HOW LIMITED ACCESS TO FOOD RETAILERS IMPACTS CHILDREN'S BMI

Andres R. Martinez[1], Sahar Alrayyes[1] Patrick Smith[1] Bhakti Desai[1], Keyla Estrada[2], Katharine Howard[3], Ben Wigley[3], Christina L. Nicholas[3]

[1]Dept of Pediatrics, UIC College of Dentistry [2]Dept of Medicine, UIC College of Medicine [3]Dept of Orthodontics, UIC College of Dentistry

UNIVERSITY OF ILLINOIS CHICAGO
College of Dentistry

INTRODUCTION

Food insecurity remains a significant public health issue that affects millions of children in the United States. While it is often associated with undernutrition, emerging research has shown a complex relationship between food insecurity and obesity, particularly in high-income settings. The purpose of this study was to examine how food insecurity and access to food retailers relate to children's BMI in the Chicago metropolitan area. Our findings showed that household food insecurity is associated with higher BMI, particularly obesity, while access to food retailers alone was not a strong predictor of outcomes. Instead, socioeconomic factors played a more influential role in shaping both food insecurity and health outcomes. Overall, this study highlights the importance of understanding food insecurity within a broader social and environmental context

OBJECTIVES

The aim of this study was to examine relationships between food insecurity (FI), childhood Body Mass Index (BMI), and geographic proximity to food retailers, with a focus on the Chicago metropolitan area.

HYPOTHESES

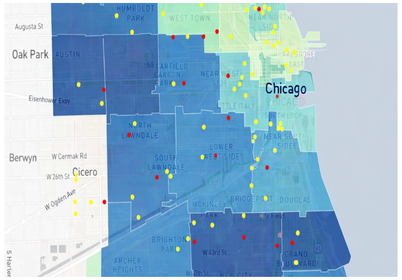
H_1^1: There is a positive correlation between BMI and food insecurity.
H_1^0: *There is no correlation between BMI and food insecurity.*

H_2^1: There is a positive correlation between proximity of supermarkets to patient ZIP code and food insecurity.
H_2^0 : *There is no relationship between proximity of supermarkets to patient ZIP code and food insecurity.*

METHODS

This prospective, observational cross-sectional study utilized participant surveys and dental records collected from the Pediatric Dental Clinic at UIC (n=171). Body mass index (BMI) was calculated using patient height and weight measurements. To assess food insecurity, parents or guardians provided information regarding household food availability during the previous 12 months. Participants were categorized into three groups: those who reported never experiencing food insecurity, those who had experienced food insecurity at times, and those who frequently experienced food insecurity. Patient zip codes and nearby supermarket locations were obtained using the Chicago Atlas. This geographic information was used to assess the number and proximity of supermarkets within each zip code.

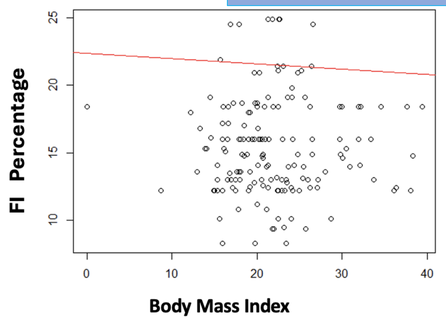
Inclusion Criteria	Exclusion Criteria
• Age 5-17.9 years • Caregivers who can read and understand English and/or Spanish • Live within the Chicagoland area	• Patients with known metabolic, endocrine, or other growth disorders (including endogenous obesity) • Caregivers unable to consent (non-legal guardians, foster care)



Chicago Health Atlas and Cite City Chicago data were merged using Canva

RESULTS

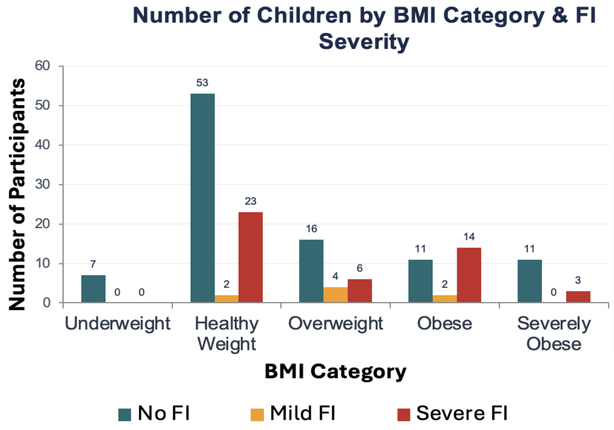
COMMUNITY FI & BMI PERCENTILE



Key Statistics- Chi-square test

Correlation (r) **−0.20**	*Very weak, negative*
p-value **0.802**	*Not significant*
Conclusion **No link**	*Community FI alone does not predict BMI*

FI SEVERITY & BMI CATERGORY

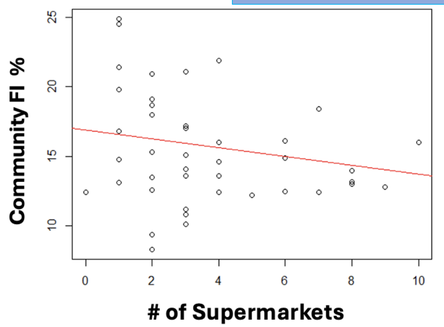


Statistical Result

Chi-square (χ^2)	**18.92**
Degrees of freedom	**8**
p-value	**0.015**

✓ SIGNIFICANT

SUPERMARKETS & COMMUNITY FI



Statistics

Pearson r:	−0.259
Direction:	Negative
p-value:	< 0.001 ✓

What this means:

↑ More supermarkets
→ Lower community food insecurity

↓ Fewer supermarkets
→ Higher community food insecurity

RESULTS CONT.

- A total of **171** participants were included in the final analysis.
- Community FI was not statistically significantly related to BMI percentile (p=0.802). However, Household FI and FI Severity were statistically significantly related to BMI category (p=0.019 and p=0.015, respectively).
- Socioeconomic status (SES) did significantly impact Household FI, FI Severity, and Community FI (p=0.010, p=0.023, p=0.004)
- The number of supermarkets within the patients' zip code areas were significantly related to the community FI (p<0.001) but it was not significantly related to household FI (p=0.737)
- Community FI was not significantly related to Household FI (p=0.167)

Statistically Significant Findings
Household FI & BMI category — χ^2=11.75, p=0.019
FI Severity & BMI category — χ^2=18.92, p=0.015
SES & Household FI — χ^2=6.66, p=0.010
SES & FI Severity — χ^2=7.54, p=0.023
SES & Community FI — t=2.97, p=0.004
Supermarkets & Community FI — r=−0.259, p<0.001
Statistically Insignificant Findings
Community FI & BMI percentile — r=−0.20, p=0.802
Supermarkets & Household FI — U=2730.5, p=0.737
Community & Household FI — t=−1.38, p=0.167

DISCUSSION & CONCLUSIONS

- Household FI is significantly associated with BMI category (χ^2=11.75, p=0.019). Obese children had disproportionately high FI rates.
- Low-SES households had 3x the FI rate of middle/high-SES (44% vs. 15%, p=0.010). SES predicts both FI experience and severity.
- More supermarkets correlate with lower community FI (r=−0.259, p<0.001). Food retail density is a meaningful policy lever.
- Severe FI was most strongly linked to obesity (χ^2=18.92, p=0.015). Chronic insecurity poses the greatest BMI risk.
- Supermarket count did not predict household FI (p=0.737). Physical proximity alone is insufficient without addressing affordability.

Clinical Significance

- Dentists are in a unique position to identify at-risk patients
- Screening for FI can be incorporated into routine patient assessments
- Understanding FI helps guide dietary counseling and preventive care

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REFERENCES