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Effectiveness of a SNAP-Ed nutrition education booth at farmers markets

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Abstract

Many farmers markets are now accepting federal nutrition assistance benefits through programs such as the Supplemental Nutrition Assistance Program (SNAP), allowing program participants to use their benefits for purchasing locally grown fruits and vegetables. Select farmers markets that accept SNAP benefits offer nutrition education through recipe testing, cooking demonstrations, and recipe cards for market patrons. Minimal data, however, have been collected to determine the effectiveness of the educational materials used at

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farmers markets. The Supplemental Nutrition Assistance Program-Education (SNAP-Ed) program through Utah State University Extension collected initial and follow-up data from farmers market patrons through directly administered questionnaires. These questionnaires measured the impact of the food samples, recipe cards, and produce information posters shared with SNAP and non-SNAP participants at six Utah farmers markets in 2014 and 2015. Farmers market vendors were also surveyed to determine the influence of the SNAP-Ed booth on food sales and market value. Results of this study show that SNAP participants (n=140) are significantly more likely (p<0.05) than non-SNAP participants (n=917) to be influenced by the educational strategies utilized at the SNAP-Ed farmers market booth. Market vendors also reported increased produce sales as a result of having the SNAP-Ed booth at the market. Offering nutrition education at farmers markets that accept SNAP benefits is one way to educate low-income shoppers on how to select, store, and prepare local produce; it may also increase the overall amount of produce purchased at the market.

Keywords
Evaluation; Nutrition Education; Supplemental Nutrition Assistance Program-Education; SNAP-Ed; Farmers Markets; SNAP Benefits; EBT Card

Introduction and Literature Review

Over 4,000 farmers markets around the nation have electronic benefits transfer (EBT) machines, which allow participants in the Supplemental Nutrition Assistance Program (SNAP) to use their federal nutrition assistance benefits to purchase fruits and vegetables (F&V) and other eligible foods at local farmers markets (Quintana & O'Brien, 2014). SNAP-authorized farmers markets have grown considerably in recent years, increasing from 936 markets in 2009 to 4,057 in 2013 (Quintana & O'Brien, 2014). Despite efforts to make F&V more available to federal nutrition assistance users, F&V consumption among SNAP participants continues to remains well below the recommendations for daily intake as outlined in the United States Department of Agriculture (USDA) Dietary Guidelines. F&V intake remains low among individuals of all socioeconomic levels; however, the prevalence of adequate F&V intake has been found to be significantly lower among individuals living in the greatest poverty (Grimm, Foltz, Blanck, & Scanlon, 2012; Moore & Thompson, 2015). Just 32% of individuals living below the 130% poverty income level report consuming two or more servings of fruit per day, and 21% report consuming three or more servings of vegetables per day (Grimm et al., 2012).

This inadequate intake of F&V suggests that availability and accessibility are not the only barriers to eating more F&V. Other barriers such as knowledge, self-efficacy, awareness, and taste preferences also influence F&V intake in low-income individuals (Eikenberry & Smith, 2004). In an effort to further increase F&V consumption among low-income populations, programs such as the Supplemental Nutrition Assistance Program-Education (SNAP-Ed) are providing nutrition education at farmers markets with EBT machines (Dannefer, Abrami, Rapoport, Sriphanlop, Sacks, & Johns, 2015; Parsons & Morales, 2013; Wholesome Wave, n.d.). A goal of these efforts is to improve SNAP participants' knowledge, self-efficacy, and skills in purchasing and preparing F&V, ultimately leading to an increased intake of these nutrient-dense foods (Savoie-Roskos, Hall, Lambright, Norman, & LeBlanc, 2016).

Few studies have been conducted to investigate the effectiveness of nutrition education at farmers markets. One study conducted in New York City found a positive relationship between nutrition education received at farmers markets and the intake of F&V (Dannefer et al., 2015). The education classes provided at the farmers market comprised a nutrition lesson, cooking demonstration with samples, and distribution of recipe handouts (Dannefer et al., 2015). Participants were able to sit near the booth to take part in the nutrition education. Participants who attended two or more nutrition education classes provided at the farmers market reported increasing their consumption of F&V by nearly a half-cup each day (Dannefer et al., 2015). A study with a similar intervention strategy also found that nutrition education through F&V information posters, recipe cards,

and food samples was effective in assisting market patrons with purchasing F&V from the farmers markets (Savoie-Roskos, Hall, et al., 2016). The findings in these studies suggest that nutrition education at a market is an effective tool for influencing purchasing behaviors among farmers market shoppers.

In addition to helping SNAP participants overcome barriers to shopping at farmers markets, nutrition education booths support some of the more frequently mentioned benefits of shopping at such locations. In a study conducted in North Carolina among low-income women, participants reported freshness of produce, taste of produce, preference to buy locally, and ability to buy in larger quantities as benefits of shopping at local markets (McGuirt, Ward, Majette Elliot, Lawrence Bullock, & Jilcott Pitts, 2014). Recipe sampling and nutrition education may help all farmers market patrons identify additional and various benefits to purchasing F&V at local markets.

Nutrition education booths at farmers markets help SNAP participants overcome common barriers while simultaneously increasing perceived positive benefits to market shopping. They also have the potential to increase SNAP sales, which are necessary to justify the financial and time commitments required to provide EBT machines at markets (Baronberg, Dunn, Nonas, Dannefer, & Sacks, 2013; Krokowski, 2014). A study conducted in Wisconsin found that several market managers and vendors were concerned about the time-intensive nature of providing an EBT machine at the market (Krokowski, 2014). However, vendors reported willingness to continue the service if more people benefited from it, making it more profitable for their agri-businesses (Krowkowski, 2014). The cost of implementing and managing the EBT machines is also a concern for many market managers (Krokowski, 2014). In 2015 alone, the USDA allocated US$3.3 million to provide free EBT machines and related equipment to eligible farmers markets across the country in an effort to reduce cost as a barrier to accepting SNAP benefits (USDA, 2015). Finding effective strategies for increasing SNAP participant use at farmers markets is vital for continued implementation of EBT machines at markets across the country.

Few studies to date have examined the impact of nutrition education at farmers markets specifically among SNAP participants. Furthermore, no study to date has compared the effectiveness of the SNAP-Ed booth among SNAP and non-SNAP participants. The objective of this study was to investigate the perception of the quality of educational strategies provided at the farmers market, such as the F&V information posters, recipe samples, and recipe cards among SNAP and non-SNAP participants. A secondary objective of this study was to assess the effectiveness of the nutrition education booth on changing behaviors related to purchasing and preparing F&V purchased at the farmers market. The final objective of this study was to determine how farmers market vendors are affected by having a nutrition education booth available at the market.

Applied Research Methods

The Institutional Review Board at Utah State University approved this study. This study included a farmers market patron survey and a vendor survey. We selected a convenience sample of farmers market patrons from six farmers markets across Utah that accept EBT cards. The sample of survey participants included farmers market patrons who visited the SNAP-Ed booth at a participating farmers market during the data collection period. Patrons received a letter of information prior to survey completion explaining the purpose and procedure of the study, risks and benefits of participation, compensation, and confidentiality. Patrons received a token valued at US$2 after completing the survey, which could be used only at the farmers market during the remaining market season for locally grown food items.

We directly administered paper surveys over an 8-week period during the 2014 and 2015 farmers market seasons. Researchers received detailed training prior to data collection to ensure the study protocol was followed identically among SNAP-Ed booths at all participating farmers market locations. Researchers learned how to administer the survey, answer potential questions from patrons, eliminate bias, and ensure accuracy of study protocol. The 20item survey included eight questions regarding the use and effectiveness of the posters, recipe

samples, and recipe cards; four questions on the quality of the SNAP-Ed booth; five demographic and shopping and/or purchasing questions; and one question about general awareness of the SNAP-Ed program. The survey also asked the patron's name and phone number for those willing to participate in a 2-week follow-up survey. A 5-point Likert scale was used to measure the level of agreement with statements about their perceptions of the recipe cards and posters and the quality of the SNAP-Ed booth (Savoie-Roskos, Hall, et al., 2016). Reliability of the measures of the perceptions related to recipe cards, poster, and effectiveness of the SNAP-Ed booth scales were previously demonstrated with Cronbach's alpha values that were higher than the commonly acceptable value of .70 (Savoie-Roskos, Hall, et al., 2016). Furthermore, face and content validity of this survey had been conducted in a previous study (Savoie-Roskos, Hall, et al., 2016).

Patrons who were willing to be contacted for a follow-up survey were called by an undergraduate researcher two weeks after completing the initial survey. Researchers attempted to contact each patron up to three times within a 7-day period. The 11-item follow-up survey included five yes/no questions on use of the SNAP-Ed recipes and the influence of the recipe cards, two questions on the influence of recipe sampling on recipe use and purchases made at the farmers market, three questions on shopping and purchasing behavior, and one open-ended question allowing for feedback or experiences related to the SNAP-Ed booth.

A convenience sample of vendors from one farmers market in Utah that accepts EBT cards was selected for the survey. Vendors were asked to participate in a 13-item survey via email. Researchers obtained email addresses from the market manager of all vendors who had booths at the farmers market at least once in the previous season. Vendors received a link to the survey and a letter of information describing the study procedures, risks, and benefits. Vendors were emailed three times over a three-week period requesting their participation. The survey tool included questions about familiarity with the SNAP-Ed booth, average SNAP sales, and financial impact of having the SNAP-Ed booth at the market; it also included demographic questions such as age, gender, type of food sold, and frequency of selling locally grown food at the market.

Data from the initial patron survey was entered into Microsoft Excel® by an undergraduate researcher and then imported into SPSS 22.0 for data analysis. Patron follow-up survey data and vendor survey data were collected in Qualtrics® and imported into SPSS 22.0. Mean, standard deviation, and sample size were calculated for data in each survey. Descriptive statistics in the initial patron survey were compared between SNAP and non-SNAP participants. Independent sample t-tests were used to compare mean scores of SNAP and non-SNAP participants for each question in the initial patron survey. Follow-up data was reported using sample size and percentages. Qualitative data collected in the patron follow-up survey and the vendor survey were analyzed by developing codes derived from participant quotes. Categories were developed based on emerging codes.

Results

A convenience sample of 1,057 farmers market patrons was recruited at farmers markets for this study. G*Power 3.1.9.2 (Heinrich Heine University Düsseldorf, 2014) was used to conduct a post hoc test for computing achieved power (Faul, Erdfelder, Lang, & Buchner, 2007). Based on actual sample sizes, means, and standard deviations of questions that were asked of SNAP and non-SNAP participants in this study, post hoc analysis shows actual power to be 0.96. Demographic characteristics of study participants are listed in Table 1. The majority were female (n=747, 71%). They ranged in age from 18 to 87 years old, with a mean age of 42 years old. Thirteen percent (n=140) of participants indicated they receive SNAP benefits, and 93% (n=130) of the SNAP participants reported using their EBT card at the farmers market to make food purchases.

The level of agreement among SNAP participants and non-SNAP participants in regard to perceptions of the recipe cards, posters, and overall booth quality is listed in Table 2. There was a significant difference when comparing means of SNAP participants and non-SNAP participants when asked how the recipe cards influenced how

much produce to purchase (p=0.001) and to plan for future purchases at farmers markets (p=0.004), with SNAP participants more likely to agree with these statements. There was a significant difference in the means of each group when asked the level of agreement with how the SNAP-Ed poster improved nutrition knowledge: SNAP participants were more likely to agree that nutrition knowledge increased as a result of reading the poster at the farmers market. Lastly, both SNAP and non-SNAP participants agreed or strongly agreed that the samples, recipes, service, and information provided by booth workers was high quality; the means of non-SNAP participants were slightly higher than SNAP participants, but the difference was not statistically significant (p>0.05).

A convenience sample of 206 patrons completed the follow-up survey two weeks after visiting the SNAP-Ed farmers market booth and completing the initial survey. The majority of patrons (n=189, 92%) indicated that they planned to use the SNAP-Ed recipe in the future, and 27% of participants (n=60) had already made the recipe provided at the SNAP-Ed booth. One woman stated, "I have never tried a sample I didn't like. I always want to make the samples when I get home." When asked why they hadn't already made the recipe at home, patrons most commonly responded that busy schedules or lack of time, traveling, forgetting about the recipe, and not having the recipe were the main influencing factors. Two patrons indicated they plan to use the recipes in the near future. One of them stated, "We are planning on making the recipe at a family get together in mid-August!"

Seventy percent of patrons (n=143) indicated that without the recipe sample provided at the booth, they were unlikely or extremely unlikely to make the recipe at home. One participant mentioned, "I have been [to the SNAP-Ed booth] three times and have enjoyed tasting new things. I probably wouldn't have wanted to make the recipes if I hadn't tasted it first." Furthermore, 65% of patrons (n=134) indicated that the recipe sample influenced their decision to buy the produce featured at the SNAP-Ed booth. One participant stated, "I really appreciate [that] you are out there giving samples. Sampling always influences my decision to buy produce because I don't want to buy something and end up not liking it." Of the patrons who completed the follow-up survey, 46% bought produce from the farmers market that had been featured at the SNAP-Ed booth the day they completed the initial survey, and 50% reported purchasing the produce at a later date.

When asked in the follow-up survey to provide details about their experiences at the SNAP-Ed booth, 105 patrons responded. Most commonly, patrons mentioned their appreciation for having the SNAP-Ed booth at the farmers markets as a way to try recipes, receive nutrition education, and learn how to eat healthy on a budget. For example, "I'm glad SNAP-Ed is at the farmers market. I hear a lot of people wanting to be healthy but things are expensive. It's a

Table 1. Demographic Characteristics of Farmers Market Patrons and Vendors

Demographics	Patrons (n=1,057)	Vendors (n=8)
Gender		
Female	71% (n=747)	50% (n=4)
Age		
25 years or younger	21% (n=221)	0%
26 to 50 years	44% (n=466)	50% (n=4)
51 years or older	35% (n=370)	50% (n=4)
Participant of SNAP		
Yes	13% (n=140)	---
Used EBT Card at Market		
Yes	12% (n=130)	---
Years as a Vendor		
1 year or less	---	0%
2 to 5 years	---	25% (n=2)
More than 5 years	---	75% (n=6)
Weeks at Market/Season		
Every week	---	75% (n=6)
Every other week	---	0%
Once a month	---	12.5% (n=1)
A few weeks each season	---	12.5% (n=1)
Once or twice a season		0%

great way to see how it can be healthy and affordable at the same time." Similarly, one participant mentioned, "I think it's an excellent way to teach people how to use their food stamps [SNAP benefits] on local foods. It's great education about incorporating vegetables into meals."

All patrons reported going to the SNAP-Ed booth frequently throughout the farmers market season, with most patrons indicating they stopped at the SNAP-Ed booth every week or every other week. One participant mentioned, "[The SNAP-Ed booth] is just great. I have a special needs daughter who just loves going over there. We are always excited to see what type of recipe they come up with each week." Another participant stated, "We just keep coming back week after week because we always have such a pleasant experience."

Many survey participants provided suggestions for improving the SNAP-Ed booth at the market. For example, one participant recommended the booth be set up in a better location and mentioned that, "the booth is kind of off the beaten path and not many people actually see it." Another participant recommended the staff at the booth draw people in by stepping outside the booth and welcoming people to try samples as they walk by. It was also recommended that recycling bins be available for market patrons to throw their serving cups and utensils into rather than a garbage can. The suggestions provided by participants will be provided to the participating markets to improve the SNAP-Ed booths at those markets in future seasons.

Other patrons mentioned how visiting the SNAP-Ed booth influenced their shopping and dietary habits. One participant stated, "I just love the [SNAP-Ed] booth. It helped me lose 10 pounds because I started eating healthy." Another mentioned, "I really appreciate the different recipes that you guys give; it's helped how our family eats at home." Lastly, a participant stated, "I didn't buy the featured produce because I already had it at home, but I did buy some of the other ingredients, like honey, that the recipe asked for."

Table 2. Assessment of the SNAP-Ed Farmers Market Booth Among SNAP and Non-SNAP Participants

	SNAP Participants		Non-SNAP Participants		
Levels of Agreement	*n*	*Mean (SD)*	*n*	*Mean (SD)*	***p* Value**
Recipe Card Questions [a]					
Recipe cards helped feel more comfortable buying produce	135	4.30 (0.66)	885	4.08 (0.74)	.051
Recipe cards helped decide how much produce to purchase	135	3.95 (0.74)	880	3.69 (0.80)	.001
Recipe cards helped plan future purchases at the farmers market	135	4.12 (0.75)	878	3.86 (0.80)	.004
Poster Questions [a]					
Posters helped gain information about featured produce	135	4.07 (0.69)	873	3.90 (0.71)	.116
Posters improved nutrition knowledge	135	3.94 (0.76)	868	3.70 (0.75)	<.001
Posters helped know what questions to ask vendors about their produce	136	4.18 (0.68)	878	4.05 (0.64)	.011
Booth Rating Questions [b]					
Presentation of samples	135	4.41(0.69)	907	4.44 (0.72)	.717
Recipe instructions	133	4.38 (0.72)	885	4.40 (0.73)	.735
Service by booth workers	135	4.59 (0.58)	904	4.69 (0.55)	.058
Information provided by booth workers	134	4.51 (0.65)	895	4.54 (0.68)	.694

Note. SNAP indicates the Supplemental Nutrition Assistance Program; SNAP-Ed indicates the Supplemental Nutrition Assistance Program-Education; *n* indicates the number of responses; SD indicates standard deviation.

[a] Values are mean ± sd points from a Likert scale (1=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree).

[b] Values are mean ± sd points from a Likert scale (1=Poor, 2=Fair, 3=Good, 4=Very good, 5=Excellent).

p values were calculated using Independent-sample t tests.

Of the 40 vendors asked to participate, eight completed the survey. Demographic characteristics of vendors are found in Table 1. Fifty percent of the vendors (n=4) were male, and ages ranged from 26 years of age to older. Seventy-five percent (n=6) of the vendors had sold locally grown food every week at the farmers market for more than 5 years. Eighty-eight percent (n=7) of the vendors indicated they sold produce; they also sold eggs and honey. SNAP sales ranged from US$0 to US$50 each week, with the majority of vendors indicating they make up to US$30 each week from SNAP benefits. Of the vendors surveyed, 88% (n=7) were aware of the SNAP-Ed booth at the farmers market. Sixty-three percent (n=5) of vendors who sold produce agreed that the SNAP-Ed booth helped increase the sale of produce when featured at the SNAP-Ed booth. One vendor stated, "We have noticed it has helped sales because it gives people different ideas of how to use fruit and vegetables." When asked how the SNAP-Ed booth has benefited them as vendors, all of the vendors familiar with the SNAP-Ed booth stated it provides an opportunity for patrons to try local produce and use it in easy-to-make recipes. One vendor stated, "It gives customers great ideas of healthy recipes they can make with my fresh produce." When asked what can be done to improve the SNAP-Ed booth, two vendors recommended the SNAP-Ed booth employees work closely with the farmers to know exactly what produce will be available each week to ensure that the SNAP-Ed featured produce is being sold at the market. One vendor stated, "I know it can be difficult coordinating with what is available at the market, but it definitely helps us as farmers make more sales."

Discussion

Nutrition education at farmers markets is an opportunity to educate families on how to select, prepare, and store fresh, locally grown produce. Nutrition education provided by SNAP-Ed is a valuable resource for SNAP eligible families who shop at farmers markets. Data from this study suggests that nutrition education tools such as posters, recipe samples, and recipe cards are effective strategies for increasing self-efficacy and knowledge of both SNAP and non-SNAP participants. Results conclude that SNAP participants are significantly more likely than non- SNAP participants to be influenced by the posters and recipe cards utilized at the SNAP-Ed farmers market booth. Furthermore, qualitative and quantitative data from this study show that farmers market patrons employ nutrition information and recipes for up to two weeks after receiving education at the SNAP-Ed booth. A similar study also found educational strategies such as posters, recipes, and food samples were effective at influencing purchasing behaviors among farmers market shoppers (Savoie-Roskos, Hall, et al., 2016). However, the majority of survey respondents were not SNAP participants, and therefore the results may not be generalizable to low-income shoppers.

Results of this study demonstrate the limited use of farmers markets among SNAP participants as compared to non-SNAP participants. Many SNAP participants are unaware that SNAP benefits are accepted at farmers markets throughout the country (Flamm, 2011; Wetherill & Gray, 2015). As a result, only 0.01% of SNAP benefits are being redeemed at farmers markets each year (Dimitri, Oberholtzer, & Nischan, 2013). Farmers markets can benefit from partnering with local food and nutrition–related organizations who work directly with SNAP participants to increase awareness of the opportunity to use SNAP benefits at local farmers markets (Hasin & Stieren, 2014). Increasing awareness within communities whose farmers markets accept SNAP benefits is vital for increasing SNAP sales at local markets. Most vendors surveyed in this study reported that a SNAP-Ed nutrition education booth at the farmers market helped increase overall sales of produce. Some markets around the country now offer farmers market incentive programs that provide SNAP participants with a dollar-for-dollar match for each SNAP dollar spent at the market (Oberholtzer, Dimitri, & Schumacher, 2012; Savoie-Roskos, Durward, Jewkes, & LeBlanc, 2016). These programs have been established in an effort to increase utilization of EBT at markets, expand consumption of locally grown fresh produce, and improve food security status among program participants (Dimitri et al., 2013; Oberholtzer et al., 2012; Savoie-Roskos, Durward, et al., 2016). Nutrition education at the

market combined with farmers market incentives may be an effective way to increase SNAP participants' purchases of locally grown foods at farmers markets.

There are limitations to this study that should be addressed. The surveys used in this study were self-reported instruments, which are subject to bias resulting in data that may be over- or underestimated (Pratt, McGuigan, & Katzev, 2000). Since only 19% of patrons completed both the initial and follow-up surveys, data from the follow-up survey may not represent accurately all farmers market shoppers. The sample size of SNAP participants was considerably smaller than non-SNAP participants surveyed in the patron survey; however, a post hoc analysis of achieved power was 0.96, which indicates the sample sizes were adequate to determine the effect size. The response rate for the vendor survey was only 20%, and therefore it is possible that vendors who did not complete the survey have had different experiences with the SNAP-Ed booth at the market.

Conclusion

Offering nutrition education at farmers markets is one way to educate low-income shoppers on how to select, store, and prepare local produce. Farmers markets across the country that accept EBT cards should consider collaborating with SNAP-Ed programs to offer nutrition education, cooking demonstrations, and recipe sampling to farmers market patrons. Nutrition education at farmers markets may also be an effective way to increase sales among local farmers and growers at the markets. Future studies should compare F&V intake among SNAP participants before and after receiving nutrition education at farmers markets. In addition, future studies should investigate produce revenue before and after implementation of a nutrition education booth. The findings from this study should help guide SNAP-Ed programs around the country in their efforts to provide effective nutrition education at farmers markets with EBT machines. SNAP-Ed nutrition education tools used in this study will be made available through the SNAP-Ed Connection website at http://snaped.fns.usda.gov/.

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