

# 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 group<sup>1</sup>.
- 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 how individuals' diets align with the 2015-2020 Dietary Guideline for Americans, which recommends limiting the intake of added sugars to <10% energy. A higher HEI score, means that a diet (or dietary component) better aligns with dietary recommendations.

## 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 Criteria<sup>2</sup>

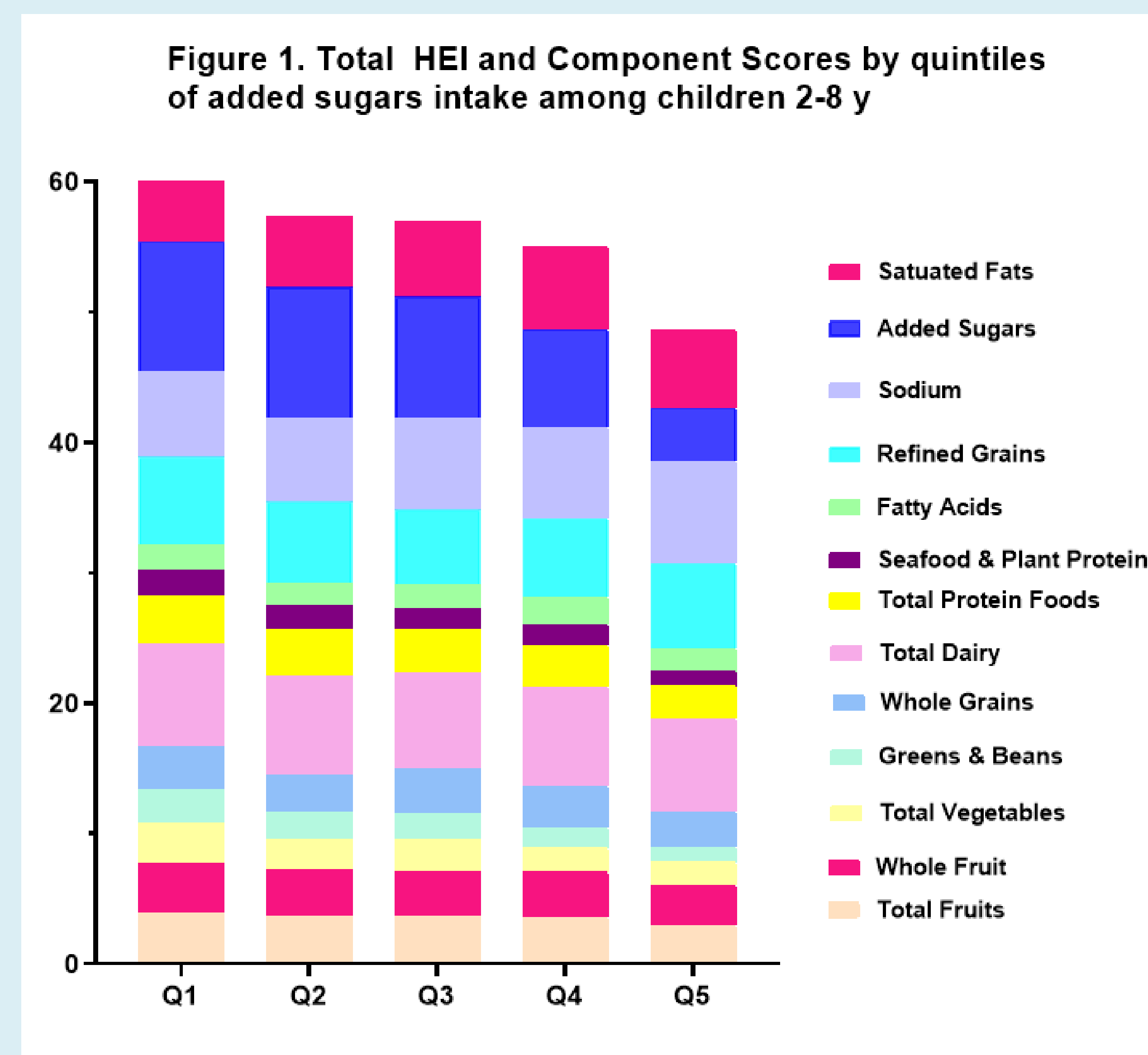
Component	Maximum Points	Standard for Maximum Score	Standard for Minimum Score
Total Fruits	5	≥ 0.8 cup equivalents/1000 kcal	No fruit
Whole Fruits	5	≥ 0.4 cup equivalents/1000 kcal	No whole fruit
Total Vegetables	5	≥ 1.1 cup equivalents/1000 kcal	No vegetables
Greens and Beans	5	≥ 0.2 cup equivalents/ 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 <sup>a</sup>	10.0±0.04 <sup>a</sup>
Q2	4.1-6.8	57.3±1.5 <sup>ab</sup>	10.0±0.04 <sup>a</sup>
Q3	6.8-11.0	57.0±1.0 <sup>b</sup>	9.2±0.05 <sup>b</sup>
Q4	11.0-14.0	55.0±2.0 <sup>b</sup>	7.5±0.07 <sup>c</sup>
Q5	>14.0	48.6±1.3 <sup>c</sup>	4.1±0.2 <sup>d</sup>

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

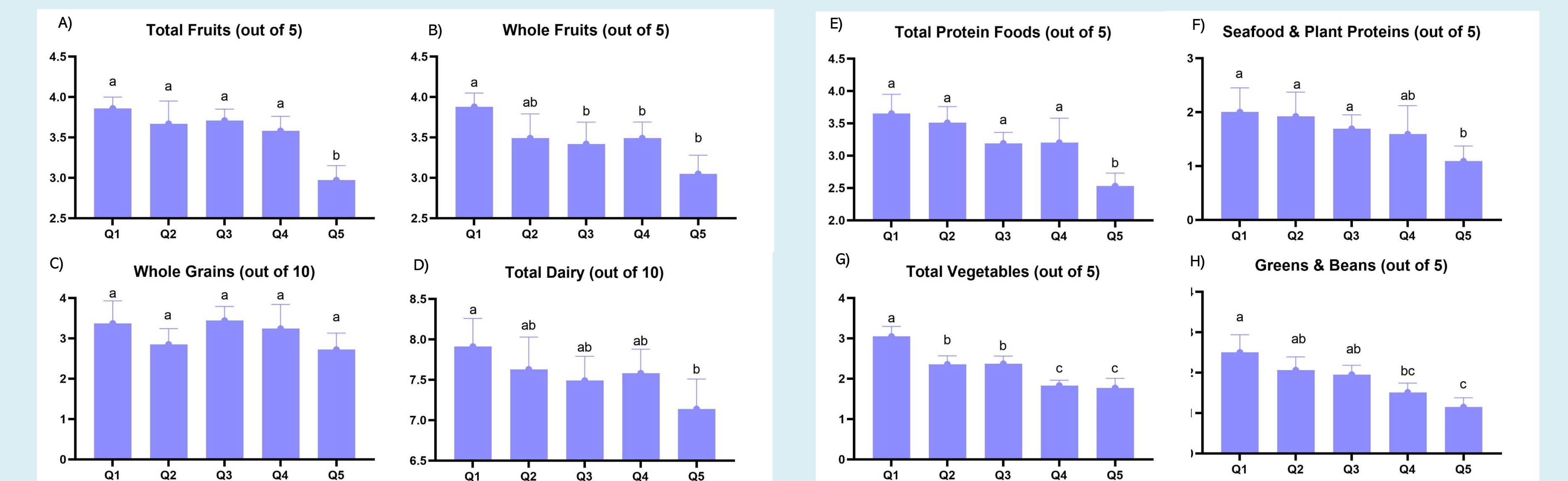
- There was a negative association between added sugars intake and total HEI scores, and the association was non-linear with greater reductions in HEI scores at higher intakes of added sugars ( $\beta_1 = -0.82$ ,  $\beta_2 = 0.84$ , p<0.0001). Those in Q5 had significantly lower total HEI scores than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



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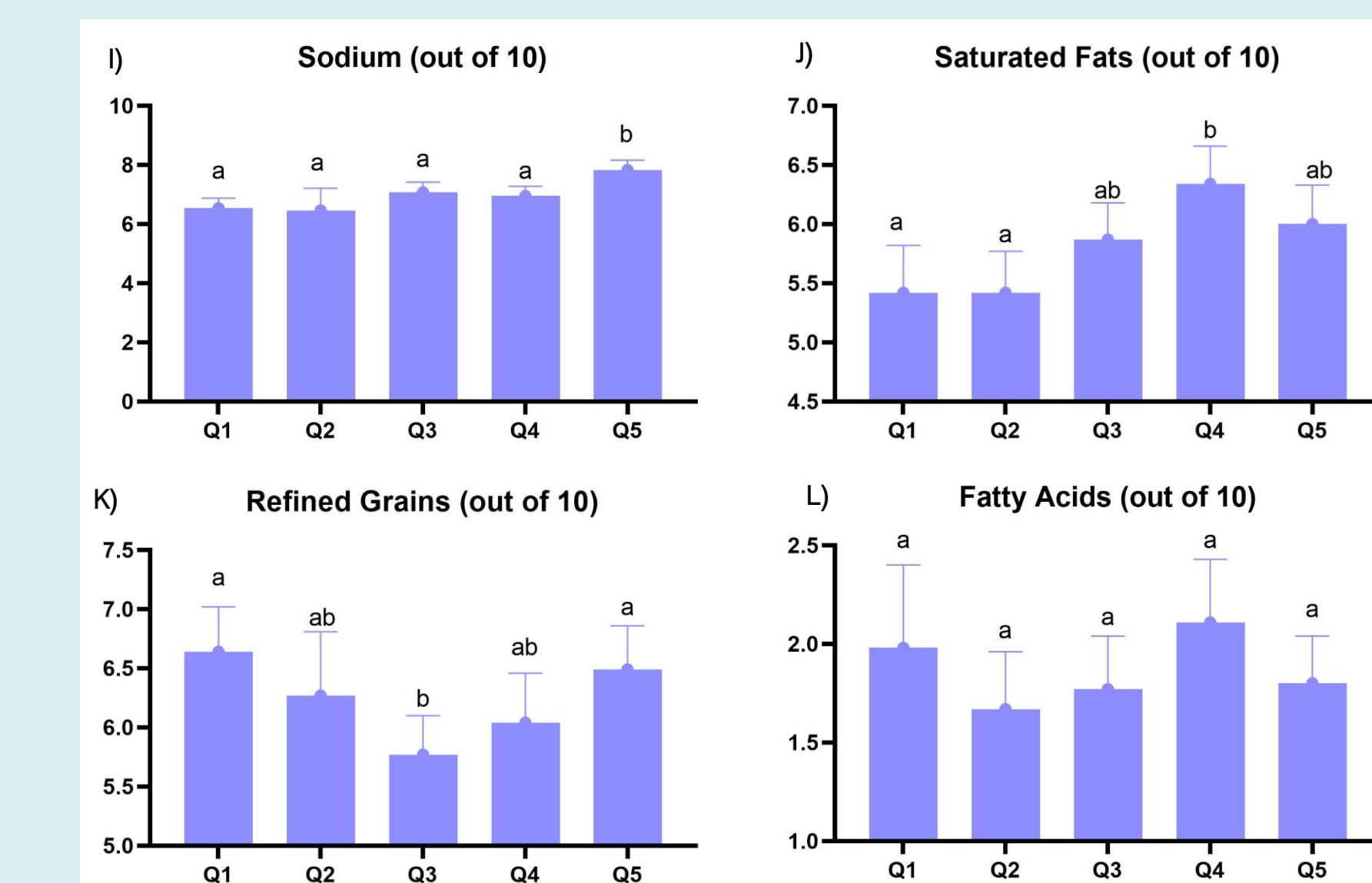
## Results

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 to Q4 for total fruit (Figure 2A), total dairy (Figure 2D), total protein foods (Figure 2E), seafood & plant proteins scores (Figure 2F), all higher than 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).

## Conclusions

- There was a negative nonlinear association between added sugars intake and total HEI-2015 scores among Canadian children aged 2-8 years, with greater reductions in HEI scores at higher intakes of added sugars.
- 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

