Increasing Low-income Residents’ Access to Fresh Produce through a Local Mobile Pantry

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Cover Page Footnote
Laura Wasson is a 2019 honors program graduate with a major in Human Nutrition and Hospitality Innovation with a concentration in Nutrition in the department of Human Environmental Sciences and a minor in Spanish Lawton Lanier Nalley MS, PhD is a professor in the Agricultural Economics and Agribusiness department Mechelle Bailey MS, RDN, LDN, the faculty mentor, is a clinical instructor instructor and Director of the Didactic Program in Dietetics in the Human Environmental Sciences department Laura Hill MS, PhD, RDN, LDN is an instructor in the Human Environmental Sciences department
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Meet the Student-Author

Laura Wasson

Research at a Glance

• This study aims to determine whether mobile pantries are an effective method to reduce food insecurity and increase fruit and vegetable consumption in low-income communities.

• A sample of low-income residents in Washington County, Arkansas was surveyed after receiving a donation from a local mobile produce pantry revealing an improvement in diet after receiving approximately 1–2 cups of fruits and/or vegetables.

• Mobile pantries focused on distributing fresh produce are an effective way to increase low-income community’s fruit and vegetable consumption and meet the USDA Food Patterns recommendations.

After grasping nutrition’s crucial role in overall health and well-being and learning of the disparity in nutrition knowledge and access that spans the globe and even my home state of Arkansas, I knew immediately that I wanted to use my education to minimize this gap.

I wanted to directly impact the local food-insecure community. Networking through the Business College’s Social Innovation Hub, I met Margaret Thomas and Alyssa Snyder, cofounders of Seeds that Feed. They share my passion for food security and use their mobile food pantry to combat food insecurity in Northwest Arkansas. My research with them has allowed them to improve their service to NWA and further support the role of mobile pantries in reducing food insecurity. I shared my research findings at the Academy of Nutrition and Dietetics’ annual conventions (state and national levels) providing a model for others in the field to adopt.

I had the opportunity to travel to Chile where I aided in pediatric nutrition care and to Mozambique where I assisted in poverty and malnutrition relief efforts. I will complete a Dietetic Internship at the Vanderbilt University Medical Center after which I plan to become a Registered Dietitian.

I would like to thank Mechelle Bailey for her investment in my personal and professional development. I also thank Dr. Nalley for assisting me with statistics and data analysis and providing the opportunity to study abroad. I thank Dr. Hill for advising me in my academic pursuits and shaping me to be a professional in the field.

Laura receiving the Outstanding Dietetic Student of the Year (undergraduate) award with her mentor Mechelle Bailey at the Arkansas Academy of Nutrition and Dietetics annual convention.
Increasing low-income residents’ access to fresh produce through a local mobile pantry

Laura Elizabeth Wasson*, Lawton Lanier Nalley†, Mechelle L. Bailey§, and Laura L. Hill‡

Abstract

Seeds that Feed (STF) is a mobile food pantry located in Fayetteville, Arkansas. Seeds that Feed receives produce from local farmers to distribute to residents in low-income housing sites throughout Northwest Arkansas. According to Feeding America, food insecurity affected 14.3% of Washington County, Arkansas’ population in 2016. The purpose of this study was to determine if STF’s model is an effective way to increase individuals’ access to fresh fruits and vegetables and increase their potential to meet the United States Department of Agriculture’s Food Patterns (USDA-FP) for fruit and vegetable consumption. Twenty-three participants from three sites completed the study. A survey was used to collect basic demographics and dietary patterns. A record was taken of what foods each participant received on the survey day including plans for preparation and to whom it would be served. The results indicated that the likelihood to meet the USDA-FP for overall fruit and vegetable intake increased significantly after receiving approximately one cup of fruit and 1.5 cups of vegetables from STF. A positive correlation was found between the number of times participants received produce from STF and participant’s total fruit intake and total intake of the “red/orange” and “other” vegetable subgroups. Therefore, STF’s model appears to be an effective method to increase access to fresh produce. Future research could utilize STF’s model to assess the potential for other supplemental nutrition programs to help low-income residents meet the USDA-FP and reduce food insecurity via mobile pantries.

* Laura Wasson is a 2019 honors program graduate with a major in Human Nutrition and Hospitality Innovation with a concentration in Nutrition in the Department of Human Environmental Sciences and a minor in Spanish.
† Lawton Lanier Nalley is a professor in the Department of Agricultural Economics and Agribusiness.
§ Mechelle Bailey, the faculty mentor, is a clinical instructor and Director of the Didactic Program in Dietetics in the Department of Human Environmental Sciences.
‡ Laura Hill is an instructor in the Department of Human Environmental Sciences.
Introduction

According to the United States’ largest domestic hunger-relief organization, Feeding America, 12.9% of Americans were food insecure in 2016 (Feeding America, 2018). Nunney et al. (2018) defined food insecurity as “the condition of inconsistent or uncertain availability of safe and nutritionally adequate food”. Food insecurity stems from a multitude of factors including income, socio-economic status, race, access, and transportation. Income influences food purchases and thus, is an indicator for predicting dietary patterns (Tsang et al., 2011; Strome et al., 2016; Singleton et al., 2017). Low-income status is commonly associated with a diet greater in energy-dense, highly processed foods with little nutritive value (Dutko et al., 2012; Strome et al., 2016; Nunney et al., 2018). Multiple studies conclude that income is often the limiting factor preventing low-income status populations from purchasing enough fruits and vegetables to meet the Dietary Guidelines for Americans (DGA) set by the USDA (Zepeda et al., 2014; Nunney et al., 2018, USDHHS and USDA, 2015).

The USDA divides vegetables into five subgroups based on their varying nutrient profiles; these subgroups are dark leafy greens, red and orange vegetables, other vegetables, starchy vegetables, and beans and legumes. Only about one-fourth of the population meets the USDA recommendations putting the nation at a deficit for both fruit and vegetable consumption. Regular consumption of fruits and vegetables that meet the recommendation set by the USDA largely influences the progression and prevention of chronic illness; therefore, intervention programs that focus on providing consistent access to affordable, nutrient-dense produce is of utmost concern for the health of our nation (USDA, 2017; Strome et al., 2016; Nunney et al., 2018).

Improving access to fruits and vegetables is a primary factor for increasing consumption. Transportation also is often recognized as one of the largest barriers to accessing fresh produce (Dunn et al., 2011, Tsang et al., 2011). An individual may live within a few miles of a large grocery store, but not having a car limits the quantity one can purchase in a single trip (Strome et al., 2016). Mobile pantries are proven to minimize the gap between residents and available produce. Multiple studies show that the use of a mobile pantry to distribute discounted produce to food insecure, low-income neighborhoods can increase residents’ consumption of fresh fruits and vegetables (Zepeda et al., 2014; Hosler and Kammer, 2015).

In this study, researchers observed the work of a mobile pantry in Northwest Arkansas, Seeds That Feed (STF), in order to determine its effectiveness in increasing fruit and vegetable consumption among low-income residents in Northwest Arkansas. In Washington County Arkansas (the location of the current study), 14.3% of the population was considered to be food insecure in 2016 (Feeding America, 2018). In 2016, three-quarters of residents in Washington County were eligible for food assistance programs based on income (Feeding America, 2018). Seeds That Feed identified multiple low-income housing sites across Northwest Arkansas to deliver fresh produce to its food-insecure residents. This study aimed to determine if STF’s mobile pantry was effective in increasing access to fresh produce for food-insecure residents in Northwest Arkansas. Related trends and barriers were also assessed.

Materials and Methods

Upon receiving approval from the University of Arkansas’ Institutional Review Board (IRB), a survey was created through the software Qualtrics (Qualtrics LLC, Provo, Utah) and distributed to participants at three of STF’s mobile pantry donation sites on three separate days. These sites included a senior citizen assisted-living apartment complex, a low-income family housing complex, and the Springdale, Arkansas Women, Infants and Children (WIC) clinic. Seeds That Feed receives its produce from farmers and some food stores in Northwest Arkansas who have agreed to donate a portion of their produce and other food items to the mobile pantry. Seeds that Feed then delivers these food items to partnering low-income housing complexes in Northwest Arkansas at no cost to its residents. The researchers accompanied STF staff to distribution sites where participants were allowed to take as little or as much produce as they wanted. Participants were considered eligible for the study after collecting produce from STF and were recruited on a volunteer basis resulting in a convenience sample of 23 total participants. Researchers approached participants after they received their produce collection to explain the survey, request their participation, and receive their verbal consent before distributing the survey.

Two of the observed sites had consistently received donations from STF preceding this study. Because most of the participants from the first two locations, the senior citizen assisted-living apartment complex and the low-income family housing, were returning customers, these participants were informed in advance that STF would be conducting a survey at the visit and that their participation was a way to “return the favor” to STF and help STF serve them better. However, it was made clear to all participants there were no penalties for not participating. The WIC clinic and its members had no prior relationship with STF leading up to this study. Participation was completely voluntary and thus, participants were able to exit the survey at any time without any consequences.

Data collected included a range of basic demographics information. Data collected also included a food frequency record, and how frequently returning customers received
produce from STF. Participants were also asked to indicate where they shopped for food, what barriers they faced when trying to access food, and what, if any, supplemental nutrition program(s) they used. Lastly, participants were asked to specify what produce they received on that day from STF.

The survey was used to determine each participant's average dietary intake in relation to the USDA-FP for their respective age and gender. These data revealed participants' average dietary intake of fruits, vegetables, and vegetable subgroups as well as the potential increase in their dietary intake of fruits, vegetables, and vegetable subgroups after receiving the produce from STF.

Each participant's answers to the food frequency record were recorded and standardized as a one-cup serving size for fruit and vegetable subgroups. Servings were standardized to one cup in order to correlate with the measurements utilized by the USDA-FP for fruit and vegetable servings. Participants' answers to the food frequency record portion of the survey were compared to the USDA-FP to determine if their average weekly fruit and vegetable intake met or fell below the USDA-FP before receiving a donation from STF according to their age and gender (USDA, 2017). When determining whether individual participants met the USDA-FP, gender and age were taken into account. Participants also recorded the foods they received, how they intended to prepare them, and the number of children and adults to whom they would be served. These responses were then analyzed and factored into participants’ answers from the food frequency record. These data were used to determine if each participant's potential to meet the USDA-FP increased after receiving a donation from STF and to what degree. These outcomes and correlations were determined using Microsoft Excel.

### Results and Discussion

The goals of this study were to collect data related to participants’ diet and barriers in accessing fresh produce so that STF and other mobile pantries may expand upon their services to reduce food insecurity. Specifically, the study aimed to determine if there was a correlation between demographics and the amount of fresh produce consumed by STF participants. Further, the study wanted to determine if STF’s mobile pantry was effective in increasing access to fresh produce for food-insecure residents in Northwest Arkansas. Lastly, the study set out to determine if the number of times a participant has received donations from STF positively correlated with their consumption of fresh produce. The results from this study can be used by STF, other mobile food pantries, policymakers and advocates to better understand the impacts that mobile food pantries can have on increasing fruit and vegetable consumption.

According to participants’ self-reported answers to the food frequency record, none of the USDA-FP of the fruit and vegetable groups represented in the study were met by all of the participants (Table 1). In other words, at least one—and in most cases more than one—participant fell short of the USDA-FP for every fruit and vegetable group represented in the study. Twenty-one of the 23 (91%) participants did not meet the USDA-FP for one or more of the fruit and vegetable groups represented in this study. In fact, on average, participants did not meet the USDA-FP for three of the seven fruit and vegetable groups, and at the low-income family housing location, the average was four out of seven fruit and vegetable groups unmet.

Participants received approximately 1 cup of fruit total and 1.5 cups of vegetables total from STF. From these

<table>
<thead>
<tr>
<th>Vegetable subgroups</th>
<th>Total fruit</th>
<th>Leafy green vegetables</th>
<th>Other vegetables</th>
<th>Red/orange vegetables</th>
<th>Starchy vegetables</th>
<th>Beans and legumes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percent (%) of participants meeting USDA-FP consumption goal</strong></td>
<td>49</td>
<td>57</td>
<td>91</td>
<td>61</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td><strong>Before</strong></td>
<td>49</td>
<td>57</td>
<td>91</td>
<td>61</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td><strong>After</strong></td>
<td>57</td>
<td>61</td>
<td>91</td>
<td>74</td>
<td>22</td>
<td>-</td>
</tr>
<tr>
<td><strong>Increase</strong></td>
<td>8</td>
<td>4</td>
<td>No change</td>
<td>13</td>
<td>No change</td>
<td>NA</td>
</tr>
</tbody>
</table>

*NA indicates that this vegetable group was not donated by STF during the study.*
amounts alone, the participants’ potential to meet the USDA-FP for total fruit, total vegetable, leafy green vegetables, other vegetables, red/orange vegetables increased by 10%, 9%, 66%, 38%, and 21%, respectively (Table 2). Vegetables from the subgroups starchy vegetables and beans and legumes were not donated during this study; therefore, no data could be gathered regarding either of those vegetable subgroups. This means that after receiving approximately one cup of fruit and/or approximately 1.5 cups of vegetables, participants’ potential to meet the USDA-FP increased on average by 9% for total fruit and 10% for total vegetables. Likewise, for each participant who received approximately one cup of vegetables from the vegetable subgroups leafy greens, other vegetables, and red/orange vegetables experienced a 66%, 38%, and 21% increase, respectively, in their potential to meet the USDA-FP. This information was gathered by comparing individuals’ responses to the food frequency record with each food item they received and the amount that they indicated they would eat themselves.

Before receiving a donation from STF during the study period, the percentage of participants who met the USDA-FP for total vegetable, total fruit, leafy green vegetables, other vegetables, red/orange vegetables, starchy vegetables, and beans and legumes was calculated at 49%, 57%, 91%, 61%, 22%, 30%, and 70%, respectively (Table 1). After receiving a donation, the percentage of participants who had the potential to meet the USDA-FP for total vegetables, total fruit, and other vegetables increased by 8%, 4%, and 13%, respectively. Consequently, 57%, 61%, and 74% of participants had the potential to meet the USDA-FP for total vegetable, total fruit, and other vegetables, respectively after receiving a donation from STF (Table 1). There was no percentage change for leafy green vegetables or red/orange vegetables, as donations were not large enough to lift participants to meeting nutrition targets set by the USDA. Nonetheless, the potential to meet the targets did increase as shown in Table 2.

Nine participants (39% of total) received a donation(s) from STF prior to the study. Two participants had received over 24 donations, three participants had received 6 to 8 donations, and four participants had received 1 to 4 donations (Table 3). The categories of total fruit and other vegetables appeared positively correlated with the number of times participants had received a donation from STF. Those who received more donations from STF were more likely to have met the USDA-FP for total fruit and other vegetable intake (Table 3). Due to the small number of participants represented in this study, more research is required to determine the validity of this conclusion.

| Table 2. Average percentage increase in participants’ potential to meet the United States Department of Agriculture Food Patterns for each fruit and vegetable group after receiving a donation from Seeds That Feed. |
|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Vegetable subgroups |                  |                  |                  |                  |                  |                  |                  |
| Percentage         | Total vegetable | Total fruit     | Leafy green vegetables | Other vegetables | Red/orange vegetables | Starchy vegetables | Beans and legumes |
| Average increase in potential to meet the USDA-FP | 10% | 9% | 66% | 38% | 21% | NAa | NAa |

a NA indicates that this vegetable group was not donated by Seeds That Feed during the study.

| Table 3. Relationship between the number of times participants received a donation from Seed That Feed (STF) and if they met the United States Department of Agriculture Food Patterns (USDA-FP). |
|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Vegetable subgroups |                  |                  |                  |                  |                  |                  |                  |
| # of times participants received donations from STF | Number of participants | Total vegetables | Total fruit | Leafy green vegetables | Other vegetables | Red/orange vegetables | Starchy vegetables | Beans and legumes |
|                  |                  |                  |                  |                  |                  |                  |                  |                  |
| >24               | 2                | 50               | 50               | 100             | 100             | 50              | 0               | 0               |
| 6-8               | 3                | 0                | 33               | 100             | 67              | 0               | 67              | 33              |
| 1-4               | 4                | 50               | 25               | 100             | 50              | 25              | 0               | 50              |

Percent (%) of participants meeting USDA-FP consumption goal
Conclusions

This study found that mobile food pantries, even small ones like STF, can have substantial impacts on fruit and vegetable intake among the low-income community. Supplemental nutrition programs that prioritize distributing fresh produce to food-insecure families and individuals via mobile pantry have the potential to increase the low-income population’s ability to obtain the USDA-FP recommendations for several fruit and vegetable categories. Even in seemingly affluent areas like Washington County, Arkansas, food insecurity is abundant. This study showed that mobile food pantries are part of a larger solution to help the most vulnerable increase food security while simultaneously providing healthy foods to increase holistic well-being. While mobile food pantries like STF are not the solution to hunger and malnourishment alone, this study shows that they can play an important role in assisting in lowering food insecurity and ensuring that underserved communities can achieve a nutritious diet by making produce more affordable and accessible.

Literature Cited