I, Meghan McNeill, hereby submit this original work as part of the requirements for the degree of Master of Science in Nutrition.

It is entitled:
A Qualitative Study Exploring Food Pantry User’s Self-Management of Type 2 Diabetes

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Committee member: Debra Ann Krummel, Ph.D.
A Qualitative Study Exploring Food Pantry User’s Self-Management of Type 2 Diabetes

A thesis submitted to the Graduate School of the University of Cincinnati in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Department of Nutritional Sciences
College of Allied Health Sciences
by

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ABSTRACT

**Significance:** Previous research has indicated that low-income, food-insecure adults with type 2 diabetes have suboptimal self-management and consequently increased risks for complications associated with type 2 diabetes.

**Objective:** The purpose of this study was to explore current type 2 diabetes self-management, facilitators and barriers of self-management, and perceived needs to improve disease self-management.

**Methods:** A qualitative study (seven focus groups) was conducted with 49 food pantry users with type 2 diabetes at a food pantry located in inner city. The audio-recorded focus groups were transcribed verbatim and analyzed following content analysis.

**Results:** Most participants (aged 54.9±16.2 years old) were African-American (87%) with a high school education or less (66%). Key facilitators to these behaviors included support from family and health care providers and reliable transportation for grocery shopping and clinic visits. However, having other multiple chronic diseases/conditions and lack of social support and transportation were identified as barriers. Challenges to consuming a healthy diet were discussed more often than other self-management behaviors. Diabetes self-management support group sessions led by experts from various health fields in a community setting rather than a clinical setting with open discussion were most frequently suggested as an idea for self-management program.

**Conclusions and Implications:** Major barriers included managing other chronic medical conditions, and not having enough money or access to healthy foods. The main facilitators included social support, having a good relationship with health-care providers, and community resources that provide free foods and clinical services. These findings can be used to develop an intervention program to improve self-management of type 2 diabetes in populations with food insecurity.
ACKNOWLEDGEMENTS

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INTRODUCTION

Type 2 Diabetes mellitus is a chronic disease that results from a progressive insulin secretory defect on the background of insulin resistance. Diabetes is associated with risk of blindness and diabetic retinopathy, amputations, and pregnancy complications. Additionally, those with diabetes are at risk of kidney failure, coronary heart disease and stroke, hypertension.¹,² As of 2012, approximately 20.1 million people in the U.S. aged 20 years were diagnosed with diabetes. The estimated medical expenses for people with diabetes are 2.3 times higher compared to people without diabetes.³,⁴ Estimated costs for diabetes in 2012 were approximately 245 billion dollars in 2012, 176 million from due to direct expenses and 69 million from indirect expenses (disability, work loss, and premature death).³

The primary treatment goal for diabetes is to minimize the associated complications described above by keeping blood sugar levels within normal ranges through successful self-management of diabetes.⁵,⁶ These include medication adherence, regular physical activity, dietary modifications, and weight management.⁵ Several factors have been identified as barriers to and/or facilitators of self-management of diabetes, such as social support,⁵,⁷,⁸ neighborhood socio-economic status,⁹,¹⁰ knowledge,¹¹-¹⁴ food security,¹⁵-¹⁷ and health insurance.¹⁸,¹⁹ Success in several intervention studies targeting adults from a diverse span of socioeconomic status has been found when the focus was on diet,²⁰ physical activity,²⁰-²² behavioral strategies,²⁰ social support,²³-²⁶ and health related quality of life.²⁰,²⁷

Adults of lower-income households and those who are food insecure have a higher prevalence of diabetes.²⁸ Previous studies have explored barriers and to self-management of type 2 diabetes with adults from a diverse span of socioeconomic status. However, these findings
may not be applicable to developing intervention programs that target low-income food insecure adults with type 2 diabetes. Food insecure adults have been found to have poor glycemic control in diabetes self-management, specifically in relation to blood glucose monitoring, medication access, medication adherence, health care access/utilization, social support, and poor adherence to dietary recommendations. The findings from these studies are based on adults from a range of socioeconomic status and therefore may not be applicable to develop appropriate interventions for those who are food insecure, low-income adults with type 2 diabetes. Hence, investigating potential barriers and facilitators that adults of lower-income households and those who are food insecure may experience can lend to tailoring intervention programs based on the unique needs of these populations. Additionally, it would be worthwhile to identify these populations’ interest in participating in an intervention program, as well as preferences for topics to be discussed and learning strategies. The objective of this study is to explore the current diabetes self-management practices, barriers and facilitators to diabetes self-management, and intervention needs for the disease management in food pantry users with type 2 diabetes.
LITERATURE REVIEW

Individual Risk Factors for Type 2 Diabetes

Those who are of low economic status, who are food insecure and/or of a minority population are associated with risk of type 2 diabetes. Adults of lower socio-economic status and/or those living in lower income households are at a higher risk of being diagnosed with diabetes. For example, in a study using data from the 1994-2004 National Health and Nutrition Examination Survey and 2000 US Census, a study that assessed the prevalence of type 2 diabetes in adults found an inverse association between the prevalence of type 2 diabetes and income level. Additionally, Ross et al investigated whether there is an association between the incidence of diabetes and lower-income adults. Results from this study showed that when compared to adults living in households with higher income, those living in a lower income households were 1.6 times more likely to be diagnosed with diabetes.

In addition to income level, there is a clear relationship between food security and type 2 diabetes; food insecure adults are also at an increased risk for type 2 diabetes. In a cross sectional analysis that used U.S. National Health and Nutrition Examination Survey data from 1999-2002 to evaluate the association between food insecurity and diabetes, prevalence of diabetes in the food secure, mildly food insecure, and severely food insecure was 11.7%, 10.0% and 16.1%, respectively. Additionally, the prevalence of diabetes has been found to be higher minority groups. Several studies have identified the risk of type of diabetes in minority populations. When minority groups such as African American, Asian American, and Mexican American were compared to non-Hispanic whites, non-Hispanic Black and Mexican American racial groups were twice as likely and Asian Americans were 30% more likely to be diagnosed with type 2 diabetes, based on nationally representative data.
In addition to economic status, food insecurity and race/ethnicity, additional personal factors can increase the risk of being diagnosed with type 2 diabetes. Those who are over the age of 65 years, have a history of diabetes,\textsuperscript{36,45} are over-weight/obese,\textsuperscript{46-49} have a medical history of gestational diabetes,\textsuperscript{50} have insulin resistance,\textsuperscript{51} or have a fatty liver\textsuperscript{51} are at a higher risk for type 2 diabetes. The InterAct Consortium study investigated the association between a family history of diabetes and incidence in adults from 8 different European countries. According to the results from this study, family history was significantly associated with a higher incidence of type 2 diabetes after adjusting body mass index (BMI) and waist circumference. Risk was also increased with the presence of bi-parental history of type 2 diabetes.\textsuperscript{45} Additionally, a study was conducted using nationally representative data to investigate the relationship between risk family history of diabetes and being diagnosed with diabetes. The results showed that the odds of diabetes increased by 2.95 times for participants when diabetes was a factor in the family history when compared to participants for whom a family history of diabetes was not a factor.\textsuperscript{36}

**Behavioral Risk Factors for Type 2 Diabetes**

There are several lifestyle behaviors known to increase risk of diabetes that have a more realistic potential to be modified. Several lifestyle behaviors such as smoking,\textsuperscript{46,47,52} moderate alcohol intake,\textsuperscript{46,47,52} poor quality diet,\textsuperscript{46,47,50,53,54} and physical inactivity\textsuperscript{46,47,49} have been positively associated with risk of diabetes. For example, Mozaffarian et al conducted a 10-year longitudinal study to determine how individual lifestyle factors or combined lifestyle factors relate to new-onset of diabetes in adults. Risk of incidence of diabetes was assessed based on low-risk lifestyle factors such as regular physical activity, healthy diet (high fiber intake, high ratio of polyunsaturated to saturated fat consumption, low \textit{trans}-fat intake and low mean
glycemic index), limited smoking history, low alcohol intake, a BMI less than 25, and waist circumference less than 88 centimeters (cm) for women and 92 cm for men. Participants who did not meet the criteria were categorized as high-risk. When compared to participants who reported high risk lifestyle behaviors, those practicing low-risk lifestyle factors for physical activity (26% of participants), dietary habits (31% of participants), smoking (23% of participants), alcohol use (34% of participants), BMI (45% of participants), and waist circumference (46% of participants) had a lower prevalence of diabetes. The risk continued to lower when multiple low-risk factors were present. For each low-risk factor identified, a 35% lower risk of diabetes was found. For example, when compared with participants who were categorized as low-risk for any behaviors, a decrease in incidence was observed in the low-risk group for 1 lifestyle factor (HR 0.70, 29% of participants), 2 lifestyle factors (HR 0.63, 36% of participants), 3 lifestyle factors (HR, 0.35, 21% of participants), or 4 lifestyle factors (HR, 0.05, 5% of participants).47

Complications of Type 2 diabetes

Several complications may occur as a result of type 2 diabetes. The most common complications include cardiovascular disease,55-60 vision impairment and blindness,61,62 and kidney disease.56,63,64 In addition, pancreatitis,65 neurologic diseases such as Alzheimer’s disease and/or dementia,66 foot ulcers,67 and amputations68 are also identified as complications of type 2 diabetes. Both physical and laboratory evaluations can be used to minimize the risk of these complications. Physical evaluations can monitor blood pressure and skin and foot care. Laboratory assessments such as Hemoglobin A1c (HgbA1c), fasting lipid profile (total, LDL, and HDL cholesterol and triglycerides), liver function tests, albumin excretion with albumin-to-
creatinine ratio, serum creatinine and calculated glomerular filtration rate are also values that can be monitored.\(^2\)

Complications of kidney disease were shown in a longitudinal study that examined the incidence and mortality of chronic kidney disease (CKD) in patients with type 2 diabetes over 5.5 years. The study found that 31.7% of participants developed CKD and 8.3% died.\(^63\) Risk of vision impairment and blindness is also of concern for adults with type 2 diabetes. In a study that assessed the risk of incidence and progression of microvascular complications such as neuropathy and retinopathy in adults with type 2 diabetes, participants with a higher resting heart rate had a greater incidence of neuropathy and retinopathy. Approximately 4 years after the baseline assessment, 8.2% of participants experienced a major microvascular event. Almost 4% and 5.2% had a new onset or worsening of nephropathy or retinopathy, respectively.\(^69\) Additionally, those with type 2 diabetes are at risk of needing amputations, especially in the event of suboptimal glycemic control. In a longitudinal study conducted over a 6 year period that assessed the risk of lower-extremity amputations in low-income adults with type 2 diabetes, for every 1% increase for baseline Hemoglobin A1c (HgbA1c), risk of lower-extremity amputations in African American and white populations increased by 13% and 15%, respectively.\(^70\)

**Self-management of Type 2 Diabetes**

A major component of the treatment of type 2 diabetes involves lifestyle behaviors that reduce the risk of complications associated with it. According to the American Diabetes Association (ADA), type 2 diabetes management requires ongoing medical care and consistent patient self-management education and support. The goals are the prevention of short-term complications and the reduction of the risk of long-term complications. Maintaining glycemic
control is one primary focus for self-management of type 2 diabetes, and this can be monitored through HgbA1c levels. The ADA target goal for HgbA1c is at or below 7.0%,\textsuperscript{2,71} a level which has been shown to reduce microvascular complications of diabetes.\textsuperscript{2} Glycemic control can be successfully achieved by following diabetes self-management recommendations, which include monitoring blood glucose, medication adherence, healthy eating patterns and maintaining or increasing physically activity (Figure 1.).\textsuperscript{2}
Self-monitoring of Blood Glucose

Self-monitoring of blood glucose (SMBG) is one of the two primary techniques available for patients and health care providers to assess the effectiveness of a glycemic control management plan. Adults with diabetes can use SMBG to frequently monitor their glycemic control, which can be useful in preventing both hyper and hypoglycemia. SMBG has also been found to aid in a patient's understanding and ability to adjust certain self-management practices such as diet, medication, and physical activity to improve glycemic control. For example, Karter et al explored the relationship between SMBG and glycemic control by comparing adults with type 2 diabetes who were new to SMBG (new users) to those who were previously practicing SMBG (prevalent users). At baseline, HgbA1c levels for new users compared to prevalent users using no medication were 8.2% and 6.4%, using oral hypoglycemic agents (OHA) only were 8.6% and 7.6%, and those using insulin were 9.3% and 8.1%. At the start of
the study, HgbA1c levels for new users were compared to HgbA1c levels for prevalent users, and regardless of medication treatment, prevalent users had lower HgbA1c levels than new users. At the end of four years, the new user groups HgbA1c levels showed a decrease from the baseline levels. After the initial date of SMBG, the change in HgbA1c for new users who did not take medication, OHA, and insulin was -0.35% -0.42%, and -0.23%, respectively.72 This study proves that SMBG can be an essential tool to improving glycemic control.

In addition to having a positive effect directly on glycemic control, previous studies identified indirect benefits related to SMBG. Compliance to SMBG has been found to have a positive correlation to diet73 and medication adherence,74 and has been an aid in improving HgbA1c levels.72,73 The association between glycemic control and SMBG may be a result of biological feedback associated SMBG, as it can facilitate a participant’s understanding of how behaviors (e.g., exercise and diet) and clinical states (e.g. different insulin doses or timing) impact blood sugar levels.72 For example, in a behavioral weight loss intervention study conducted by McAndrew et al, the association between SMBG to weight loss and HgbA1c levels was examined. This study found that an improvement in SMBG was correlated with greater weight loss and a greater adherence to dietary recommendations over a 3-month time period. Although no correlation between SMBG and HgbA1c was found, a greater weight loss was correlated to a lower HgbA1c, indicating an indirect relationship between increased SMBG and improved HgbA1c.73 Thus this study suggests SGBM may have direct positive effects on weight loss and an indirect effect on HgbA1c levels.
Diet Recommendations for Self-management of Type 2 Diabetes

Improving dietary habits to include eating a well-balanced, nutrient rich diet can also improve glycemic control. Currently, there is no standardized macronutrient recommendation for diabetes self-management. However, the Academy of Nutrition and Dietetics (AND) makes recommendations about optimal diet patterns for adults with type 2 diabetes but does not recommend any ideal percentage for macronutrient consumption. These recommendations include consuming carbohydrates from fruits, vegetables, whole grains, legumes, and low-fat milk for general good health. Dietary guidelines emphasize a healthy eating pattern that incorporates nutrient-dense foods in appropriate portion sizes, coupled with regular physical activity. Sargrad et al compared metabolic outcomes for adults with type 2 diabetes who followed either a high protein or high carbohydrate diet for 8 weeks. Between the high-carbohydrate and high-protein group, no significant difference in weight loss was found, (2.2±0.9 kg, 2.5±1.6 kg, respectively, P=0.9). HgbA1c significantly decreased (from 8.2% to 6.9%, P=0.03) in the high-carbohydrate group; however, HgbA1c was not significantly different in the high-protein group (from 7.6% ± 0.9% to 6.6%±0.5%). Benefits to a high-protein diet were observed in blood pressure, with a decrease in diastolic and systolic blood pressure (-18±9.0 mm Hg, P<.05, and (-10.5±2.3 mm Hg, P<.03, respectively), whereas no differences were found in blood pressure for the high-carbohydrate participants. These results indicate that diet recommendations should be focusing on a well-balanced diet of protein, carbohydrate, and fats to improve glycemic control.

Physical Activity Recommendations for Self-management of Type 2 Diabetes

Physical activity is another important component of diabetes self-management. For adults
with type 2 diabetes, physical activity has been found to improve insulin sensitivity\textsuperscript{77} and glucose control,\textsuperscript{71, 78} contribute to weight-loss and maintaining a healthy weight,\textsuperscript{71, 79} and improve well-being.\textsuperscript{71} At least 90 to 150 minutes per week of moderate-intensity aerobic physical activity in addition to two to three days per week of resistance and strength training are recommended for adults with type 2 diabetes.\textsuperscript{71, 77} Hordern et al conducted a randomized controlled trial to compare usual care for diabetes to an experimental group that participated in usual care (targeting blood pressure and lipid profiles, as well as smoking cessation), in addition to a 4-week exercise program. Participants who practiced both cardiorespiratory and resistance exercise group had a significant change in BMI compare to the usual care group.\textsuperscript{79}

A combination of both aerobic and resistance training, rather than either in isolation, may have optimal benefits for glycemic control. A randomized controlled trial compared the benefits of aerobic training alone, resistance training alone, and a combination of both aerobic and resistance training in adults with type 2 diabetes who participated in a 9-month exercise program. This trial indicated that only the combined aerobic and resistance training group resulted in a significant decrease in HgbA1c when compared to the non-exercise group. In contrast, no significant change in HgbA1c was found when the non-exercise control group was compared to the groups who participated in only resistance training group or aerobics group.\textsuperscript{78} The studies described above support that adults with type 2 diabetes should practice a combination of cardio and strength training on a regular basis.

**Pharmacological Treatment for Type 2 Diabetes**

In addition to lifestyle modifications discussed above, pharmacological treatment plays an important role in the self-management of type 2 diabetes. To help regulate blood sugar levels,
insulin or noninsulin medications (such as metformin) are prescribed. The decision on the type of diabetes medication(s) will depend on individual health factors, knowledge of potential side effects of medications, one’s risk of hypoglycemia, and patient preferences.²,⁷¹ Although diabetes medication(s) can be critical to managing diabetes and improving blood glucose levels, benefits associated with taking diabetes medication(s) will only occur if patients comply with prescribed recommendations. Medication adherence has significant effect on glycemic control.⁷⁴,⁸⁰ According to a 9-year longitudinal study that followed veterans with type 2 diabetes, HgbA1c decreased as medication adherence increased. Medication adherence was measured by Medication Possession Ratio (MPR), which evaluated purchasing medication, oversupply and refill adherence. For each percentage increase in MPR, participants were 48% less likely to have poor glycemic control.⁸⁰

**Barriers and Facilitators to Self-management of Type 2 Diabetes in Adults**

*Adherence to Self-management Recommendations*

Diabetes self-management involves practicing adherence, or behavior that is consistent with healthcare provider recommendations,⁸¹ in everyday life. Therefore, in order to consistently adhere to recommendations, individuals with type 2 diabetes may need to make several lifestyle changes. These changes may involve learning and mastering new skills such as personally checking blood sugar levels, taking medications based on meal times, increasing physical activity levels, and modifying eating habits. Numerous internal and external factors can influence one’s ability and/or motivation to change, as well consistently practice, lifestyle behaviors to adhere to self-management recommendations. Adults with type 2 diabetes often struggle with adherence to dietary recommendations,⁸²,⁸³ physical activity,⁸⁴,⁸⁵ medication adherence,⁸⁶ and
Factors associated with level of adherence include food insecurity, social support, health care access, health literacy, and perceived susceptibility to risk of diabetes-related complications (Figure 2).

**Food Insecurity**

Previous studies have shown that adults who are food insecure are more likely to experience several obstacles to managing type 2 diabetes. Food insecurity is defined by having limited quality or accessibility to food, which results in disrupted eating patterns and may lead to reduced food intake. Food insecure adults have been found to have poor self-efficacy in diabetes self-management, specifically in relation to blood glucose monitoring, medication access, medication adherence, health care access/utilization, social support, and poor adherence to dietary recommendations. Low-income adults who were food insecure had 1.48 greater odds of poor glycemic control (HgbA1c ≥8.5%). Those who were food insecure were also more likely to report poor adherence to a diabetic diet, lower diabetes self-efficacy, and higher emotional distress related to diabetes than food-secure, low-income adults.
Figure 2. Barriers and facilitators of type 2 diabetes self-management

Social Environment

One’s social environment can have a significant impact, either positive or negative, on type 2 diabetes self-management. Social support has been commonly used as a construct for theories of health behavior change related to diabetes self-management. Mayberry et al
evaluated the relationship between family support for diabetes self-management for adults with type 2 diabetes. Participants who were married and/or with a partner were more likely to report their respective families were knowledgeable about diabetes. Those of a higher income ($≥40,000) were more likely to report supportive family behaviors. Participants who reported non-supportive family members were inversely associated with adherence to diabetes medication (p=0.44, P<0.001), which was associated with HgbA1c levels.\(^5\)

**Access to Healthcare**

Access to health-care is important to achieving optimal glycemic control. Accordingly, adults with type 2 diabetes who do not have health insurance are more likely to have poor glycemic control.\(^{100}\) Zhang et al conducted a study to compare glycemic control between those with and without health insurance. Those who were uninsured (16%) were more likely to be younger, Mexican American, less educated (less than high school), live below to poverty level, have a lower BMI, and more likely to report fair of poor health compared to those who were insured (84%). Adults who were uninsured had poor diabetes control compared to those with health insurance, which was demonstrated by 34.1 vs. 16.9% HgbA1c value >9% (p=0.002), respectively. Those without health insurance were less likely to routinely use health care services compared to those with insurance. Those uninsured were also likely to meet ADA recommendations for yearly visits (four or more per year) compared to insured adults, 49.3 vs. 70.9%, respectively. When measured in a less frequent health care use (either a12 month period or one to three times per year) those without health insurance were more likely to not utilize healthcare services in both a 12 month or only one to three times per year compared to those with health insurance, 12% vs. 2.1%, and 38.6 vs. 27%, respectively. A lower frequency of health
care use was associated with a higher HgbA1c level. Those who did go to a health care visit in the last 12 months or 1-3 visits per year, were 4.8 times and 1.6 times more likely to have poor glucose control compared those who went 4 or more health care visits per year.\(^{100}\)
METHODS

Participants

All participants were recruited from Saint Vincent de Paul (SVdP), which is located in urban area of Cincinnati, Ohio. SVdP provides a variety of services to help Cincinnati residents in crisis including emergency assistance with rent and utilities, a food pantry, a charitable pharmacy, and a number of referral systems. SVdP has a Choice food pantry, providing groceries to more than 800 families monthly. Similar to a grocery store, this type of food pantry allows families to shop for the food and personal care items free of charge. The SVdP Charitable Pharmacy provides completely free medication and professional pharmaceutical care to those in need. It is a reliable safety net for those who have no other way to access their prescription medication. SVdP also hosts the University of Cincinnati’s Open School Clinic, which provides a variety of services to clients including: blood pressure checks, blood glucose checks, weight monitoring, and nutrition information.

A sample of 49 food-pantry users who have type 2 diabetes participated in one of seven focus groups (N= 6 to 9 people per focus group). The participants were recruited from a food pantry and clinic operated by Saint Vincent de Paul (SVdP) in an urban area of Cincinnati, Ohio. Recruitment methods included posting flyers throughout service areas as well as having research staff individually approach SVdP clients in the waiting room to determine interest in participation. The predominant form of recruitment occurred on the same day as focus group sessions. This recruitment strategy was done to maximize efficiency of recruitment efforts. The morning of each focus group session, research staff approached adults in the waiting area of SVdP to see if they were interested in participating in the study. Research staff members would then ask interested participants screening questions to determine eligibility. Inclusion criteria are
being an adult aged 18 years or older, having a diagnosis of type 2 diabetes, a recipient of the food pantry, speaking English as his/her primary language, and having no cognitive impairment. If eligible, participants had the option to attend the focus group session that same day. Participants received a $20 Kroger gift card after completion of all self-administered surveys and participation in the focus group.

**Procedures**

This study was approved by the Institutional Review Board of the University of Cincinnati. Participants who expressed interest in joining the study were required to complete a screening questionnaire to ensure inclusion criteria were met. For each participant, an informed consent was obtained to participate in this study. After completion of a survey, participants attended a sixty to ninety minute focus group session. The moderator was a volunteer from SVdP who received training from study staff for responsibilities and techniques essential for focus group sessions to discuss the level of details study staff were looking for, minimize discussions going off topic, and making sure all participants had a turn to talk. The moderator followed a script that included a welcome message and instructions prior to the start of the discussion. Additionally, several questions had leading prompts for the moderator to use in order to cue specific discussion topics.

**Data Collection and Instrument**

Prior to the start of the focus group session, participants completed a survey. The survey was either self-administered or completed with research staff. Survey questions asked about
demographics, food security status, nicotine dependence, medication adherence, and mental health.

**Sociodemographics and body mass index (BMI):** Mutually exclusive response categories were created for each variable. Sociodemographic variables included age, sex, race/ethnicity (non-Hispanic white, non-Hispanic Black/African American, or other), and marital status (married, single, divorced, separated, cohabitant, widowed/widower). Education level was categorized as less than high school degree, high school/General Education Development (GED), some college, or college graduate. Annual household income was categorized as $0, $1-$5,000, $5,001-$20,000, $20,001-$40,000, >$40,001. BMI was calculated from self-reported height and weight (kg/m^2). Health insurance was categorized as either “Yes” or “No” to having health insurance. Those who reported “Yes” were categorized as having private health insurance, Medicaid, Medicare, Medicaid and Medicare, Military health care, or other. Employment status was categorized as unemployed or employed. Those who reported being employed where categorized as being full-time (permanent), full-time (seasonal/temporal), part-time, or self-employed. Those who reported being unemployed where categorized as being out of work and looking for work, out of work but not currently looking for work, a homemaker, a student, retired, or unable to work. Participants were able to check all that apply for the following food and nutrition assistance program(s): food pantry, Supplemental Nutrition Assistance Program (SNAP), Women, Infants, and Children (WIC), WIC Farmer’s Market Nutrition Program, Senior Farmer’s Market and Nutrition Program (SFMNP), and soup kitchen.
**Food security:** Questions were derived from the Self-Administered Food Security Survey Modules for Youth Ages 12 and older questionnaire to make ask questions that could be self-administered for adults. According to the United States Department of Agriculture, the function the survey is to evaluate the level of household food security or insecurity “by obtaining information on a variety of specific conditions, experiences, and behaviors that serve as indicators of the degrees.” This survey assesses the degree to which a household food budget or food supply may be inadequate, potentially leading to a decrease in the quality or quantity of food, and experiencing the feeling of hunger or loss of weight. Using this validated method, food security scale was used to define food secure, low food secure, and very low food secure adults. Based on the U.S. Adult Food Security Scale, used to define high food security (raw score zero), marginal food security (raw score 1 to 2), low food security (raw score 3 to 5), or very low food security (raw score 6 to 10).

**Focus group**

Focus group questions were developed based on previous research that addressed self-management behaviors in persons with diabetes. The questions that were chosen elicited discussion on participants understanding and management of their diabetes; barriers and facilitators to self-management; the role community resources and/or health-care providers have on their self-management. Interest in an intervention program for diabetes self-management and type of intervention program were also explored. Participants were asked fourteen questions (Table 1.), which were sequenced to allow maximum insight from participants, which allowed participants to become more familiar with the topic and take time to recollect on personal opinions and listen to the opinions of other group members. Initial questions during the session
focused on knowledge of diabetes, complications associated with diabetes and what can be done to minimize associated complications. Participants were then asked what they do to manage their diabetes, as well as barriers and facilitators to their diabetes self-management. Participants were then asked what information and support they have received in a clinical setting and/or community resources. The final questions focused on gathering input from participants about interest in participating in an intervention program in a community setting such as a food pantry. All fourteen questions were tested in a pilot focus group session. During the pilot session, participants appeared to understand all fourteen questions and questions were therefore kept the same for all other sessions. Pilot data was not included in our analysis.

The moderator was a volunteer from SVdP and was trained to facilitate and open discussion that also kept participants on topic. The moderator for the focus group sessions was key to the quality of discussion because she is a good representation of our targeted population. Prior to this study, the moderator has previously volunteered at SVdP and had also collaborated with research staff members through a nutrition education program help at SVdP. The moderator is also very familiar with the community surrounding SVdP as she lives near the residential area of SVdP. Additionally; the moderator also has type 2 diabetes. She was trained to facilitate and open discussion that also kept participants on topic by research staff. For certain questions, the moderator would asked specific prompts in order to guide conversations to stay on topic.

An assistant moderator was present at all focus group to facilitate that each focus group sessions collected optimal data. The same assistant moderator attended all focus group sessions. The assistant moderator took notes and asked follow-up questions at the end of each focus group to clarify responses that were unclear and ask questions the moderator may have skipped. After each focus group session, the moderator and assistant moderator met to discuss impressions from
that particular session and to compare similarities and differences of responses from previous focus group sessions.

Table 1. Focus Group Questions

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<th>KNOWLEDGE</th>
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<td>What do you know about diabetes?</td>
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<td><strong>Prompts:</strong></td>
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<tr>
<td>• What is diabetes?</td>
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<td>• What are possible complications associated with diabetes?</td>
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<td>• What would be the most important thing to do to decrease those</td>
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<td>complications?</td>
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<th>SELF-MANAGEMENT</th>
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<td>What have you been trying to do to decrease the risk of complication related to diabetes?</td>
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<td>What do you do to manage your blood sugar?</td>
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<tr>
<td><strong>Prompts:</strong></td>
</tr>
<tr>
<td>• What self-management strategies (monitoring blood glucose, dietary</td>
</tr>
<tr>
<td>modifications, exercise) do you use most frequently and why?</td>
</tr>
<tr>
<td>• What lifestyle (health related to behavior) have you tried to improve</td>
</tr>
<tr>
<td>(Weight management, smoking cessation)?</td>
</tr>
<tr>
<td>What makes it easy to manage your blood sugar?</td>
</tr>
<tr>
<td>What makes it difficult to manage your blood sugar? (Food insecurity – more specifically, include stress, depression, etc.)</td>
</tr>
</tbody>
</table>

How do you think your environment, such as grocery store, restaurants, and convenience store in your neighborhood or close to your neighborhood, influence managing your diabetes?
What efforts have you made to overcome your barriers to controlling blood sugar?

Who is/are a major person/people providing support for your diabetes management?

**Prompt:**
- What type of help/support have you received from her/him/them?

If you have friends/family who also have diabetes, what type of support have you provided to them?

**Prompt:**
- How interested would you be in educating/providing support to others with diabetes?

<table>
<thead>
<tr>
<th>SELF-MANAGEMENT EDUCATION AT A CLINIC</th>
</tr>
</thead>
</table>
What information have you received about diabetes self-management for your health care providers, such as doctor, nurse, or pharmacist?

**Prompts:**
- What kind of information did you learn?
- Who educated you about this information?
- What type of education materials do you feel are most helpful?
- What information do you use the most?

How often do you have a follow-up visit for diabetes?

**Prompts:**
- What makes it easy to go to a follow-up visit?
- What makes it hard to go to a follow-up visit?

<table>
<thead>
<tr>
<th>COMMUNITY RESOURCES</th>
</tr>
</thead>
</table>
Besides clinic visits, what community resources or other programs have you found to be helpful with diabetes self-management?

How has the food bank at St. Vincent de Paul affected your self-management of diabetes?
**Prompts:**
- What has been helpful? Why?
- What has been helpful? Why?

What type of additional education program do you think would help you improve your self-management of diabetes?

**Prompts:**
- How would you be interested in participating in a diabetes management program at a community setting such as the food pantry compared to a program in a clinical setting? What makes you interested in it?
- How often would you want to participate in an education/support group program if it was held at the food pantry (times per year, length of time per session)?
- If you could design your own diabetes education program…..
  - How many people would you want to be with you in this program?
  - What activities would help you learn how to improve your self-management of diabetes?

**Data Analysis**

All focus group sessions were audio recorded and then transcribed by research staff that was facilitated by field notes taking by the research staff during the focus sessions to capture things that may be missed through the audio recording. The transcripts were analyzed using NVivo 10. This is a software program used for qualitative research to aid in organizing and analyzing unstructured data such as transcripts.

A codebook was developed through the collaboration of research staff, which involved creating an outline of themes and ideas that emerged throughout all focus group sessions. The codebook was an essential tool during the coding process that enabled research staff to organize themes and subthemes. To ensure inter-rater reliability, three coders independently analyzed all
transcripts. For consistency, emerging themes and patterns were discussed between all three coders. Coders discussed, compared and agreed on the best code(s) for each quote. Quantitative data was entered and analyzed in Excel to find mean and sums for survey questions. Missing data points were excluded from data analysis.
RESULTS

Demographics and Food Security Status

Seven focus groups involving 49 participants with type 2 diabetes (6 to 9 participants per focus group) were conducted. Demographic characteristics for the sample are listed in Table 2. The average age of participants was 54.9 years with equal representation of males and females. Most participants were single, had obtained less than a high school degree or a high school degree, and were African American. All participants’ household income was less $40,000, and more than half had a household less than $20,000. Many participants reported they had health insurance, primarily through Medicaid or Medicare. Most participants were unemployed, which was an account of being unable to work (Table 2). The vast majority of participants were categorized as being food insecure (95.5%), with 29.5% being of low food security and 65.9% being of very low food security (Table 3).

Table 2. Characteristics of survey population

<table>
<thead>
<tr>
<th>Age (years) (Mean ± SD)</th>
<th>54.9(±16.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male (%)</td>
<td>21 (45.7%)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>25 (54.3%)</td>
</tr>
<tr>
<td>Marriage Status</td>
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<tr>
<td>Married</td>
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</tr>
<tr>
<td>Single</td>
<td>30</td>
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<tr>
<td>Divorced</td>
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<tr>
<td>Separated</td>
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</tr>
<tr>
<td>Cohabitant</td>
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</tr>
<tr>
<td>Widowed/Widower</td>
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</tr>
<tr>
<td>BMI (kg/m²) (±SD)</td>
<td>33.6 (±8.7)</td>
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<tr>
<td>Highest Education grade completed</td>
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<table>
<thead>
<tr>
<th>Education Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school degree</td>
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<tr>
<td>High school/GED</td>
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<tr>
<td>Some college</td>
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<tr>
<td>College</td>
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<tr>
<th>Race/Ethnicity</th>
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<td>Non-Hispanic White or Caucasian</td>
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<tr>
<td>Non-Hispanic Black/African American</td>
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<tr>
<td>Other</td>
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<table>
<thead>
<tr>
<th>Household Income</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>$0</td>
<td>9</td>
</tr>
<tr>
<td>$1-5,000</td>
<td>16</td>
</tr>
<tr>
<td>$5,001-20,000</td>
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<tr>
<td>$20,001-40,000</td>
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<table>
<thead>
<tr>
<th>Type of Monthly Housing Expenses</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Living in home already paid for</td>
<td>4</td>
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<tr>
<td>Subsidized housing</td>
<td>20</td>
</tr>
<tr>
<td>Rented housing (no government assistance)</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
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</table>

<table>
<thead>
<tr>
<th>Health Insurance</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
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<tr>
<td>No</td>
<td>5</td>
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<table>
<thead>
<tr>
<th>Type of Health Insurance</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Private health insurance</td>
<td>3</td>
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<tr>
<td>Medicare</td>
<td>8</td>
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<tr>
<td>Medicaid</td>
<td>14</td>
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<tr>
<td>Military health care</td>
<td>1</td>
</tr>
<tr>
<td>Medicare and Medicaid</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
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<table>
<thead>
<tr>
<th>Currently Employed</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
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<td>Yes</td>
<td>7</td>
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<table>
<thead>
<tr>
<th>Type of employment</th>
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</thead>
<tbody>
<tr>
<td>Employment Status</td>
<td>Count</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Full-Time (Permanent)</td>
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<tr>
<td>Full-Time (Seasonal/Temporal)</td>
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<tr>
<td>Part-Time</td>
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<tr>
<td>Self-employed</td>
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<tr>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th>Reason not employed</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of work and looking for work</td>
<td>6</td>
</tr>
<tr>
<td>Out of work but not currently looking for work</td>
<td>0</td>
</tr>
<tr>
<td>A homemaker</td>
<td>2</td>
</tr>
<tr>
<td>A student</td>
<td>2</td>
</tr>
<tr>
<td>Retired</td>
<td>3</td>
</tr>
<tr>
<td>Unable to work</td>
<td>24</td>
</tr>
</tbody>
</table>

**Table 3. Food security among adults with type 2 diabetes who use a food pantry (n=44)**

<table>
<thead>
<tr>
<th>Food security status</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food secure (%)</td>
<td>2 (4.5%)</td>
</tr>
<tr>
<td>Low food security (%)</td>
<td>13 (29.5%)</td>
</tr>
<tr>
<td>Very low food security (%)</td>
<td>29 (65.9%)</td>
</tr>
</tbody>
</table>

**Themes**

Seven themes were identified (Table 4): (1) *Understanding and awareness about diabetes and its complications*; 2) *Current practices for managing type 2 diabetes*; 3) *Facilitators to self-management*; 4) *Barriers to self-management*; 5) *Knowledge sources*; 6) *Impact community resources have had on self-management*; and 7) *Interest in an intervention program for self-management*. 
Table 4. Summary of main themes and subthemes from results

<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding and awareness about type 2 diabetes and complications</td>
<td>- General understanding of type 2 diabetes</td>
</tr>
<tr>
<td></td>
<td>- Long-term complications</td>
</tr>
<tr>
<td>Current practices for managing type 2 diabetes</td>
<td>- Diet</td>
</tr>
<tr>
<td></td>
<td>- Physical activity</td>
</tr>
<tr>
<td></td>
<td>- Blood sugar monitoring</td>
</tr>
<tr>
<td></td>
<td>- Medication adherence</td>
</tr>
<tr>
<td>Facilitators to self-management</td>
<td>- Social support</td>
</tr>
<tr>
<td></td>
<td>- Understanding of diabetes</td>
</tr>
<tr>
<td></td>
<td>- Health-care providers</td>
</tr>
<tr>
<td>Barriers to self-management</td>
<td>- Other chronic medical conditions</td>
</tr>
<tr>
<td></td>
<td>- High food cost and inadequate access to healthy foods</td>
</tr>
<tr>
<td></td>
<td>- Taste preferences</td>
</tr>
<tr>
<td></td>
<td>- Lack of transportation</td>
</tr>
<tr>
<td></td>
<td>- Barriers to blood glucose monitoring</td>
</tr>
<tr>
<td></td>
<td>- Barriers to medication adherence</td>
</tr>
<tr>
<td></td>
<td>- Ways participants have overcome barriers</td>
</tr>
<tr>
<td>Knowledge sources</td>
<td>- Health-care provider(s)</td>
</tr>
<tr>
<td></td>
<td>- Family</td>
</tr>
<tr>
<td></td>
<td>- Other</td>
</tr>
<tr>
<td>Impact community resources have had on self-management</td>
<td>- Food resources</td>
</tr>
<tr>
<td></td>
<td>- Clinical services</td>
</tr>
<tr>
<td>Interest in an intervention program for self-management</td>
<td>- Logistics of program</td>
</tr>
<tr>
<td></td>
<td>- Topics</td>
</tr>
<tr>
<td></td>
<td>- Intervention format</td>
</tr>
</tbody>
</table>
Understanding and awareness about diabetes and complications

General understanding of type 2 diabetes
Most participants described diabetes using general terms, such as “silent killer,” high blood sugar, bad disease, a genetic disease. However, a few participants were able to give a concrete description or accurate definition of diabetes.

“Diabetes is the body’s inability to manage sugar”

“When I first got my diabetes I didn't know I had it but my mom was a diabetic. So I thought I heard it was hereditary so I checked into it and found out that I had it.”

“Diabetes is too much blood sugar in your blood stream or going to your pancreas, can’t deliver enough insulin.”

Long-term complications of type 2 diabetes

Many participants were able to identify at least one long-term complication of diabetes such as kidney failure, amputations, cardiovascular diseases, amputations or foot complications. Instead of listing long-term complications, several participants were only able to identify symptoms associated with low blood sugar (passing out, shakes, excessive sweating). Some participants stated death was a complication associated with diabetes.

“Yeah you don’t care of your diabetes, your kidney gives in. That’s what the doctors told me. Take care of your diabetes. Your kidneys fail. Your eyes can fog up, I mean go blind, you can fall out...”

“Diabetes is um, it’s hard to control. You have to control it, soon it controlling you. Um, the worst thing is um, your eyesight will go.”
Current type 2 diabetes self-management practices

Participants reported that they managed type 2 diabetes by eating a healthy diet, being physically active, monitoring blood sugar levels, and adhering to medication recommendations.

“The only thing I do is I just take my Metformin, I take the pill. The only thing I do is I take my Metformin everyday, I get up, I eat me a little breakfast in the morning, I watch what I eat and I eat plenty of vegetables.”

“It’s one more other thing. They give you a meter with it. And you, if you take your uh, you know to help yourself. If you take your sugar before the meal and then take it like 30 minutes afterwards when it’s settled, then you can find out.”

“No I do my finger prick every morning and then check my blood pressure every morning”

Diet

Even though many participants mentioned that they were trying to eat a healthier diet as part of their diabetes management, only some of them were able to provide specific details about what they were doing to eat a healthier diet. Common diet behaviors included eating more fruits and vegetables, planning out meals, and decreasing foods perceived to be less healthy such as certain meats, beverages, and carbohydrates. Eating consistent meals throughout the day seemed to be one of major strategies they have used, especially consuming breakfast regularly to maintain optimal blood glucose levels. Further, they used cooking methods, such as baking, broiling, or grilling food rather than frying to decrease fat consumption.

Most of them perceived their favorite foods as the less healthy option. However, some participants said they used portion control as a way to still enjoy these less healthy options. Increasing consumption of fruits and vegetables was a common theme. With fruit, however,
there was some confusion was seen as a contradictory for diabetes management because they contain sugars and increases blood sugar in spite of other health benefits.

“Eating the right food. Well, eating, have a balanced diet every day.”

“…cause I love my fried chicken. And I have to do baked, you know.”

“So all I've been doing is cutting my food level down to where if they only have chicken, I took, how I lost my weight is I slow my portions down. Instead of me eating a big plate like I love to eat, I eat a half a piece of chicken. Umm, 2 tablespoons of this and a tablespoon of that.”

“…I eat me a little breakfast in the morning, I watch what I eat and I and I eat plenty of vegetables.”

“I kind of watch what I eat. I eat a lot of fruit but my main thing is giving up my pop. I had the hardest time giving up my pop.”

Restriction on the choice and amount of beverage was also discussed as a component of diabetes management. Participants discussed consuming more or less of specific kinds of beverages. Some participants specifically discussed trying to drink more water. Decreasing or eliminating alcohol was also brought up by many participants. Reducing or removing pop and diet beverages was also discussed. Although diet beverages do not have any real sugar, some participants were able to identify that diet beverages are not a healthy alternative to sugary beverages such as pop, juice, etc. Participants also may be taking diet recommendations too far, which in turn led to a barrier to diabetes self-management. Carbohydrate consumption was the most common example of this.

“I kind of watch what I eat. I eat a lot of fruit but my main thing is giving up my pop. I had the hardest time giving up my pop.”

“Yes. Well, I know, when I first I found out like I said, I was pissed because I had to really change my lifestyle I mean. Drink beer, drink alcohol, smoke cigarettes, I mean that’s all day every day and when you find out you have to deal with this for the rest of your life man it ain’t hard to stop smoking, it’s not hard. Throw them away, ain’t no such thing as cold turkey. Stop smoking cigarettes, I smoke them. I had a pack of cigarettes a
day, a day and a half, I was drinking 12 pack of beer, I mean… but when I got sick realized what was going on. I stopped because I want to live.”

“And I don’t eat when I could, I cook corn bread you know my family comes, I don’t eat corn bread. I don’t eat biscuits. If I got a sandwich I trim all the bread around the sandwich. That’s how I eat me bread. I don’t eat grits. I don’t eat oatmeal. I don’t eat no cream of wheat.”

Physical activity

Physical activity was discussed as one of the major components of diabetes self-management. Participants identified different forms of physical activity that they practiced. Walking or riding a bike were the most common types of physical activity mentioned. Occasionally, participants mentioned that they go to a gym or attend group fitness classes.

“Walkin… I tried to walk to work and then tryin to rest. So walkin to work, right now I’m in physical therapy for my back and it’s helping and just exercising period.”

“Yea and start tryin to exercise. I’m gonna start goin back to the gym. Down to the Lord’s gym.”

Blood sugar monitoring and other strategies

Multiple participants explained that monitoring blood sugars daily, if not multiple times per day, helped prevent poor glycemic control. Frequent monitoring of blood sugar levels has several benefits for diabetes self-management. Weight loss or weight maintenance was also discussed. A few participants described their success in losing a significant amount of weight through eating a healthier diet and/or exercising. Smoking cessation was another behavior that was occasionally mentioned. Very few participants were able to say they were able to successfully quit smoking. Although participants were unable to successfully quit, some did say they were either trying to quit or decreasing the number of cigarettes smoked each day.
“Well I, umm, I'm doing weight loss. I've decided I'm going to try uhh, go to the gym like I said. A weight loss program for my weight to come down and I think I've already lost about 6 pounds.”

“I don’t smoke cigarettes but 10 years ago I used to smoke a pack a day. One day I woke up someone stopped smoking cigarette, I ain’t smoke a cigarette since.”

**Facilitators to diabetes self-management**

Several behaviors and factors were identified by participants as facilitators for diabetes self-management, including good mental health, specific strategies to improve compliance to self-management recommendations, working with health-care providers and social support.

**Social support**

Social support was the most common facilitator mentioned for diabetes self-management. Friends, family members, and significant others were all listed as people who provided support, such as encouraging or reminding them to take medication, eat a healthier diet, and/or monitoring blood sugar levels. Often, those who provided support also had diabetes and their social support is based on their own knowledge and experience obtaining from self-management of their own diabetes.

“My sister she had diabetes, type 2, but she takes 3 kinds of insulin and she checks her sugar and every time I goes over there and checks on her and she talks to me, let me know what's going on. She showed me how to do the machine, what I check my blood and everything. I watch what she do and she talks me and let me know.”

“With me… my boyfriend’s a diabetic too so it's easy, easier for us cause we do it together. Like our socks, our medicine and we schedule time we do things. That makes it easier. I mean I'm sorry that he's got it, you know, he had it before I did, but, or I found out I did. But it's easier when you get somebody, you know to keep you on the straight and narrow.”

“Well my, my friend, and my daughter, she keeps the, she keeps like 10 pills over at her house if I go back over. Say I did watch them grandbaby’s if I ain’t got them in my bag she got them right them there for me. She call me every day and make sure I, did you took your medicine, yeah baby I already took my medicine. So she look out for me.”
Understanding of diabetes

Some participants acknowledged that their understanding of keeping blood sugar levels within a recommended range and awareness of diabetes complications motivated them to adhere to diabetes self-management recommendations. Several participants mentioned that they observed the serious consequences, such as vision impairment or kidney disease, requiring dialysis, and amputations, resulting from poor diabetes in their family and friends. In order to avoid these complications, they seek more information to manage diabetes by reading news articles, researching internet resources or attending diabetes management classes, as well as working with healthcare providers to improve self-management behaviors.

“Right, cause we had diabetic nutritious club that we had in the neighborhood where I stay at. They had a 10 week stay where we would go every uh, I think it was Wednesday. And they was teaching us about how to eat, you know, what, what we can replace certain food with as far as uhhh, nutritious food, it was a nutritious class that’s what it was. And it lasted for 10 weeks and it was on every Wednesday and I went and I learned a little bit more about how to eat with diabetes… I read a lot of stuff about diabetes and about the pancreas and the insulin and stuff. So I know somewhat about it and how it affects the body and stuff and what it can destroy if you don’t really take care of yourself.”

“...living in a senior building, I witness so many people who are on dialysis. And the fear of having to do dialysis because I guess that diabetes and all the other negative things that happen, uh, would cause me that motivates me to try to do the right think as best as I can. If I don’t want to experience dialysis. And uh...for me, I think that diabetes, you know. I think diabetes and dialysis almost go together. If you let it stay out of control. So um, maybe fear is a motivating force that um allows me to do the right thing, but sometimes that’s what you need to do. To….avoid the ultimate or the worst thing that could happen to you...”

“Um probably doin the blood sugar because that’s 4 times per day. And why? Because they help me with my A1C, my lowest blood sugar.”

“But it’s good if you keep up with uh, monitoring your sugar, uh, your um, blood, you know. Uh, and that can help you out better more so than anything and with the exercise and stuff. Because it escalate and you don’t know and when you countin those carbs, whatever is coming in, those carbs its ok, you need to count them. But you need to take
that blood sugar, and to find out what’s going on there first. That’s more important than anything. That meter, you know.”

Health-care providers

Participants also mentioned that working with health care providers such as doctors, nutritionists, nurses, and social workers have been helpful to their diabetes self-management. Participants said that health-care providers have been supportive of improving current self-management behaviors by creating and working on ways to improve their blood sugar levels. Examples of behaviors that health-care providers worked with participants on included typically by changing medication prescriptions and/or doses of diabetes medication, improving dietary habits, blood sugar monitoring, and being physically active.

“Um I remember…I think it was a nurse practitioner and she showed me a picture of a plate and how I’m supposed to eat. You supposed to take your plate, divide it in half and that’s supposed to be all vegetables, and you have a corner for meat and a corner for something else. I don’t remember what. But seein a plate like that helped me. And I listen to my doctor a lot. He helps to tell me where I should be getting to and what he would like to see and I gotta try to get there.”

Facilitators to going to follow-up visits included social support, being in close proximity to the clinic, having reliable transportation, health insurance, relationship with health-care provider, fear of long-term complications, receiving reminder calls from the clinic and writing down scheduled visits on a calendar. Some participants expressed that the fear of long-term complications related to not managing their diabetes well encouraged them to go to follow-up visits.

“They make fun of me cause I always bring, if anything happens to me in the 3 months, I write it down and when I go in I ask about this, this and this. They had a habit of just rushing you. You sit out there and wait 2 or 3 hours to see them and in 15 minutes they’ve finished, you know. Weight and everything, blood pressure. Didn’t tell you nothing. Take some more blood. So I start making, take my list with me. And I keep up
with my blood sugars and my blood pressure everyday so I have them on a piece of paper I take that with me. And then I ask about whatever I want to know before they would rush you on out. I guess they say “here she comes with the paper again“, but that’s alright.

“Elm Street Clinic is where I found out I was a diabetic but they didn’t educate me on nothing. She didn’t tell me nothing. All she said is you a type 2 diabetic, go downstairs and get your Metformin. That’s all she said. So now that I’m in the clinic where they help the homeless at, at McMicken, my doctor is Dr. ... over there. So since I been there I’ve been there I’ve been learning a lot and now I think it’s the 20th I got to go see the lady in nutrition for diabetes cause I told her I don’t know anything. I didn’t know I was supposed to prick my finger every day or none of that. I’m just learning since I’m in this new clinic. The Elm Street Clinic didn’t teach me anything. They just said go downstairs, get your Metformin.”

**Barriers to diabetes self-management**

Participants reported challenges in diabetes self-management practice included managing medical conditions, lack of support from one’s social environment, and inadequate resources to live optimal healthy lifestyle practices such as healthy, affordable food options.

**Other chronic medical conditions**

The most commonly reported barrier to overall diabetes self-management was having other diseases/condition besides diabetes. Managing these multiple diseases/conditions required taking multiple medications and additional clinic visits for follow-up/blood work. Further these conditions sometime lead to limited activities of daily living (physical ability) to manage diabetes. Mental health condition was another factor negatively influencing diabetes management. For example, mood swings from Post-Traumatic Stress Disorder (PTSD) or depression further exacerbated the difficulty to optimal diabetes self-management practices as it decreased motivation to adhere all aspect of self-management of diabetes - diet, physical activity, blood glucose monitoring, and medication adherence.
“You know and it’s hard. I don’t like needles and seein not only do I have to do that for my diabetes, I also have to get myself stucked for my Crohn’s Disease and you would not believe myself how I have to psych myself up to do it.”

“I see a chocolate bar, I gots to have it. I'm just learning how to get rid of the food that I love so much. I'm a pasta eater. I'm a fish eater. And having to give it up is really, really hard. And dealing with diabetes and high blood pressure at the same time is really hard for me.”

“I got PTSD, umm, same thing the Army guys get. And it seems like umm, I was 40 when they diagnosed me with it. I'm 46 now but it seems like my stress level is more dangerous to where now I'm in all kinds of groups and psychiatrists, I take like 3 different psych meds and it really works with your depression when you aint got nothing right, the right things you need to do.”

“I have arthritis pretty bad so I have gotten in the habit I got an office chair in the kitchen and that's how I do my cooking. I just roll from one side to the other and reach what I can without standing up.”

“Well I got degenerative disc disease so anything that bends, pulls, cuts is just deteriorating. And now I'm trying to work with this artificial knee I have and she's walking me.”

*High food cost and inadequate access to healthy foods*

Many participants explained that they could not afford the healthier foods needed to follow diet recommendations for diabetes self-management. Many participants perceived healthy foods are more expensive than unhealthy food option and they were unable to afford healthier food options. They explained that the consequence of high food costs for healthy food options is difficulty in changing their diet habits to improve glycemic control. Another barrier identified was few close grocery stores in their neighborhoods. The few that are close have a poor selection of healthy foods and those options are too expensive for their means.

“We can’t afford to get all that good food that we supposed to have because we don’t have enough money and that’s what make it harder.”

“You never have enough food stamps, you don’t get enough food. And that makes it extra hard.”
“Food is so high now, like me, I’m a diabetic type 2. I can’t go in the store all the time and get what I want and get what’s what they give me a diet book, I look a diabetic book and get all that stuff. I can’t afford it. I don’t have the money for it.”

“And as far as the grocery stores and stuff we, we don't really have any around us. I have to either get in the car and go to Price Hill or Westwood to get anything reasonable. The choice of meat that we have here at the Kroger’s on Vine, you know, they don't have that much of a selection. It's, it's kind of rough and if you don't get there early certain days a month you can't even get a bunch of bananas, you know.”

“I think there’s a Kroger that I shop at down here on Vine is not as good as the Kroger up in Corryville. The vegetables, I mean first of all it’s a small selection, if something is fresh it is really expensive. I like goin Uptown but sometimes it’s not possible so you have to settle for down here which is not much. So there will probably be low selection but it’s a matter of convenience though.”

**Taste preferences**

Taste preferences were one of the most commonly reported obstacles for healthy diet. Some participants reported that they did not like the sugar free or “healthier” foods. One of the main issues with participants complaining about the taste preferences about sugar free foods is that these options are likely not the best for diabetes self-management. Participants also discussed the inability to remove or decrease fried foods from their diets.

“I have all of them so what I'm just trying to do is just stay up under my doctor cause sometimes it’s really hard to incorporate that, the way they want you to eat.”

“Well I try to drink more water but stay away from fried foods cause my sugars gonna rocket. But then again, my sugar goes really low also, so I’m just trying to make a balance of it. I eat fried foods once a week now but I love fried fish so, I have a problem.”

“Cause you speaking about bananas right? Now when I eat I’m a pig. I ate seven bananas in a day and my doctor told me I better not eat but one. That it’s too much, what you call it?”

**Lack of transportation**
Participants added that they often cannot afford to pay for transportation to get to the grocery store, and even then, carrying a lot of groceries on a bus or walking is very difficult. Lack of transportation was also a barrier to doctors’ appointments.

**Barrier to blood glucose monitoring**

Barriers to blood glucose monitoring included fear of needles as well as an inadequate supply of testing strips. A few participants said they were unable to test blood sugar levels on their own due to the inability to overcome their anxieties related to pricking their finger. Testing equipment can be very costly, so if participants are not able to access adequate numbers of testing strips or get a machine that works, this can be a significant barrier.

“See that’s what I don’t do because I’m scared of needles, very scared.”

“It’s one more other thing. They give you a meter with it. And you, if you take your uh, you know to help yourself. If you take your sugar before the meal and then take it like 30 minutes afterwards when it’s settled, then you can find out. You know that’s the appropriate way to do it but they say just three times a day because the insurance don’t want to give you the strips.”

**Barrier to medication adherence**

Some participants reported that they did not like taking medication every day because of uncomfortable side effects, such as impairing gastrointestinal health (gastrointestinal symptom or decreasing appetite and forgetfulness. Mental health conditions such as depression decreased their motivation to be healthy and proper self-management of diabetes. Barriers to going to a follow-up visits included being too tired, the clinic was too far away, lack of or unreliable transportation, not having health insurance, not having enough money, a poor relationship with the health-care provider, fear of not meeting goals or hearing bad news, or having a fear of
needles. “You might need to increase the medication that the doctor’s prescribing, the
Metformin or whatever. Metformin let me tell you that stuff give you diarrhea. That’s something
I don’t think a lot of people should get. You should try to change over to Gluthal. But that
Metformin had give you the runs.”

“My barrier mostly just me and my bad attitude. I get through drinkin and be like forget it, you got to die something and that’s the biggest, especially when I am not workin in the winter. The depression kicks in. I feel like I don’t care about myself or anyone else. I just want to be alone, watch TV or eat and drink what I want to. And that’s my biggest barrier, me.”

“Well, I have a follow up every 3 months and I have my own transportation now. So that’s easy for me. Uh, before I had to use uh, I would call for transportation, you know they have that transportation service. But they would make it hard when you use that. Some of them don’t be on time or they say they came and they haven’t and you’re still waiting on them or it takes 45 to an hour to get there. You know, that’s the hard part and that’s why I’m glad now I have my own transportation to get to the doctor and then the parking is free cause they going to give you a parking thing to get out for free. So that’s what’s easy for me now.”

**Overcoming Barriers**

Several different efforts were reported to overcome these barriers. Barriers reported to
overcome diet, using public transportation to go to the grocery store or organizing a carpool with
a friend or family member who has a car. Barriers reported to overcome physical activity
included walking with family or friends. One person had a strategy to improve his
communication with health-care providers by making a list of questions or concerns prior to the
visit, this facilitated a discussion with the provider that allowed him to improve self-management
of diabetes.

“They make fun of me cause I always bring, if anything happens to me in the 3 months, I
write it down and when I go in I ask about this, this and this. They had a habit of just rushing you. You sit out there and wait 2 or 3 hours to see them and in 15 minutes they’ve finished, you know. Weight and everything, blood pressure, didn’t tell you nothing. Take some more blood. So I start making, take my list with me. And I keep up
with my blood sugars and my blood pressure everyday so I have them on a piece of paper I take that with me. And then I ask about whatever I want to know before they would rush you on out. I guess they say “here she comes with the paper again, but that’s alright.”

Participants described a variety of strategies that had led to improving diabetes self-management. One of the most common strategies listed was making signs for reminders for specific management behaviors. For example, participants would put up signs in the kitchen to remind themselves to eat or avoid certain foods. Participants also put up signs in their house to remind them to take medication. One participant explained how he would write down things that were not a part of his self-management plan to avoid giving in. Another participant identified that a barrier to going to follow-up visits was that he would run out of minutes on his cell phone. He gave the clinic a friend’s cell phone as a back up to prevent missing any calls from the clinic.

“I put signs on my refrigerator and around my house of do not fry. Bake, boil or broil. Poison.”

“Well I monitor my blood pressure and then I have a monitor for my for my sugar but I have a calendar on my refrigerator and I got one in the bathroom on my mirror where I marks it off, make sure I take my medicine every day and on my refrigerator I have a chart uh… I have me an orange, banana to make sure I get me a fruit in my system every day.

“Me myself I go about every couple of months and only problem I really have is sometimes I run out of minutes, when I am low, they be trying to get back in touch with me and having a hard time. So what I did is I gave them my friends telephone number for a second number.”

“I like to write things down to remember them. When I smoked cigarettes only time I wanted a cigarette is when I um… drunk a beer… Or sitting there watching television. That’s when I want a cigarette so I wrote that down, every time I ate, when that urge hit, I want a cigarette… I wrote it down, I take that pack of cigarettes, I take a cigarette out and put it in a bowl and when I finally got over there after eating, watching TV, drinking, or taking a shower, cigarette time, At one time would a 500 hundred cigarettes and I counted my money and I said look what I could have had. You think that’s funny, but I went cold turkey. And sometimes I wanted a cigarette.”
Knowledge Sources

Even though few participants mentioned that they did not obtain any information or education from a clinic, most participants discussed what information they learned from a clinic through doctors, nurses, and dietitians. Participants reported learning information about diabetes self-management from health-care providers and/or family and friends. Learning information about self-management of type 2 diabetes from health care providers can have positive benefits because these sources are likely using credible, evidenced based sources. However, suboptimal patient-healthcare provider relationships may decrease the patient’s ability to follow and/or understand recommendations for diabetes self-management. Some participants relied on family and friends for information about diabetes self-management, which is beneficial because participants typically rely on these persons for social support as well. Even though this may be a consistent form of support for adults with type 2 diabetes, if the information provided by is incorrect or inappropriate, this may lead to self-management behaviors that may be ineffective, if not harmful to their health.

“'I've been having these muscle spasms, the diabetic muscle things. I've been just learning about that and that's only because my aunt. So, I'm new with this. Everyday is an up and down dollar for me cause I'm just learning. I done did the blackouts. I get the sweats; I'm going through that now. Cause I don't have the food that I need and I'm not properly educated. So, I really depend on my aunt to tell me what I can and cannot do.”

Information most commonly received at a clinic included information about diet and blood sugar monitoring. Participants said they would learn how to prick their finger to get blood and then how to use the blood glucose monitoring machine. In terms of diet, participants learned about general diet modifications that should be made to improve blood glucose levels. Dietary
changes that were mentioned included, such as increasing fruit, vegetables, and water consumption, consuming less pork, alcohol, soda and diet beverages.

Strategies to adhere to diet recommendations included describing the plate method and practicing portion control. Participants said information for diet was either presented in a classroom setting or in a brochure. Both of these forms of presentations can be beneficial to learning. Sitting in a classroom setting allows for participants to engage in the content being discussed and then ask questions to facilitate optimal learning. Having a brochure allows for participants to have a reference when at home that they can continually look at to help guide decisions that comply with medical nutrition therapy for diabetes. Some participants also said they found that the referrals, such as to a nutritionist or podiatrist, were very helpful.

“The pop isn’t good for her and plus its diet. If you take the um, the sugar, if your doctor tells you to go to the sugar diabetes class….the biggest thing that is a no that they tell you is the diet pop. And it’s like ah like my daughter-in-law, her mother they were eating um, turkey bacon… and then I found out in the um diabetes education class same kind of fat as pork bacon.”

“Um I remember…I think it was a nurse practitioner and she showed me a picture of a plate and how I’m supposed to eat. You supposed to take your plate, divide it in half and that’s supposed to be all vegetables, and you have a corner for meat and a corner for something else. I don’t remember what. But seein a plate like that helped me. And I listen to my doctor a lot. He helps to tell me where I should be getting to and what he would like to see and I gotta try to get there.”

“Yea, I got diabetic classes and everything. I got a big old book on it. Proper food to eat and how you fix it and everything.”

“They give me some papers it’s a good thing I’m takin the medication, the pills.”

“My doctor up at UC, you know, they only over there for so, I mean years and the majority of participants reported going to follow-up visits every 1 to 3 months, some reported going every 6-months. Although our question did specifically ask participants about diabetes follow-up visits, some participants answered this was question included follow-up visit for other conditions, such as hypertension.”

“For diabetes? I follow-up on mine ah every 2-3 months.”
“I go about every 3 months for my A1C check.”

**Community Resources**

The majority of participants discussed how helpful receiving free meals and food were to diabetes self-management. Whether through a meal at a senior center, or receiving free groceries at a food bank, participants were very appreciative of these resources and considered them as a staple resource for their food supply. Although participants were grateful for having these resources, some mentioned that some meals and foods offered were not always the healthiest options. Therefore, several participants identified how beneficial it was to have resources that not only provided free food, but healthier food options as well. For example, several participants discussed why SVdP’s food pantry was supportive of recommended diet behaviors for diabetes self-management. SVdP’s food bank has a choice system in place so that recipients have the ability to choose what foods they will take home. A choice food pantry allows clients to go through an individually pick food items, similar to going to the grocery store but without having to pay any money. Many participants said this system is very helpful when considering their diabetes-self management because they typically bring home healthier options such as fruits, vegetables and whole grain foods. Participants said that some food pantries will just hand out a bag to each recipient. Participants feel with this system they have no control over the foods they take home, which may not be foods appropriate eating a healthy diet.

“The pantry helped me with gettin vegetables, canned good vegetables, cuz if it wasn’t for that I wouldn’t get none. I wouldn’t go to the store if it weren’t for that I wouldn’t buy them.

“I think the selection process of how you can get, what you get and how many of it is pretty good. Cuz I mean they try to give you vegetables and meats and fresh fruits and vegetables. But I mean you get a little bit everything. You get your protein, you get your
nutrients, you get your breads. You get a little bit of everything.”

Additional community resources included free clinics or classes, as well as religious organizations. Each of these resources offered at least one service that participants said were helpful, including discounted medication, and/or educational or clinical services. A few participants mentioned that free or discounted medication from resources such as the Free Pharmacy at SVdP and grocery stores has helped with diabetes self-management. Clinical services such as blood pressure and blood sugar monitoring were specifically mentioned as being helpful to managing diabetes. Additionally, SVdP has offered free nutrition classes.

“Meijer's can give her insulin for free. Meijer can give her, cause she said she don't have no insurance. Meijer’s give you your insulin free.”

“Like I said in my neighborhood we had nutritious class for the diabetics. And sometimes they would have diabetic studies in my neighborhood, every now and then cause I live in Lower Price Hill. So every now and then they have like I said nutritious class, diabetic studies and they try to educate the people down there in that rough neighborhood.”

“And every other Saturday I go out there [Open School Clinic at SVdP] and they have like, they check your blood, they check your you know your high blood pressure and all that. Every time my blood pressure be high. And that’s how, one of the reason I that’s one of the reasons why I find out I was a diabetic. My blood, my blood sugar kept getting high, every time I went it was always high.”

“I learned, I learned a long time ago. I go to every class cause you always learn at each class you go to you can learn more about diabetes in each class you go to. So I learned to roll, just going to other classes, other programs, churches, every little thing they got listed somewhere in the newspaper, stuff like that. It’s, it’s everywhere you just pay attention and read what’s out there.”

“Well if it wasn't for St. Vincent's charitable pharmacy like I told them all the time and I say it in a joking way but I couldn't afford to be sick.”

“Yeah, they will cook something they will tell you this is a meal that’s for you know…for this and low you know on this or low on that. And every now and then they do that and I think that’s helpful. You get… whenever they do that, they also have people there that can give you information on what’s healthy and you know what I’m sayin and things like that. I think that’s cool.”
**Lack of healthy options**

Unhelpful community resources were generally described as having a lack of consideration for diabetes self-management, which was only discussed in reference to food. Food pantries and provision of groceries and meals perceived as unhealthy were reported as the most unhelpful. Participants felt that food pantries at times do not have options appropriate for the health needs of a person with diabetes. Participants also reported that food pantries that do not allow you to pick and just give you a bag are also not helpful for diabetes self-management.

“It depends on when you come and it depends on how many fresh fruits and vegetables you can get. And you can’t always get it every time.”

“Yea like Daily Bread they serve everything that you can't eat. So I can't stand in line to get nothing to eat cause I can't have the pasta. I can't have the bread.”

“They do when I came in they do have like wheat pasta and stuff like that. I’ve seen that. The Free Store, they have so many people coming in and out. They have to get them in and get them out. They really do. You know and then you got some down there that works in their food room, sometimes might have attitudes and stuff. And they do probably, you know they have attitudes. They’re trying to get you in and get you out. That’s all they trying to do. They put you in that computer. Tell you how much pounds you can get and that be it. I mean cause they’re really busy.”

**Interests in intervention program for diabetes self-management**

All participants expressed interest in participating in an intervention program in a community setting, specifically because of feeling more comfortable with people who live in a similar community and the accessibility. The majority of participants wanted to meet for 1 hour, at least 1 time per month and felt the duration of the program could be anywhere from 3 to 6 months. Saturdays were recommended as the best day of the week to meet. Many participants expressed their preference for having a smaller class size of 6 to 8 people. Saint Vincent de Paul [the site where the focus group were conducted] was most commonly reported for where it should be held. Holding the program in a church, YMCA, and/or senior center was also
expressed. Participants expressed their interest in having an open discussion and support group lead by experts from multiple disciplines while answering their questions as needed.

“I think a smaller class would be better. You get more informant with the teacher and the students back and forth.”

That’s what I mean, that’s what I like. Everyone is voicing their opinions. Feeding off of each other. Knowing about different things.”

“Yeah, continuous. And have good doctors, and good nurses who have a good bedside manner and are not scared to challenge you and get in the trenches with you. That helps a lot.”

Recommended topics to discuss included general education for diabetes self-management. Specific topics included monitoring blood sugar, nutrition, physical activity, and hygiene. Participants discussed the desire to learn more about nutrition the most, suggesting activities such as meal planning, learning about diabetes-friendly substitutions and cooking lessons. Participants also expressed that including group exercise classes would be a great addition to an intervention program. Participants said it would be beneficial if caregivers and/or family members could come to the classes.

“Protein. A lot of nuts are good. You know I’m learning, you know, my portion sizes. I’m getting there. But they could, you know learn how to just put some, get some fake food, get the plate and say show me how to do a portion. Cause I went to the nutritious class as far as losing weight. They say you got to have a fast carb, slow carb and a protein. And they show you portion size. So I’m suddenly trying to say, learn what is the fast carb. What is the slow carb? Meat is protein. So that’s the thing. Learning what a fast carb is. Learning what a slow carb is.”

“Exercise room, walking clubs, um, you know, it’s nothing like a good book, going to a play, swimming, which is another great exercise.”

“I think you know, like it you have, they should come too so they can learn about it. Because I have a 17-year-old daughter, she’s my baby. And she came to one class with me here before and she told me momma I’m going to take your blood sugar because she knew I was scared. I think they should have the kids or whomever that’s living with you or who’s around you all the time. Or some in case you get sick or something they can know what to do.”
DISCUSSION

The key finding from this study is that low-income populations using a community resource such as a food pantry would value participating in an intervention program to improve diabetes self-management skills. All of the participants were interested in a community-based diabetes self-management intervention program. Participants’ knowledge of diabetes, specifically long-term complications associated with type 2 diabetes could be improved. Many barriers and facilitators were discussed that had a positive or negative impact on their self-management including: knowledge, managing other diseases, relationships with health-care providers, social environment, and food environment. Participants specifically discussed how community resources have been helpful to providing free clinical services, as well as groceries and meals, to improve diabetes self-management.

Many participants were able to identify symptoms of type 2 diabetes, including signs of low blood sugar such as dizziness, shaking, and passing out. Some participants were also able to identify at least one long-term complication associated with type 2 diabetes such as renal failure, amputations, eye problems or blindness, and/or cardiovascular complications. However, not all participants were able to identify at least one, or multiple, complications associated with type 2 diabetes. Participants understanding of diabetes could be improved, ultimately leading to improved self-management of diabetes. Some participants in our study explained that knowledge was a facilitator to managing type 2 diabetes, thus further supporting the results from Rise et al. Previous studies have showed a positive impact of knowledge of diabetes on self-management of diabetes. Rise et al conducted an intervention study for diabetes self-management that focused on knowledge of type 2 diabetes, diet physical activity, and metabolic control through lectures, discussion, and interactive lessons. After completion of this course, many participants identified
knowledge as an essential component for changing lifestyle behaviors. After completion of the intervention program, participants completed a qualitative assessment through semi-structured assessments that assessed how they utilized the information learned through the program to change their diabetes self-management practices. Participants articulated that with the new knowledge gained during this program led them to take responsibility of their self-management because they had a better understanding of their role in their health. Some explained that the fear of complications facilitated complying to recommendations for self-management. The results from this study demonstrate the positive impact knowledge can have on improving diabetes self-management practices. This study points out two critical areas of knowledge that are essential to diabetes self-management: complications associated with type 2 diabetes and self-management behaviors. It is important for those with type 2 diabetes to understand long-term complications that can occur, as well as the additional risks associated with these complications if there is poor compliance to diabetes self-management recommendations. Additionally, participants need to understand how to follow recommendations in their daily lives. When developing an intervention program it is important to not only teach participants what they need to do, but explain how and why self-management is important.

Managing other diseases such as hypertension, hyperlipidemia, depression and PTSD in addition to managing type 2 diabetes was a common barrier to diabetes self-management for participants in our study. Beverly et al assessed older patients’ (>60 years of age) perceived impact of chronic co-morbid conditions on type 2 diabetes self-management. Many participants found managing multi-conditions to be too difficult, therefore participants selected one condition as a main priority to manage because they felt that condition was more serious than the other(s). Some participants prioritized managing one condition over the other due to financial and/or
insurance barriers. The results from this study revealed that most participants expressed that managing multiple chronic conditions had a negative impact on their over-all well being due to frustrations and feeling overwhelmed by the variety of self-management components for the multiple conditions. Participants also reported feeling confused when self-management conditions contradicted one another, specifically for diet, physical activity, and medication. However, some participants discussed how managing co-morbidities was a facilitator, as they were very motivated to minimize complications associated with their other health conditions. Many participants acknowledged the importance of improving their glycemic control in order to improve the status of other condition(s). The results from this study are a good example of how knowledge can impact self-management of diabetes. Intervention programs should not only address why it is important to properly management and overcome barriers, but help participants few this as a facilitator to comply with recommendations for diabetes self-management.

Participants reported relationships with health-care providers where either a barrier or facilitator to self-management of diabetes. Participants who felt they were able to ask their health-care providers questions and clearly communicate with them, found this to be beneficial to their diabetes self-management. However, participants also expressed that if health-care providers do not take the time to explain what is going on with their diabetes, participants were less likely to go to follow-up visits, which likely leads to decreased self-management and self-efficacy. Based on the findings of Ritholz et al on patients and healthcare providers’ perceived impact of patient-provider communications on achieving optimal treatment outcomes, similar to other study finding. Both physicians and patients acknowledged that developing trust and a non-judgemental atmosphere, open and honest communication, and a positive approach to long-term health outcomes, facilitated management of type 2 diabetes. In contrast, barriers to
One previous study identified two suboptimal communication styles in health-care provider and diabetes patient interactions during clinical visits. Checklisting is a way health-care providers can communicate with patients by asking a brief series of questions related to diabetes self-care, without tailoring conversations to address individual patient’s needs. The second method of health-care provider interacting with diabetes patients is focusing on quantifiable values such as blood pressure or HgbA1c instead of physical symptoms associated with suboptimal diabetes self-management. In this method, health-care providers typically focused quantifiable numbers such as blood sugar levels rather than discussing patients’ concern for physical symptoms. However, results from this study found that patients were less likely to engage in self-management activities unless they experienced unpleasant physical symptoms and had found that performing recommended self-management behaviors helped relieve these unpleasant symptoms. Use of checklisting and focusing on quantitative measures likely occurs due to the limited time that health-care providers, have to spend with patients.

One’s social environment, which includes both family and friends, was one commonly discussed as a facilitator and/or a barrier to type 2 diabetes self-management. Participants in our study often reported that family members who are knowledgeable about diabetes tended to support optimal self-management of diabetes, especially, by encouraging healthy eating habits, encouraging physical activity by going on walks, going with participants to doctor appointments,
or reminding them taking medication. Similar to the findings from our study, a previous study found that there is positive association between family support to diabetes self-management, specifically medication adherence and glycemic control (measured by HgbA1c levels).

Participants most commonly reported that having a support social environment was instrumental to following recommendations for diet, exercise, blood glucose monitoring, and going to doctor’s appointments. The participant’s HgbA1c values further supported the qualitative findings from this study. Participants who perceived family members were not supportive had lower adherence to diabetes medication and higher HgbA1c values. However, participants in this study also reported that families and friends were not supportive at times and would negatively impact their ability to practice optimal self-management behaviors when family members continued to practice unhealthy behaviors. The findings from our study were consistent with the study mentioned above, as several participants in our study reported that family members were at times unwilling to support efforts participants were making to follow recommendations for diabetes self-management.

The participants discussed various strategies to have a healthful diet, such as decreasing consumption of fried foods and salt intake through modifying cooking methods or portion control, as well as increasing consumption of whole grain, fruit and vegetables. Even though most participants discussed multiple ways to achieve a healthful diet, it appears that eating healthy is the most commonly discussed challenge among the self-management of diabetes, including taste preferences, and lack of money to afford foods or healthy foods. Some participants explained that when health-care providers showed visual examples of portions and the plate method, they had a better understanding of how to follow recommendations for their food intake. Breen et al conducted a study to explore patients’ understanding of carbohydrates
and beliefs in regard to carbohydrates role in type 2 diabetes management. Health care providers were found to recommend consumption of a wide variety of foods, rather than focusing on restriction of certain food groups. Participants who participated in an education class where visual aids for portions of foods and food models were used expressed that this was an effective way to help them improve their dietary habits rather compared to using the food pyramid for guidance. Food insecurity was discussed as a primary barrier to healthy diet practices for diabetes self-management. Food insecurity has been found to be a barrier for diabetes self-management in several other research studies as well. A couple of studies showed a higher proportion of hypoglycemia in food insecure individuals with diabetes than their counter part. The association between poor glycemic control and food insecurity may be explained with lower self-efficacy in adherence to diet recommendations and medication adherence. Additional barriers that may further negatively influence diabetes self-management for food insecure adults include limited medication access, lower social support, and depression or emotional distress. Seligman et al conducted a study to assess whether food insecurity compromised diabetes self-management and hypoglycemia who use a primary care safety net clinic. Food insecure adults had a lower self-efficacy score (34.4) compared to adults who were food secure (41.2). Differences in self-efficacy scores can be backed up by HgbA1c scores. Food insecure participants had HgbA1c value of 9.1%, which was higher than food secure adults who had an average value of 7.7%. There were statistically significant associations between food insecurity and suboptimal diabetes self-management, including poor adherence to blood glucose monitoring and lifetime history or hypoglycemic-related emergency department visits. Food insecure adults were also more likely to
The moderator prompted discussion about education preferences, topics, activities, in addition to logistics such as frequency and length of each session. Participants articulated that they prefer to participate in interactive and participatory intervention rather than an intervention that solely utilized lectures from healthcare professionals. Participants expressed the benefit of working with other people with type 2 diabetes, possibly a form of a support group to share diabetes self-management tips and encourage each other. Dasgupta et al investigated participants’ perspectives on the efficacy of nutrition education through a hands-on meal preparation training program. Participants identified the benefit of having hands-on cooking lessons, but particularly valued discussions with the chef and dietitian to facilitate the learning process. Participants also explained that developing a concrete connection about the relationship between blood sugar levels and diet choices and physical activity further facilitated their ability to more competently practice optimal self-management behaviors. Peer support was found to change self-management behaviors because it minimized the feeling of isolation, which facilitated discussions to create solutions to barriers participants had previously been experiencing. The finding of this study is similar to what the findings in the current study on an optimal learning environment for a self-management intervention program for diabetes.

One of the main strengths of this study was to target food pantry users with type 2 diabetes who were most in need. The moderator was a volunteer for this food pantry, allowing for participants to engage in a more open discussion. The moderator also was trained to create an open environment where all participants felt comfortable sharing his/her thoughts and experiences by keep participants on topic and minimizing any behaviors or discussions that
deviated from the topic or would diminish a safe environment where participants felt comfortable sharing. Participants also shared communalities in terms of using a food pantry and being diagnosed with type 2 diabetes, which facilitated a more open environment for discussion of personal topics and issues. To support validity, a multidisciplinary data analyst strategy was employed by utilizing multiple data sources, including transcribed focus group sessions, participant observation (e.g. participant affect, behaviors) and field notes (i.e., written account of what happened during the interviews).

There are some limitations as well. Participants were recruited using convenience sampling, which may cause a systematic bias in sample. Participants who were willing to participate in the study may experience different barriers and facilitators to diabetes self-management than those not willing to participate. Group dynamic or responses/opinions from other participants may have influenced what others discussed. Because the findings were from food pantry users in an urban, they cannot be generalized.
CONCLUSION AND IMPLICATIONS

Even though all participants listed long-term complication of type 2 diabetes, only a few participants were able to describe basic facts about type 2 diabetes. Having other diseases, in addition to diabetes, was a barrier that influenced all aspects of self-management. Participants felt the most challenged with healthy diet behaviors. The major barriers to healthy eating were the inability to afford healthy foods and difficulty in accessing healthy foods because of no close grocery stores available in their neighborhoods. The primary facilitator discussed was social support from family and friends, especially from those who have diabetes.

These identified barriers and facilitators can be considered during clinic visits as well as the development of community diabetes intervention programs for low-income adults with type 2 diabetes, especially for food insecure populations. Health-care providers can provide tips or refer resources to overcome barriers and encourage them to build and maintain social support system. Community interventions can include ways to improve communication with health care providers, ways to engage family and friends to support lifestyle changes, and managing other chronic conditions. Additionally, intervention programs for low-income adults may want to consider having an interactive format that also serves a support group for participants.


