Assessing The Monthly Cycle of Food Abundance-Shortage in Food Insecure/Overweight-Obese Women

Qian Ye1, Ana Claudia Zubieta1,2, Dan Remley1,2, Deb Angell1,2, Sheryl D. Mims1, Hugo Melgar-Quinonez1,2
1Department of Human Nutrition, The Ohio State University, 2Ohio State University Extension

Abstract

Background: This study aims to assess a hypothesized monthly cycle of food abundance-shortage among food insecure/overweight-obese (FIS/Ow-Ob) women as a possible explanation to the paradoxical relationship between food insecurity and overweight/obesity.

Methods: Overweight and obesity were determined by a Body Mass Index (BMI) ≥ 25. A validated shelf-food inventory was used to determine household food supply, and dietary intakes were measured by 24-hour dietary recalls. Food insecurity was measured using the USDA Household Food Security Supplemental Module (US-HFSSM). Differences in the number of shelf-food items and energy/nutrient intake between week1 and week4 were determined through paired t-tests.

Results: 22 women participating in the Ohio Family Nutrition Program (77% overweight/obese, 91% food insecure) were interviewed at the beginning and the end of the month (week1, week4) to determine their dietary energy intake (EI) and household food supply. Among FIS/Ow-Ob women (n=16), the number of shelf-food items (week1: 86.8, week4: 62.6, p=0.0004) decreased significantly when comparing measures at week1 and week4. A significant decrease in fat intake was observed as well (p=0.02). Significant drops were also observed in food supply for food groups of grains, vegetables, fruits, milk, and meat & beans (p≤0.05).

Conclusion: These findings suggest the existence of a monthly cycle of food abundance-shortage among FIS/Ow-Ob women, who might be experiencing a caloric overconsumption on week1, when food is more abundant, as a response to the food shortage on week4. Nutrition education and policy interventions are needed to better distribute the available resources throughout the month to avoid such variations.

Introduction

Food insecurity is defined as the limited access to “nutritionally adequate and safe foods” in reasonable ways [1]. In the US, food insecurity is associated with an increasing chance of obesity, particularly in adult women [2]. Previous studies have showed a monthly sharp-flattened pattern on food expenditure and food intake in low-income population [3].

Hypothesis: Food insecure individuals may experience a higher EI during the first weeks of the month due to increased household food availability, followed by a more limited EI in the last week of the month. Over time, this cycle might be related to cumulative energy storage and subsequent weight gain.

Subjects and Methods

Subjects: 80 low-income women in three Ohio counties: Butler, Richland and Huron. (Data shown here are preliminary results from 22 women.)

Study Design: The study is designed to measure the hypothesized monthly variations in EI and food supply in a sample of low-income women in Ohio. Four groups of women are followed for three months (a quarter), distributed throughout 12 months. In every three months, a group of 20 women are interviewed at the first week and the last week of the month.

Data Collection: Data collection methods include interview-administered and self-reported survey questionnaires, and anthropometric measurements.

1. Family Record: demographics (not shown here)
2. Household Food Security Supplemental Module
3. 24-hour Dietary Recall
4. Shelf Food-Inventory
5. Anthropometrics

Data analysis:

Key Variables: Food Insecurity, Weight Status (or BMI), Energy Intake (EI), and Household Food Supply.

Statistical Analysis:

1. Associations between Food Insecurity and Weight Status: Descriptive statistics.
3. Relationship between Variations in EI, Weight Status, and Food Insecurity Status: Logistic Regression, Linear Regression Analysis. (Results not shown in the preliminary results)

All the statistical analyses were performed using the software STATA 9.0 [4]. Statistically significant differences were determined as p < 0.05.

Objectives

1. Measure monthly variations in energy intake and household food supply among low-income women in Ohio.
2. Measure monthly variations in household food supply among low-income women in Ohio.

Preliminary Results (n=22)

1. Energy Intake (Month 1)

- Week1: 2517.2 kcal
- Week4: 1965.9 kcal

2. Total Food Inventory Items

- Group 1 (Week1): 86.76
- Group 1 (Week4): 79.69
- Group 2 (Week1): 57.06
- Group 2 (Week4): 56.06
- Group 3 (Week1): 42.76
- Group 3 (Week4): 30.76
- Group 4 (Week1): 26.16
- Group 4 (Week4): 18.16

3. Mean BMI by Household Food Security Status

- Food secure, fs: BMI 25.9 vs. 38.83
- Low food secure, lfs: BMI 35.0 vs. 38.83
- Very low food secure, vlfs: BMI 38.83 vs. 37.83

4. Conclusions

- Food insecure women have higher mean BMI than food secure women.
- FIS/Ow-Ob women experience higher EI in week1 when compared to week4.
- Fat intake is significantly higher in week1.
- In FIS/Ow-Ob women, the availability of essential food groups drops significantly from week1 to week4.
- The most significant drop is in mean & beans group.
- Nutrition education programs focusing on a better monthly food resource distribution are needed.
- Policy to change on food stamp distribution can help beneficiaries to better distribute their resources throughout the month.

References