The Nutritional Status of Food Pantries: A Quasi-Experimental Investigation

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Abstract

Our goal was to identify pantries in the Greater Hampton Roads area that commonly rely on resources purchased by or donated to the Foodbank of Southeastern Virginia and the Eastern Shore, and how much of their distributions are foods that contribute to adverse health outcomes. We selected pantries by stratified sampling (n=22) and examined their purchase invoices over two three-month periods, and compared the before and after results using the Paired Wilcoxon Rank Test (alternative hypothesis H_a: $p_{1,med} > p_{2,med}$, $\alpha = 0.05$, p-value = 0.0174). Our results show that food pantries in Greater Hampton Roads have reduced the proportion of less-healthy foods they distribute to clients.

Objectives

- Rank food items in Ceres database based on SWAP system
- Analyze proportions of each SWAP rank for pantries
- Provide report-card like document of analysis to each pantry

Population Background

- Food insecurity: limited or uncertain access to adequate food
- 1.29 mil. Virginians food insecure
- Hampton Roads – 10.4% of population food insecure, 20.7% low access to grocery store

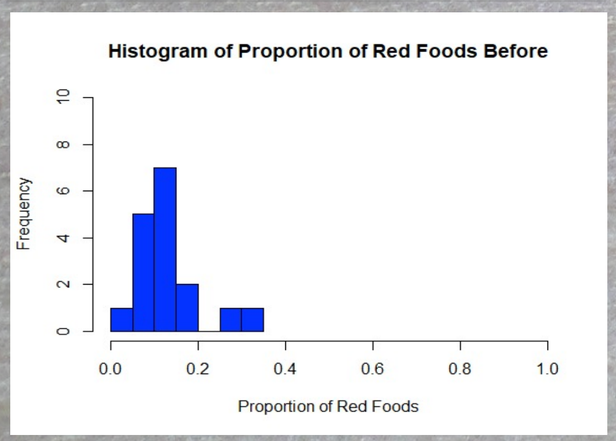
SWAP Background

- Supporting Wellness at Pantries
- Ranks food by saturated fat, sodium, and sugar levels as green, yellow, red
- Provides visual representation of how healthy a food item is to clients

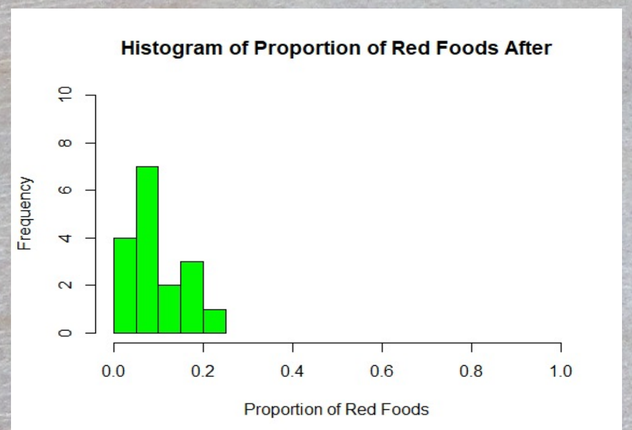
Methods

- Ranked Foodbank-purchased foods according to SWAP system
- Stratified pantries by food bank county code and randomly sampled within strata, with respect to total number of pantries in county (n=22)
- Jet Reports in Microsoft Excel to extract invoice information for two time periods (Aug 1, 2020 to Oct 31, 2020 and Jan 1, to match item numbers and extended gross weight on invoice to SWAP rank
- Pivot Table to display the proportion of red foods by total weight
- Used R to run a Paired-Wilcoxon Rank Test to compare two periods

Results



Results Continued



Paired Wilcoxon Rank Test $\alpha = 0.05$

H_0: $p_{1,med} = p_{2,med}$ H_a: $p_{1,med} > p_{2,med}$

V = 121 p-value = 0.0174

Discussion

- Paired Wilcoxon Rank Test led to rejection of the null hypothesis
- Results show that the food pantries in the Greater Hampton Roads area are choosing to reduce the proportion of less-healthy food distributed
- Research limitations include small sample size and not all inventory items at FSEVA were SWAP-ranked
- Encourage partner agencies to implement SWAP and utilize developed videos to create a deeper understanding of the system
- Elicit feedback on client education sheet to understand how we can more effectively communicate nutritional concepts to the public

Interprofessional Education

The scope of my practicum enabled me to work with many individuals both inside and outside of FSEVA. When it came to logistical operations and understanding the processes for procuring food at the Foodbank, I was able to meet with both an Inventory Control Assistant and the Product Sourcing Manager to understand the warehouse's capacity to assist with SWAP implementation. I also sat on video conferences, where I was able to discuss barriers and solutions with a variety of partners at other food banks nationally, as well as shadow a Director of Business Solutions to understand how the Ceres database can organize certain information as well as extract data from it. I worked closely with the Registered Dietitian at FSEVA to develop both partner agency and client education material related to SWAP, as well as establish a report template that displays the current nutritional distributions of partner agencies in the Greater Hampton Roads area.

Acknowledgements

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Abstract

- Goal – identify pantries in Greater Hampton Roads that rely on resources from the Foodbank of Southeastern Virginia and the Eastern Shore
  - How much of these items distributed contribute to adverse health outcomes
- Selected pantries by stratified sampling (n=22) and examined their purchase invoices over two three-month periods
- Compared before and after results by Paired Wilcoxon Rank Test
  - Alternative hypothesis H_a: $p_{1,med} > p_{2,med}$
  - $\boldsymbol{\alpha} = 0.05$, p-value = 0.0174
- Results show food pantries in Greater Hampton Roads have reduced proportion of less-healthy foods distributed to clients

Objectives

- Research
  - Rank food items in Ceres database according to SWAP
  - Analyze pantry invoices for proportions of each SWAP rank
  - Provide report-card like document of analysis to each pantry
- Project
  - Design client education sheet to explain SWAP and how the clients can use this information to their benefit
  - Develop materials pantries can use to understand and implement the SWAP system
  - Identify next steps for FSEVA

Terminology and Acronyms

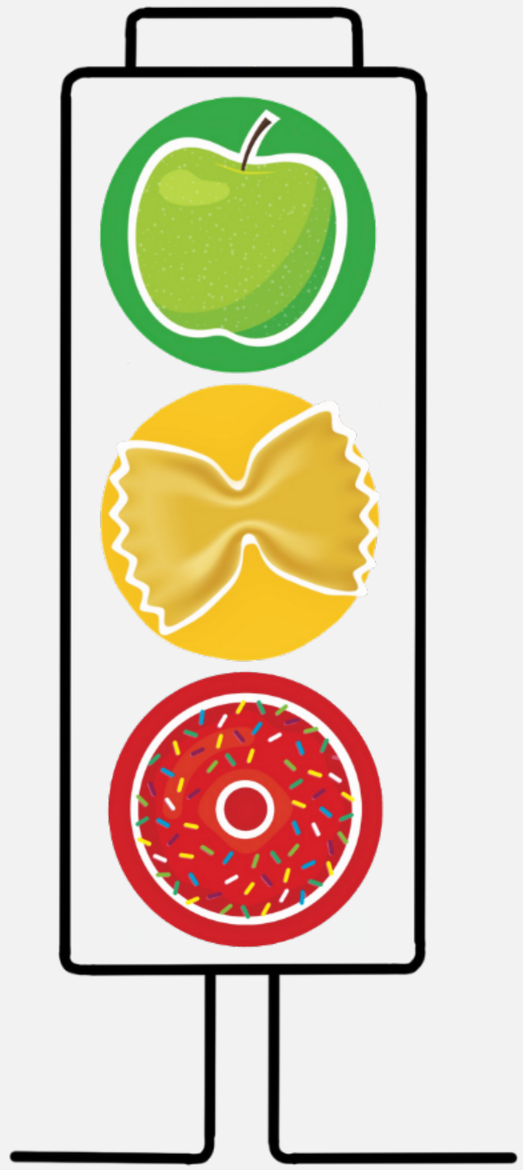
- **Food insecurity** – limited or uncertain access to food
- **Hunger –** physiological condition for an individual beyond normal uneasiness, includes discomfort, illness, weakness
- **FSEVA** – the Foodbank of Southeastern Virginia and the Eastern shore, also referred to as the Foodbank
- **Ceres** – inventory database used at the Foodbank
- **SWAP –** Supporting Wellness at Pantries
- **Partner agency** – organizations that purchase items from the Foodbank to distribute to individuals, also called food pantries or pantry partners
- **Client –** individual who receives food by distribution; they can receive food from a pantry or the Foodbank

Food Insecurity Snapshot

- 1.29 million Virginians have limited access to fresh foods that are affordable and nutritious
  - An estimated 447,000 Virginians will experience food insecurity as a result of COVID-19
- Food insecurity in southeastern Virginia is 10.4% of population, 20.7% of population has low access to a grocery store
  - Sussex and Northampton counties and cities of Norfolk and Franklin have highest prevalence of food insecurity
  - Adults 20+ in Norfolk: 34.5% obese, 12.8% have diabetes
- Many factors can contribute to food insecurity such as income and employment status, neighborhood and built environment, social and community context, race or ethnicity

SWAP 101

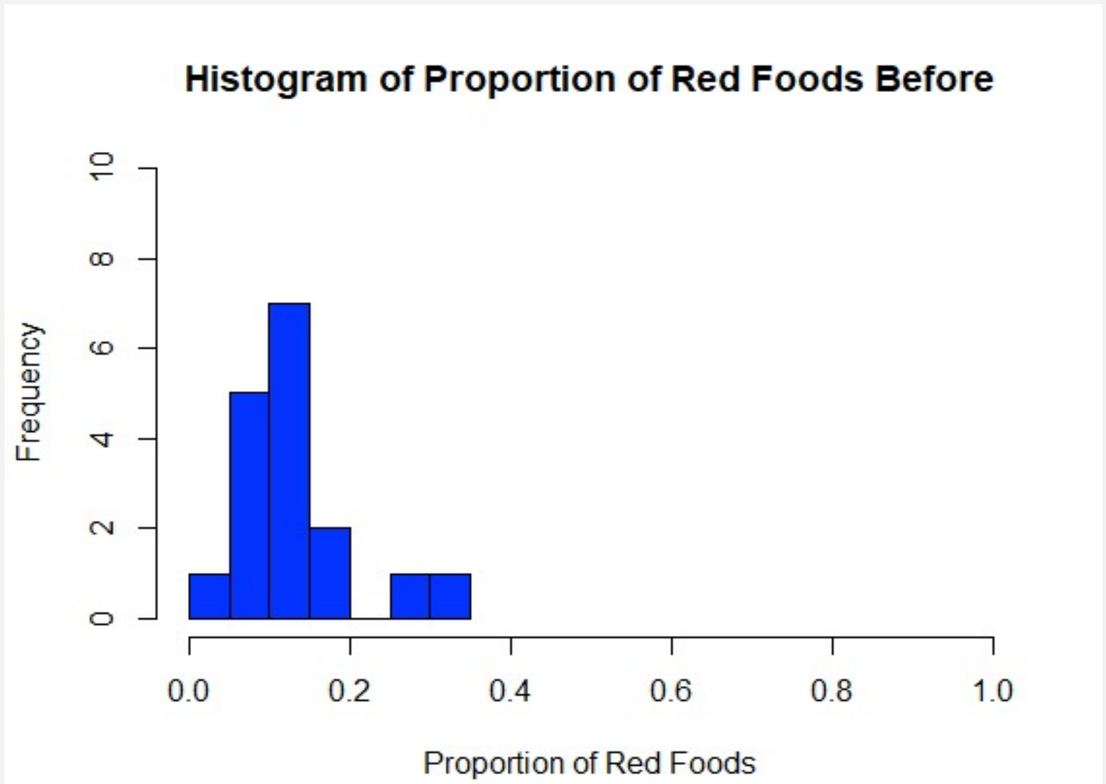
- Stoplight nutrition ranking system
  - Green: choose often
  - Yellow: choose sometimes
  - Red: choose rarely
- Ranks foods by saturated fat, sodium, and sugar levels
- Easy to implement in both food banks and food pantries
- Provides visual cues for pantry clients so they are more informed about the foods they choose

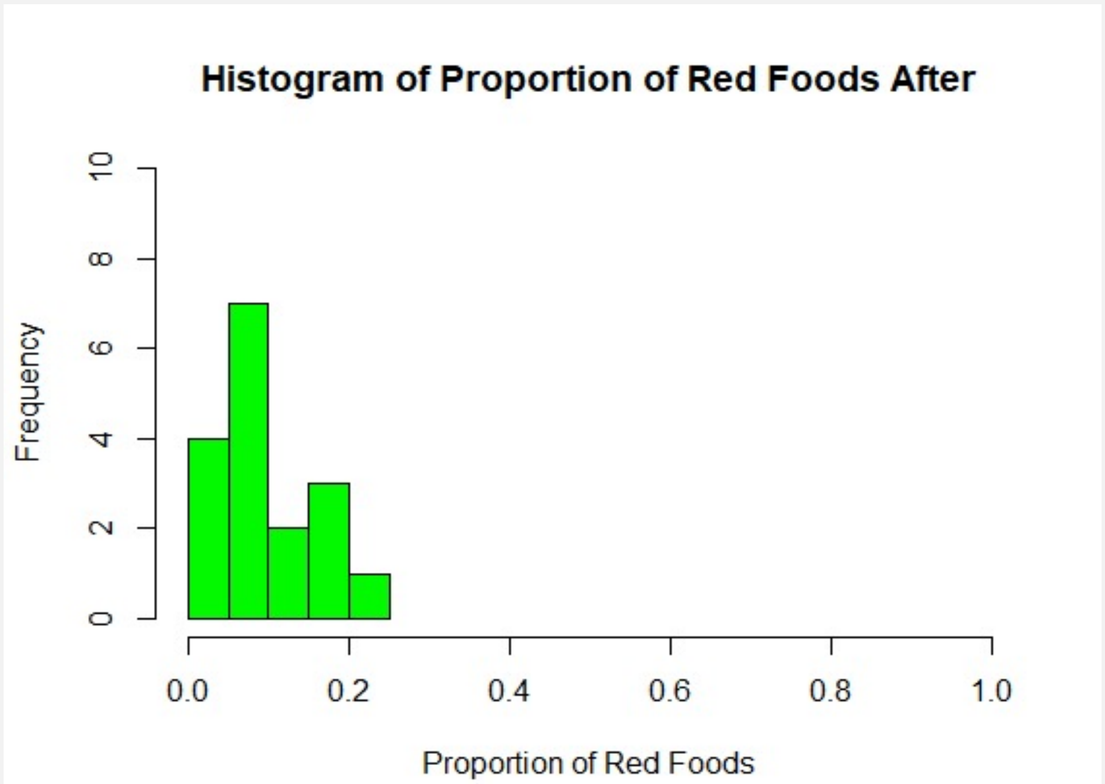


Research Methods

- Ranked FSEVA-purchased food items according to SWAP
- Stratified pantries for sampling by foodbank county code
  - Accomack, Chesapeake, Franklin, Isle of Wight, Norfolk, Northampton, Portsmouth, Southampton, Suffolk, Sussex, Virginia Beach
  - Selected pantries in counties by random sampling and number chosen proportional to total number of pantries in county
- Used Jet Reports add-on in Microsoft Excel to aggregate data from multiple tables
  - Indicators: agency number and date range
  - Displayed item number, item description, SWAP rank, pounds distributed
- Summarize report via Pivot Table
- Compare proportions of red foods per invoice by Paired Wilcoxon Rank Test

Findings





Paired Wilcoxon Rank Test	**$\alpha = 0.05$**
$H_0: p_{1,med} = p_{2,med}$	$H_a: p_{1,med} > p_{2,med}$
V = 121	p-value = 0.0174

Discussion and Next Steps

- Rejected null hypothesis
  - Food pantries in Greater Hampton Roads reducing the proportion of red foods distributed
- Research limitations
  - Small sample size
  - Not all foods in Ceres were ranked
- Next steps
  - Encourage partner agencies to implement SWAP
  - Elicit feedback from clients regarding the client education sheet
    - Is it helpful?
    - What would they like to see more or less of?

Interprofessional Education

- FSEVA staff
  - Inventory Control Assistant
  - Product Sourcing Manager
  - Registered Dietitian
- External partners
  - Director of Business Solutions, Three Square Los Angeles
  - Executive Director of Foodshare Institute for Hunger Research and Solutions

References

1. Brand Style Guide. Foodbank of Southeastern Virginia and the Eastern Shore2021.
2. Food Programs. Foodbank of Southeastern Virginia and the Eastern Shore; 2021.
3. Staff. Foodbank of Southeastern Virginia and the Eastern Shore; 2021.
4. About Social Determinants of Health. Social Determinants of Health: Know What Affects Health: Centers for Disease Control and Prevention; 2021.
5. Social Determinants of Health. Healthy People 2030: U.S. Department of Health and Human Services; 2020.
6. Coleman-Jensen A, Rabbit M, Gregory C. Definitions of Food Security. United States Department of Agriculture.
7. Food Insecurity. Healthy People 2030: U.S. Department of Health and Human Services; 2020.
8. Braveman P, Gottlieb L. *The Social Determinants of Health: It's Time to Consider the Causes the Causes of the Causes*. Vol. 129. 2014:19-31.
9. Scribner R, Simonsen N, Leonardi C. The Social Determinants of Health Core: Taking a Place-Based Approach. *American Journal of Preventive Medicine*. 2016;52(1):S13-S19.
10. Institute CHC. Food Insecurity Index. Community Indicators Dashboard: Greater Hampton Roads Connects; 2020.
11. Food Security in Virginia. FeedVA Map Series: FeedVA; 2021.
12. Virginia Roadmap to End Hunger. Virginia.
13. Institute CHC. Projected Food Insecurity Rate. Community Indicators Dashboard: Greater Hampton Roads Connects; 2020.
14. Institute CHC. Food Access Dashboard. Community Indicators Dashboard: Greater Hampton Roads Connects; 2020.
15. Institute CHC. 2021 Demographics. Community Indicators Dashboard: Greater Hampton Roads Connects; 2020.
16. Martin K, Wolff M, Callahan K, Schwartz M. Supporting Wellness at Pantries: Development of a Nutritional Stoplight System for Food Banks and Food Pantries. *Journal of the Academy of Nutrition and Dietetics*. 2018;
17. Schwartz M, Levi R, Lott M, Arm K, Seligman H. *Healthy Eating Research Nutrition Guidelines for the Charitable Food System*. 2020.