

Association between added sugars intake and the Healthy Eating Index-2015 among Canadian children— Analyses from the Canadian Community Health Survey – Nutrition 2015 Public Use Microdata File

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Introduction

- Diet quality has been measured by scoring dietary patterns based on how closely they are aligned with national dietary guidelines and examining the healthy food items chosen within each food group¹.
- There is continuing debate regarding the association between added sugars intake and overall diet quality, and such data remains a research gap for the Canadian population.
- Healthy Eating Index (HEI)-2015 assesses adherence to the 2015-2020 Dietary Guideline for Americans, which recommends limiting the intake of added sugars to <10% energy.

Purpose

- This study aimed to assess the association between the intakes of added sugars and the Healthy Eating Index (HEI) - 2015 as an indicator of diet quality among Canadian children aged between 2-8 years.

Methods

- The first 24-hour dietary recalls of children (2-8 years, n=1,896) from the 2015 Canadian Community Health Survey (CCHS) - Nutrition Public Use Microdata File were used to calculate added sugars intake (as a percentage of energy, %E) and HEI scores (adapted for CCHS).
- The association between total HEI scores and added sugars was tested for nonlinearity in a regression model using higher-order polynomial terms.
- HEI component scores were compared between quintiles of added sugars intake using ANOVA.
- All models were adjusted for age, sex, and dietary misreporting status.

Table 1. Healthy Eating Index 2015 Scoring Criteria²

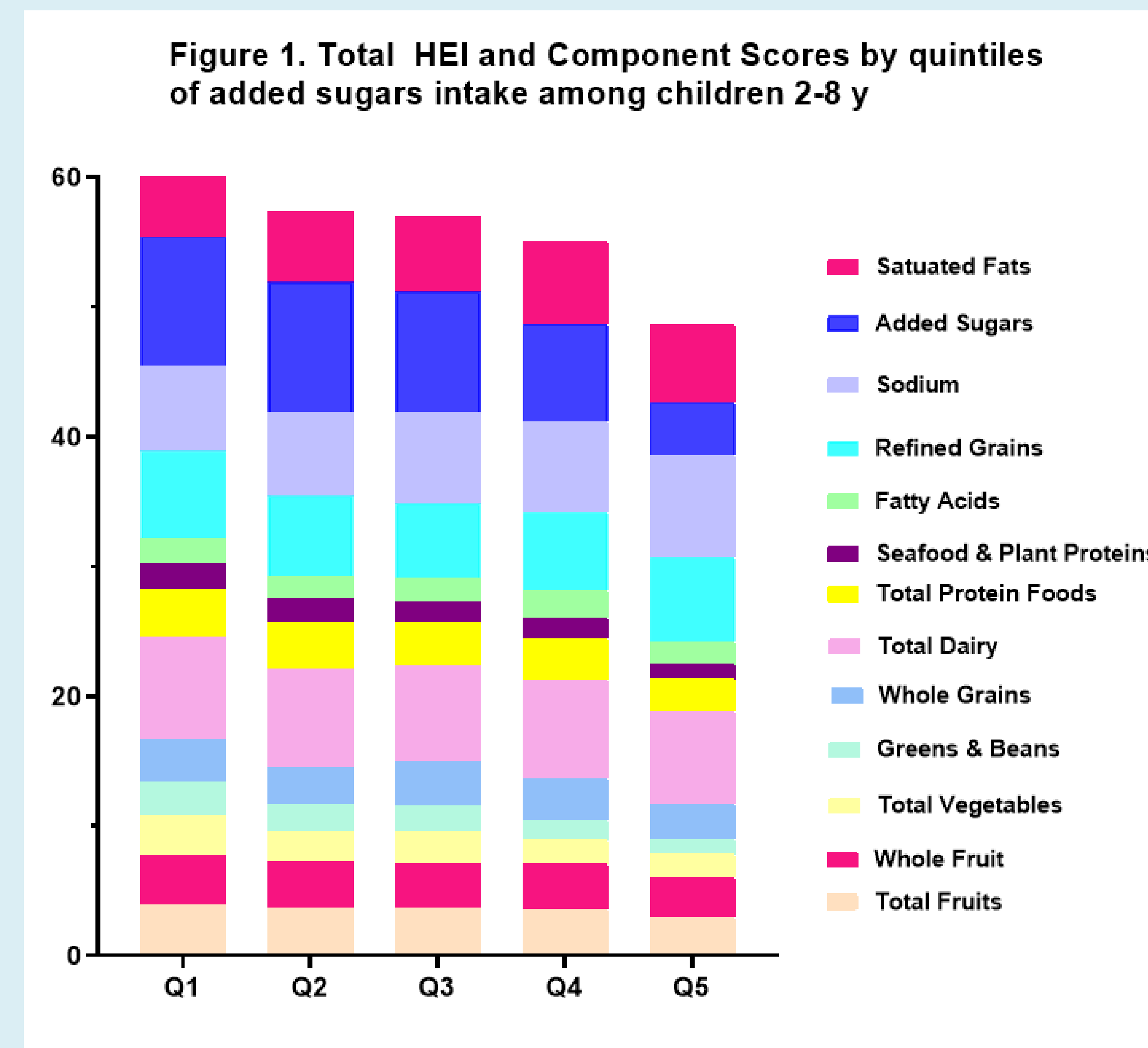
Component	Maximum Points	Standard for Maximum Score	Standard for Minimum Score
Total Fruits	5	≥ 0.8 cup equivalents/1000 kcal	No fruit
Whole Fruits	5	≥ 0.4 cup equivalents/1000 kcal	No whole fruit
Total Vegetables	5	≥ 1.1 cup equivalents/1000 kcal	No vegetables
Greens and Beans	5	≥ 0.2 cup equivalents/ 1000 kcal	No dark-green vegetables or legumes
Whole grains	10	≥ 1.5 oz equivalents/ 1000 kcal	No whole grains
Dairy	10	≥ 1.3 cup equivalents/1000 kcal	No dairy
Total Protein Foods	5	≥ 2.5 oz equivalents/1000 kcal	No protein foods
Seafood and Plant Proteins	5	≥ 0.8 oz equivalents/ 1000 kcal	No seafood or plant proteins
Fatty Acids	10	(PUFAs + MUFAs)/SFAs ≥ 2.5	(PUFAs + MUFAs)/SFAs ≤ 1.2
Refined Grains	10	≤ 1.8 oz equivalents/1000 kcal	≥ 4.3 oz equivalents/ 1000 kcal
Sodium	10	≤ 1.1 grams/1000 kcal	≥ 2.0 grams/1000 kcal
Added Sugars	10	≤ 6.5% of energy	≥ 26% of energy
Saturated Fats	10	≤ 8% of energy	≥ 16% of energy
Maximum Total			100

- The ranges of added sugars intake, total HEI scores, and the added sugars component scores by quintiles of added sugars intake are shown in the table below.

	Added Sugars Intake (%energy)	Total HEI Score (out of 100)*	Added Sugars HEI Score (out of 10)*
Q1	<4.1	60.7±2.0 ^a	10.0±0.04 ^a
Q2	4.1-6.8	57.3±1.5 ^{ab}	10.0±0.04 ^a
Q3	6.8-11.0	57.0±1.0 ^b	9.2±0.05 ^b
Q4	11.0-14.0	55.0±2.0 ^b	7.5±0.07 ^c
Q5	>14.0	48.6±1.3 ^c	4.1±0.2 ^d

*Means ± Standard Error. Within each column, means with different letters are significantly different between quintiles of added sugars intake based on post-hoc analyses, p<0.05

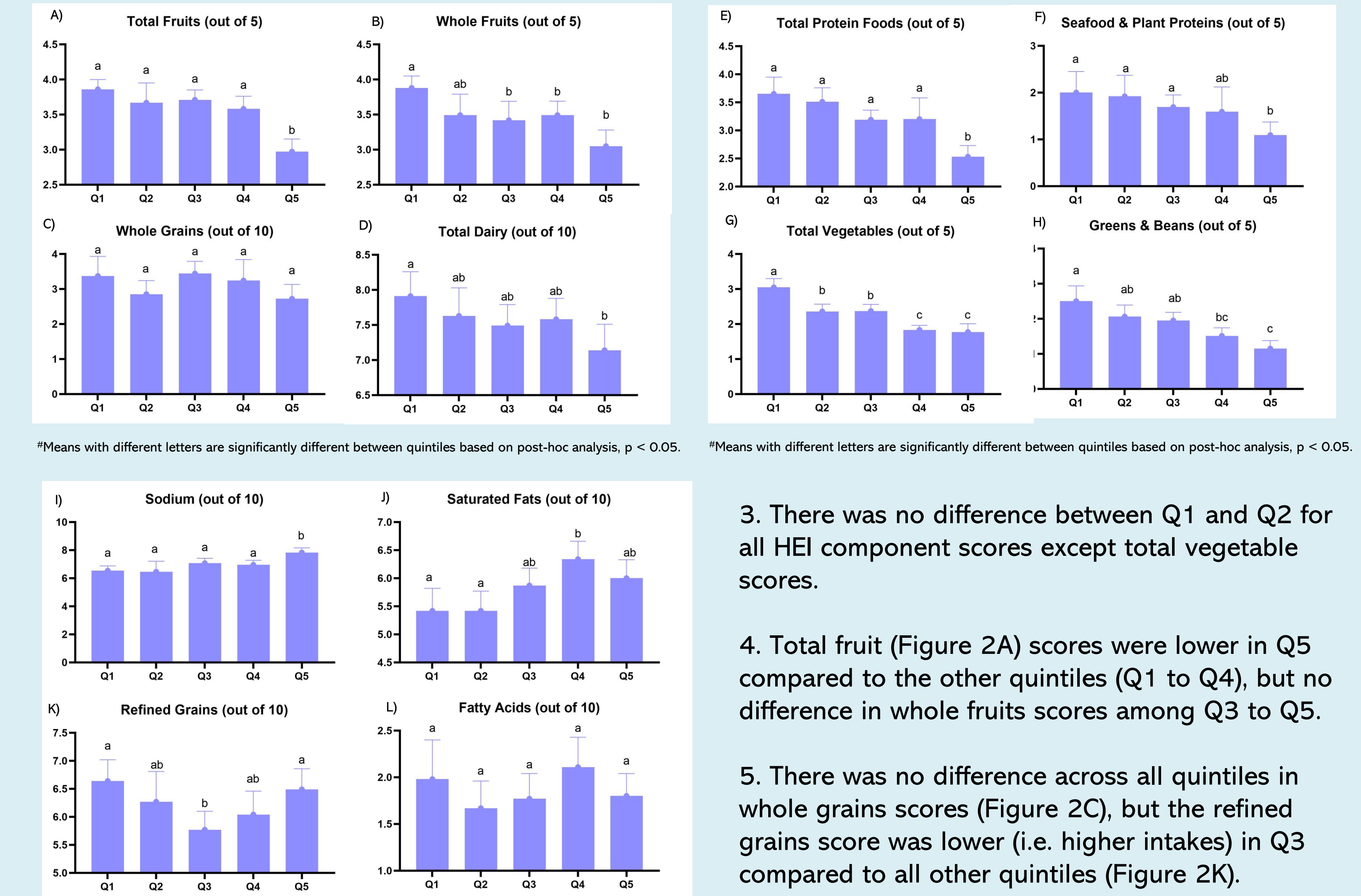
- There was a negative association between added sugars intake and total HEI scores, and the association was non-linear with greater reductions in HEI scores at higher intakes of added sugars ($\beta_1 = -0.82$, $\beta_2 = 0.84$, $p < 0.0001$). Those in Q5 had significantly lower total HEI scores than all other quintiles, but no difference was observed between Q1 and Q2, as well as among Q2 to Q4.



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Results

Figure 2. HEI component scores across quintiles of added sugars intake #.



#Means with different letters are significantly different between quintiles based on post-hoc analysis, p < 0.05.

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- There was no difference between Q1 and Q2 for all HEI component scores except total vegetable scores.
- Total fruit (Figure 2A) scores were lower in Q5 compared to the other quintiles (Q1 to Q4), but no difference in whole fruits scores among Q3 to Q5.
- There was no difference across all quintiles in whole grains scores (Figure 2C), but the refined grains score was lower (i.e. higher intakes) in Q3 compared to all other quintiles (Figure 2K).
- Compared to the other quintiles, the scores were higher (i.e. reflective of lower intakes) for sodium in Q5 (Figure 2I) and saturated fat in Q4 (Figure 2J), but no difference was observed in fatty acid scores across all quintiles.

- As intakes of added sugars increased from Q3 to Q5, scores for total protein (Figure 2E), seafood & plant protein (Figure 2F), total vegetables (Figure 2G), and greens & beans (Figure 2H) decreased; all changes were more pronounced in Q4 and Q5.

Conclusions

- There was a negative nonlinear association between added sugars intake and HEI-2015 scores among Canadian children aged 2-8 years.
- There was no difference in total HEI or most component scores between Q1 and Q2. Reductions in vegetable, fruit, dairy, and protein intakes were more prominent for those with the highest intakes of added sugars.
- Limitations in interpreting HEI-2015 for children in the Canadian context should be considered. Similar assessment can be performed using the Healthy Eating Food Index-2019 developed based on the 2019 Canada's Food Guide, and for the other age groups.

References:

- Kirkpatrick SI et al. J Acad Nutr Diet. 2018.
- Krebs-Smith et al. J Acad Nutr Diet. 2018

