent breakfast (<5 times/week)** | | | |
| Food secure (reference) | 1.00 | | |
| Food insecure | 1.76 | 1.49–2.07 | < **0.001** |
| **Infrequent evening family meals (< 5 days/week)** | | | |
| Food secure (reference) | 1.00 | | |
| Food insecure | 1.46 | 1.24–1.71 | < **0.001** |
| **Frequent SSB intake (≥ 5 days/week)** | | | |
| Food secure (reference) | 1.00 | | |
| Food insecure | 1.32 | 1.12–1.53 | < **0.001** |
| **Restrictive eating (> than once/year)** | | | |
| Food secure (reference) | 1.00 | | |
| Food insecure | 1.12 | 0.92–1.37 | 0.231 |

**Abbreviations:** AOR, adjusted odds ratio; CI, confidence interval; SSB, sugar-sweetened beverage.

**Notes:** Models are adjusted for age (in years), gender, body mass index Z scores, cultural/racial background, urbanicity, parental education (when not the exposure), household food security status (when not the exposure) and total household income (when not the exposure). Survey sample weights and 1000 bootstrap weights were applied to generate nationally representative rates and robust standard errors.

* Benjamini-Hochberg adjusted *p* values. Statistically significant associations ($p < 0.05$) are **bolded**.

research.[5,16] Girls were more likely than boys to skip breakfast and engage in restrictive eating, reflecting broader societal and media influences that reinforce thinness ideals among adolescent girls.[38] This study identified a gender difference in evening family meal frequency among adolescents, diverging from prior research that has generally found minimal or no differences by gender[8,9] Girls were less likely to participate in evening family meals, which may indicate avoidance related to body dissatisfaction or dietary restraint.[39] However, this difference was modest and could represent a chance finding. Boys reported more frequent consumption of SSB, consistent with evidence that beverage marketing disproportionately targets male adolescents.[37] Gender-diverse youth could not be examined separately because of small sample size and data quality constraints; however, future research should examine whether their eating behaviours and nutrition-related risks differ from those observed among binary gender groups.

Age was significantly associated with all four eating behaviours, with older adolescents generally displaying less favourable patterns than their younger peers. This overall pattern is consistent with previous literature showing that health-promoting routines often decline across adolescence as autonomy increases and parental influence decreases.[10,11,40] The lower frequency of family meals among older adolescents aligns with international and longitudinal evidence that shared meals become less common as youth age and household routines change.[10,11] Similarly, the higher likelihood of breakfast skipping observed among older adolescents is consistent with studies showing lower breakfast consumption from early to late adolescence.[40,41] Prior research also suggests that adolescents commonly report lack of time, valuing sleeping over eating and not feeling hungry as reasons for skipping breakfast.[42,43] Older adolescents also reported higher consumption of SSB, which is in line with surveillance data indicating greater intake among older youth, potentially due to increased independent purchasing, peer norms, and marketing exposure.[40,44] In addition, dietary restriction for weight management was more prevalent among older adolescents, consistent with evidence of increasing body image concerns and disordered eating behaviours from adolescence into adulthood.[45] Collectively, these findings highlight adolescence as a critical developmental period in which increasing independence and social influence may contribute to the loss of structured, health-promoting eating behaviours.

Racial and cultural background was associated with several eating behaviours among adolescents. Black adolescents were more likely than their White peers to skip breakfast, consume SSB frequently, and participate less often in evening family meals, echoing previous findings of racial disparities in adolescent nutrition.[16,46] Prior literature suggests that structural and socioeconomic inequities, including differential exposure to food insecurity and unhealthy food environments, may contribute to these patterns, although these factors were not directly examined in the present study.[47,48] Arab adolescents in this study also showed a greater risk of suboptimal eating behaviours, including higher prevalence of breakfast skipping and restrictive eating, consistent with

previous studies reporting disparities in eating behaviours across ethnocultural groups.[49] Conversely, Asian individuals demonstrated more structured eating patterns, reporting more frequent breakfast consumption and family meals, which aligns with evidence that eating patterns vary across cultural groups and family contexts.[39] Taken together, these findings highlight meaningful differences in adolescent eating behaviours across population groups and support the need for culturally responsive, equity-oriented public health strategies that address broader social determinants of health.[45,50]

All three socioeconomic indicators (parental education, household income, and food insecurity) were significantly associated with multiple eating behaviours, reflecting important socioeconomic differences in adolescents' dietary practices. Adolescents from lower socioeconomic backgrounds were more likely to skip breakfast, consume SSB frequently, and share fewer evening family meals than their more advantaged peers. These consistent patterns underscore the multidimensional nature of socioeconomic position, as each indicator reflects distinct but interrelated mechanisms shaping adolescents' dietary behaviours.[16] Parental education was associated with breakfast and SSB consumption. Individuals whose parents had a high school education or less were more likely to skip breakfast and to consume SSB five or more days per week. These findings mirror international evidence that higher parental education promotes healthier dietary behaviours through greater nutritional knowledge, modelling, and structured routines.[12] Household income was another key determinant of eating behaviour. Adolescents from higher-income households were less likely to skip breakfast or consume SSB, and more likely to participate in frequent evening family meals compared to those from lower-income households. Although not all contrasts reached statistical significance, the trends were consistently in the expected direction. These results suggest that Canadian adolescents are not insulated from household income insecurity; rather, economic disadvantage continues to influence everyday eating routines. This contrasts with earlier evidence indicating weaker income–diet relationships among adolescents compared to adults,[51] suggesting that while food quantity may be buffered within households, the structure and regularity of eating behaviours remain sensitive to financial strain. Food insecurity was the most robust predictor across outcomes, being associated with infrequent breakfast, fewer evening family meals and higher SSB consumption. Despite parental efforts to shield children from the effects of food insecurity,[52] these associations indicate that current efforts are insufficient. Food insecurity thus represents not only an indicator of material deprivation but a direct social determinant of adolescent health. Overall, these findings highlight persistent socioeconomic inequities in Canadian adolescents' eating behaviours. These socioeconomic disparities underscore the need for upstream, structural interventions addressing income insecurity, parental work conditions, and access to nutritious food to foster equitable environments that support healthy eating among adolescents.

### *Strengths and limitations*

A key strength of this study is the use of a large, nationally representative sample of Canadian adolescents from all provinces and territories, enhancing the generalizability of the findings. The study also examined four distinct eating behaviours simultaneously within a single dataset, allowing for a more comprehensive assessment of social patterning in adolescent eating practices than studies focussed on a single behaviour alone. However, several limitations must be acknowledged. First, self-reported eating behaviours are subject to recall and social desirability bias, which may lead to underreporting of behaviours perceived as unhealthy, particularly among girls or also overreporting of evening family meals and breakfast consumption. Second, while Statistics Canada used items with demonstrated validity, only a limited subset of questions from the Eating Attitudes Test-26 (EAT-26) was included, restricting the ability to capture the full complexity of restrictive eating.[53] Third, the CHSCY lacked validated youth-reported indicators of perceived social status or affluence, which are increasingly recognized as important predictors of adolescent health. Fourth, despite national representativeness, some populations, such as individuals living on First Nations reserves, in foster care, or institutional settings, were excluded in the CHSCY. In addition, gender-diverse youth could not be examined separately because the small sample size yielded unreliable estimates under Statistics Canada data quality guidelines. This is an important limitation, as gender-diverse adolescents may experience distinct and potentially elevated risks related to restrictive eating and food insecurity. Finally, as the data were collected in 2019, before COVID-19, future research should examine how pandemic-related changes may have affected adolescent eating behaviours and socioeconomic inequalities. Although more recent data from the 2023 CHSCY cycle are available, several methodological considerations justified the use of the 2019 cycle for this study. First, the 2023 cycle had a substantially lower response rate (19%), which considerably limits external validity. Second, the reference period for eating behaviours differed between cycles, where the 2019 survey used a 7-day recall period, whereas the 2023 survey used a 30-day period. Longer recall periods are more prone to recall error, which may reduce the accuracy and reliability of self-reported eating behaviours.[54] Lastly, the 2023 cycle did not include a variable of breakfast consumption, an important measure of adolescent eating behaviours. For these reasons, the 2019 CHSCY cycle was deemed more appropriate for the objectives of the present study.

## Conclusion

This study showed that sociodemographic disparities in eating behaviours among Canadian adolescents exist. Older adolescents and girls were more likely to report suboptimal patterns, such as skipping breakfast, eating fewer evening family meals, and engaging in restrictive eating behaviours. Racial and cultural differences were also evident, with Black adolescents showing higher risk for unhealthy eating patterns, while Asian adolescents reported more structured meal routines. Socioeconomic position emerged as a strong determinant of breakfast frequency and SSB consumption, underscoring persistent inequities in access to healthy eating environments.

These findings reinforce the importance of addressing the social determinants of adolescent eating behaviours through targeted, equity-oriented public health strategies. Although interaction terms and formal intersectional analyses were not examined in the present study, future research should explicitly test how gender, race, and socioeconomic factors interact to shape eating behaviours among adolescents.[16,55] Developing validated youth-reported measures of both eating behaviours and perceived

social status would enhance construct validity. Longitudinal and qualitative studies are also needed to capture trajectories and contextual influences over time. Finally, addressing upstream determinants through structural interventions, such as policies to reduce income inequality, food insecurity, and educational barriers, will be essential to promoting healthier and more equitable eating behaviours among Canadian adolescents.

## Acknowledgements

This research was conducted at the Ottawa Research Data Centre (ORDC), a part of the Canadian Research Data Centre Network (CRDCN). This service is provided through the support of the Canada Foundation for Innovation, the Canadian Institutes of Health Research, the Social Sciences and Humanities Research Council, and Statistics Canada, and through the support of the University of Ottawa.

The 2019 Canadian Health Survey on Children and Youth (CHSCY) data used in this project were provided by Statistics Canada and accessed through one or more of the Research Data Centres (RDC) in the Canadian Research Data Centre Network (CRDCN).

No external funding was received for this study. GDG acknowledges the funding received through the Nutrition and Mental Health scholarship from the University of Ottawa.

## Conflicts of interest

The authors declare no conflict of interest.

## Authors' contributions and statement

GDG: Conceptualization, data curation, formal analysis, methodology, validation, visualization, writing—original draft, writing—review and editing.

JPC: Conceptualization, methodology, writing—review and editing.

RAK: Data curation, writing—review and editing.

CTL: Supervision, conceptualization, methodology, project administration writing—review and editing.

All authors have read and approved the final manuscript.

Because of the confidential nature of these microdata, they cannot be shared. Researchers in Canada working at one of the CRDCN's member institutions can access the data at no additional cost to the researcher. Other researchers will have to pay cost-recovery to access the data. Access to the data is subject to a background check and research approval process. The protocols for data access, including fees for researchers at non-CRDCN institutions, can be found on the CRDCN website.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

## References

1. Health Canada. Canada's food guide [Internet]. Ottawa (ON): Health Canada; 2021 [cited 2025 May 4]. Available from: https://food-guide.canada.ca/en/

2. Appannah G, Murray K, Trapp G, Dymock M, Oddy WH, Ambrosini GL. Dietary pattern trajectories across adolescence and early adulthood and their associations with childhood and parental factors. Am J Clin Nutr. 2021;113(1):36-46. https://doi.org/10.1093/ajcn/nqaa281

3. Das JK, Salam RA, Thornburg KL, Prentice AM, Campisi S, Lassi ZS, et al. Nutrition in adolescents: physiology, metabolism, and nutritional needs. Ann N Y Acad Sci. 2017;1393(1):21-33. https://doi.org/10.1111/nyas.13330

4. Ahmed M, Ng AP, L'Abbe MR. Nutrient intakes of Canadian adults: results from the Canadian Community Health Survey (CCHS)–2015 Public Use Microdata File. Am J Clin Nutr. 2021;114(3):1131-40. https://doi.org/10.1093/ajcn/nqab143

5. Sliwa SA, Merlo CL, McKinnon II, Self JL, Kissler CJ, Saelee R, et al. Skipping breakfast and academic grades, persistent feelings of sadness or hopelessness, and school connectedness among high school students — Youth Risk Behaviour Survey, United States, 2023. MMWR. 2024;73(Suppl. 4):87-93. https://doi.org/10.15585/mmwr.su7304a10

6. López-Gil JF, Tully MA, Cristi-Montero C, Brazo-Sayavera J, Gaya AR, Calatayud J, et al. Is the frequency of breakfast consumption associated with life satisfaction in children and adolescents? A cross-sectional study with 154 151 participants from 42 countries. Nutr J. 2024;23:78. https://doi.org/10.1186/s12937-024-00979-5

7. Ricotti R, Caputo M, Monzani A, Pigni S, Antoniotti V, Bellone S, et al. Breakfast skipping, weight, cardiometabolic risk, and nutrition quality in children and adolescents: a systematic review of randomized controlled and intervention longitudinal trials. Nutrients. 2021;13(10):10. https://doi.org/10.3390/nu13103331

8. Berge JM, Truesdale KP, Sherwood NE, Mitchell N, Heerman WJ, Barkin S, et al. Beyond the dinner table: who's having breakfast, lunch and dinner family meals and which meals are associated with better diet quality and BMI in pre-school children? Public Health Nutr. 2017;20(18):3275-84. https://doi.org/10.1017/S1368980017002348

9. Robson SM, McCullough MB, Rex S, Munafò MR, Taylor G. Family meal frequency, diet, and family functioning: a systematic review with meta-analyses. J Nutr Educ Behav. 2020;52(5):553-64. https://doi.org/10.1016/j.jneb.2019.12.012

10. López-Gil JF, Smith L, Tully MA, Álvarez-Pitti J, Gómez SF, Schröder H. Prevalence of daily family meals among children and adolescents from 43 countries. Matern Child Nutr. 2025;21(1):e13706. https://doi.org/10.1111/mcn.13706

11. Neumark-Sztainer D, Wall M, Fulkerson JA, Larson N. Changes in the frequency of family meals from 1999–2010 in the homes of adolescents: trends by sociodemographic characteristics. J Adolesc Health Off Publ Soc Adolesc Med. 2013;52(2):201-6. https://doi.org/10.1016/j.jadohealth.2012.06.004

12. Warren C, Hobin E, Manuel DG, Anderson LN, Hammond D, Jessri M, et al. Socioeconomic position and consumption of sugary drinks, sugar-sweetened beverages and 100% juice among Canadians: a cross-sectional analysis of the 2015 Canadian Community Health Survey – Nutrition. Can J Public Health. 2022;113(3):341-62. https://doi.org/10.17269/s41997-021-00602-8

13. Potvin Kent M, Pauzé E, Roy EA, de Billy N, Czoli C. Children and adolescents' exposure to food and beverage marketing in social media apps. Pediatr Obes. 2019;14(6):e12508. https://doi.org/10.1111/ijpo.12508

14. Drewnowski A, Rehm CD. Socioeconomic gradient in consumption of whole fruit and 100% fruit juice among US children and adults. Nutr J. 2015;14(1):3. https://doi.org/10.1186/1475-2891-14-3

15. Health Canada. Canada's food guide - healthy eating for teens [Internet]. Ottawa (ON): Health Canada; 2020 [cited 2025 Oct 9]. Available from: https://food-guide.canada.ca/en/tips-for-healthy-eating/teens/

16. Patte KA, Duncan MJ, Amores A, Belita E, Kocsis R, Riazi NA, et al. Inequities in dietary intake and eating behaviours among adolescents in Canada. Can J Public Health. 2024;1-14. https://doi.org/10.17269/S41997-024-00854-0

17. Statistics Canada. Canadian Health Survey on Children and Youth (CHSCY) [Internet]. Ottawa (ON): Statistics Canada; 2019 [cited 2025 Apr 22]. Available from: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1215270

18. Patton GC, Sawyer SM, Santelli JS, Ross DA, Afifi R, Allen NB, et al. Our future: a Lancet commission on adolescent health and well-being. The Lancet. 2016;387(10036):2423-78. https://doi.org/10.1016/S0140-6736(16)00579-1

19. Health Canada. Canada's food guide - appendix A: healthy eating recommendations [Internet]. Ottawa (ON): Health Canada; 2022 [cited 2025 Oct 9]. Available from: https://food-guide.canada.ca/en/guidelines/appendix-a-healthy-eating-recommendations/

20. World Health Organization. Healthy diet [Internet]. Geneva (CH): WHO; 2020 [cited 2025 Oct 9]. Available from: https://www.who.int/news-room/fact-sheets/detail/healthy-diet

21. Cayres SU, Júnior IFF, Barbosa MF, Christofaro DGD, Fernandes RA. Breakfast frequency, adiposity, and cardiovascular risk factors as markers in adolescents. Cardiol Young. 2016;26(2):244-9. https://doi.org/10.1017/S1047951115000050

22. Neumark-Sztainer D, Eisenberg ME, Fulkerson JA, Story M, Larson NI. Family meals and disordered eating in adolescents: longitudinal findings from project EAT. Arch Pediatr Adolesc Med. 2008;162(1):17-22. https://doi.org/10.1001/archpediatrics.2007.9

23. Utter J, Denny S, Peiris-John R, Moselen E, Dyson B, Clark T. Family meals and adolescent emotional well-being: findings from a national study. J Nutr Educ Behav. 2017;49(1):67-72.e1. https://doi.org/10.1016/j.jneb.2016.09.002

24. Johnson RK, Appel LJ, Brands M, Howard BV, Lefevre M, Lustig RH, et al. Dietary sugars intake and cardiovascular health. Circulation. 2009;120(11):1011-20. https://doi.org/10.1161/CIRCULATIONAHA.109.192627

25. Millen BE, Abrams S, Adams-Campbell L, Anderson CA, Brenna JT, Campbell WW, et al. The 2015 Dietary Guidelines Advisory Committee scientific report: development and major conclusions. Adv Nutr. 2016;7(3):438-44. https://doi.org/10.3945/an.116.012120

26. World Health Organization. Guideline: sugars intake for adults and children [Internet]. Geneva (CH): WHO; 2015 [cited 2026 Apr 16]. Available from: https://www.who.int/publications/i/item/9789241549028

27. Health Canada. Canada's food guide - Canada's dietary guidelines: section 2 foods and beverages that undermine healthy eating [Internet]. Ottawa (ON): Health Canada; 2022 [cited 2026 Apr 16]. Available from: https://food-guide.canada.ca/en/guidelines/section-2-foods-and-beverages-undermine-healthy-eating/

28. Statistics Canada. 2019 Canadian Health Survey on Children and Youth (CHSCY): User Guide. Ottawa (ON): Statistics Canada; 2020.

29. Food and Nutrition Board, National Academies of Sciences, Engineering, and Medicine. Dietary reference intakes (DRIs): estimated average requirements. In: Oria M, Harrison M, Stallings VA, editors. Dietary Reference Intakes for Sodium and Potassium. Washington (DC): National Academies Press; 2019. Available from: https://www.ncbi.nlm.nih.gov/books/NBK545442/table/appJ_tab1/

30. Statistics Canada. Income reference guide: census of population, 2021 [Internet]. Ottawa (ON): Statistics Canada; 2022 [cited 2025 Sep 29]. Available from: https://www12.statcan.gc.ca/census-recensement/2021/ref/98-500/004/98-500-x2021004-eng.cfm

31. Health Canada. Canadian Community Health Survey, Cycle 2.2, Nutrition (2004): income-related household food security in Canada [Internet]. Ottawa (ON): Health Canada [Catalogue No. H164-42/2007E-PDF]; 2007. Available from: https://publications.gc.ca/collections/collection_2007/hc-sc/H164-42-2007E.pdf

32. Tugault-Lafleur CN, Barr SI, Black JL. Examining differences in school hour and school day dietary quality among Canadian children between 2004 and 2015. Public Health Nutr. 2019;22(16):3051-62. https://doi.org/10.1017/S1368980019000788

33. Tugault-Lafleur CN, Black JL. Who misses lunch on school days in Canada? J Hunger Environ Nutr. 2022;17(6):763-79. https://doi.org/10.1080/19320248.2021.1984359

34. World Health Organization. Growth reference data for 5–19 years [Internet]. Geneva (CH): WHO; 2007 [cited 2025 Dec 26]. Available from: https://www.who.int/tools/growth-reference-data-for-5to19-years

35. Benjamini Y, Hochberg Y. Controlling the false discovery rate: a practical and powerful approach to multiple testing. J R Stat Soc Ser B Methodol. 1995;57(1):289-300. https://doi.org/10.1111/j.2517-6161.1995.tb02031.x

36. StataCorp. Stata statistical software: release 13. College Station (TX): StataCorp LLC; 2013.

37. Doggui R, Ward S, Johnson C, Bélanger M. Trajectories of beverage consumption during adolescence. Appetite. 2022;175:106092. https://doi.org/10.1016/j.appet.2022.106092

38. Lucibello KM, Zhang Q, Leatherdale ST, Patte KA. Changing eating to manage weight or shape: a cross-sectional and prospective study of the prevalence and correlates in a large Canadian adolescent cohort. Prev Med. 2024;184:107987. https://doi.org/10.1016/j.ypmed.2024.107987

39. Ju S, Helton JJ, Iwinski S. Protective role of family mealtime frequency against disordered eating behaviours: racial and ethnic differences. Appetite. 2024;197:107328. https://doi.org/10.1016/j.appet.2024.107328

40. Doggui R, Ward S, Johnson C, Bélanger M. Trajectories of eating behaviour changes during adolescence. Nutrients. 2021;13(4):4. https://doi.org/10.3390/nu13041313

41. Coulthard JD, Palla L, Pot GK. Breakfast consumption and nutrient intakes in 4–18-year-olds: UK National Diet and Nutrition Survey Rolling Programme (2008–2012). Br J Nutr. 2017;118(4):280-90. https://doi.org/10.1017/S0007114517001714

42. Doughty KN, Treu JA, Eckner K. A qualitative analysis of students' breakfast habits and school breakfast participation in two public school districts. J Child Nutr Manag. 2020;44(2). Available from: https://schoolnutrition.org/journal/fall-2020-a-qualitative-analysis-of-students-breakfast-habits-and-school-breakfast-participation-in-two-public-school-districts/

43. Badrasawi M, Anabtawi O, Al-Zain Y. Breakfast characteristics, perception, and reasons of skipping among 8th- and 9th-grade students at governmental schools, Jenin governance, West Bank. BMC Nutr. 2021;7(1):42. https://doi.org/10.1186/s40795-021-00451-1

44. Centers for Disease Control and Prevention (CDC). Fast facts: sugar-sweetened beverage consumption [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; 2026 [cited 2026 Jul 6]. Available from: https://www.cdc.gov/nutrition/php/data-research/sugar-sweetened-beverages.html

45. Simone M, Telke S, Anderson LM, Eisenberg M, Neumark-Sztainer D. Ethnic/racial and gender differences in disordered eating behaviour prevalence trajectories among women and men from adolescence into adulthood. Soc Sci Med. 2022;294:114720. https://doi.org/10.1016/J.SOCSCIMED.2022.114720

46. Jones AC, Kirkpatrick SI, Hammond D. Beverage consumption and energy intake among Canadians: analyses of 2004 and 2015 national dietary intake data. Nutr J. 2019;18(1):60. https://doi.org/10.1186/s12937-019-0488-5

47. PROOF. New data on household food insecurity in 2024 [Internet]. Toronto (ON): PROOF; 2025 [cited 2025 Jul 27]. Available from: https://proof.utoronto.ca/2025/new-data-on-household-food-insecurity-in-2024/

48. Cassidy O, Tanofsky-Kraff M, Waters AJ, Shank LM, Pine A, Quattlebaum M, et al. The impact of racially targeted food marketing and attentional biases on consumption in Black adolescent females with and without obesity: pilot data from the Black Adolescent & Entertainment (BAE) study. PLOS One. 2023;18(1):e0279871. https://doi.org/10.1371/journal.pone.0279871

49. Melisse B, de Beurs E, van Furth EF. Eating disorders in the Arab world: a literature review. J Eat Disord. 2020;8(1):59. https://doi.org/10.1186/s40337-020-00336-x

50. Dierckens M, Deforche B, De Clercq B, Weinberg D, Stevens GWJM, Chatelan A, et al. Country-level sociocultural context and socioeconomic inequalities in adolescent dietary behaviours: a multilevel analysis in 21 European countries. Appetite. 2024;198:107339. https://doi.org/10.1016/j.appet.2024.107339

51. Garriguet D. Overview of Canadians' eating habits, 2004. Ottawa (ON): Statistics Canada [Catalogue No. 82-620-MIE, No. 2]; 2006. Available from: https://publications.gc.ca/collections/Collection/Statcan/82-620-M/82-620-MIE2006002.pdf

52. Hevesi R, Downey MR, Harvey K. Living in food insecurity: a qualitative study exploring parents' food parenting practices and their perceptions of the impact of food insecurity on their children's eating. Appetite. 2024;195:107204. https://doi.org/10.1016/j.appet.2024.107204

53. Papini NM, Jung M, Cook A, Lopez NV, Ptomey LT, Herrmann SD, et al. Psychometric properties of the 26-item eating attitudes test (EAT-26): an application of rasch analysis. J Eat Disord. 2022;10:62. https://doi.org/10.1186/S40337-022-00580-3

54. Shim JS, Oh K, Kim HC. Dietary assessment methods in epidemiologic studies. Epidemiol Health. 2014;36:e2014009. https://doi.org/10.4178/epih/e2014009

55. Bauer GR. Incorporating intersectionality theory into population health research methodology: challenges and the potential to advance health equity. Soc Sci Med. 2014;110:10-7. https://doi.org/10.1016/j.socscimed.2014.03.022