



NEVADA DIVISION of PUBLIC
and BEHAVIORAL HEALTH

Health Impact Statement Fruit and Vegetable Prescription Program (FVRx)

DIVISION OF PUBLIC AND BEHAVIORAL HEALTH

DEPARTMENT OF HEALTH AND HUMAN SERVICES

STATE OF NEVADA



Published December 2023

Problem

Food insecurity is associated with a 20 percent increase in the risk of self-reported measures of hypertension and a 30 percent increase in the risk of self-reported hyperlipidemia. Food-insecure individuals have a 2.4 times higher risk of diabetes and hypertension (Gundersen & Ziliak, 2015). The FVRx Program aimed to decrease hypertension by addressing food insecurity and providing farm fresh fruit and vegetable boxes to food-insecure patients in Clark County and surrounding Las Vegas areas with hypertension, high cholesterol, or who have experienced a post-cardiac event. Food insecurity is a social and economic condition where access to food is limited or uncertain. It differs from hunger in that hunger is a physiological feeling. Food insecurity has broad effects on health due to the mental and physical stress it places on the body (America's Health Rankings, n.d.). According to the CDC, food insecurity is associated with higher healthcare costs (Berkowitz et al., 2019). According to 2020 data, 12.9 percent of households in Nevada were unable to provide adequate food for one (1) or more household members due to a lack of resources, compared to 11.7 percent of the United States households (America's Health Ranking, n.d.). Identifying food-insecure adults and linking them to available resources could be essential in addressing disparities in high blood pressure, diabetes, and obesity prevention and control (Mendy et al., 2016).

Intervention

The intervention included one (1) Community Health Worker (CHW) and two (2) Registered Dietitians (RDs) to implement the FVRx program. Patients discharged from Dignity Health Hospitals were prioritized based on their hypertension status, high cholesterol, or post-cardiac event status. NaviHealth is the platform used to refer participants to the RDs. The screening tool *Are You at Risk for Heart Disease?* is used to determine eligibility for the referral to the FVRx and the Healthy Heart Program (HHP) at other locations and community partners. Participants must score a five (5) or higher to qualify for both programs, and the CHW ensured participants were referred to the appropriate program. The screening tool includes two (2) food insecurity questions, which helped to identify the individuals the program targets and tracks. Food-insecure participants could choose to join the HHP or the FVRx program.

Once individuals were referred, the CHW contacted them to schedule an initial appointment with the RD. The RD explained the program and captured baseline data, including a baseline blood pressure measurement and Body Mass Index (BMI) calculation. Patients completed a pre-program survey capturing current fruit and vegetable intakes to set goals. The final aspect of the appointment was for the RD to address barriers and provide tips for healthy eating patterns. The patients identified as food insecure were then offered a consent form allowing the state to collect and analyze their survey data. Over the next six (6) months, participants of the FVRx Program received bi-monthly fruit and vegetable boxes delivered to their homes by Cluck-It Farms, a local Las Vegas farming vendor. The boxes included fresh produce as well as healthy eating tips and recipes. Medication Therapy Management (MTM) and Medical Nutrition Therapy (MNT) are optional services. At the three (3)-month mark, the CHW checked in with each participant, administered a second survey to determine progress, including a blood pressure measurement, and assisted with overcoming any barriers. If necessary, a patient may have been referred back to the RD for additional guidance and support. At the completion of six (6) months, each participant met with the RD to collect final data, including completing the post-program survey, blood pressure measurement, and BMI calculations.

The comparison group, the HHP, was implemented alongside the intervention group. Dignity Neighborhood Hospitals patients and community members who expressed interest with a

score of five (5) or higher on the *Are You At Risk of Heart Disease?* Screening tool who signed a consent form and did not report food insecurity were enrolled into the HHP. The comparison group received the four-course education from the RD but did not receive the bi-monthly fruit and vegetable boxes until the classes were complete. Participants also attended an MNT appointment with the RD within 45 days of completing the final education course. MTM is also offered as an optional service in HHP. The QTAC also provided data collection for all individuals enrolled in the intervention and comparison groups. After completing the program, the individuals enrolled in the HHP were invited to receive any educational courses and additional produce boxes.

Health Impact

Overall, participants in the Fruit and Vegetable Prescription (FVRx) program and Healthy Heart Program (HHP) who had higher than normal blood pressure at the pretest in programs and who had both pretest and posttest systolic blood pressure were included in these analyses. A one-way ANCOVA was conducted to evaluate the effect of program on post-intervention systolic blood pressure after controlling for pre-intervention systolic blood pressure. There was a significant intervention effect, $F(1, 108) = 6.08, p = .015, \text{partial } \eta^2 = .053$. After adjustment for pre-intervention systolic blood pressure, the FVRx programs had lower post-intervention systolic blood pressure than HHP participants. A Chi-Square test was used to determine if the proportion of respondents in the four (4) blood pressure stages at posttest differed between the two (2) programs among participants with higher-than-normal blood pressure at pretest. There was a statistically significant difference between the two groups $\chi^2(3, N = 11) = 9.18, p = .027$. The proportion of participants at normal and prehypertension stages at the posttest did not differ between the two (2) groups. However, a higher percentage of FVRx participants compared to HHP participants were in Stage 1 at posttest and a lower percentage of FVRx participants were in Stage 2 hypertension compared to HHP participants at the posttest. The two (2) groups did not differ with respect to blood pressure stages at pretest.

A Chi-Square test was used to determine if the proportion of respondents who had achieved blood pressure control at posttest differed between the two (2) programs among participants with higher-than-normal blood pressure at pretest. There was not a statistically significant difference between the two groups, $\chi^2(1, N = 111) = .169, p = .68$. Chi-square tests were also used to determine if the frequency with which participants engaged in lifestyle behaviors at posttest differed by program. There were not statistically significant differences between the two (2) programs with respect to frequency of eating fruits, eating vegetables, nor the frequency of exercising. However, FVRx participants reported eating high amounts of fat less frequently than HHP participants, $\chi^2(3, N = 195) = 16.37, p < .001$. Also, FVRx participants reported eating high amounts of salt less frequently than HHP participants, $\chi^2(3, N = 195) = 20.47, p < .001$.

According to the QTAC, longitudinal engagement with participants was consistently vexatious and the participants, like many others, had little understanding regarding the value and benefits of the medical nutrition therapy (MNT) and medication therapy management (MTM) components. Participants might have been less likely to engage these services due to this lack of knowledge. The QTAC reported some language barriers due to the participants

being primarily Spanish-speaking. There were also significant challenges in recruiting and enrolling rural communities in the surrounding areas of Las Vegas. In future implementations, it would be beneficial to secure additional Spanish-speaking staff members, including RDs and CHWs. In addition, focusing more attention on accessing and improving potential participants' health literacy, and budgeting for incentives to encourage consistent participation and enhance data collection. There is also potential for the programs to focus on risk factors such as stress and tobacco use when engaging with these populations. Further evaluation would be necessary to determine the influence and increased risk of cardiovascular disease as well as barrier reduction for these factors. While the FVRx program did observe these factors, they were excluded from HHP surveys.

There was a large emphasis on community partners throughout the implementation, which provided a diverse community pool. Partners such as local casinos, wellness centers, churches, and other places of worship played a significant role in the outreach and referral for the FVRx program and HHP. QTAC's relationships with community partners aided the programs' success and continue to impact the lives touched by these interventions. This will be a significant factor for any future iterations of this program.

This publication was supported by the Nevada State Department of Health and Human Services through Grant Number 5 NU58DP006538-05 from the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Department nor the CDC.

References

- America's Health Rankings analysis of U.S. Department of Agriculture, Household Food Security in the United States Report, United Health Foundation, AmericasHealthRankings.org, Accessed 2021.
- Berkowitz, S. A., MD, MPH, Basu, S., MD, PhD, Gundersen, C., PhD, & Seligman, H. K., MD, MAS. (2019). State-Level and County-Level Estimates of Health Care Costs Associated with Food Insecurity. Retrieved from https://www.cdc.gov/pcd/issues/2019/18_0549.htm
- Gundersen, C., & Ziliak, J. P. (2015). Food Insecurity And Health Outcomes. Health affairs (Project Hope), 34(11), 1830–1839. <https://doi.org/10.1377/hlthaff.2015.0645>
- Mendy, V. L., Vargas, R., Cannon-Smith, G., Payton, M., Enkhmaa, B., & Zhang, L. (2018). Food Insecurity and Cardiovascular Disease Risk Factors among Mississippi Adults. International journal of environmental research and public health, 15(9), 2016. <https://doi.org/10.3390/ijerph15092016>
- [Christiansen EJ, Saunders S, Cazares S. Fruit, and Vegetable Prescription Program Cumulative Results. University Nevada Reno-Center for Program Evaluation and Nevada Division of Public and Behavioral Health; 2023.](#)