

An Apple a Day Keeps Diabetes at Bay: Incentivizing Participation in Diabetes Self-Management Education with Fruit & Vegetable Vouchers

Angie Mejia, Mary Kate Lee, and Shannon M. Monnat

Diabetes is an urgent public health problem in the U.S., with 30.3 million people diagnosed with Type 2 diabetes as of 2017¹. Compared to the percentage of non-Hispanic whites with diabetes in 2017 (7.4 %), Native Americans (15.1 %), African Americans (12.8%) and Latinos (12.1%) have much higher rates.¹ Low-income individuals and those with less than a high school education are also more likely to be diagnosed with diabetes than individuals with a higher income and education.^{2,3} Efforts to improve access to healthy foods and to educate patients about diabetes self-management may help to reduce the unequal burden of diabetes among these marginalized and medically underserved groups.⁴

Uncontrolled or poorly managed diabetes can lead to high blood glucose levels, kidney and cardiovascular problems, vision problems, and nerve damage. Patients can manage diabetes by improving their diets, increasing physical activity, monitoring glucose levels, and participating in routine physician examinations. Educational programs for diabetes self-management,⁵ including those that incorporate assistance with purchasing fruits and vegetables,⁶ have been found to improve patient adherence to physician recommendations, increased healthy behaviors, and improve health outcomes among low-income individuals with Type 2 diabetes.

This brief describes the results of a 12-month, diabetes self-management education and fruit and vegetable purchase assistance intervention

KEY FINDINGS

- Providing vouchers to low-income Type 2 diabetes patients increases their purchase of fruits and vegetables.
- Participation in diabetes self-management education was associated with increases in fruit and vegetable intake, weight loss, and a decrease in blood sugar levels among low-income adults with Type 2 diabetes.
- Integrating a fruit and vegetable purchase assistance incentive with diabetes self-management education is a cost-effective way to increase low-income patient participation in diabetes self-management education and improve self-management knowledge and behaviors.

designed to improve diabetes self-management knowledge and health outcomes (weight, glucose, blood pressure, and cholesterol) among adults diagnosed with Type 2 diabetes.

Findings suggest that small incentives for fruit and vegetable purchases are associated with higher educational program attendance, increased fruit and vegetable consumption, and decreased weight and blood sugar among low-income adults with Type 2 diabetes.

Diabetes Self-Management Education and Fruit/Vegetable Purchase Assistance Intervention

With funding from Excellus Blue Cross Blue Shield, the Lerner Center for Public Health

Promotion at Syracuse University partnered on a 12-month intervention with a local clinic (*Primary Care Center West*), a primary care hospital (*St. Joseph's*), and a small, locally-owned grocery store (*NoJaim Brothers Supermarket*) to incentivize participation in a diabetes self-management education program, with the aim of improving health outcomes among adults with Type II diabetes in a low-income community in Syracuse, NY. Participants were 48 adults (age 18 and older) with Type 2 diabetes, spread across four cohorts (7-9 participants per cohort).

As part of the 12-month intervention, participants attended monthly group educational sessions led by a registered dietitian and other clinical support staff, including pharmacists, podiatrists, and ophthalmologists. Lessons focused on nutrition, physical activity, medication management, healthy cooking, smart shopping, and eye and foot care. An average of 12 lessons were held in each of the four cohorts. On average across the cohorts, participants attended nearly 75% of sessions. Monthly support group meetings were established for participants who expressed interest in continuing meetings after the sessions ended. Support groups were held monthly after the completion of the 12-month curriculum.

Participants received \$5 incentive vouchers to purchase fresh and frozen fruits and vegetables at our partner grocery store each time they attended a monthly group meeting or appointments related to diabetes care (e.g., nutrition counseling meetings with the registered dietitian, follow-up blood pressure or glucose checks). Participants also received other incentives, such as reusable grocery bags, cooking utensils, and pill boxes. A total of 1,687 fruit and vegetable coupons were distributed to participants. Redemption rates were high, varying monthly from 65% to 100%. Our tracking of specific items purchased with the vouchers revealed that the most commonly purchased fruits included bananas,

grapes, oranges, apples, and strawberries. The most commonly purchased vegetables included tomatoes, cucumbers, peppers, lettuce, and potatoes.

A brief programmatic survey was administered to the participants who had most recently completed the 12-month curriculum (N=27) to identify which modules were well-received, which incentives were most beneficial and whether participants perceived improvements in their health due to their participation. When asked what incentives were most useful in helping to better manage their diabetes, participants noted the fruit and vegetable coupons (92%), kitchen cooking utensils (80%), and the pill boxes (56%). In terms of the educational lessons, respondents noted that the Smart Shopping (70.4%), Medication Management (66.7%) and Physical Activity (66.7%) modules the most useful. Other useful modules included eye health (55.6%) and Diabetes 101 (44.4%). Participants noted that these classes were most useful in helping them to better understand the consequences of not effectively managing their diabetes and for learning strategies to take care of their health.

Program Participants Lost Weight and Reduced their Blood Sugar Levels

Prior to enrollment in the diabetes self-management education program, we collected data on participant weight, blood sugar (HbA1c), blood pressure, and LDL cholesterol levels and then again after the 12-month program ended. Participants achieved a combined weight loss of 327 pounds, representing 2.1% of total body weight. Blood sugar levels decreased by an average of 6.7%. There were no discernible decreases in blood pressure or LDL cholesterol levels.

Participants Improved their Knowledge about Diabetes and

Engaged in More Healthy Behaviors

In surveys administered at the end of the education program, the majority of participants (83%) reported that they significantly increased their fruit and vegetable intake since starting the program. Eighty percent reported that they had increased their level of physical activity significantly (44%) or a little (36%). Almost all (92%) felt that their knowledge of diabetes and diabetes self-care had improved. Two-thirds reported that they scheduled an eye or foot exam after attending the classes. Participants also noted feeling more empowered to manage their condition and to find the resources to do so. Patients also shared the positive impacts of connecting with others who have similar anxieties around their condition. Most importantly, participants gained the confidence and ease to speak with their providers and take a more active role in planning for their care.

Implications for Clinical Practice

Integrating a fruit and vegetable purchase assistance incentive with diabetes self-management education can be a cost-effective way to increase patient participation in diabetes self-management education and improve self-management knowledge and behaviors. Education interventions that target low-income patients can be effective if they promote and incentivize fruit and vegetable consumption and increase nutrition knowledge and access to nutritionists, counselors, and other patient education programs. However, the somewhat modest declines in weight and blood sugar and lack of decline in blood pressure and cholesterol suggest that educational programs alone are not sufficient for improving outcomes among low-income individuals with diabetes.

Neighborhood context, socioeconomic, housing, and family support factors, must be considered when designing diabetes interventions.^{2,5,7,8,9}

Data

We drew our sample from among 729 adults (age 18 and older) diagnosed with Type 2 diabetes. Some of these individuals were current patients of a medical provider partner. Fifty patients were selected to participate in the 12-month intervention that spanned 2016 and 2017. One patient declined to participate. 48 patients enrolled in the intervention and attended at least one educational session. Five patients stopped participating after one session due to hospitalization, cessation of services, or unknown reasons. Sample participants were mostly female (67%), 48% self-identified as African American, 33% as non-Hispanic white, 33% as Latino, and 13% as other or refused to answer. We collected participant health data before and after participation in the education program (weight, blood sugar [HbA1c], blood pressure, and LDL cholesterol levels). In December 2016, a brief survey was administered to participants that had recently completed the 12-month intervention (N=27) on which educational sessions were most helpful, which incentives were most beneficial, and whether participants perceived improvements in their health and/or their diabetes self-management behaviors due to their participation in the program.

Endnotes

1. Centers for Disease Control and Prevention. (2017). National diabetes statistics report, 2017. Atlanta, GA: Centers for Disease Control and Prevention.
2. Conroy, K., Sandel, M., & Zuckerman, B. (2010). Poverty grown up: how childhood socioeconomic status impacts adult health. *Journal of Developmental & Behavioral Pediatrics*, 31(2), 154-160.
3. Geiss, L. S., Wang, J., Cheng, Y. J., Thompson, T. J., Barker, L., Li, Y., ... & Gregg, E. W. (2014). Prevalence and incidence trends for diagnosed diabetes among adults aged 20 to 79 years, United States, 1980-2012. *JAMA*, 312(12), 1218-1226.
4. Marks, R., & Allegrante, J. P. (2005). A review and synthesis of research evidence for self-efficacy-enhancing interventions for reducing chronic disability: Implications for health education practice (part II). *Health Promotion Practice*, 6(2), 148-156.
5. Norris, S. L., Engelgau, M. M., & Narayan, K. V. (2001). Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care*, 24(3), 561-587.
6. Palar, K., Napoles, T., Hufstедler, L. L., Seligman, H., Hecht, F. M., Madsen, K., ... & Weiser, S. D. (2017). Comprehensive and medically appropriate food support is associated with improved HIV and diabetes health. *Journal of Urban Health*, 94(1), 87-99.
7. Tung, E. L., Cagney, K. A., Peek, M. E., & Chin, M. H. (2017). Spatial Context and Health Inequity: Reconfiguring Race, Place, and Poverty. *Journal of Urban Health*, 94(6), 757-763.
8. Gaskin, D. J., Thorpe Jr, R. J., McGinty, E. E., Bower, K., Rohde, C., Young, J. H., ... & Dubay, L. (2014). Disparities in diabetes: The nexus of race, poverty, and place. *American Journal of Public Health*, 104(11), 2147-2155.
9. Rosland, A. M., Kieffer, E., Israel, B., Cofield, M., Palmisano, G., Sinco, B., ... & Heisler, M. (2008). When is social support important? The association of family support and professional support with specific diabetes self-management behaviors. *Journal of General Internal Medicine*, 23(12), 1992.

Acknowledgements

This project was supported with funding from Excellus Blue Cross Blue Shield.

About the Authors

Angie Mejia is a former graduate Fellow with the Lerner Center for Public Health Promotion and a Ph.D candidate in the Sociology program at the Maxwell School of Citizenship and Public Affairs at Syracuse University (amejia@syr.edu). Mary Kate Lee is the Program Coordinator for the Healthy Monday Campaigns at Syracuse University (mlee77@maxwell.syr.edu). Shannon M. Monnat is the Lerner Chair for Public Health Promotion and Associate Professor of Sociology at Syracuse University (smmonnat@maxwell.syr.edu).

The mission of the Lerner Center for Public Health Promotion at Syracuse University is to improve population health through applied research and evaluation, education, engaged service, and advocating for evidence-based policy and practice change.

426 Eggers Hall | Syracuse | New York | 13244
 syracuse.edu | lernercenter.syr.edu