Dietary Behaviors, Perceptions, and Barriers in Patients At-Risk for Type 2 Diabetes Mellitus at the Frank Bryant Health Center

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Introduction

Type 2 diabetes mellitus (T2DM) is a major public health concern in San Antonio, Texas, affecting 14% of its population. It is well-understood that the development of T2DM is influenced by both genetic factors and lifestyle choices. Several studies have suggested that availability, cost, food preparation, and social support are potential barriers to healthy eating (Haire-Joshu & Fleming, 2006; Horowitz, Colson, Hebert, & Lancaster, 2004; Lindsay, Sussner, Greaney, & Peterson, 2009; Russell et al., 2010; Jetter & Cassady, 2006; Harrison et al., 2007; Wang et al., 2010; Schiotz et al., 2012; Gellar et al., 2007; Gallant, 2003; Carbone et al., 2007; Wen et al., 2004; Treiman et al., 1996; Anderson et al., 1998; Larson et al., 2006).

Currently, there is no research about diet intake and dietary perceptions and barriers for patients of CommuniCare Health Centers (CommuniCare). CommuniCare is one of two federally-qualified community health center in San Antonio, Texas. Patients who seek care at CommuniCare are typically low-income; about half of the patients are self-pay (uninsured). Research into the dietary practices and perceptions of this specific population will reveal key insights about limitations to healthy eating that will be useful for both CommuniCare practitioners and San Antonio public health leaders alike.

Background

According to the American Diabetes Association (2013), 14% of San Antonio's population is diabetic, twice the national average of 7%. Ethnicity plays an important role in diabetes. African Americans and Hispanics are more likely than Caucasians to develop diabetes (CDC, 2011a). Within the subgroups of Hispanics, Mexicans and Puerto Ricans have the highest incidence of diabetes (CDC, 2011a). While genetics can predispose one to type 2 diabetes mellitus (T2DM), lifestyle choices—namely, diet and physical activity—can prevent the onset of

T2DM (Orozco et al., 2008; Schulze et al., 2005; Steyn et al., 2004), and also reduce the disease burden in patients with diabetes (Roberts & Barnard, 2005).

Medically-underserved, low-income, and urban populations face barriers in implementing healthy lifestyle habits, especially in regard to dietary adherence. These barriers include limited access to healthy foods and supermarkets (Haire-Joshu & Fleming, 2006; Horowitz, Colson, Hebert, & Lancaster, 2004; Lindsay, Sussner, Greaney, & Peterson, 2009; Russell et al., 2010). In neighborhoods with small grocery stores, i.e., in low-income neighborhoods, there is limited access to whole grain and low-fat products (Jetter & Cassady, 2006). These studies suggest that medically-underserved, low-income populations are more likely to live in "food deserts," a term coined in the 1990s in the United Kingdom to describe the rapid decrease in grocery stores in low-income areas post-World War II (Whelan, 2002).

Apart from availability, cost is also a barrier to healthy food choices. There is higher cost for a healthier food basket (Harrison et al., 2007; Jetter & Cassady, 2006). Healthier foods cost more, regardless of whether in urban or rural areas (Wang et al., 2010).

While a person's geographical environment contributes significantly to their eating choices, their social environment plays an important role as well. Dietary behavior is especially susceptible to social influences, both positive and negative (Schiotz et al., 2012; Gellar et al., 2007; Gallant, 2003). In the management of chronic diseases in Hispanics with T2DM, family members and friends can provide positive social support (Carbone et al., 2007; Wen et al., 2004).

Perhaps another barrier to healthy eating is simply that healthy food is hard to prepare. For example, a lack of time is a commonly cited reason for deterring people from preparing fruits and vegetables (Treiman et al., 1996; Anderson et al., 1998). In a study by Gellar et al., youth with diabetes reported that their families ate fast food because their parents did not feel

like cooking. Youth noted that "the junk stuff is already prepared and you don't have to cut it or anything," (2007). A lack of skills and resources related to ethnicity (Hispanic and African American) also exists (Larson et al., 2006).

Several barriers exist that prevent patients from consuming healthy foods. This study provides an initial assessment of current dietary habits and patient-perceived barriers to healthy eating for the patient population of CommuniCare Health Centers; recommendations for providers at CommuniCare, and directions for future research.

Methods

Subjects were recruited from the waiting rooms of the two primary care clinics at CommuniCare Health Center's east campus, the Frank Bryant Health Center. Subjects were recruited by convenience sampling. Subjects were excluded if they were not between the ages of 18 and 65, and if they did not appear to have the cognitive ability to provide answers to the survey questions. Surveys were individually given to subjects in the waiting room. Subjects could either fill out the survey on their own, or they could receive assistance. Surveys were in English text only, which excluded Spanish-speaking patients who did not have a translator present with them at the time.

The instrument utilized was a 30-item survey, which included questions adapted from a diabetes patient health survey by California Pacific Medical Center (2013). The survey instrument contained free response questions, yes or no statements, and Likert scale questions. Surveys asked patients to describe their typical food intake for one day. Patients were then asked their gender; age; ethnicity; height and weight; and goal weight, if they had one. Patients were then asked if they ever had gestational diabetes or if they had a family history of diabetes. Subsequently, patients were asked if they ever received diabetes education, and then asked to

rate their understanding of diabetes (good, fair, or poor). Following this, the survey listed statements regarding barriers to healthy eating and self-perception of dietary habits, and subjects had to agree (yes answer) or disagree (no answer) with the statement. A total of 44 surveys were collected.

Subjects were stratified into two groups, at-risk for diabetes (at-risk) and non at-risk for diabetes (non at-risk). "At-risk for diabetes" was defined as either having a history of gestational diabetes, or having a family history of diabetes. Subjects were not asked if they had a diagnosis of T2DM.

Body mass index (BMI) was calculated from the patient's height and weight, using the calculation [(weight in pounds)*(703)]/[(height in inches)^2]. BMI is a standard method of assessing a person's body fat (Mei et al., 2002). Normal BMI is between 18.5 to 24.9, overweight BMI is 25 to 29.9, and obese BMI is 30 and above (CDC, 2011b).

Descriptive statistics and percentage comparisons are listed.

Results

Of the 44 surveys collected, 36% were completed by men, 64% by women. The average age of the patient was 45 years old. About half (47%) of the patients identified themselves as Hispanic, and 41% identified themselves as African-American. The majority of the patients were obese (58%), followed by overweight (26%), normal (14%), and underweight (2%). Of the patients who were obese, 68% had a goal weight; of those who were overweight, 54% had a goal weight.

When asked whether they had ever received diabetes education, 43% reported yes (at-risk: 45%; non at-risk: 36%) (Figure 1). When asked to rate their understanding of diabetes,

those in the at-risk group tended to reply "fair," whereas those in the non at-risk group tended to report "good" (Figure 2).

In reporting a typical breakfast meal, patients described meals that satisfied an average of 1.7 food groups. For lunch, 55% of patients ate food from home, 27% ate out, and 18% skipped lunch (Figure 3). For dinner, 41% of patients ate a balanced meal, defined as a meal with protein and vegetables (Figure 4). As a whole, patients reported eating out an average of 1.8 times per week (at-risk average: 1.8 times; non at-risk average: 2.1 times). Restaurants patronized were typically fast food restaurants (e.g., McDonald's, Pizza Hut). In response to the statement, "I believe that I eat healthy," those who responded "yes" ate out an average of 1.5 times per week, and those who responded "no" ate out an average of 2.5 times per week.

In response to statements concerning external barriers to healthy eating, the data suggests that, for the at-risk group, cost and preparation are the most significant barriers to healthy eating. 36% of patients agreed their friends and family members ate healthy. 57% of patients felt they had a support system to help them eat healthier (Figure 5).

In response to the self-perception statements, 61% of patients felt they did eat healthy, 43% were afraid their current diet would increase their risk for diabetes, and 86% said they were actively trying to eat healthier (Figure 6). Of those who said they ate healthy, 56% did not include fresh fruit as part of their typical daily diet and 22% did not include at least one full serving of vegetables as part of their typical daily diet.

In response to the Likert scale question, "How important is it for me to eat healthy?" most agreed that it was very important (rating of 5; at-risk: 91%, non at-risk: 73%) (Figure 7). In response to the second Likert scale question, "How important is it for me to eat on a budget?" the answers were more varied: most (58%) of the at-risk group responded with a rating of 5 (very

important); most (55%) of the non at-risk group responded with a rating of 4 (somwhat important) (Figure 8).

Discussion

The data suggest that patients at CommuniCare face certain barriers in healthy food decision-making. In considering BMI alone, 84% of patients in this study were overweight or obese; however, only 64% of overweight and obese patients had a goal weight. Perhaps some overweight and obese patients do not have a goal weight because they do not perceive their current weight to be a problem. Clinicians should focus on emphasizing the importance of losing weight, as an increased BMI strongly correlates with increased risk for chronic diseases (Bays, Chapman, Grandy; 2007).

Diabetes education is lacking in 55% of the at-risk group. There are many ways that education can be provided to patients. Besides patient education by the primary care provider during an office visit, it may be useful to identify patients who are at-risk for diabetes and offer a separate diabetes education course or program for this population. Education is a method of prevention of lifestyle-induced chronic diseases, such as T2DM, and community health centers such as CommuniCare are well-suited to provide such preventive health services.

The data suggest that the at-risk group faces a financial barrier. The majority of the at-risk group felt that healthy food was too expensive. This is consistent with the majority of the at-risk group giving a 5-rating (very important) for the importance of eating on a budget, as opposed to the non at-risk group giving a majority of a 4-rating (somewhat important). The at-risk group perceives food preparation as a more significant barrier than does the non at-risk group as well. Not surprisingly, fast-food restaurants comprise the majority of the restaurants

patronized, regardless of group. Diet plans should provide strategies for patients to buy and prepare healthy food on a budget.

A barrier to healthy eating that exists for both at-risk and non at-risk groups is the social environment, i.e., the eating behaviors of friends and family members. However, it is interesting to note that, while most patients did not think their friends and family members ate healthy, the majority still believed they had a support system to help them eat healthier. It is possible that patients have an overly optimistic view of their goal to eat healthier: the patient believes they will succeed in their goal and their social system will succeed in their role as well. It is important for healthcare providers to stress the idea of "eating right right now" and to involve the patient's family members in making these lifestyle changes as well. In a study by John and Ziebland (2004), patients faced a barrier of their household's preferences, in which spouse and children did not like the taste of fruits and vegetables and would therefore waste healthy food. Taste preferences are established during childhood; thus, one of the most important factors in determining someone's fruit and vegetable intake is whether or not fruits and vegetables were introduced to them in their youth (Krebs-Smith et al., 1999). Family members responsible for food preparation should be educated on ways to incorporate more healthy foods into the family meals.

Interestingly, availability of healthy food and difficulty in healthy food preparation were not perceived as barriers. However, these barriers might exist and be unidentified because of lack of patient health literacy, i.e., it is possible that patients do not understand what healthy eating is. Thus, alternative ways to inquire about these two barriers should be considered for future studies.

Many patients who felt they ate healthy described eating meals that lacked an adequate amount of fruits and vegetables, defined as at least 1.5 cups of fruit per day and at least 2.5 cups

of vegetables per day, based on an 1800 calorie per day diet (CDC, 2013). In other words, many patients have a misunderstanding about what qualifies as a healthy meal. Misperceptions about lifestyle behaviors significantly hinders readiness to change (Jansink et al., 2012). Physicians, nurses, medical assistants, and dieticians should all play a role in nutrition education. An interdisciplinary approach to nutrition education provides a consistent, cohesive, and powerful message to the patient.

Families, workplaces, schools, and communities should all be involved in the pursuit of healthy lifestyle behaviors (Bazzano et al., 2005). In San Antonio, the Bienestar program is an excellent model for diabetes prevention in the youth of San Antonio (Trevino et al., 1998). It involves parents, teachers, and school cafeteria workers, so that diet and exercise become an integrated part of the children's lives. Going forward, health advocates should focus on developing healthy lifestyle habits in the youth.

Recommendations

Clinicians at CommuniCare should focus on improving patient health literacy. For example, this study suggested that some patients have a discrepancy between the actual healthiness of their diet and their self-perception of the healthiness of their diet. CommuniCare primary care providers and medical assistants have an opportunity, though time-limited, to educate their patients on healthy diet during their office visits. An alternative way to approach the patient health literacy issue is to have a dedicated team of healthcare professionals who can provide patient health education at a time outside of the office visit. At CommuniCare, the diabetes care and management team serves such a function, but specifically for a limited number of highly-complex diabetic patients. Perhaps a more reasonable method of patient education is to

promote attendance at the diabetes nutrition workshop, hosted every month by the Texas Diabetes Institute.

In addition to promoting health literacy, clinicians should make an effort to involve the patient's family members in implementing healthier lifestyle choices. Children, especially, should be trained to eat healthy foods when they are young, so as to promote health eating behaviors later in life.

For future research studies, it is important to further investigate patient health literacy on nutrition. Patients can be asked to describe what they believe is a healthy meal, or perhaps the questionnaire will provide an example of a meal and ask the patient if they believe it is healthy or not and why. Further, patients can be asked about their knowledge of T2DM with specific questions about the risk factors, causes, symptoms, consequences, and treatments for T2DM. In performing future assessments of the barriers to healthy eating, patients can be asked to rank the barriers in order of most signficant to least significant. More internal barriers can be investigated as well. Additional internal barriers to consider include taste preferences, exposure to healthy foods during youth, current unhealthy eating habits (e.g., eating right before bedtime), and personality questions that pertain to self-image and goal-setting.

Conclusion

Patients at CommuniCare Health Centers face barriers to healthy eating and lack adequate health literacy. The most significant barrier to the at-risk for diabetes group is cost. Both at-risk and non at-risk groups face a social environment barrier, i.e., they are surrounded by friends and family members who eat unhealthy. It is important for clinicians at CommuniCare to focus on patient health literacy and to involve the patient's friends and family members in making better eating decisions as well. To influence a more dramatic and widespread change in

lifestyle behaviors, CommuniCare can partner with larger community-based organizations—for example, schools, workplaces, churches—to promote a city-wide effort to eat healthier, exercise more regularly, and to ultimately decrease the incidence of T2DM in San Antonio.

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APPENDIX

Figure 1

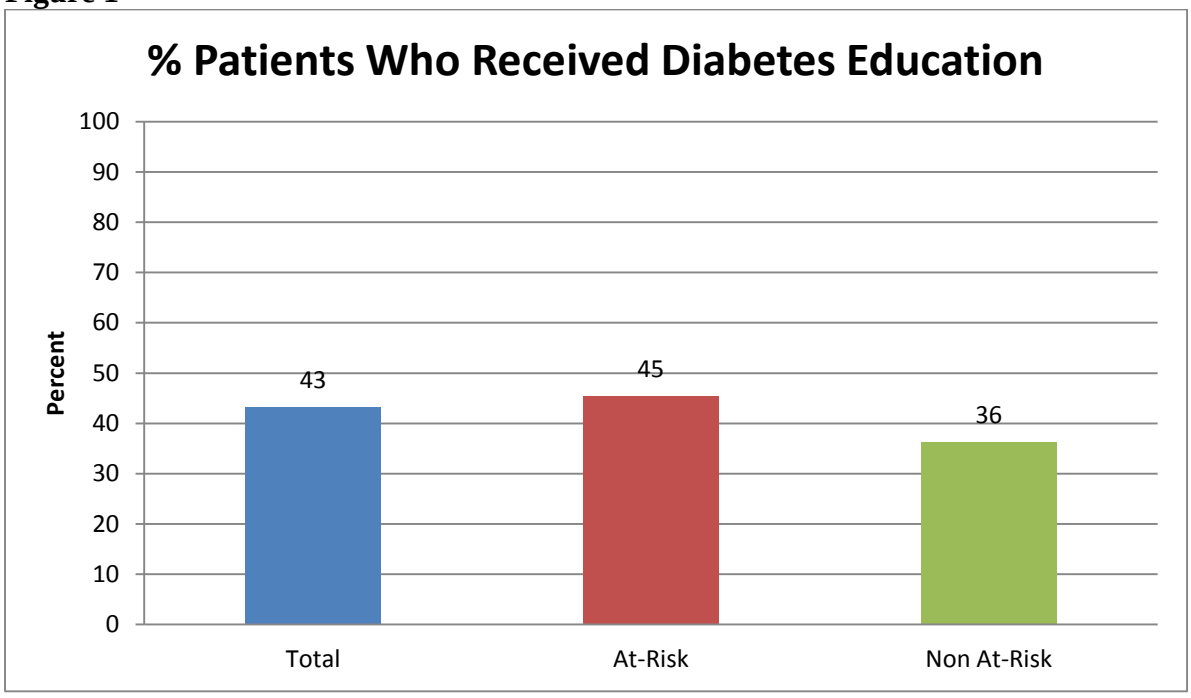

Figure 2

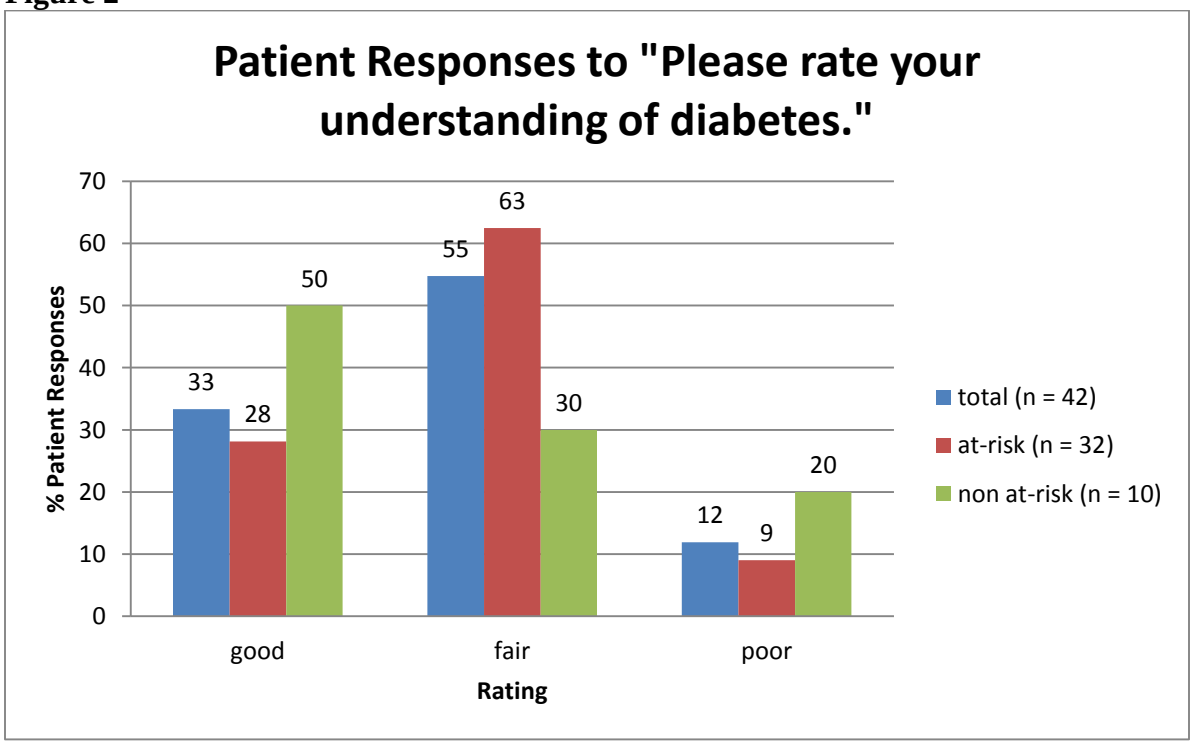

Figure 3

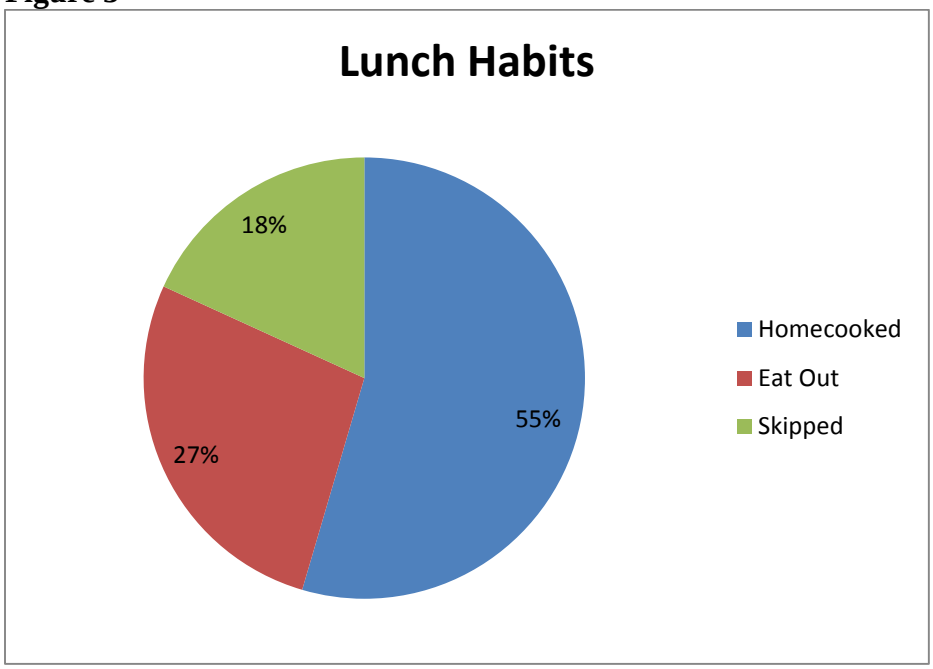

Figure 4

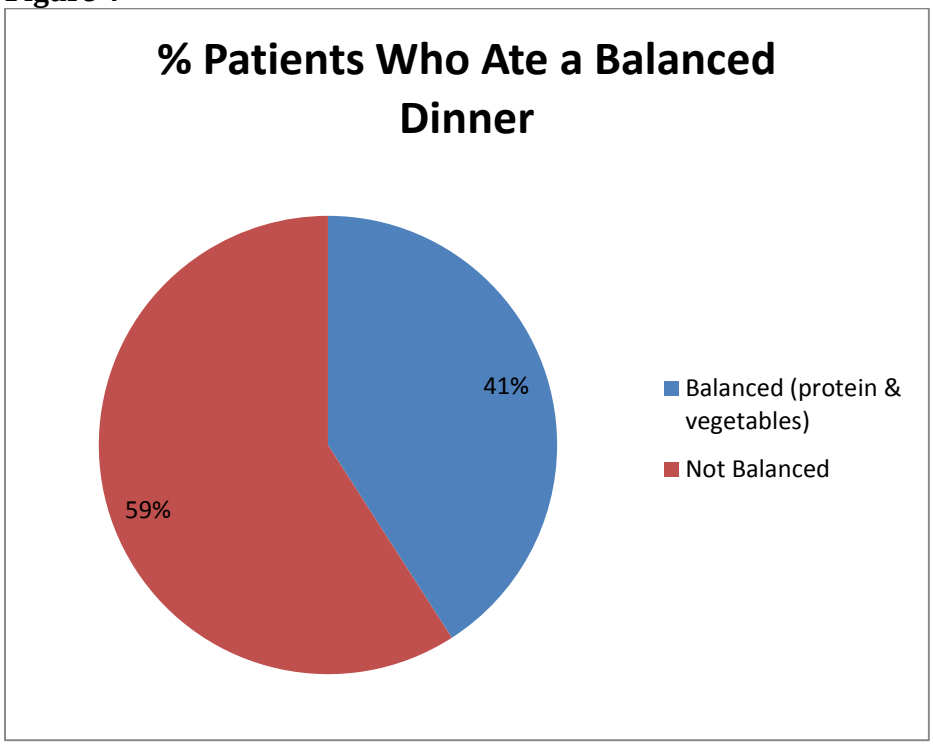

Figure 5

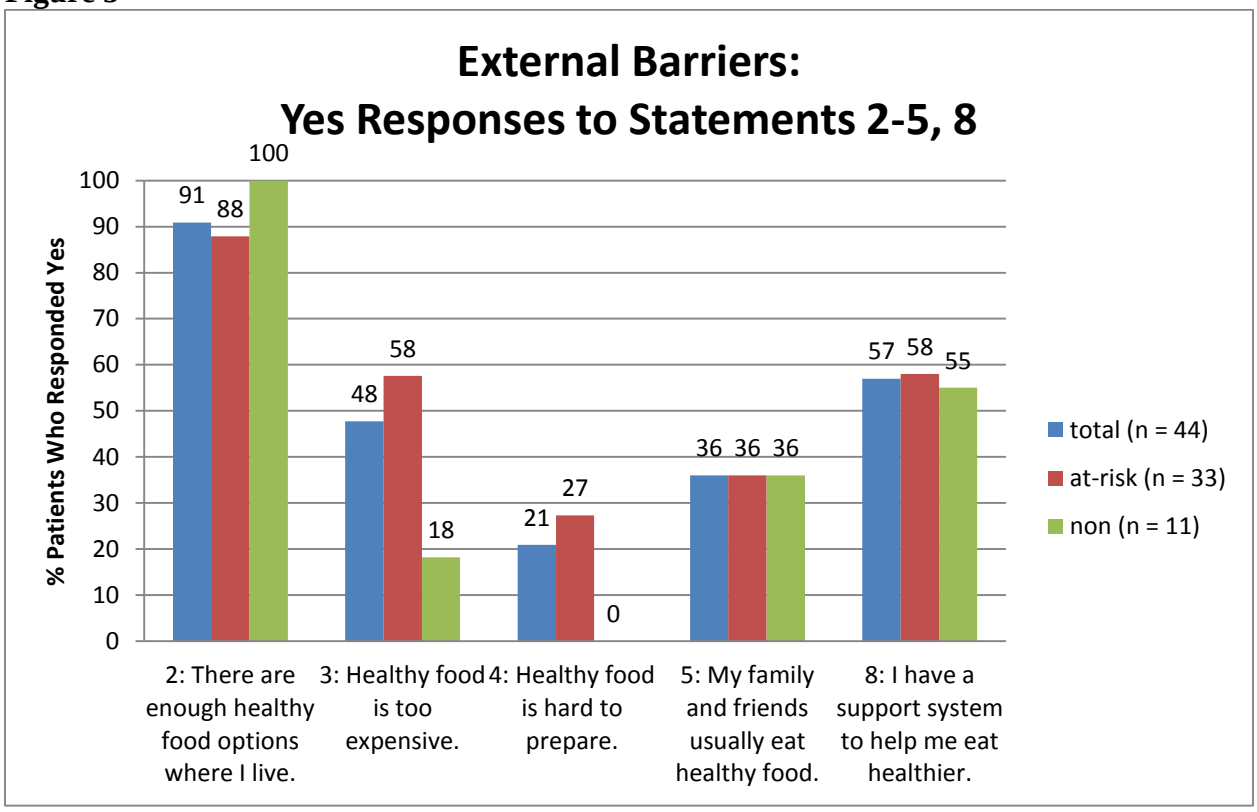

Figure 6

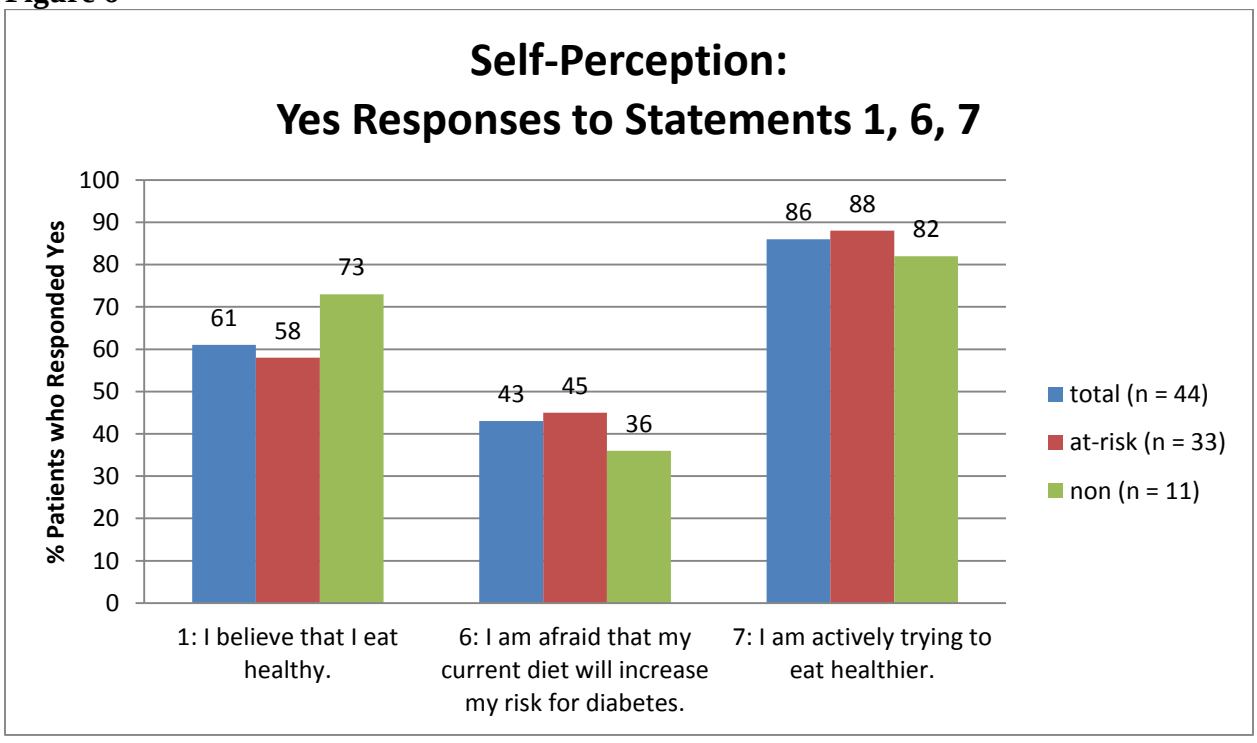

Figure 7

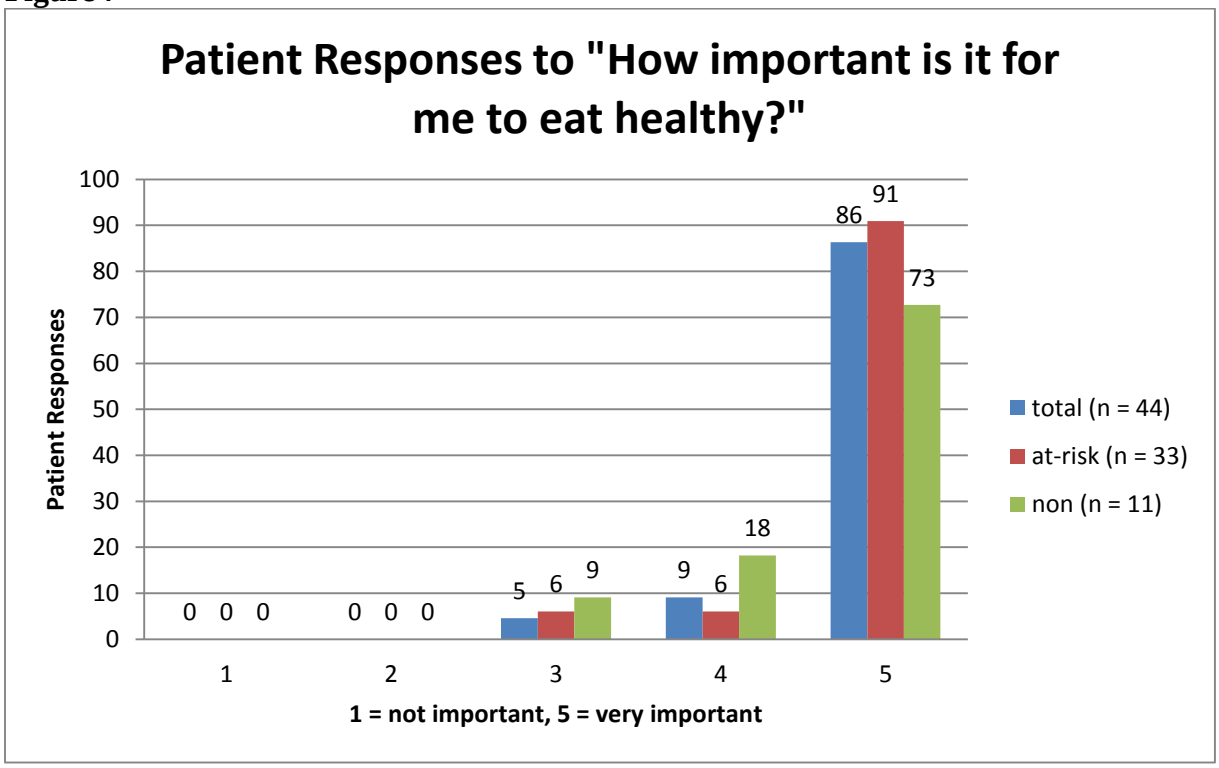

Figure 8