Implementing Food Insecurity Screenings and Self-Care Assessments: A Quality Improvement Project Among Diabetic Patients in a Free Clinic

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Abstract

Type 2 diabetes is an American epidemic effecting more than 24 million adults in the United States (Berkowitz, Gao, & Tucker, 2014). Diabetes is currently the seventh leading cause of death in the United States (Smalls, Gregory, Zoller, & Egede, 2015). Current estimates suggest that as many as a quarter of adults with diabetes struggle to obtain food that is suitable for their nutritional requirements (Knight, Probst, Liese, Sercy, & Jones, 2015). Diabetics who struggle with affording and obtaining food to adhere to an appropriate diet are at an increased risk for experiencing poor outcomes (Lyles et al., 2013). The purpose of this quality improvement project was to implement a food insecurity screening tool and a self-care assessment for diabetic patients seeking care at a safety net clinic and evaluate providers perceptions of the usefulness of the selected assessment tools.
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Introduction

There are approximately 24 million people living with type 2 diabetes mellitus (T2DM) in the United States (Berkowitz, Gao, & Tucker, 2014). Current estimates suggest that the number of Americans living with T2DM will rise to 30 million by the year 2050 (Smalls, Greory, Zoller, and Egede, 2015). T2DM is currently the seventh leading cause of death among American adults (Smalls et al., 2015). Poorly controlled T2DM results in decreased life expectancy, increased rates of heart disease, and renal failure (Healthypeople.gov, 2016). T2DM and associated complications are a significant financial burden in the United States. In 2012 alone healthcare costs associated with T2DM were estimated to have exceeded $200 billion (Smalls et al., 2015).

As many as 17 million household experienced some degree of food insecurity (FI) in 2010 (Lyles et al., 2013). Heerman et al. (2015) defines food insecurity as “the limited or uncertain availability of nutritionally adequate and safe foods” (p. 844). Knight, Probst, Liese, Sercy, and Jones (2015) states that individuals diagnosed with a chronic disease, such as T2DM, are more likely to experience FI. Estimates suggest that as many as a quarter of Americans living with T2DM struggle to obtain food that suits their nutritional needs (Knight el al., 2015). Poor compliance, poor glycemic control, and poor medication adherence have been observed in individuals with T2DM who struggle with FI (Mayer, McDonough, Seligman, Mitra, & Long, 2015). Lyles et al. (2013) found that patients with T2DM who struggle to afford an adequate diet are at an increased risk of experiencing costly complications related to the disease process.

Individuals of low socioeconomic status experience T2DM and FI at disproportionate rates and are more likely to depend on safety net clinics to meet their healthcare needs. Patients seeking care from safety net clinics have been found to have higher rates of T2DM,
hypothesis, multiple co-morbidities, and polypharmacy (Shalowitz et al., 2016). Many safety
net clinics were established to provide acute care services to those who would have difficulty
obtaining it otherwise. As the number of individuals living with chronic ailments has increased,
these free clinics have adapted to be the medical home of many Americans in need of chronic
disease management (Mehta et al., 2016). Safety net clinics serve as a site of primary care for the
over 40 million Americas who are uninsured or underinsured (Nguyen, Makam, & Halm, 2016).

Primary care providers (PCPs) play an important role in successful T2DM management.
PCPs work with patients to improve diabetic management by providing patient education,
recommending exercise regimens, dietary changes, and by prescribing medications to promote
glycemic control (Mehta et al., 2016). Lifestyle modifications are a cornerstone to the
management of T2DM, and successful management requires the adaption of a nutrient dense diet
and physical activity. Obtaining a nutrient dense diet is challenging for many individuals who
seek care from safety net clinics due to financial constraints (Eng et al., 2017). PCPs working in
safety net clinics should be aware of the effects of FI on self-care activities and should provide
education and interventions specific to the needs of the patient with T2DM and FI.

Significance

The Healthy People 2020 initiative established a goal to reduce morbidity and mortality
of T2DM, decrease the economic burden of the disease, and improve the quality of life for
individuals living with T2DM (Healthypeople.gov, 2016). As many as 14.3 percent of
households in the United States experienced some degree of FI in 2013. The Healthy People
2010 initiative established a goal to reduce FI to six percent, but this was unfortunately unmet
(Goldberg & Mawn, 2014). The Healthy People 2020 initiative recognizes the need for
continued improvement in this area and established the same goal of reducing FI from 14 percent
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to six percent (Healthypeople.gov, 2016). Minority races and individuals of low socioeconomic status are at increased risk of suffering from T2DM as well as FI, which places these individuals at an increased risk for experiencing poor patient outcomes (Lyles et al., 2013). Knight et al. (2015) identified the need for increased education on the effects of FI, and the need for identifying community-based food assistance resources for individuals living with FI.

The American Diabetes Association (ADA) recognizes that diet therapy is a critical component of diabetes management and recommends that all individuals with T2DM receive dietary education. Monitoring carbohydrates is a significant component of diet therapy. The ADA reports that a review of randomized control trials have demonstrated that nutrition therapy improves glycemic control. The ADA recommends that individuals with T2DM do not skip meals, choose carbohydrates that are nutrient-dense, increase consumption of lean protein, and limit sodium to 2,300mg or less per day (American Diabetes Association, 2018). Following the dietary recommendations of the ADA is difficult for individuals who struggle to obtain food and are left with fewer options about what type of food they eat.

**Clinical Problem Statement**

Individuals diagnosed with T2DM and living with FI have an increased risk of experiencing poor glycemic control, dangerous hypoglycemic episodes, and other health complications (Silverman et al., 2015). Efforts to improve assessments for FI and self-care in adults diagnosed with T2DM are necessary in an effort to direct education and interventions to those at greatest risk for the development of complications, poor glycemic control, and poor medication adherence. With a large number of FI patients seeking care for T2DM at safety net clinics, PCPs in these settings require tools that allow them to identify FI and self-care needs in order to implement the best treatment plans.
Literature Review

A review of current literature was conducted to identify the prevalence of FI, the health implications of FI among patients with T2DM, and to identify what screening tools are currently being utilized to identify FI.

Prevalence of Food Insecurity

Current data suggests that FI is a major public health concern. Goldberg & Mawn (2015) conducted a retrospective study which utilized data from the National Health and Nutrition Examination Survey to identify predictors of FI in older adults. In this study the authors state that FI impacts more than 14% of household in the United States. This study reports that individuals who were identified as being FI were also likely to report depressive symptoms and the use of government assistance, such as food stamps. The authors of this study called for more nursing authored research to develop screening tools and interventions specifically tailored to food insecure populations. Only elderly adults over the age of 60 were utilized for this study, which is an identifiable limitation to the findings.

Knight et al. (2015) conducted a cross sectional study with a sample of individuals with T2DM (n= 3,242) who participated in the National Health Interview Survey in 2011. The authors of this study state that individuals who are diagnosed with a chronic disease experience FI disproportionately to individuals without chronic disease. This study reports that 17% of individuals with T2DM surveyed were food insecure (Knight et al, 2015).

Minority status and living in poverty contribute to both T2DM and FI (Lyles et al., 2013; Seligman et al., 2012). Lyles et al. (2013) conducted an observational study that reported that minorities and socioeconomically disadvantaged patients are more likely to have T2DM and
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report FI. Seligman et al. (2012) conducted a cross-sectional survey of patients with T2DM at safety net health clinics in which the authors found that 46% of their participants were food insecure. FI among individuals with T2DM is a prevalent problem that requires additional attention.

**Health Implications of Food Insecurity Among Type 2 Diabetics**

The health implications of FI and risks for diabetic complications are noted throughout the current research on this topic. Silverman et al. (2015) conducted a secondary analysis of randomized control trial data and concluded that individuals living with FI are more likely to suffer from depression, poor medication compliance, and higher hemoglobin A1C. In a cross-sectional survey conducted by Seligman et al. (2012) the authors state that FI contributed to higher hemoglobin A1C, increased difficulty following a recommended diabetic diet, and increased emotional stress. A cross sectional survey conducted by Mayer et al. (2015) report that FI has a significant impact on glycemic control among low income adults seeking care at an urban medical center. Lyles et al. (2013) conducted a secondary observational analysis study and reported that low income diabetic patients living with FI had poor self-care behaviors and higher hemoglobin A1C. A randomized control trial conducted by Heerman et al. (2015) found that individuals in their study that were identified as food insecure had poor glycemic control.

**Assessment Tools**

**USDA Food Security Survey.**

A review of the literature revealed that the *USDA Food Security Survey* is a tool that is widely utilized to screen patients for FI. There are several different versions of the *USDA Food Security Survey* that vary in the number of questions asked. There is also a Spanish version of the
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survey available (United State Department of Agriculture, 2012). Knight et al. (2015) utilized the 10-item USDA scale, while Heerman et al. (2015) utilized a 3-item scale to measure FI. There is also a six-item scale which has been reviewed and found to be a useful tool for assessing for FI. The Six-Item USDA Scale has been found to have a 92% sensitivity and a 99.4% specificity (Blumberg, Bialostosky, Hamilton, & Briefel, 1999). The Six-Item USDA Scale is a survey that was developed by the National Center for Health Statistics. The first question in the survey asks the respondent to state how often in the previous 12 months the household ran out of food and did not have the ability to obtain more food from the options often true, sometimes true, or never true. The second question asks how often the adults in the household could not afford to eat balanced meals from the responses often true, sometimes true, and never true. The third and forth questions ask if individuals in the household have had to reduce the size of their meals or skip meals due to a lack of available food, and if so, how often this occurred. The fifth question in the survey asked if the respondent had to eat less than they felt that they should due to a lack of available food, and the last question asked the respondent if they had experienced hunger but didn’t have money for food in the past 12 months. The number of affirmative responses determines the food security status of the respondent with zero to one affirmative answers indicating high food security. An individual with two to four affirmative responses is identifies as having low food security and five to six affirmative responses indicates very low food security. High food security indicates that the individual has no issues with consistently accessing food. Low food security indicates that the individual has needed to reduce the quality, variety, and desirability of food, but the quantity of food intake is not generally impacted. Very low food security indicates that the individual reduced food intake due to a lack of access to food and a lack of money to obtain more food (United States Department of Agriculture, 2012).
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**The Summary of Diabetes Self-Care Activities Assessment.**

*The Summary of Diabetes Self-Care Activities Assessment (SDSCA)* is a widely utilized assessment tool in adults with T2DM. The *SDSCA* measures self-care activities in the categories of diet, smoking status, self-monitoring of glucose, and self-monitoring of feet. The *SDSCA* has been reported to be a useful tool with a validity of 0.23 and a reliability of 0.40 (Toobert, Hampson, & Glasgow, 2000).

**Role of the PCP**

Mehta et al. (2016) states that PCPs play a critical role in influencing glycemic control through education, medication management, exercise recommendations, and dietary counseling. A prospective study conducted by Mehta et al. (2016) utilized a sample of patients seeking care at a free clinic (n=55) to assess the effectiveness of one on one visits with PCPs in lowering Hgb A1c at follow-up visits. Patients were counseled on the importance of establishing care with a PCP and asked to establish care at a Federally Qualifies Health Center. Participants made an initial visit for disease counseling and medication management and were asked to follow-up 9 months later for a repeat Hgb A1c. The authors report that 21 participants from the initial 55 follow-ups with the PCP as recommended. The participants who followed-up with the PCP at the federally qualified health center as recommended experienced a reduction in Hgb A1c. The authors report that Hgb A1c decreased from 9.5 to 8.3, a standard deviation of 2.2 (Mehta et al., 2016).

**Summary**

T2DM and FI are rising public health concerns. Individuals with both T2DM and FI are at an increased risk for experiencing poor glycemic control and poor health outcomes (Lyles et
PCPs play an important role in the successful management of T2DM and FI by providing interventions, education, and medication to patients (Mehta et al., 2016). Incorporating screening tools to assess for FI and self-care measures may be helpful in providing care to at risk patients. The *USDA Food Security Survey* is a common tool utilized to assess FI status. This tool is reported to have appropriate sensitivity and specificity (USDA, 2012). The *SDSCA* is a very common tool utilized to assess a patient’s self-care activities. This tool is reported to have appropriate reliability and validity (Toobert, Hampson, & Glasgow, 2000).

**Theoretical Framework**

The Theory of Human Motivation by A. H. Maslow was the framework chosen to guide this scholarly project (Maslow, 1943). The Theory of Human Motivation states that basic needs must be met prior to an individual being capable of satisfying more complex needs (Maslow, 1943). Maslow’s theory is often represented by a pyramid known as Maslow’s Hierarchy of Needs. This pyramid is comprised of five levels: (1) physiological; (2) safety; (3) love and belonging; (4) esteem; and (5) self-actualization. Physiological needs are at the base of the pyramid, and these needs include the requirement of food and water (Beran, 2013).

Maslow’s Theory of Human Motivation has been used as a framework for research related to the management of diabetes. Beran (2013) applied Maslow’s hierarchy to Type 1 diabetes research, in order to develop a framework for prioritizing needs and goals. This study found that survival is dependent on measures beyond simply supplying medications for diabetic management, and that the inability to meet the basic needs at the bottom tier of Maslow’s pyramid led to poor health outcomes and increased mortality (Beran, 2013).
Satter (2007) utilized Maslow’s hierarchy to develop a hierarchy of food needs. Satter’s pyramid is comprised of six levels, in which the basic need of having enough food must be met in order to advance to the next tier of the pyramid. The six levels presented in Satter’s model are: (1) enough food; (2) acceptable food; (3) reliable, ongoing access to food; (4) good-tasting food; (5) novel food; and (6) instrumental food (Satter, 2007). Satter (2007) states the need to provide patient education that is relevant to the patient’s present position on the pyramid, as providing information on food selection solely based on nutritional value is only obtainable for individuals functioning at the top of the hierarchy. As described by Maslow (1943) the attainment of physiological needs, such as food, is required before safety needs, such as health, can be satisfied. This proposed quality improvement project is developed with the understanding that appropriate diabetic management requires providers to consider the role of FI, and barriers to self-care, when implementing interventions and providing patient education. A major goal of this project is to educate providers, identify resources, and target education to the specific needs of diabetic patient’s seeking care in a safety net clinic. The hope is that these interventions will allow patients to improve their self-care and better enable them to successfully move to higher tiers of Maslow’s pyramid.

**Purpose and Aims**

The purpose of this quality improvement project was to implement a food insecurity screening and a self-care assessment for patients with T2DM seeking care at a safety net clinic and evaluate providers perceptions of the usefulness of the selected assessment tools. The purpose of this project was accomplished by the following aims:

1. The first aim was to educate providers and student providers on the implications of FI on diabetes self-care and teach providers how to utilize the *USDA Food Security Survey* and
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the Summary of Diabetes Self-Care Activities Assessment to assist providers with identifying FI and self-care deficits (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000).

2. The second aim was to implement the selected assessment tools in the safety net clinic to be utilized by providers and student providers.

3. The third aim was to provide providers and student providers with easy to read educational materials and community resources to assist with patient education and disease management.

4. The fourth aim was to determine whether the providers and student providers were satisfied with the usefulness of the selected assessment tools, as measured by the final provider survey.

**Expected Outcomes**

Following the implementation of this scholarly project, the expectation was that providers and student providers would increase their understanding of the prevalence of FI among patients with T2DM. Providers and students working at the safety-net clinic were expected to screen all patients with T2DM for FI using the USDA Food Security Survey and ask patients to complete the Summary of Diabetes Self-Care Activities Assessment (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). Providers and students were expected to provide targeted patient education to individuals that are found to be struggling with FI. Providers and students utilized educational information and patient handouts that were specifically selected for this project. After a patient encounter, providers and students completed a post-visit survey to identify patient demographics, level of FI, and barriers to utilizing the tools
provided. At the end of the project implementation period, providers and students were asked to compete a final provider survey to assess provider opinions regarding the selected screening tools.

**Methods**

**Design**

This DNP scholarly project was a quality improvement project conducted in a safety-net clinic providing care to an underserved population over a 12-week period. Screening tools were utilized by providers and students to identify patient’s with FI and T2DM in an effort to target education to the specific needs of patients. Providers and students were provided patient education and resources developed for this project. Providers and students were surveyed to determine provider preferences and the sustainability of the project.

**Sample/Setting**

The sample for this project was providers and student providers working with diabetic patients at a safety net clinic. This quality improvement project was conducted at Porto Urgent Care Clinic in Northeast Omaha, Nebraska. Porto Clinic is an urban free clinic that serves patients with a variety of healthcare needs, from acute complaints to chronic disease management. The clinic is located within the Heart Ministry Center, which is a community resource center providing clients with access to a food pantry, social work services, case management, job placement programs, and dental services. Close to 50% of the individuals utilizing Heart Ministry Center resources live below the federal poverty line. Approximately half of the patients served at this clinic are African American. The median household income of
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individuals served by the Heart Ministry Center and Porto Urgent Care Clinic is $25,000, nearly half the median income of the state of Nebraska (Seifert, 2018).

**Ethical Considerations**

Appropriate measures were taken to ensure patient confidentiality, including deidentifying all patient information. Screening tools collected for this project did not contain any identifying patient information and provider surveys did not contain the names of the respondents. Patients had the right to refuse participation and were not limited in the education or access to resources that any other patient would receive. This study was reviewed by the Creighton University Institutional Review Board (IRB) to ensure that they study was not in violation of any ethical standards of care.

**Interventions**

**Educate providers and students.**

Providers and student providers working at Porto Urgent Care Clinic were educated on the role of FI on diabetes management and self-care. A power point presentation was provided to providers and student providers summarizing the information that was discovered in the literature review. Providers and students received education on how to administer the screening tools chosen for this QI project.

**Implement assessments.**

Participants were screened for FI using the United States Department of Agriculture’s (2012) *Six-Item Food Security Scale* and were asked to complete the *Summary of Diabetes Self-Care Activities Assessment (SDSCA)* (Toobert et al., 2000). The SDSCA was modified from its
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original version to a condensed version that assessed diet, exercise, and blood sugar testing. The results of the *Six-Item Food Security Scale* and *SDSCA* were used to individualize patient education and identify available resources to help meet the specific needs of patients (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000).

**Provide educational resources.**

Providers and students were given easy to read educational materials to provide to patients at their discretion. Educational handouts included information on signs and symptoms of hypoglycemia and hyperglycemia, tools and tips for shopping and eating healthy on a budget, understanding blood sugar numbers, and dietary recommendations. Providers and student providers also received information on community resources and a list of local food banks to provide to patients.

**Assess provider perceptions.**

Providers and student providers completed a post-visit survey after each diabetic visit (See Appendix C). Providers and students were also asked to complete a final survey at the end of the data collection period to assess their perception of the usefulness, applicability, and sustainability of the screening tools chosen for the project (See Appendix D).

**Measurement Methods**

The United States Department of Agriculture’s (2012) *Six-Item Food Insecurity Scale* was utilized to screen patient with T2DM for FI (See Appendix A). The level of FI was identified for each patient surveyed. A score of 0-1 indicated high food security, a score of 2-4 indicated low food security, and a score of 5-6 indicates very low food security (United States Department of Agriculture, 2012). *The Summary of Diabetes Self-Care Activities Assessment*
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(SDSCA) was utilized to assess areas for self-care improvement (Toobert, Hapson, & Glasgow, 2000) (See Appendix B). The provider post-visit survey was completed after patients were screened for FI and completed the SDSCA (See Appendix C). The post-visit survey was utilized to collect demographic data and identify any barriers to implementing the screening tools at each visit. At the end of the 12-week implementation period, providers and student providers completed a final Likert-scale survey to assess for provider perceptions of the screening tools utilized and the sustainability of the project at Porto Urgent Care Clinic (See Appendix D).

Data Collection Procedures

Data collection was completed using the SDSCA and USDA Six-Item Food Insecurity Scale (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). Following patient visits and use of the selected screening tools, providers were asked to complete a post-visit survey. The post-visit survey asked about patient demographics including gender, age, ethnicity, last hemoglobin A1c, and food security status determined by the USDA Six-Item Food Insecurity Scale (United States Department of Agriculture, 2012). Providers used paper screenings and surveys that were filed into corresponding folders during the data collection period. After the 12-week data collection period was completed, providers and student providers completed the final provider survey on paper. Providers were asked not to write their names on the paper surveys to prevent bias. After the data collection period was complete, the data was entered into an excel spreadsheet for analysis. All data used for this project was deidentified.

Results

Descriptive data analysis was completed for 17 patients with T2DM who were screened for FI and completed the self-care assessment over the course of 12 weeks. Results provided
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information on patient demographics, hemoglobin A1c values, food security status, and areas of self-care deficient. Final provider surveys provided information on provider perceptions and preferences regarding the screening tools chosen for this project. Analysis of the data collected from the *Six-Item Food Insecurity Scale* and the *SDSCA* allowed providers and student providers to better understand the prevalence of FI in this population and the challenges that many patients face related to diabetes self-care. Responses to the final provider survey gave insight to the sustainability of this project at Porto Urgent Care Clinic. The majority of providers and student providers reported that the use of the *Six-Item Food Insecurity Scale* and the *SDSCA* were useful in the development of patient treatment plans and frequency of follow-up (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). Most providers and student providers also reported that they would like to continue to use these tools in the clinic.

**Patient Demographics**

There was a total of 17 patients with T2DM screened using the *Six-Item Food Insecurity Scale* and the *SDSCA* (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). This study evaluated the mean value of patient demographics. Patient ages ranged from 22 years to 64 years. The average patient age was 48.8 years. Males made up 24% of the patients screened and 76% of patients screened were females. African Americans represented 41% of the patient sample, 29% were Caucasians, 24% were Hispanic, and 6% identified as other. Hemoglobin A1c data was only provided for 10 patients. The mean hemoglobin A1c of those 10 patients was 8.51% with a range from 6.4% to 11.6%. Use of the *Six-Item Food Insecurity Scale* identified 17.6% of patients as having high or marginal food security, 58.8% were found to have low food security, and 23.5% were found to have very low food security.

**Self-Care Assessment**
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The SDSCA was modified for this project to only include information on diet, exercise, and blood sugar monitoring. There was a total of 8 assessment items. The first question asked patients how many of the last 7 days they followed a healthful eating plan. The mean number of days was 3.6. The second item asked the patients the average number of days over the course of the last month they followed a healthful eating plan. The mean number of days was 3.4. The third item asked patients how many of the past 7 days they ate at least 5 servings of fruits and vegetables. Analysis of the data revealed that the mean was 3.7 days. The fourth item asked patients how many of past 7 days they consumed high fat foods, and the mean number of days was 5.1. The fifth item asked patients to identify how many of the last 7 days they participated in at least 30 minutes of physical activity. The mean number of days was 3.9. The sixth item asked how many of the last 7 days the patient participated in formal exercise beyond what they complete at work or around the home. The mean number of days was 2.9. The seventh item asked patients to identify how many of the last 7 days they checked their blood sugar. The mean number of days was 2.3. The final item asked patients to identify the number of days in the last 7 days that they checked their blood sugar according to their healthcare providers recommendations. The mean number of days was 2.1.

Provider Perceptions

The final provider survey assessed provider perceptions on the usefulness of the screening tools chosen for this scholarly project. A total of 5 providers and student providers completed the final provider survey. The survey contained a total of 10 items that were scored with a Likert scale where a response of 0 indicated the provider strongly disagreed with the statement, 1 was disagree, 2 was neutral, 3 was agree, and 4 was strongly agree. Of the providers surveyed, 80% indicated strong agreement that the Six-Item Food Insecurity Scale and the
SDSCA were easy to use, while 20% indicated agreement that the tools were easy to use. Analysis of survey results revealed that 80% of providers agreed that they had time in patient visits to use the selected tools, while 20% responded neutrally to these items. Provider responses indicated that 80% of providers strongly agreed that the Six-Item Food Insecurity Scale and the SDSCA were helpful in developing patient treatment plans and allowed providers to tailor interventions to the specific needs of patients, while 20% indicated agreement with these questionnaire items. To assess sustainability of this project, providers were asked if they would like to continue to use these screening tools at Porto Urgent Care Clinic. Responses indicated that 80% of providers would like to continue to use that the Six-Item Food Insecurity Scale and the SDSCA, while 20% of providers responded neutrally about continuing to use these tools (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000).

Discussion

The data collected from this scholarly project confirms that the majority of patients with T2DM seeking care at Porto Urgent Care Clinic struggle with some level of FI. Analysis of data from the SDSCA confirmed that patients at the clinic struggle to adhere to a healthful eating plan and do not check their blood glucose as recommended by their healthcare provider. The results from the SDSCA indicated that the mean number of days that patients reported that they followed a healthful eating plan was 3.6 days but the average Hgb A1c was greater than 8%. There is the potential that recall bias affected the result of the SDSCA. Additionally, Hgb A1c data was only available for 10 of the 17 patients screened during this study, making it difficult to give a true average of Hgb A1c levels. The SDSCA and the Six-Item Food Insecurity Scale provide data that is helpful for providers to utilize when developing treatment plans and providing patient
education, however the results from the SDSCA do not seem to correlate to Hgb A1c results in this study (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000).

Individuals with both T2DM and FI are at an increased risk for experiencing poor glycemic control and poor health outcomes (Lyles et al., 2013). PCPs play an important role in the successful management of T2DM and FI by providing interventions, education, and medication to patients (Mehta et al., 2016). In order to care for patient with T2DM and FI, providers need tools and resources available to them to assist patients to overcome self-care deficits and prevent poor patient outcomes. The majority of providers and student providers at Porto Urgent Care Clinic indicated that the Six-Item Food Insecurity Scale and the SDSCA were useful tools that allowed interventions to be targeted to patient needs (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000).

Limitations

Several limitations were found during the implementation of this scholarly project. The clinic does not have access to reliable interpretation services, making it difficult to use the SDSCA and Six-Item Food Insecurity Scale for non-English speaking patients. The project was limited by the short time period allotted for data collection and by the unpredictability of patient volume and purpose of patient visits. The Six-Item Food Insecurity Scale and the SDSCA were only reportedly utilized for 17 patient visits. It is unclear how many patients with T2DM were seen in the clinic and not screened using the Six-Item Food Insecurity Scale and the SDSCA (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). The post-visit provider survey and the final provider survey were created for this project, and the reliability and validity of these methods can not be determined.
Implications for Further Research

The data collected for this scholarly project confirmed that Porto Urgent Care Clinic serves patients struggling with FI and that providers found the Six-Item Food Insecurity Scale and the SDSCA screening tools to be beneficial (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). Further research is needed to determine how screening tools and education targeted to overcoming FI and self-care deficits impacts glycemic control. Future studies should implement screening tools and education over a longer time period and assess for improvement by re-administering the screening tools after interventions and collecting data on hemoglobin A1c levels prior to and after interventions.

Conclusions

Providers and student providers in a safety-net clinic found the Six-Item Food Insecurity Scale and the SDSCA to be useful tools in determining FI and self-care deficits (United States Department of Agriculture, 2012; Toobert, Hapson, & Glasgow, 2000). The majority of patients with T2DM were found to have some level of FI, thereby validating the need for screening tools and patient interventions that address FI. Through initiating FI screenings and self-care assessments at Porto Urgent Care Clinic, efforts to decrease poor outcomes in this patient population have been initiated. Based on provider feedback, this project will be sustained in the clinic. The Six-Item Food Insecurity Scale will be added to the electronic health record to be utilized at the providers discretion (United States Department of Agriculture, 2012).
References


Appendix A

U.S. Household Food Security Survey Module: Six-Item Short Form

FILL INSTRUCTIONS: Select the appropriate fill from parenthetical choices depending on the number of persons and number of adults in the household.

HH3. I’m going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 12 months—that is, since last (name of current month).

The first statement is, “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

[ ] Often true
[ ] Sometimes true
[ ] Never true
[ ] DK or Refused

HH4. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

[ ] Often true
[ ] Sometimes true
[ ] Never true
[ ] DK or Refused

AD1. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn’t enough money for food?

[ ] Yes
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[ ] No (Skip AD1a)
[ ] DK (Skip AD1a)

AD1a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
[ ] Almost every month
[ ] Some months but not every month
[ ] Only 1 or 2 months
[ ] DK

AD2. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?
[ ] Yes
[ ] No
[ ] DK

AD3. In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?
[ ] Yes
[ ] No
[ ] DK

[End of Six-Item Food Security Module]

User Notes

(1) Coding Responses and Assessing Households’ Food Security Status:
Responses of “often” or “sometimes” on questions HH3 and HH4, and “yes” on AD1, AD2, and AD3 are coded as affirmative (yes). Responses of “almost every month” and “some months but not every month” on AD1a are coded as affirmative (yes). The sum of affirmative responses to the six questions in the module is the household’s raw score on the scale.
Implementing Food Insecurity Screenings and Self-Care Assessments

Food security status is assigned as follows:

- Raw score 0-1—High or marginal food security (raw score 1 may be considered marginal food security, but a large proportion of households that would be measured as having marginal food security using the household or adult scale will have raw score zero on the six-item scale)

- Raw score 2-4—Low food security

- Raw score 5-6—Very low food security

For some reporting purposes, the food security status of households with raw score 0-1 is described as food secure and the two categories “low food security” and “very low food security” in combination are referred to as food insecure.

For statistical procedures that require an interval-level measure, the following scale scores, based on the Rasch measurement model may be used:

<table>
<thead>
<tr>
<th>Number of affirmatives</th>
<th>Scale score</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>1</td>
<td>2.86</td>
</tr>
<tr>
<td>2</td>
<td>4.19</td>
</tr>
<tr>
<td>3</td>
<td>5.27</td>
</tr>
<tr>
<td>4</td>
<td>6.30</td>
</tr>
<tr>
<td>5</td>
<td>7.54</td>
</tr>
<tr>
<td>6</td>
<td>8.48</td>
</tr>
</tbody>
</table>

((evaluated at 5.5)

However, no interval-level score is defined for households that affirm no items. (They are food secure, but the extent to which their food security differs from households that affirm one item is not known.)

(United States Department of Agriculture, 2012).
Appendix B

The Summary of Diabetes Self-Care Activities

The questions below ask you about your diabetes self-care activated during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick.

Diet

How many of the last SEVEN DAYS have you followed a healthful eating plan?

0  1  2  3  4  5  6  7

On average, over the past month, how many DAYS PER WEEK have you followed your eating plan?

0  1  2  3  4  5  6  7

On how many of the last SEVEN DAYS did you eat five or more servings of fruit and vegetables?

0  1  2  3  4  5  6  7

On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?

0  1  2  3  4  5  6  7

Exercise

On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? (Total minute of continuous activity, including walking).

0  1  2  3  4  5  6  7

On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?

0  1  2  3  4  5  6  7

Blood Sugar Testing

On how many of the last SEVEN DAYS did you test your blood sugar?

0  1  2  3  4  5  6  7

On how many of the last SEVEN DAYS did you test you blood sugar the number of times recommended by your healthcare provider?

0  1  2  3  4  5  6  7

(Toobert, Hampson, & Glasgow, 2000).
Appendix C
Post-Visit Provider Survey

Visit date: ________

Patient Demographics
Gender: ________
Age: ________
Race/Ethnicity: ________
Last Hgb A1c: ________

Food Security Status:
(circle one)
Raw score 0-1 Raw score 2-4 Raw score 5-6

Visit Details
Was this patient screened for food insecurity at this visit?
YES NO
If no, why?
1. Patient refused
2. Time constraints
3. Lack of provider knowledge/confidence in administering screening
4. Patient has been screened in the past 60 days
5. Other: ____________________________________________

Did this patient complete the SDSCA Assessment?
YES NO
If no, why?
1. Patient refused
2. Time constraints
3. Lack of provider knowledge/confidence in administering screening
4. Patient has been screened in the past 60 days
5. Other: ____________________________________________
Appendix D

Final Provider Survey

Please respond to the following six statements using a Likert-type scale where:

0= Strongly Disagree; 1= Disagree; 2= Neutral; 3= Agree; 4= Strongly Agree

1. The USDA Food Security Survey was easy to use.
   0 1 2 3 4

2. I had time in my patient visits to use the USDA Food Security Survey.
   0 1 2 3 4

3. The results of the USDA Food Security Survey were useful in developing treatment plans for diabetic patients.
   0 1 2 3 4

4. The results of the USDA Food Security Survey allowed me to tailor interventions and education to the specific needs of patients.
   0 1 2 3 4

5. I would like to continue using the USDA Food Security Survey at Porto Clinic.
   0 1 2 3 4

6. The SDSCA Assessment was easy to use.
   0 1 2 3 4

7. I had time in my patient visits to use the SDSCA Assessment.
   0 1 2 3 4

8. The results of the SDSCA Assessment were useful in developing treatment plans for diabetic patients.
   0 1 2 3 4

9. The results of the SDSCA Assessment allowed me to tailor interventions and education to the specific needs of patients.
   0 1 2 3 4

10. I would like to continue using the SDSCA Assessment at Porto Clinic.
    0 1 2 3 4