Article

Differences in Farmers’ Market Patronage among Participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

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Abstract: In the United States, there is a high prevalence of diet-related diseases in low-income communities that lack access to fresh produce. Greater access to local farmers’ markets may affect individual and household intake of fruits and vegetables. However, barriers to farmers’ market access remain. The purpose of this study is to evaluate the differences between participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) who regularly shop at farmers’ markets and those who do not. We found that regular farmers’ market shoppers tended to consume on average more fruits and vegetables than WIC participants who did not regularly shop at farmers’ markets. Differences in the importance of various store or market characteristics, barriers to fruit and vegetable consumption, and fruit and vegetable procurement methods were also found.

Keywords: farmers’ markets; fruit and vegetable intake; low-income consumers; WIC

1. Introduction

In the United States, only 10% of adults meet recommended vegetable intake levels and only 12.3% of adults eat the recommended number of fruit servings on a daily basis [1]. This is a concern because suboptimal diets with low levels of fruit and vegetable intake are correlated with an increased risk for the development of several chronic diseases, including cardiovascular disease [2], cancer [3], and diabetes [4]. The importance of fruit and vegetable consumption is further underscored by emerging research that has found a linkage between a diet rich in fruits and vegetables and favorable gut bacterial composition and diversity [5]. In addition, researchers have identified that changes in gut microbiome composition occur in certain diseases like irritable bowel syndrome [6]. Although firm evidence regarding the precise health implications of gut bacterial diversity and composition is yet to be established [5], these findings contribute to our understanding of the complex health challenges associated with nutritionally inadequate dietary intake. As a result, some researchers have called upon policy makers to consider nutrition security equity in the development of U.S. food policies [7].

Nutrition equity and security are particularly important because members of U.S. minority racial and ethnic groups face a disproportionately high burden of preventable disease [8]. Higher rates of diabetes, cardiovascular disease, and hypertension are found among Hispanic, African American, and low-income populations [9–11]. These chronic diseases, as well as an overweight and obese-weight status, are associated with diverse causal factors, but the risk of developing these diseases can be partially mitigated by following a healthy diet and regularly consuming an adequate amount of fruits and vegetables [12].
One factor that explains this disproportionate disease burden is the legacy of systemic racism and its role in influencing the relationship between urban development and the built environment [13,14]. Many communities across the United States lack sufficient access to fresh produce due to historical processes that have produced inequality within diverse food environments [15–17]. These communities often face challenges associated with food deserts, where the availability of nutritious and affordable food options is limited [18]. In fact, some food environments have even been designated as “obesogenic”, meaning that their built and social environments contribute to obesity [19]. Such food environments have a high availability and affordability of calorie-dense, low-nutrition foods while nutritious and healthy foods, such as fresh fruits and vegetables, are less accessible and affordable [20,21]. One study revealed that obesogenic environments can be more predictive of obesity than the mere presence of food deserts [18]. Another study has shown that there is an association between living in an obesogenic food environment and developing cardiovascular disease (CVD), and this link is partially explained by one’s health behaviors and physiological state [21]. Living in an obesogenic food environment may limit a person’s ability to make healthy choices, resulting in the development of chronic disease.

In the U.S., these environments exist largely in low-income, non-White neighborhoods, both urban and rural, with higher rates of food insecurity, lower access to supermarkets, and greater access to convenience or small grocery stores [22,23]. Residents of such communities have been shown to eat below the daily recommended amount of fruits and vegetables and show higher levels of obesity [20,22–24]. These communities often lack supermarkets and contain a high density of fast-food restaurants and convenience stores that do not offer healthy food options [16,17,25]. One study conducted in New York City showed that nearly all of the 13,000 study subjects lived within a half mile of at least one unhealthy food outlet, and the average density of such food stores was 31 stores per square kilometer [17]. These unhealthy food outlet options in low-income neighborhoods have been known to dedicate the smallest amount of shelf space to fruits and vegetables and the largest amount to unhealthy snack foods when compared to grocery stores and supermarkets [25]. Negative reports of observed and perceived access to fresh produce as well as produce quality in these unhealthy food outlets have been noted [20,26]. Conversely, predominantly white, food-secure, and middle-to-high-income areas tend to have greater access to supermarkets with higher quality fresh produce, low-fat dairy products and snacks, lean meats, and high-fiber bread [17,20,22,24].

Farmers’ markets are one kind of intervention to impact the food environment of low-income communities on a local level. Perceived farmers’ market access has been found to be associated with a lower prevalence of overweight and obesity [20]. Because farmers’ markets are relatively inexpensive to establish and have low overhead costs as compared to retail establishments, they provide an ideal structure to serve the nutrition needs of low-income communities with low access to fresh fruits and vegetables. However, considerable barriers hamper farmers’ market patronage among low-income consumers, including accessibility [27]; transportation constraints [28–31]; perception of high prices or prices that do not compete with those of supermarkets [28,29,32,33]; inconvenient opening hours or location [28,29,31,32]; and limited product selection when compared to grocery stores [28,29].

The necessity to overcome these barriers and encourage fruit and vegetable consumption has led to modifications in federal food and nutrition programs to allow participating farmers’ markets and market vendors to accept federal food assistance benefits [28,34] and to the creation of incentive programs to improve access to fresh produce in low-income communities [35]. The U.S. federal government provides two major federal programs to assist low-income families and individuals with food procurement. The Supplemental Nutrition Assistance Program (SNAP) provides benefits to low-income families to assist with purchasing eligible foods [36]. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) serves low-income pregnant, breastfeeding, and non-breastfeeding
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postpartum women, and infants and children up to the age of five [37]. Within WIC is the Farmers’ Market Nutrition Program (FMNP), which provides WIC participants with vouchers to buy eligible foods from approved farmers, farmers’ markets, or roadside stands [38]. Even with these federal assistance programs, farmers’ markets remain inaccessible to many low-income and at-risk communities. One study [39] evaluated the Farmers Market Access Project in nine lower-income regions in King County, Washington. The project aimed to improve access to farmers’ markets for nutrition assistance program beneficiaries. The intervention provided subsidized electronic benefit transfer (EBT) terminals for SNAP processing and allowed vendors to accept WIC vouchers. Results showed a 79% increase in market stalls accepting SNAP, with 38 out of 88 WIC-eligible vendors accepting vouchers. However, low redemption rates were observed despite vendors expressing a willingness to serve SNAP and WIC shoppers. Additionally, another study [40] conducted in New Jersey found that the organic farmers who accepted payment via WIC or SNAP were not more likely to sell in lower-income communities, and fewer organic farmers compared to non-organic counterparts accepted payments through these nutrition assistance programs.

Various healthy food incentive programs aim to further improve access. Such programs include Market Match in California [32], Double Up Food Bucks [41,42], Food on the Move in Rhode Island [43], and the Produce Plus Program in D.C. [44]. These programs provide incentives such as coupons, vouchers, and dollar-for-dollar matching of food assistance benefits to be used at participating farmers’ markets or other produce retail venues. These incentives have effectively motivated participants to purchase from farmers’ markets by “stretching” their food assistance benefits, mitigating the cost of produce, and decreasing overall worry about the cost of food [33,42]. Some of these programs also offer nutrition education classes, educational materials, and other activities [45–47]. Many of these incentive programs have succeeded in bringing new, low-income consumers to farmers’ markets who otherwise would have not shopped there [32,41,48]. One study found that women were more willing to shop at farmers’ markets if they were close to home, but they became more willing to travel a longer distance to a farmers’ market that offered greater savings when compared to a supermarket [30].

Despite the existence of documented barriers, researchers have found that farmers’ market patronage along with incentive program participation is associated with increased fruit and vegetable consumption [41–43,46,48–53]; the temporary alleviation of food insecurity [50]; an increased sense of financial autonomy and dignity [41,47]; an increased sense of social and community connection [29,41,47,50]; and increased nutritional knowledge and skills for both adults and children [29,47,50]. These benefits seem to increase along with the frequency of farmers’ market patronage. Despite these benefits, there tends to be a lack of knowledge about WIC, FMNP, or SNAP redemption possibilities [28] as well as a lack of awareness of incentive programs [31].

The purpose of this study is to evaluate the differences between regular farmers’ market shoppers’ and other consumers among a sample of WIC participants. Differences in participant demographics, fruit and vegetable procurement and consumption practices, and FMNP participation are examined.

2. Materials and Methods

This research utilized a cross-sectional survey design with a non-randomized, convenience sampling method targeting WIC participants at two clinics in Northern New Jersey. The survey was conducted using an electronic tablet (i.e., an iPad) with the Qualtrics Survey Software offline tablet application and took approximately 10-to-15 min to complete. To recruit participants, a plea was given to individuals in two WIC office waiting rooms during opening hours. Both the plea and survey were written in English and Spanish. Incentives were offered to participants, including a snack, stickers for children, and an opportunity to enter a gift card drawing to a local supermarket. After conducting the in-person plea, a researcher administered the survey. Participation in the WIC program was considered to be the inclusion criteria. Contact information for the gift card drawing
was entered into a separate survey. Data were collected between the months of October 2017 and January 2018. Institutional Review Board approval was granted from Montclair State University prior to beginning data collection.

The survey was divided into three parts. The first section assessed fruit and vegetable procurement and consumption practices and values. The second section of the survey included questions on FMNP participation for 2017 and previous seasons. The third section included demographic characteristics such as age, gender, education level, race/ethnicity, and employment status.

In the first section, questions covered where and how often individuals shop for fresh fruits and vegetables between the months of June and November, the time period when FMNP vouchers are valid. Another question covered the types and number of transportation modes usually used to get to the store or market. The importance of store or market characteristics, such as opening hours, location, accessibility, and measures of convenience, were assessed on a 5-point Likert Scale (1 = Very Unimportant to 5 = Very Important). Survey respondents ranked fruit and vegetable consumption in two ways, which were adapted from previous research [54]. They were asked to indicate average fruit and vegetable consumption on a scale of None, Less than One, One, Two, Three, etc. In addition, they were asked to identify the number of servings of fruits and vegetables they consumed in the past 24 h (0, 1, 2, 3, etc.). Additionally, a self-reported evaluation of the health of their diet was obtained, including rankings of Poor, Fair, Good, Very Good, and Excellent. Participants were asked to rank common barriers of fruit and vegetable procurement and consumption. The survey tool was developed and pre-tested to elicit feedback and to estimate response rates. It was also reviewed for face validity.

Results were exported into the IBM Statistical Package for Social Sciences (SPSS) Version 25 for analysis. Participants were separated into two groups based on their survey responses: Farmers’ Market Users (FM Users), which included those who reported usually shopping for fresh fruits and vegetables at farmers’ markets, farm stands, or mobile farmers’ markets, and Non-Farmers’ Market Users (Non-FM Users), which included those who did not report usually shopping at those outlets for fresh fruits and vegetables. Frequency distributions and one-way ANOVA were used to analyze demographic data, fruit and vegetable purchasing and consumption behaviors, and store and market characteristics valued by respondents. Independent t-tests were performed to assess differences in fruit and vegetable consumption across the two groups. Frequency distributions and independent t-tests were conducted to compare these two groups. Additionally, Spearman’s rank correlation was performed on the whole sample to determine if there were associations between participants’ shopping preferences for fruits and vegetables with their age category and level of education. All significance levels were set at 0.05.

3. Results

Survey responses were collected from 520 participants. Due to incomplete responses, 25 surveys were not included in the analysis. The final number of survey participants included 234 FM Users and 261 Non-FM Users. When comparing demographic characteristics, such as age, highest level of education, and employment status, significant differences between FM Users and Non-FM Users were only found for race/ethnicity and age groups (see Table 1).

Participants were asked to describe the overall health of their diet on a 5-point scale of 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, and 5 = Excellent. A statistically significant difference was found between FM Users and Non-FM Users ($p = 0.026$), with FM Users (2.85) having better perceptions of their own dietary health than Non-FM Users (2.65) (See Table 2). To evaluate fruit and vegetable consumption, participants were asked to provide their number of servings consumed over the last 24 h. A statistically significant difference was found between FM Users’ and Non-FM Users’ fruit consumption ($p = 0.014$), with FM Users consuming more servings of fruits (Mean = 2.30) than Non-FM Users (Mean = 1.93). The difference between the two groups’ vegetable consumption was not
statistically significant (FM Users’ Mean = 1.92; Non-FM Users’ Mean = 1.67; \( p = 0.077 \)).
The difference between FM Users and Non-FM Users was statistically significant for both
average fruit (\( p = 0.001 \)) and vegetable (\( p = 0.039 \)) consumption. On average, FM Users
consumed more servings of fruit (Mean = 2.03) and vegetables (Mean = 1.71) than Non-FM
Users (Mean = 1.74 and 1.52, respectively).

Table 1. Demographic characteristics of the study participants separated between Farmers’ Market
Users and Non-Farmers’ Market Users.

<table>
<thead>
<tr>
<th>Age</th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 24 years old</td>
<td>19% (41)</td>
<td>24% (59)</td>
<td>0.054</td>
</tr>
<tr>
<td>25–34 years</td>
<td>47% (104)</td>
<td>52% (130)</td>
<td></td>
</tr>
<tr>
<td>Over 35 years</td>
<td>34% (76)</td>
<td>24% (59)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman</td>
<td>95% (211)</td>
<td>98% (244)</td>
<td>0.121</td>
</tr>
<tr>
<td>Man</td>
<td>5% (10)</td>
<td>2% (5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian/Pacific Islander</td>
<td>3% (7)</td>
<td>0% (0)</td>
<td>0.014</td>
</tr>
<tr>
<td>Black or African American</td>
<td>15% (33)</td>
<td>23% (57)</td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>74% (160)</td>
<td>70% (174)</td>
<td></td>
</tr>
<tr>
<td>Native American or Indian American</td>
<td>1% (1)</td>
<td>0% (0)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>4% (9)</td>
<td>5% (12)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3% (7)</td>
<td>2% (5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Highest Level of Education</th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than High School</td>
<td>14% (31)</td>
<td>11% (24)</td>
<td>0.489</td>
</tr>
<tr>
<td>High School Graduate, Diploma, or the equivalent (GED)</td>
<td>44% (95)</td>
<td>54% (116)</td>
<td></td>
</tr>
<tr>
<td>Post-High School Education, No Degree</td>
<td>28% (62)</td>
<td>35% (74)</td>
<td></td>
</tr>
<tr>
<td>College Degree or More</td>
<td>14% (30)</td>
<td>15% (32)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed Full Time</td>
<td>22% (49)</td>
<td>22% (55)</td>
<td>0.728</td>
</tr>
<tr>
<td>Employed Part Time</td>
<td>13% (29)</td>
<td>16% (39)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>65% (143)</td>
<td>62% (155)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FMNP Redemption Status</th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not receive vouchers</td>
<td>23% (53)</td>
<td>39% (99)</td>
<td>0.000</td>
</tr>
<tr>
<td>Received Vouchers</td>
<td>77% (176)</td>
<td>61% (157)</td>
<td></td>
</tr>
<tr>
<td>Redeemer</td>
<td>87% (153)</td>
<td>48% (75)</td>
<td></td>
</tr>
<tr>
<td>Non-Redeemer</td>
<td>12% (21)</td>
<td>51% (80)</td>
<td></td>
</tr>
</tbody>
</table>

N corresponds to the sample size for each category.

Table 2. Participants’ characteristics (Farmers’ Market Users and Non-Farmers’ Market Users) and
dietary health.

<table>
<thead>
<tr>
<th></th>
<th>Farmers’ Market Users</th>
<th>Non-Farmers’ Market Users</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived health of diet</td>
<td>2.85</td>
<td>2.65</td>
<td>0.026</td>
</tr>
<tr>
<td>Serving of fruits in the last 24 h</td>
<td>2.30</td>
<td>1.93</td>
<td>0.014</td>
</tr>
<tr>
<td>Serving of vegetables in the last 24 h</td>
<td>1.92</td>
<td>1.67</td>
<td>0.077</td>
</tr>
<tr>
<td>Average daily servings of fruits</td>
<td>2.03</td>
<td>1.74</td>
<td>0.001</td>
</tr>
<tr>
<td>Average daily servings of vegetables</td>
<td>1.71</td>
<td>1.52</td>
<td>0.039</td>
</tr>
</tbody>
</table>

Values are expressed as the mean.

The importance of various store or market characteristics when shopping for produce
was assessed on a 5-point Likert Scale, with 1 = Very Unimportant, 2 = Unimportant,
3 = Neutral, 4 = Important, and 5 = Very Important. The characteristics that were significantly more important to FM Users than to Non-FM Users were low/discounted prices at the store ($p = 0.008$); open on weekends ($p = 0.014$); and the availability of locally grown produce at the store ($p = 0.025$). One factor that was significantly more important to Non-FM Users (3.91) than to FM Users (3.55) was the availability of non-food items at the store ($p = 0.004$). Additionally, for the whole sample, the degree of importance of various store/market characteristics when shopping for produce were correlated with age category and education level (See Table 3). Notably, while age group exhibited no statistical significance in its correlation with the degree of importance of various store/market characteristics, education level demonstrated some significant results. Specifically, as education level increased, respondents’ level of importance of the following store/market characteristics decreased in a statistically significant manner: the possibility of redeeming WIC vouchers at the store ($-0.091$, $p = 0.049$); the possibility of using food stamps (SNAP) at the store ($-0.267$, $p = 0.000$); the availability of locally grown produce at the store ($-0.115$, $p = 0.014$); the delivery options available ($-0.333$, $p = 0.000$). Various barriers to fruit and vegetable consumption were evaluated using a scale of 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The only barrier where the difference between FM Users and Non-FM Users was statistically significant was that Non-FM Users (2.12) were more likely than FM Users (1.78) to agree that vegetables are time consuming to prepare ($p = 0.000$). However, it is important to note that both groups expressed a high level of disagreement with this statement.

Table 3. Correlation between age group and education level with participants’ preferences when shopping for fruits and vegetables.

<table>
<thead>
<tr>
<th>Shopping Preferences</th>
<th>Age Group Correlation (N)</th>
<th>$p$-Value</th>
<th>Education Level Correlation (N)</th>
<th>$p$-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of multiple food items at one store</td>
<td>0.015 (469)</td>
<td>0.743</td>
<td>0.001 (464)</td>
<td>0.981</td>
</tr>
<tr>
<td>Possibility of redeeming WIC vouchers at the store</td>
<td>-0.030 (468)</td>
<td>0.512</td>
<td>-0.091 (463)</td>
<td>0.049</td>
</tr>
<tr>
<td>Low/discounted prices at the store</td>
<td>0.029 (470)</td>
<td>0.529</td>
<td>-0.079 (464)</td>
<td>0.087</td>
</tr>
<tr>
<td>Open on weekends</td>
<td>0.022 (470)</td>
<td>0.629</td>
<td>-0.030 (464)</td>
<td>0.517</td>
</tr>
<tr>
<td>Proximity of the store to my home</td>
<td>0.063 (468)</td>
<td>0.173</td>
<td>-0.036 (463)</td>
<td>0.440</td>
</tr>
<tr>
<td>Possibility of using food stamps (SNAP) at the store</td>
<td>-0.089 (462)</td>
<td>0.056</td>
<td>-0.267 (457)</td>
<td>0.000</td>
</tr>
<tr>
<td>Availability of locally grown produce at the store</td>
<td>0.000 (467)</td>
<td>0.997</td>
<td>-0.115 (462)</td>
<td>0.014</td>
</tr>
<tr>
<td>Late opening hours (until 10 pm)</td>
<td>0.057 (470)</td>
<td>0.216</td>
<td>-0.004 (464)</td>
<td>0.931</td>
</tr>
<tr>
<td>Ease of access/parking</td>
<td>0.002 (465)</td>
<td>0.974</td>
<td>0.162 (460)</td>
<td>0.000</td>
</tr>
<tr>
<td>Availability of non-food items at the store</td>
<td>-0.084 (469)</td>
<td>0.068</td>
<td>-0.056 (463)</td>
<td>0.228</td>
</tr>
<tr>
<td>Delivery options available</td>
<td>-0.055 (463)</td>
<td>0.240</td>
<td>-0.333 (458)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

$N$ corresponds to the sample size for each shopping preference according to age and education.

Fruit and vegetable procurement was evaluated in two ways: the total number of places shopped for fruits and vegetables, and the total number of transportation methods used to purchase fruits and vegetables. Each of these measures were evaluated from the months of June to November, the main farmers’ market season in NJ. The difference between the total number of different types of retail outlets that FM and Non-FM Users
shopped for produce was statistically significant ($p = 0.024$). FM Users were more likely to shop at different types of places for produce on average (Mean = 2.106) than Non-FM Users (Mean = 1.897). Lastly, the difference between FM and Non-FM Users’ total number of transportation methods utilized was statistically significant ($p = 0.000$), with FM Users (Mean = 1.40) being more likely to utilize different types of transportation than Non-FM Users (Mean = 1.19).

The WIC FMNP redemption status of participants was evaluated. Seventy-seven percent of FM Users and sixty-one percent of Non-FM Users reported receiving FMNP vouchers. Of those that received vouchers, eighty-seven percent of FM Users and forty-eight percent of Non-FM Users reported redeeming their vouchers.

4. Discussion

Differences between the demographics of FM Users and Non-FM Users in age were found, with more FM Users being over 35 years of age. This mirrors previous research that found that farmers’ market shoppers are most likely to be female and middle-aged [55–58]. We found no significant differences between groups when comparing the highest level of education and employment status. This is consistent with other studies that have found that shoppers and non-shoppers of farm-to-consumer retail outlets, such as farmers’ markets, are similar with respect to employment status [56] or level of education [59].

Another difference between FM Users and Non-FM Users was the overall perceived health of their diet and their fruit and vegetable consumption practices. This study found that FM Users are more likely to have a better perception of their overall dietary health than Non-FM Users. Other studies have found similar results, with shoppers agreeing that going to a farmers’ market positively affected their health and fruit and vegetable consumption [44,48,50,60–62]. In other research, farmers’ market shoppers had increased odds of consuming five or more servings of fruits and vegetables per day than non-shoppers [59]. In addition, existing research on both low- and middle-income farmers’ market customers has found that those who shop for fruits and vegetables more frequently at farmers’ markets tend to purchase a greater variety and have a higher intake of fruits and vegetables [41,53,60,63]. Interestingly, factors such as self-efficacy in fruit and vegetable preparation and perceptions of the quality of produce available at farmers’ markets were significant differentiators. Non-FM Users exhibited notably lower levels of self-efficacy compared to FM Users in previous research [61], indicating a reduced confidence in preparing fresh green or root vegetables. Additionally, this group held less favorable views on the quality of fruits and vegetables at FMs compared to those available at other food stores. Finally, another study documented changes in measurable health-related outcomes among participants in a farmers’ market fruit and vegetable prescription program at a federally qualified health center [64]. Focusing on low-income individuals with type 2 diabetes, this study showed that the implementation of the Fresh Prescription program improved participants’ hemoglobin A1C levels [64].

The importance placed on certain food store characteristics also differed between FM Users and Non-FM Users in this study. FM Users tended to value low or discounted prices, markets being open on weekends, and the availability of locally grown produce. Results from the literature regarding farmers’ market prices are conflicting, with some studies indicating that consumers report fair or low prices, while in other studies, shoppers report that prices were too high or not competitive with supermarkets [55,65,66]. In previous research, consumers also valued the ability to use food assistance benefits [29,56,65,66]. Similarly, limited hours of market operation have been seen as a barrier to farmers’ market use in many studies. Consumers described market hours as limiting and conflicting with their schedules [33,56,65,67].

Another significantly valued market characteristic by FM Users in our study was the availability of locally grown produce. Local produce and other products are a main feature of farmers’ markets as well as the ability to interact with local producers. The opportunity to support local agriculture is a large motivator of farmers’ market use and is often associated
with the availability of fresh food, high-quality food, organic and pesticide-free foods, and health foods [55–57]. The only store/market characteristic that was more important in a statistically significant manner to Non-FM Users than to FM Users was the availability of non-food items at a store. The importance of this factor can be due to the convenience of one-stop shopping that is not available at farmers’ markets [67,68]. In one study [69], the availability of non-food items was mentioned by food shoppers as one of their main reasons for choosing their primary food store.

Barriers to fruit and vegetable intake were also evaluated in this study. Non-FM Users reported feeling that vegetables are time consuming to prepare significantly more than FM Users. This attitude has been expressed by low-income mothers who have multiple responsibilities, including work, school, childcare and household chores [70]. These factors contribute to time poverty, which negatively impacts their ability to plan, shop, prepare, and consume a variety of healthy meals. The availability of convenience foods may also play a role in this finding. Low-income women and primary food shoppers often perceive canned or frozen produce to be more convenient than fresh produce due to limited cooking skills, longer shelf life, and being overall more economically practical than fresh produce [62,71]. When compared to non-shoppers, farmers’ market shoppers tend to be more involved in cooking and are more likely to enjoy cooking [56]. However, in previous research, some shoppers found that farmers’ markets did not provide the cooking and nutrition knowledge or personal food preferences that they were looking for [66]. This lack of knowledge on how to cook with fresh vegetables may contribute to the attitude that they are time consuming to prepare.

Another practice that was different between FM Users and Non-FM Users was the number of stores that they frequent for produce, with FM Users shopping at more types of locations than Non-FM Users. Past studies have found that farmers’ market shoppers tend to shop at more locations for produce, such as supercenters and supermarkets in addition to farmers’ markets [53,56]. This may be due to various barriers of inconvenience associated with shopping at a farmers’ market, such as the need to make an extra trip to stop at the farmers’ market and their lack of non-food items. Convenience has been emphasized as an important factor when shopping for fruits and vegetables for low-income households, with a preference to shop in one location for all food items [68]. Another factor to consider is the limited types of food that can be purchased at a farmers’ market. In a study by Dubowitz et al., it was found that low-income mothers choose the types of stores they visit, and their frequency of shopping, based on the availability of staple items on sale [70]. This method of shopping has been identified as an adaptive strategy for low-income women to be able to purchase high-quality products at the lowest prices in desirable stores [72].

Our research found differences in transportation usage between FM Users and Non-FM Users. FM Users were more likely to utilize more than one mode of transportation when food shopping. In another study on low-income shoppers who frequent community food sources, such as farmers’ markets, researchers showed that these shoppers traveled using multiple forms of transportation including someone else’s vehicle, bus, taxi, bicycle, or by walking [73]. In another study conducted in low-income neighborhoods in New York City, researchers found that most shoppers walked to their usual supermarket, and used a personal car, bus, train, cab or walked to supermarkets outside their neighborhoods [74]. A lack of transportation is a significant barrier to attending farmers’ markets [65–67,70,71]. The availability of multiple transportation options also varies based on region. One study found that women living in the city of Boston reported easier access to a wide range of stores due to a variety of transportation options in the city, while women in less urbanized parts of Western Massachusetts reported difficulty as they had to rely on cars to get to a store [70]. These findings suggest that FM Users may have access to more modes of transportation in order to attend farmers’ markets outside of their neighborhoods.

Finally, our research found that of those who received WIC FMNP vouchers, 87% of FM Users and 48% of Non-FM Users reported redeeming their vouchers. The redemption rate for Non-FM Users closely matched the overall FMNP redemption rate in New Jersey,
which was 47.9% in 2014 [75]. However, the discrepancy between FM User redemption rates and Non-FM User redemption rates shows that FMNP vouchers may not have provided a sufficient incentive to make Non-FM Users into habitual shoppers.

**Strengths and Limitations**

This study has at least five limitations. First, it was a cross-sectional study as part of a larger project on FMNP redemption barriers that did not measure changes over time [76–79]. Second, this study utilized a non-randomized, convenience sampling methodology, which may also introduce bias and limits generalizability. Third, only WIC participants were surveyed, and surveys were conducted at only two WIC offices. Therefore, this population is not representative of all low-income shoppers. Fourth, all data were self-reported because it was not feasible to verify actual fruit and vegetable intake or FMNP redemption information. Fifth, this study was conducted before the coronavirus pandemic. Although the pandemic has appeared to subside, it had a significant impact on food insecurity [80], food procurement practices [81], and local food markets [82]. Future research could utilize more detailed and validated measures of fruit and vegetable intake and track health outcomes over time.

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