

# Association between added sugars intake and the Healthy Eating Index-2015 among Canadian adults — 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 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 adults.

## Methods

- The first 24-hour dietary recalls of adults (19 years and older, n=11,817) 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

## Results

- 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.

Quintile	Added Sugars Intake (%energy)	Total HEI Score (out of 100)*	Added Sugars HEI Score (out of 10)*
Q1	<2.8	57.5±0.5 <sup>a</sup>	10.0±0.02 <sup>a</sup>
Q2	2.8-5.6	55.9±0.5 <sup>a</sup>	10.0±0.02 <sup>a</sup>
Q3	5.6-9.0	54.1±0.6 <sup>b</sup>	9.66±0.03 <sup>b</sup>
Q4	9.0-14.0	50.7±0.6 <sup>c</sup>	7.70±0.04 <sup>c</sup>
Q5	>14.0	43.9±0.7 <sup>d</sup>	3.49±0.08 <sup>d</sup>

\*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 ( $\beta_1 = -0.86$ ,  $\beta_2 = 0.68$ ,  $p < 0.0001$ ).

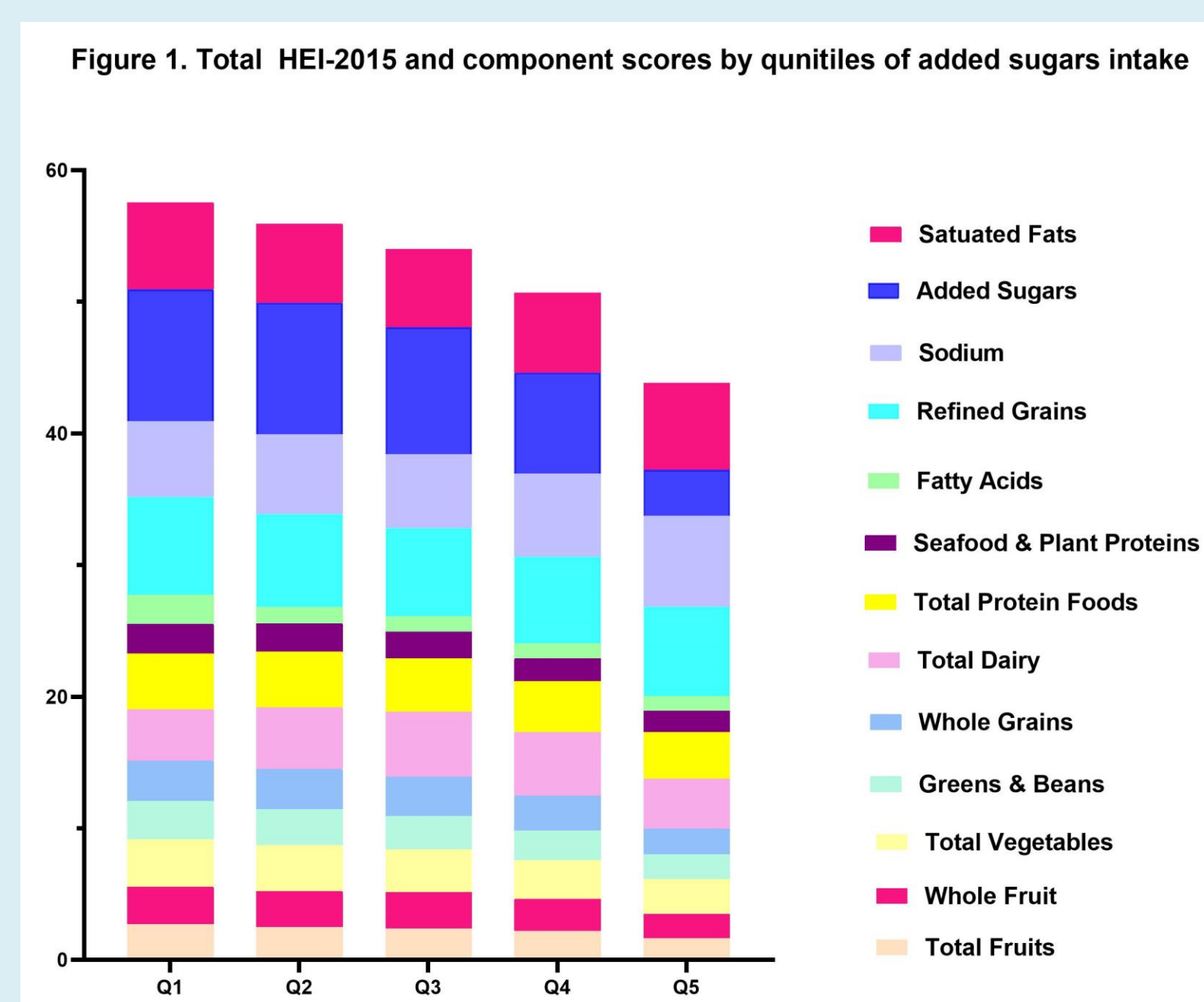
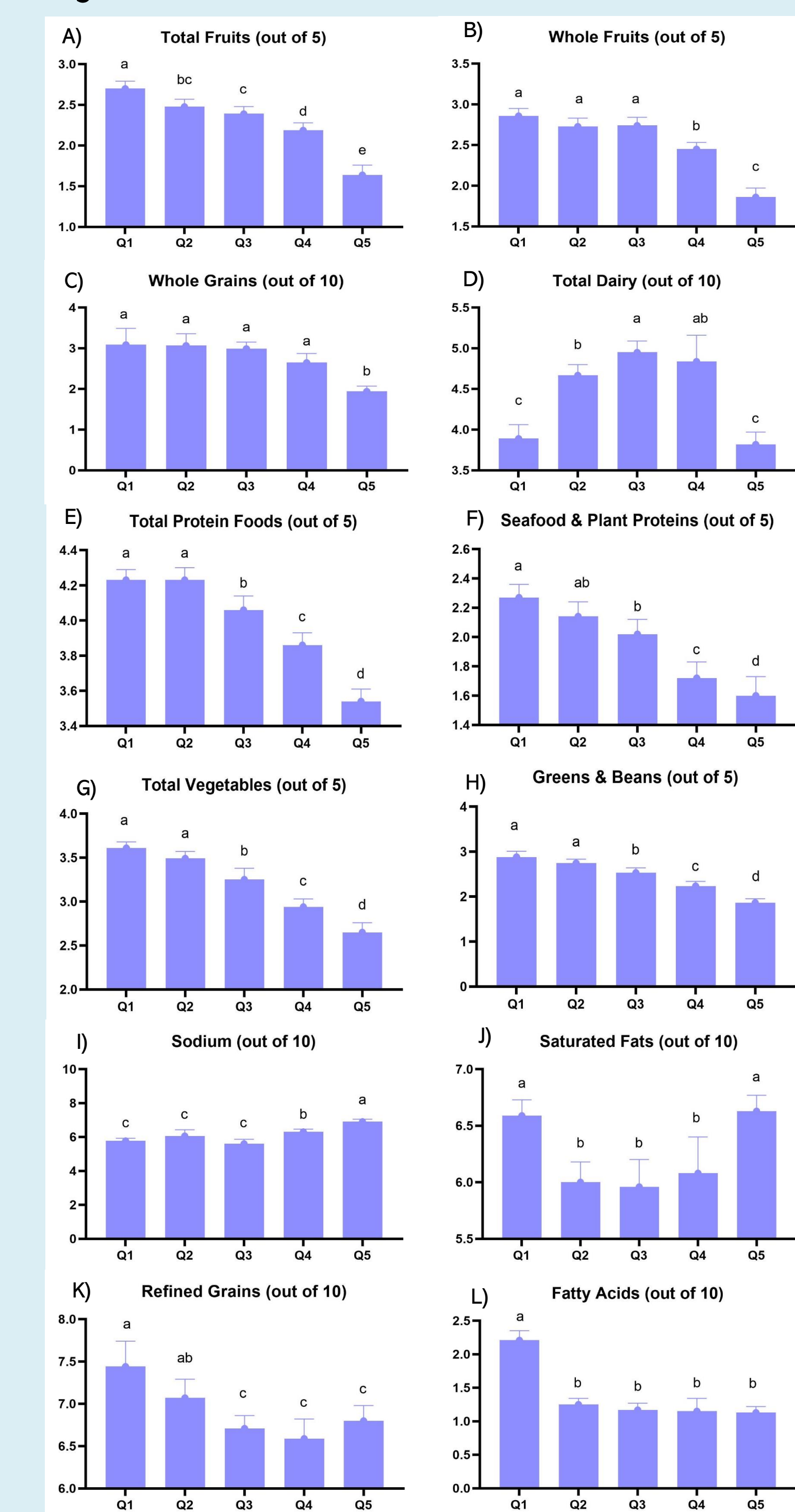


Figure 2. HEI component scores across quintiles of added sugars intake #.



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

- When comparing HEI component scores between quintiles, there was no difference in the whole fruit scores (Figure 2B) among Q1 to Q3 (all higher than Q4 and Q5), and in the whole grain scores (Figure 2C) among Q1 to Q4 (all higher than Q5). The total dairy score (Figure 2D) in Q3 was higher than those in Q1, Q2, and Q5.

- 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.

- Sodium intakes in Q4 and Q5 were lower (i.e. higher scores, Figure 2I) compared to those in Q1 to Q3, and saturated fat intakes were lower in Q1 and Q5 (i.e. higher scores, Figure 2J) compared to the other quintiles.

## Conclusions

- There was a negative nonlinear association between added sugars intake and HEI-2015 scores.
- Reductions in total HEI and components scores for vegetable, fruit, and protein intakes were more prominent for those with the highest intakes of added sugars.
- Different patterns were observed for sodium, saturated fat, fatty acid ratios, dairy foods, and whole grains, suggesting distinctive food choices across different levels of added sugars intake.

References:

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

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