Oregon Health & Science University
School of Medicine

Scholarly Projects Final Report

Title

Veggie Rx: A Fruit and Vegetable Intervention to Improve Health and Healthcare

Student Investigator's Name

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Project Course

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Food and Nutrition Services

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Concentration Lead's Name

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Project/Research Question

Will providing patients Veggie Rx vouchers to purchase fresh fruits and vegetables reduce food insecurity, improve physical and mental health, and reduce healthcare overutilization?

Type of Project

Research Study – Cohort Design, non-parametric analysis

Key words *(4-10 words describing key aspects of your project)*

Food insecurity, nutritional assistance, coordinated care organizations, fruit, vegetable

Meeting Presentations

If your project was presented at a meeting besides the OHSU Capstone, please provide the meeting(s) name, location, date, and presentation format below (poster vs. podium presentation or other).

N/A

Publications

Taher, Tajwar. Veggie Rx: 2019-2020 Program Results Summary. Oregon Community Food Systems Network. http://ocfsn.net/wp-content/uploads/2020/09/Statewide-Evaluation-of-Veggie-Rx-Programs-2019-2020.pdf

Submission to Archive

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N/A

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Next Steps

- Working with participating programs to implement a standardized voucher (equivalent dollar amount and duration of participation) and standardized group workshops.
- Selecting for or stratifying high ED utilizers to better measure impact of intervention on this metric
- Standardizing the survey across programs, and including questions about hospital readmission rates, transportation, lifestyle changes, self-efficacy, and knowledge about healthy eating practices/preparation
- Collecting biometrics: BMI, BP, A1C, etc.

Student's Signature/Date

This report describes work that I conducted in the Scholarly Projects Curriculum or alternative academic program at the OHSU School of Medicine. By typing my signature below, I attest to its authenticity and

Tajwar Taher 03/11/2021

Mentor's Approval *(Signature/date)*

X

Mentor Name

Eecole Copen

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Introduction

The evidence linking poor nutrition to poor health is robust.[1] Chronic conditions like cardiovascular disease, diabetes, hypertension, and depression could be partially or totally prevented with adequate nutrition.[2,3,4,5,6] Unfortunately, for 37.2 million people in the US living with food insecurity – lacking consistent access to enough food for a healthy, active life – [7] developing chronic conditions could be inevitable.

Supplemental Nutrition Assistance Programs (SNAP) prevent 40 million Americans from starving,[8] but even when such programs curb food insecurity,[5] studies show they do not increase access to fruits and vegetables.[9,10] Indeed, many people experience the "obesity-hunger paradox"[11] when SNAP makes cheap, calorie-dense-nutrient-poor foods abundant, increasing the risk of obesity and chronic conditions.[12,13]

The consequences of food insecurity extend beyond individuals to the healthcare system. Food insecurity adds about 11% to healthcare costs of older adults, regardless of whether they have chronic conditions. [14] One medication alone can be costly, but as chronic diseases progress people may require multiple medications for management and costly ED or hospital admissions.[15] With food insecurity projected to increase by 75% from 2005 to 2025[16], the $160.7 billion spent on health care in 2014 due to food insecurity[17] may seem minimal in the future.

To amend the obesity-hunger paradox and support lifestyle changes fundamental to preventative medicine, various "Fruit and Vegetable Food Prescription Programs" have been developed in the US.[18,19,20,21,22,23] These programs demonstrated that removing a financial barrier to purchasing fruits and vegetables by providing participants vouchers for Farmer's or local markets improved food security and fruit/vegetable intake. Washington State's "Wholesome Wave" program distributed over 28,000 "prescriptions" and delivered consistent financial, educational, and social support for participants to help them modify their diets and achieve healthy eating goals. [20]

However, most programs did not explore the effects of food prescriptions on standard medical biometrics and overall attitudinal or behavioral change.[23] We identified only two studies that did so: a 2017 study finding a significant decline in Hemoglobin A1C[19] and a 2020 study finding improved BMI in Navajo children.[24] As such, our study sought to expand the size and scope of this small body of research by investigating whether these prescription food programs have value beyond simply increasing fruit/vegetable intake: whether they can improve physical and mental health, quality of life, and reduce burdens on the healthcare system. As Coordinated Care Organizations (CCO) seek to fund non-medical interventions ("Health Related Services") that address upstream factors in healthcare and improve individual and community health, behavioral health, education, economic stability, and neighborhood/built environment,[25,26] our study aims to demonstrate that Veggie Rx would have a place in the Oregon Health Authority's vision for a more equitable and efficient healthcare system and healthier populace overall in the state of Oregon.

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Methods

Under the guidance of the Oregon Community Food Systems Network, five food share programs across the state of Oregon agreed to participate in this research study. Though all programs implemented similar interventions in the sense that fresh fruits/vegetables were distributed to food insecure participants at no cost, each program's intervention came in a slightly different form and may or may not have been accompanied by additional interventions (counseling, educational workshops, etc.) These details are described here:

Adelante Mujeres

20 participants were referred by their healthcare providers after being identified as food insecure, having a diet-related disease, or recommended to consume more vegetables. Participants were excluded based on an inability to understand Spanish or having a higher income level. Vouchers were worth $2 each, distributed over 16 weeks for a total of $96 per participant ($6 per week). The vouchers were redeemable at farmers markets for fresh fruits and vegetables, dried and fresh beans, and edible plant starts. Participants were also required to attend monthly Group Sessions and Cooking Demonstrations, attend market tours, and had periodic check-in/support phone calls.

The High Desert Food and Farm Alliance (HDFFA)

106 participants were primarily identified and recruited by their healthcare providers, but community-based organizations, self-referral, and general word of mouth drew in participants as well. To be eligible, participants had to be experiencing food insecurity and have a diet modifiable disease (heart disease, diabetes, pre-diabetes, obesity). Participants were given a $20 cash equivalent every week they attended, for up to 8 weeks; they had the potential of collecting 96 tokens ($160) over the duration of their enrollment. These tokens were valid at farmers markets for fresh fruits and vegetables. As part of their enrollment, participants received paper nutrition education materials and recipes. Participants also had the opportunity for farmers market mentorship.

Marion Polk Food Share

117 patients from one of three local health clinics were offered a free weekly produce box for 14 weeks. Participants were selected based on food insecurity and having a diet-related illness. Participants were excluded if they had low interest in dietary change or increasing fresh vegetable consumption. At clinics, participants picked up their food, tasted new recipes, and attended cooking classes. The produce boxes typically include between 8 and 14 items of produce (salad greens, cooking greens, fruits, herbs.) Similar shares have been sold retail for $350. In 2019, produce for the program was grown and donated by the crew of teens working the Food Share's Youth Farm for two of the program sites, and a third site was supported by Mama Tee's Farm in Willamina.

FOOD for Lane County

20 clients of Trillium Community Health Plant who had diabetes and low incomes were offered the opportunity to participate. Each week, participants received $6 per individual in the household in the form of vouchers. These vouchers could only be redeemed at the FOOD for Lane County Youth Farm Produce Stands. Participants also had the opportunity to join cooking and nutrition classes.

OSU Extension/SNAP-Ed Umatilla Morrow and Umatilla Morrow Head Start, Inc.

136 participants were enrolled primarily through the local Women Infant Child (WIC), with additional recruitment from local Food Pantries and Senior Centers. Eligibility was based on having food insecurity, being an Eastern Oregon CCO member, and having a health risk factor. Participants were excluded if their income was too high to qualify for supplemental nutritional assistance programs. Participants received a monthly produce distribution worth at least $50 (about $12.50 per family each week) which included fresh, frozen, and/or canned fruits and vegetables, and dried beans. Larger families received 2 distributions per month. 2-hour long voluntary cooking workshops were offered monthly, open to the entire family to participate.

At enrollment, the 399 total participants were given a Demographic survey to record their age, ethnicity, household income and size, and current chronic health conditions. Before beginning and after completing the program, participants were given the same 7-question survey. These 7-questions were adapted from other validated screening tools such as the USDA Food Insecurity Survey,[27] the Wholesome Wave Nutritional Assessment Tool,[28] and a survey developed by the Michigan Farmers Market Association.[29] The questions assessed food insecurity, self-perceived physical and psychosocial wellbeing, and healthcare utilization (measured by number of ED visits and number of prescriptions per participant). The Post-survey also included a space for participants to comment on their satisfaction or feedback for the program.

Of the 399 participants, only those completing both Pre and Post surveys were included in final analysis. Statistical analysis was performed using SPSS. A Wilcoxon Signed-Ranks test was performed for each question, with a p-value of 0.05 set as the cut-off for statistical significance.

The OHSU Institutional Review Board deemed evaluation activities exempt from review.

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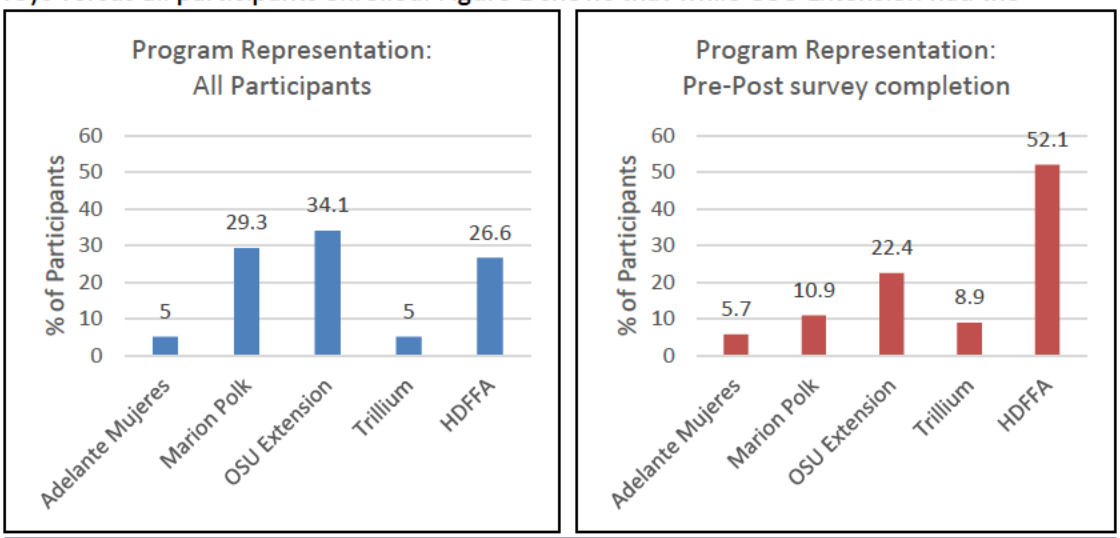
Results

Of the 399 participants enrolled across the programs, only the 192 participants who completed a Pre and Post survey were included in the analysis. The 207 missing participant surveys were likely either lost to follow up, had entered the program later than the start date and didn't complete a Pre-survey, or were lost in the process of data entry. Not all 192 surveys were used in the analysis for each question, as participants either did not respond or were not asked (HDFFA did not include Questions 1, 2, and 5 on the Pre-survey), leading to a variable sample size for each question.

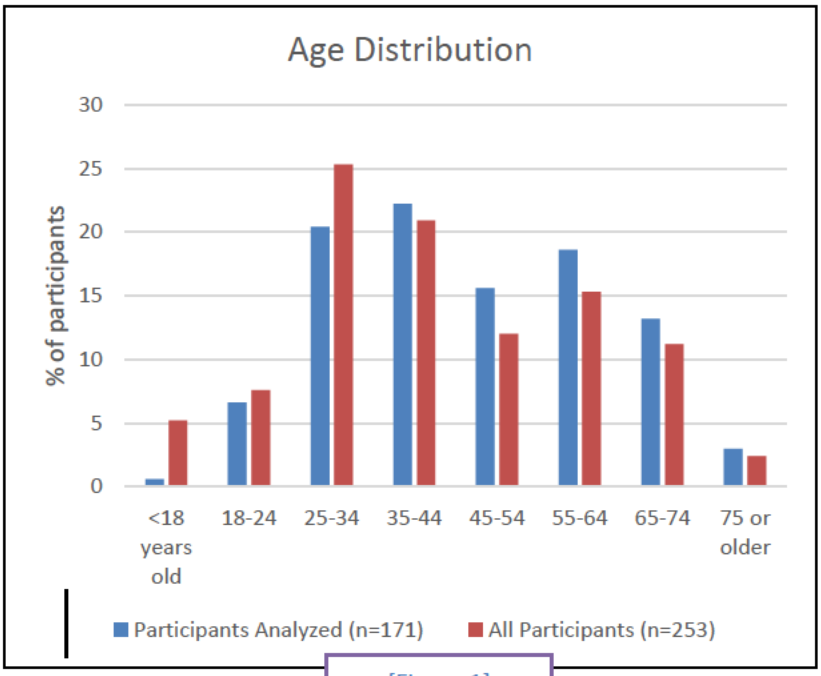
Demographics

There was a sizeable difference in program representation between the sample of 192 participants that had Pre-Post matched surveys versus all participants enrolled. Figure 1 shows that while OSU Extension had the most participants overall (with close numbers from Marion Polk and HDFFA), 52.1% of participants who were ultimately analyzed were from HDFFA since they completed both Pre and Post surveys. However, even though HDFFA had the most participants who completed both Pre and Post surveys, their program's data is not necessarily overrepresented in the results as several questions on the survey administered to HDFFA participants were omitted (discussed further in "Survey Responses" section).

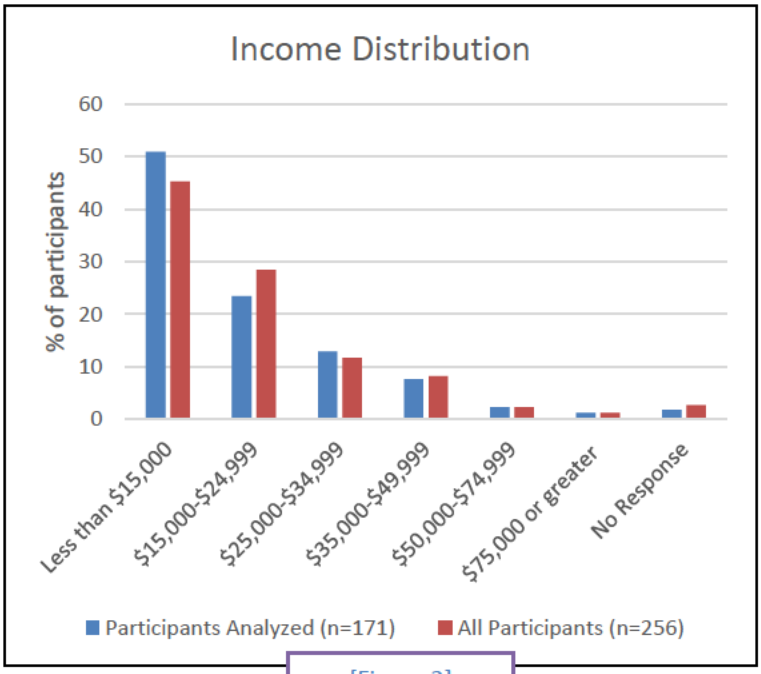


[Figure 1] Significantly higher proportion of High Desert participants in group analyzed

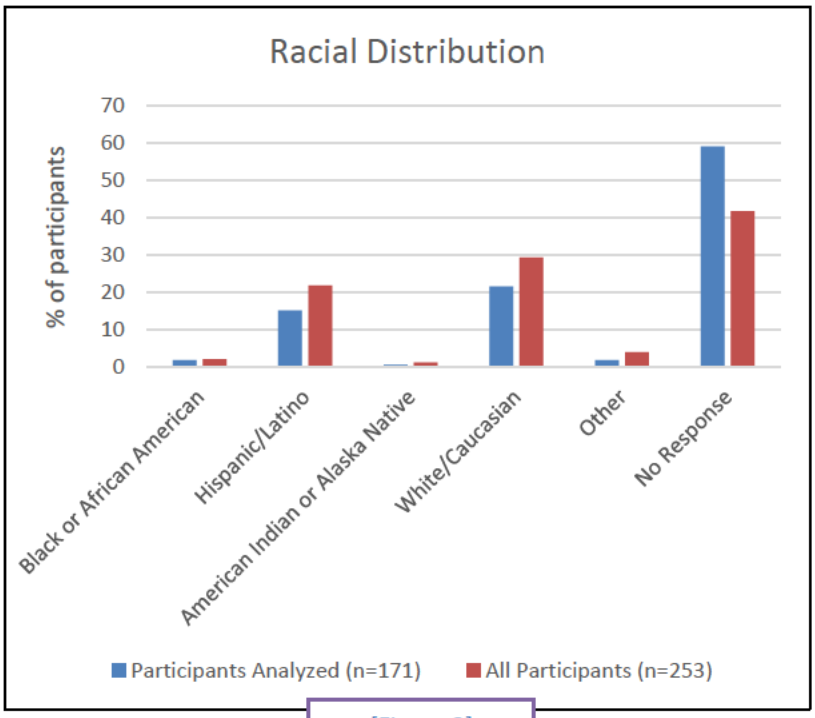
The following demographics were calculated using only participants who completed a Pre-survey. Therefore, Marion Polk was completely excluded from this portion of the analysis since there was no Demographics data from their participants. There was a similar distribution in gender, race, income, household size, and chronic conditions when comparing all 399 participants and the 192 analyzed. About 80% of participants were female, with 20% male, in both the sample analyzed and the overall group. On average, there was 1.91 (n=171) vs 2.03 (n=251) adults and 1.32 (n=168) vs 1.57 (n=248) children per household.



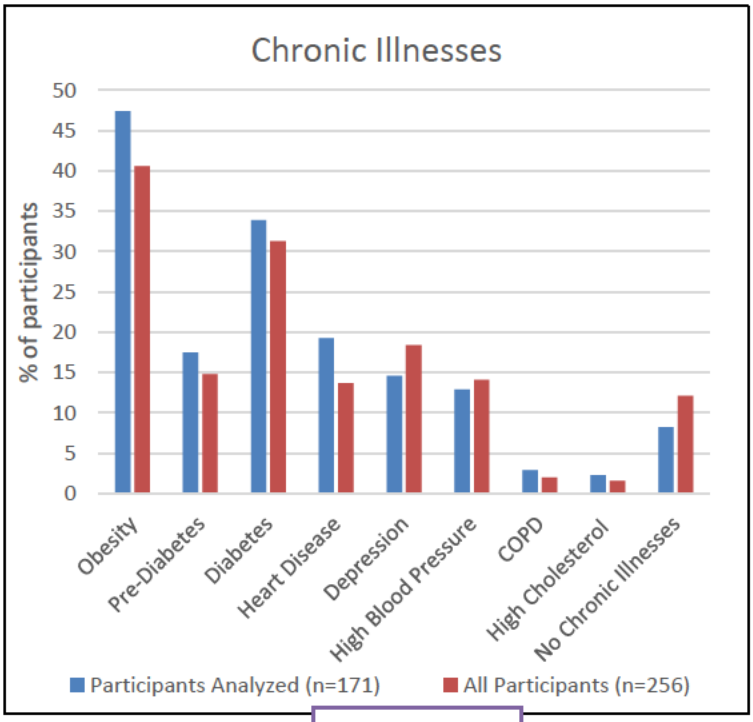
[Figure 1]



[Figure 2]



[Figure 3]



[Figure 4]

On average, most participants had 1-2 of the chronic illnesses depicted in Figure 5. The most common co-occurrence was diabetes and obesity. However, there was a notable proportion of individuals who reported depression in conjunction with either diabetes and/or obesity.

Survey Responses

Our seven-question survey assessed food insecurity (Q1, Q2), general health (Q3), social interaction (Q4), stress (Q5), Emergency Department utilization (Q6), and prescription medication use (Q7). The data (Table 1) demonstrates that Veggie Rx is associated with statistically significant improvements in Q1, Q2, Q3, Q4, and Q7.

	Pre (%)	Post (%)	Statistically Significant
Q1. Within the past 30 days, did you worry your food would run out before you got money to buy more? (n=88)			**Yes** Z= -3.793, p < 0.001
Never True	10.2	25.0	
Sometimes True	55.7	53.4	
Often True	34.1	21.6	
Q2. Within the past 30 days, did the food you bought just not last and you didn't have enough money to get more? (n=87)			**Yes** Z= -2.435, p =0.015
Never True	17.2	27.6	
Sometimes True	55.2	54.0	
Often True	27.6	18.4	
Q3. Would you say your health in general is… (n=191)			**Yes** Z= -4.713, p < 0.001
Poor	13.6	7.3	
Fair	40.8	30.4	
Good	35.1	43.5	
Very Good	8.9	15.7	
Excellent	1.6	3.1	
Q4. In the last 30 days, how often did you talk or visit with friends or relatives, or go to community events or gatherings? (n=178)			**Yes** Z= -1.981, p = 0.048
Less than once this past month	16.9	10.7	
A few times this month	27.5	28.7	
About once a week	14.6	10.1	
A few times a week	29.8	36.5	
Every Day	11.2	14.0	
Q5. In the past 30 days, how often did you feel nervous or stressed? (n=80)			**No** Z=0.922, p=0.357
Less than once this past month	12.5	13.8	
A few times this month	17.5	20.0	
About once a week	10.0	6.3	
A few times a week	25.0	28.7	
Every Day	35.0	31.3	
Q6. In the last 30 days, how many times did you or a family member in your household go to a hospital Emergency Room (ER)? (n=183)			**No** Z= -1.818, p=0.069
None	76.0	82.5	
One	15.8	10.9	
2-3	6.0	4.4	
4-5	1.1	2.2	
More than 5	1.1	0.0	
Q7. How many different prescription medications are you currently taking for chronic illness? (n=181)			**Yes** Z= -2.834, p=0.005
Less than 5-10	59.7	65.2	
5-10	27.6	27.1	
More than 10	12.7	7.7	

Table 1 – Summary of Survey Results

The sample size was decreased by ~100 in questions 1, 2, and 5 because some programs chose not to administer those particular questions. The sample size was decreased to a lesser degree in other questions due to blank responses for unknown reasons.

For both food insecurity questions (Q1 and Q2), only the proportion of people "Never" worrying about food running out increased after intervention. Some participants may have moved from "Often" worrying about food to the "Sometimes" category, but the participants whose food security changed positively during the Veggie Rx intervention (which was the majority of the participants from this data) mostly moved into the "Never" worrying about food security category.

Similarly, there were only increases in the categories of "Good" (35.1 to 43.5%), "Very Good" (8.9 to 15.7%), or "Excellent" (1.6 to 3.1%) health in the Post-survey relative to Pre when measuring self-reported physical health. The proportion of "Poor" health decreased by 49% from Pre-survey to Post-survey and "Fair" health decreased by 10.4%.

Question 4, assessing social interaction, also indicated positive change as the proportion of participants reporting visiting friends or family "less than once this past month" decreased from 16.9% to 10.7%. There was an associated increase in all other categories (the greatest being in "A Few times a week" from 29.8 to 36.5%, the majority of answers) except for "About once a week", which decreased.

Lastly, the proportion of individuals using "More than 10" prescriptions decreased from 12.7% to 7.7% by the end of the Veggie Rx study. There was a smaller (0.5%) decrease in the "5-10" group. Again, this change was seen in just the ~3 months each program conducted the study.

Qualitative Data Summary

Physical Health

With Veggie Rx vouchers, participants filled the gaps in their diet with high quality, nutritious foods. Although most participants received some form of food assistance, one participant wrote "I was able to eat more (and better quality) fruits + veggies that I can't afford on my low income." Since Veggie Rx programs opened access to fresh produce, we posit participants were able to rely less on calorically dense, nutrient poor foods. This explains how some participants later said, "I lost over 25 pounds while on veggie Rx". The impact of consistent access to nutritious food also affected biomarkers of health, with one participant reporting "I feel healthier now, in less pain and with more energy. My A1C level is down to 6.0, was very high at the start of Veggie Rx."

Participants also seemed more willing to collaborate with the healthcare system to improve their own health. For example, one participant wrote "I used to avoid doctors' appointments [but] now I'm going to my PCP for the first time in 10 yers [sic] as well as a wound specialist. I am now on diabetes medicationa [sic] and am seeking mental health therapy because of PTSD."

Mental Health

The empowerment of having access to their choice of fresh fruits and vegetables – and to then being able to cook the food to their liking – did much to improve the participants' moods, excitement, and outlooks on life. Having the vouchers gave participants a compelling reason to leave their homes and engage socially. As one participant beautifully summarized, "More than just access to produce. The walking, sunshine, interaction with vendors and other customers was positive and made the experience so much more than just a shopping trip." Veggie Rx may reduce the stress and social isolation associated with food insecurity, thus preventing (and/or improving) mental illness.

Lifestyle: Changes and Outlook

Participants were ecstatic about being able to eat more vegetables and fruits, as it meant eating less frozen foods, junk foods, or foods from restaurants. Some participants overcame the "fear" of purchasing unfamiliar fruits and vegetables. With Veggie Rx, participants were empowered to try and cook new foods.

In contrast to typically negative dieting mindsets which emphasize restriction and limitation, Veggie Rx provided participants with added resources to make positive lifestyle changes. For example, many participants utilized recipes the programs distributed. They discovered new and exciting ways to cook vegetables. By the end of the program, many were more cognizant about incorporating fruits and vegetables into each meal. Participants not only changed the content of their diets on Veggie Rx, but also their knowledge and perception of food preparation. One participant said, "This class has helped my family tremendously. We have learned many different ways to integrate [sic] fruits and veggies into our regular meals."

Financial Benefits

Veggie Rx helped participants overcome a major barrier to eating more fruits and vegetables: the perceived or actual high cost. They were grateful and more excited to be eating fruits and vegetables knowing they could use the saved money on other essential bills. This financial flexibility was acutely appreciated by several senior participants, who find living on fixed incomes difficult. One participant commented "I went to the doctors and my blood pressure is down. And it's because of the fruit and vegetables. This makes a huge difference for me. That's money I didn't have to spend on a blood pressure prescription- my husband is on 17 prescriptions so having one less to purchase really matters."

Family Impacts

"I felt more support with the company of my husband and children when we went to the market, they eat more fruits and veggies," said one participant at the program's conclusion. Family ties were strengthened during the program as participating families spent more time together at the market, in the kitchen, and at the table. Being seen as a "food hero" by the family for consistently providing nutritious foods helped participants feel validated and empowered, inspired confidence in their families, and contributed to an overall feeling of optimism in the household. Veggie Rx also had a direct impact on the household's physical wellbeing. By eating more fruits and vegetables, participants reported that even their children were able to lose weight and begin developing healthy lifestyles.

Discussion

In this study measuring Veggie Rx's impact on food insecurity, self-perceived physical and psychosocial wellbeing, and healthcare utilization of its participants, we aimed to demonstrate Veggie Rx's potential as a non-clinical Health Related Service (HRS) to partner with healthcare institutions in their mission to deliver high-quality and cost-effective healthcare to Oregon's disadvantaged populations. To qualify as an HRS, Veggie Rx must include activities that improve health care quality by improving health outcomes and reducing health disparities, preventing hospital readmissions, and increasing focus on wellness and health promotions activities.

To begin with, food insecurity is associated with long-term effects on the body like diabetes, high cholesterol, hypertension, heart disease, and obesity,[30] and in this study Veggie Rx demonstrated a statistically significant improvement in food insecurity for its participants. Consequently, there was also a statistically significant improvement in self-perceived health status – the proportion of individuals reporting "Poor" or "Fair" health decreased while "Good", "Very Good" and "Excellent" health increased – and decreased proportion of individuals using "more than 10" prescription medications. From the qualitative data we also have some evidence that Veggie Rx resulted in weight loss for individuals and was associated with changes in cholesterol and Hgb A1c levels. Taken together, this data suggests Veggie Rx is associated with improving diet and health to prevent or reduce the progression of chronic conditions that economically burden the healthcare system.

Veggie Rx also demonstrated it could potentiate the preventative healthcare approach valued by healthcare institutions. Preventative healthcare emphasizes "lifestyle changes", but both healthcare professionals and patients face barriers on making or following through on these recommendations.[31,32] With Veggie Rx however, some participants reported overcoming their socioeconomic and educational barriers to bring their lifestyles closer to the ideal, learning to eat more fruits and vegetables with every meal and being eager to do so. The success of Veggie Rx in sparking and maintaining these lifestyles changes stems from it being an active and empowering opportunity for participants. Where most conversations about dieting focus on sacrifice and restriction, participants in Veggie Rx embraced healthy lifestyles because of the variety of fresh, flavorful, and fun options opened to them.

Participants also seemed more willing to cooperate with the integrated care model at large, with one participant saying "I used to avoid doctors' appointments [but] now I'm going to my PCP for the first time in 10 yers [sic] as well as a wound specialist. I am now on diabetes medicationa [sic] and am seeking mental health therapy because of PTSD". Veggie Rx could play a fundamental role in getting people to consistently follow-up with primary care and prevent poor physical and financial outcomes. It might seem antithetical, then, that the proportion of Veggie Rx participants decreased in the "More than 10 prescriptions" group and increased in the "Less than 5-10" and "5-10" groups in association with the study. However, though the ideal may be to decrease prescriptions, we cannot necessarily eliminate medications entirely. In fact, the data was stratified as such based on the definition of "polypharmacy" (using at least 5-10 medications[34]). Considered that for people with chronic conditions (most participants in this study) we must find a balance between under-prescribing and over-prescribing to appropriately manage those chronic conditions,[34] the statistically significant decrease in the "More than 10" group is very promising for Veggie Rx's ability to not only improve the health of participants – as evidenced by Q3 – and thereby reduce their reliance on prescriptions, but also protect them from the adverse effects of a complicated medication regimen.

Of course, having to pay for fewer medications is a benefit to both patients and the healthcare system. One of the pleasant surprises from this study was learning from the qualitative data that for people on fixed incomes – seniors particularly – Veggie Rx either made it possible for people to take fewer medications because of improved health or made it possible to purchase the prescriptions they needed due to financial flexibility they had not had before. As the age of the population continues to increase in a system where long-term financial security is difficult to establish,[35] the role of Veggie Rx programs in ensuring geriatric populations are receiving adequate nutrition to remain healthy and cut healthcare costs may become even more prominent. It would be interesting in future studies to measure how well participants can afford

prescriptions (akin to food insecurity, "medication insecurity"), since medication non-adherence also contributes to the progression of chronic conditions and – ultimately – increased healthcare expenditures.[36]

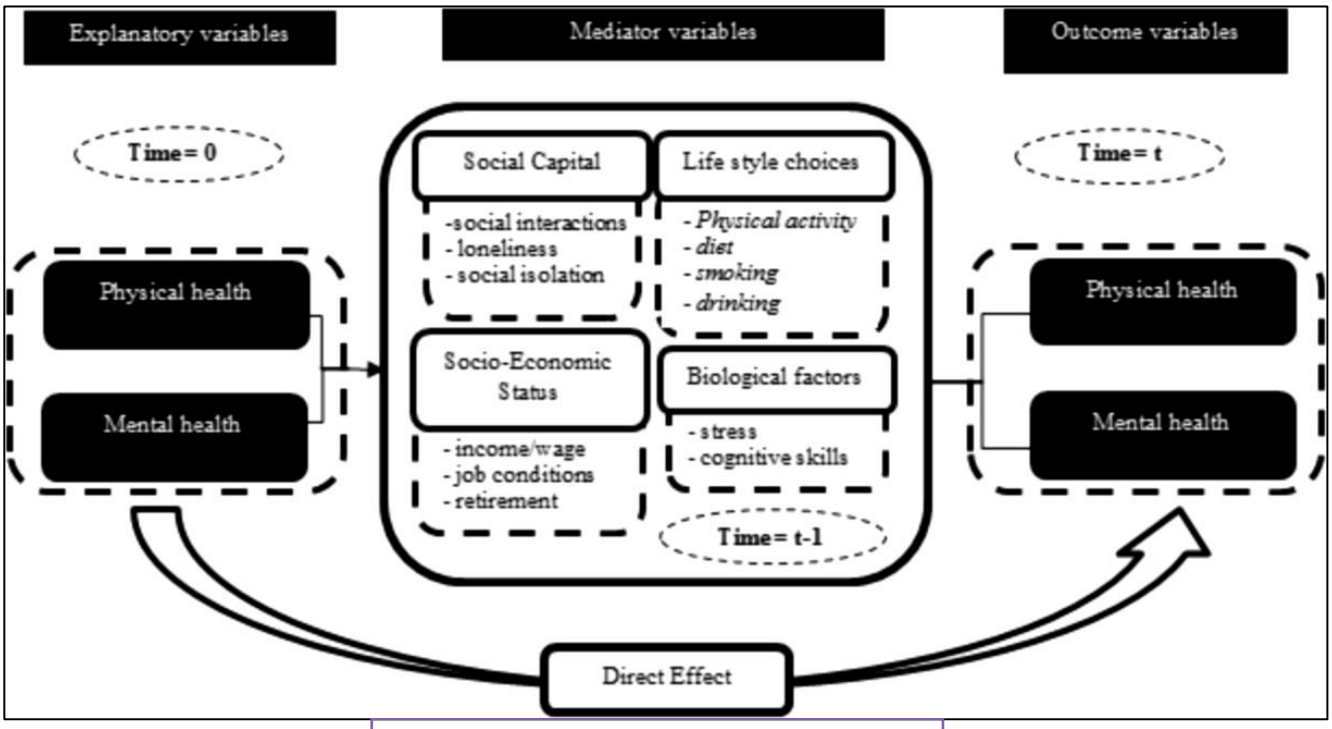
Unfortunately, this study did not demonstrate a statistically significant change in the number of ED visits even though the data moved in the direction we would have expected, with a greater proportion in the lower categories and lower proportion in the higher. There was already a high proportion of participants reporting never using the ED at baseline, so the lack of change is not altogether surprising. The p-value of 0.069 was so close to significance though that we wonder whether having a higher-powered study with more participants would have pushed the results into significance. It would be interesting in future studies to track the impact of Veggie Rx on high ED utilizers specifically (as well as hospital readmission rates rather than this surrogate measure).

Behavioral Health

The improvement in social interaction associated with Veggie Rx (a 6.2% decrease in the proportion of participants reporting visiting friends or family "less than once a month") suggests Veggie Rx may affect mental health, since social isolation contributes to mental illness.[37] Participants were supplemented nutritionally and socially in the program through interaction with farmer's markets vendors or fellow participants at group cooking workshops.

We had also hoped to measure Veggie Rx's impact on mental health by surveying participants about their frequency of nervousness or stress; however, we did not find a statistically significant change over the duration of their enrollment. Our question may have overlooked the fact that some degree of stress is a normal part of life, and future studies may choose to specifically define "chronic" or "toxic" stress as the parameter of interest (i.e. stress that feels like it is too difficult to handle, is physically or mentally debilitating, or interfering with normal life).[38]

However, in our qualitative data, many participants alluded to decreased financial stress related to their increased food security. This fact, combined with the increased social interaction and previously mentioned improvements in physical health and lifestyle changes, demonstrates Veggie Rx's potential for being an essential component of the Behavioral Health Home model. Ohrnberger, Fichera, and Sutton outline exactly this set of factors in their mediation analysis (Figure 5) describing the impact of physical health on mental health, and mental health on physical health. Intimately tied into this process was economic stability and social interaction. The authors went on to explain that improved physical and mental health encouraged positive lifestyle changes (their example was smoking cessation), which in turn improved physical and mental health.[39] Since Veggie Rx follows this schema, it is an ideal intervention for the Behavioral Health Home model to improve health holistically, preventing worse outcomes, and contributing to a more efficient healthcare system.



[Figure 5] Courtesy of Ohrnberger, Fichera, Sutton

Two-Generational Approach to Health

Though not intended for study, it is worth noting the impact Veggie Rx had on the children of participants. Participants described their children accompanying them to the market, helping prepare meals, enjoying the consumption of more fruits and vegetables, and even experiencing health improvements. Although not assessed quantitatively, these qualitative findings suggest that children directly benefit both physically and mentally from Veggie Rx via the same mechanisms as their parents, even though they were not specifically targeted by the intervention. In addition to the household adults' mood, resilience, and quality of life influencing the child's physical health,[40] the Council on Community Pediatrics also describes the role that poverty – with food insecurity a vital aspect – has on developing self-regulation, executive function, and toxic stress which ultimately result in significant individual and societal economic hardship[41]. Our study has demonstrated that Veggie Rx can improve household food insecurity and a parent's physical and mental health, thereby impacting the direct and indirect environmental influences on a child's health. Noting that the standard allotment for one participant had the potential for benefiting the entire household, our findings suggest Veggie Rx could be a cost-effective investment that focuses on "upstream prevention which sets the trajectory for lifelong health and reduction in chronic disease, which in turn leads to sustainable reductions in healthcare costs".[25]

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Conclusions

This study has demonstrated that Veggie Rx affects individuals and communities by arguably touching upon all four domains of the CCO spending priorities for non-medical "Health Related Services": the "neighborhood and built environment" through supporting local Farmers Markets, "economic stability" by curbing food insecurity and giving participants financial flexibility to pay other necessary costs of living, and "education" through group workshops that additionally benefit mental health, all of which contribute to "social/community health". The statistically significant improvements in self-perceived health and reductions in polypharmacy suggests Veggie Rx could make healthcare institutions more medically effective and more cost effective, especially since the two-generational health improvements of Veggie Rx holds the potential for preventing poor health, poor outcomes, and financial losses for society in the generations to come.

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