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Culturally Oriented Diabetes Education for Somali Immigrants of Minneapolis

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CULTURALLY ORIENTED DIABETES EDUCATION FOR SOMALI IMMIGRANTS OF MINNEAPOLIS

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ABSTRACT

This project aims to support Somali patients at Axis Medical Center in Minneapolis, MN by providing education on the link between diet and blood glucose level as well as the impact of that on the disease progression of type 2 diabetes mellitus (T2D). Axis Medical Center serves many Somali immigrant patients. Due to the language barrier between the Somali patients and clinicians as well as the low health literacy amongst the Somali patients, an eight minute educational video with visual aids was created to facilitate diabetes education in this population. In the educational video, a Somali PA-C explains the pathophysiology of T2D to a patient with a new diagnosis of T2D in Somali. Diet modifications as well as the role of monitoring hemoglobin A1C in the management of T2D are also addressed in the video. The video was uploaded to the YouTube account of Mohamed Adan, PA-C from Axis Medical Center in January 2023 and hence was readily available to both patients and other clinicians at Axis Medical Center. Since then, the video has become an effective tool in pioneering Somali patient education at Axis Medical Center. One hundred thirteen views were generated and PA Adan has since uploaded two additional health education videos in Somali. Somali patients and other clinicians at Axis Medical Center have encouraged PA Adan to make more videos for Somali health education.

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Chapter One: Introduction

Introduction

Axis Medical Center in Minneapolis, MN, serves many Somali immigrant patients (M. Fletcher, September 26, 2021). Clinicians at Axis Medical Center need tools to educate their Somali patients on preventing and treating type 2 diabetes mellitus (T2D) through healthy dietary choices. To meet the needs of Somali patients and clinicians at Axis Medical Center, an educational video was created in the Somali language, focusing on the intersection of diet, physiology, and biomarkers applicable to diabetes.

Background

Minnesota is home to 78,846 Somalis (Minnesota Compass, n.d.-b; Brown, 2019), the largest Somali population of any state. The prevalence of T2D is significantly higher among Somalis than non-Somalis, even when adjusted for age, sex, BMI, and education level (Njeru, Tan et al., 2016). In part, the higher prevalence of T2D among Somalis can be attributed to a more sedentary life in conjunction with a diet higher in carbohydrates and fried foods following immigration from Somalia to Minnesota (Njeru, Tan, et al., 2016). Traumatic experiences incurred as a refugee also seem to play a contributory factor to the high rates of diabetes among Somalis (Kinzie et al., 2008). According to Michaela Fletcher, FNP-BC, Axis Medical Center in Minneapolis, MN serves approximately 600 patients, with about 95% of those patients being Somali (personal communication, March 24, 2022). Axis Medical Center has requested educational resources for their Somali patients that address the role that nutrition plays in the treatment of T2D. Although the rates of literacy and health literacy are low amongst Somali patients (CIA, 2011; M. Neterer, personal communication, October 5, 2021; Njeru, Formea, et al., 2016), visual-based diabetes education has been shown to be effective in reducing A1C levels amongst patients with lower literacy (Bowen et al., 2016). For these reasons, a video with visual graphic aids was produced as an adjunct to the diabetes education that is provided by

Axis Medical Center. The content of the video addresses the pathophysiology of T2D, dietary changes that can lead to better health outcomes, and how lab values can be used to track the progression of T2D.

Problem Statement

Type 2 diabetes mellitus is a treatable disease that requires the patient to be knowledgeable on the link between food, blood glucose, and insulin (Wexler, 2021). Somali Americans face high rates of diabetes (Njeru, Tan, et al., 2016) and clinicians at Axis Medical Center face language and cultural barriers to educating diabetic Somali patients on the pathophysiology of T2D. Specifically, Axis Medical Center needs culturally literate materials to educate their patients on the effect that diet has on the progression of T2D (M. Fletcher, personal communication, September 26, 2021).

Purpose

This project aims to educate Somali patients at Axis Medical Center on how diet and nutrition relate to biomarkers of T2D, such as serum glucose level, insulin, and hemoglobin A1C. A video educational tool was created to meet the cultural and linguistic needs of Somali patients. In addition, this tool was designed to assimilate smoothly into the existing workflow of the providers at Axis Medical Center as an adjunct to their diabetes education.

Significance of the Problem

Healthy People 2020 was a project that the Department of Health and Human Services launched in 2020 to address public health issues. One of its goals was to "achieve health equity, eliminate health disparities and improve the health of all groups" (Zuber et al., 2020). Type 2 diabetes mellitus is a disease with a significant public health disparity in the United States (Peek et al., 2008) and this disparity is present among Somali patients. A study conducted in 2011 and 2012 showed that the prevalence of T2D was significantly higher in Somali patients than non-Somali patients in Minnesota: 12.1% to 5.3%, respectively (Njeru, Tan, et al., 2016). The

Somali T2D health disparity needs to be acknowledged and barriers addressed in order to achieve the goals of Healthy People 2020.

Type 2 diabetes mellitus also carries a significant economic cost, estimated at $4.7 billion annually in Minnesota (Minnesota Department of Health, 2018). In addition, higher diabetes-related healthcare costs are incurred with an earlier onset of a T2D diagnosis (Zhuo et al., 2014). Therefore, preventing the onset of diabetes could reduce the overall financial burden on the U.S. healthcare system.

Diabetes is also a risk factor for cardiovascular disease (CVD) and can damage major organs in the body. A cohort study conducted in 2006 found a direct link between the onset of CVD and T2D (Kengne & Patel, 2006). After eliminating all the possible confounders, the study found that elderly patients who have known, diagnosed, and controlled T2D have twice the risk of CVD and CVD mortality compared to age matched, non-diabetic patients. Furthermore, a 2015-2016 study of 1,156 Somali immigrants residing in the Minneapolis-Saint Paul metropolitan area (MSP metro) participated in a cross-sectional study that identified CVD risk factors in Somali immigrants in MN (Westgard et al., 2020). The results of the study suggest that pre-diabetes was present in 20.92% and 24.94% of female and male CVD patients, respectively. In addition,14.56% of female patients and 21.08% of male patients had T2D or Hgb A1C greater than 6.5%. This means that 35% of female CVD patients and 46% of male patients had some form of insulin resistance.

Physician Assistants (PAs) are trained as advanced practice providers to meet the increasing demand for primary medical care (Hooker, 2012). Part of a PA's role in healthcare is to manage chronic diseases, including T2D. By educating Somali patients on diabetes prevention and early intervention strategies, PAs can prevent CVD, reduce healthcare costs, and work towards the goals of Healthy People 2020 to attain health equity.

Limitations of the Project

Pursuing the education of diabetic Somali immigrants of Minnesota has several limitations. There were many cultural aspects of the immigrant groups that could affect the efforts of the project. The first to acknowledge were the communication barriers, especially health literacy. A study from The Mayo Clinic found that health literacy among Somali patients in Minnesota is below 50% which is considered low (Njeru, Formea, et al., 2016). If providers failed to recognize this disparity when communicating, there is a chance that patients could leave without the proper education.

Other potential barriers were the actual use of the material by both the provider and patient. Choosing the correct medium to present the information was a large obstacle to overcome. Video with a visual aid was chosen to overcome any potential literacy concerns. In addition, with the abundance of educational pamphlets generally located within clinics, this project's information in the form of visual aids could have been lost amongst the other materials. Presenting the information in a way that was enticing for both provider and patient was critical for successful educational outcomes.

The last barrier to overcome was approaching this educational problem without being influenced by the research team’s native western lens. The project could have excellent research in terms of the core diabetes education, but a lack of cultural competency could have hindered the ability to connect this information to the patient. There was a need to have input from natives of the Somali community to help inform the project on the realistic expectations in terms of patient lifestyle modifications. Furthermore, the material needed to be screened to ensure that nothing was offensive or contradictory to Somali core beliefs.

Conclusion

The migration of Somali immigrants to Minnesota has led to negative health outcomes. The adaptation to the western lifestyle and diet has resulted in a large prevalence of T2D within

the Somali immigrant communities (Njeru, Tan, et al., 2016). Axis Medical Center of Minneapolis serves as a primary health center for Somali immigrants but has encountered obstacles in the treatment of their diabetic patients. There was a strong need for Axis Medical Center to develop culturally literate educational material aimed at Somali patients. The project's aim was to develop materials to assist Axis Medical Center in educating Somali immigrants concerning the link between diet and diabetic biomarkers such as A1C. By analyzing literature and research regarding Somali culture and diabetes education, a culturally appropriate video was created to educate diabetic Somalian immigrants living in Minnesota.

Chapter 2: Literature Review

Introduction

Minnesota is home to the largest population of Somali immigrants in the United States (CDC, 2021, March 18). Approximately 78% of the 78,846 Somalis in Minnesota live in the Minneapolis-St. Paul metropolitan area (Minnesota Compass, n.d.-a). Somali language is widely used by Somali immigrants, and it is the third most common language spoken in Minnesota (Minnesota Department of Transportation, n.d.). First-generation Somali Americans have adopted aspects of the typical American diet including higher-fat meats and refined carbohydrates that have led to prediabetes and T2D (Njeru, Tan, et al., 2016). Due to cultural and language barriers, the prevalence of T2D in the Somali population in MN remains high. To fill the gap in diabetes education for Somali immigrants in MN, this paper reviews the currently available literature regarding T2D, Somali culture, and diabetes education to the general public as well as Somali Americans.

Diabetes

The pathogenesis of type 1 diabetes is related to the destruction of beta cells in the pancreas (Pietropaolo, 2021). In type 1A, the disease is the result of an autoimmune response destroying the cells. Due to the abundance of beta cells in the pancreas, this process may occur for a long duration before the symptoms of hyperglycemia are observed. Individuals with type 1A diabetes may have antibodies present selective against a variety of targets within the insulin secretion pathway. Type 1B is the absence of any specific antibody and is defined as idiopathic destruction of the pancreatic beta cells (McCulloch, 2019).

The pathogenesis of T2D has many contributing factors but ultimately is a combination of insulin resistance and inadequate insulin secretion (Robertson, 2021). The insulin resistance is thought to be contributed by multiple genes leading to a predisposition to the insulin resistant state. However, the altered insulin secretion is believed to be a result of environmental factors.

High-fat diets have been proven to cause oxidative stress to the insulin-secreting beta cells of the pancreas which leads to cellular damage. Increased weight gain, upper body or central obesity, and sedentary lifestyle have been found as characteristics of T2D patients in the US (Robertson, 2021). The combination of lower levels of secreted insulin, and resistance to insulin, is the basis of how hyperglycemia occurs in these individuals.

According to the CDC, there are an estimated 34.2 million people living with diabetes in the United States (2020, August 28). Of the total cases, only 26.9 million are officially diagnosed. Roughly 90-95% of diagnosed diabetes cases are type 2, while the remaining 5-10% are type 1 (CDC, 2020, August 28). Furthermore, the CDC mentions that 88 million adults have what is considered “prediabetes,” which may lead to the development of T2D in the future.

A clinical diagnosis of diabetes can be established when a patient meets the qualifying criteria for either symptomatic, or asymptomatic diabetes (Inzucchi & Lupsa, 2021). Glycated hemoglobin (A1C), fasting plasma glucose (FPG), and oral glucose tolerance test (OGTT) are three of the diagnostic tests approved by the American Diabetes Association (ADA) to confirm a diagnosis of diabetes (American Diabetes Association [ADA], n.d.-a). In asymptomatic patients, diabetes can be confirmed with a FPG equal or greater than 126 mg/dL, OGTT equal or greater than 200 mg/dL, or an A1C greater than or equal to 6.5%. In patients presenting with the classic symptoms of hyperglycemia, such as polydipsia or polyuria, a random FPG equal or greater than 200 mg/dL is sufficient for the diagnosis of diabetes.

After the diagnosis of T2D is made, it is essential to establish realistic goals for the management and treatment of the disease (Wexler, 2021). A reduction in A1C can greatly impact long-term outcome in T2D patients with A1C levels greater than 7%. Therefore, an A1C below 7% is the standard goal of therapy for most patients. However, there are many factors that can affect A1C, such as age or comorbidities, so goals of therapy should be tailored toward

the specific patient. Furthermore, the goal of therapy should aim to reduce cardiovascular risk factors to aid in the reduction of vascular complications often associated with diabetes (Wexler, 2021). Interventions that may reduce CVD risk include blood pressure management, smoking cessation, and the use of statins.

Type 2 diabetes mellitus may respond to multiple different forms of intervention and treatment (Wexler, 2021). Lifestyle modifications can aid patients in achieving goals of therapy. For patients who are overweight, (Body mass index >25 kg/m^2), caloric restriction should be implemented considering a reduction in weight of 10 percent can produce a considerable impact on blood pressure, blood glucose, and lipids (Delahanty, 2020). Furthermore, exercise apart from weight loss can benefit patients with T2D by increasing sensitivity to insulin (Wexler, 2021). If possible, patients should aim for 150 minutes of moderate-to-vigorous aerobic exercise spread out throughout the week (ADA, 2019). Additionally, patients may also benefit from the addition of resistance training to their exercise regimen.

Another important aspect of lifestyle modification in diabetes is diet. Surprisingly, the dietary recommendations for a diabetic are similar to those recommended for the general population (Delahanty, 2020). There is not a set amount of carbohydrates per day, but patients should lean toward carbohydrate sources such as whole grains, legumes, fruits, and vegetables (Delahanty, 2020). There is also a recommendation to reduce sugar-sweetened beverages to help with glycemic control. Furthermore, many of the dietary recommendations are aimed at reduction of common comorbidities such as coronary artery disease. This reduction is evident with the recommendation to replace trans and saturated fats with polyunsaturated and monounsaturated fats which are proven to reduce cardiovascular disease (Delahanty, 2021).

There are numerous factors to consider when choosing the treatment of T2D. For asymptomatic patients with an A1C less than 7.5%, lifestyle modification may be sufficient for diabetes management (Wexler, 2021). However, in asymptomatic patients with A1C greater

than 7.5%, starting pharmaceutical intervention at time of diagnosis is correlated with improvement in patient outcomes. Unless contraindicated, it is recommended that patients start with oral administration of metformin. It is more cost effective than other oral glycemic control agents and has also been proven to reduce cardiovascular events (Wexler, 2021). In the presence of kidney disease or heart failure, there is indication to use other oral glycemic agents such as sodium-glucose cotransporter 2 inhibitors. In patients with AC1 values greater than 9% who cannot tolerate metformin, insulin or GLP-1 receptor agonists may be used to aid glycemic control. Furthermore, more consideration beyond initial therapy may be required if glycemic control is still not obtained (Wexler 2021).

Somali Immigrants

Somalia is a country in East Africa, east of Ethiopia, at the horn of Africa. Due to its unique geographic location, the country is divided into two parts: a northern mountainous region and southern plains suitable for farming. Diet preferences in these two regions are therefore different based on what is available. In the north, a common meal is lahoh, which is made from fermented flour and shaped in the form of a pancake. Meat sauce with little to no vegetables is often eaten with the lahoh. Women take an essential home-making role in the family in Somalia and in the United States. In Minnesota, many women purchase groceries daily because they do not have the money to buy more than a week's worth of food (M. Schussman, personal communication, October 15, 2021).

Somali immigrants to the United States come from a country that descended into civil war in 1991 when the reigning military regime was overthrown (Adam, A., 2005). This led to a power vacuum, with various warlords vying for control of the country (Adam, A., 2005). The ensuing economic and political chaos led to widespread starvation and resulted in a refugee crisis that eventually brought Somalis to the United States and to other countries as refugees (Kinzie et al., 2008, Osman, 2016). Somalis living in the United States are less active when

compared to the lifestyle of their homeland (M. Schussman, personal communication, October 15, 2021; H. Sharif, personal communication, April 21, 2022). For example, Somali women living in Minnesota no longer walk long distances to the grocery store as they did in their home country. However, staying less active did not remove life stressors; adjusting to an entirely new lifestyle in the U.S. is hard on their mental and physical health (M. Schussman, personal communication, October 15, 2021).

Minnesota houses the most Somali immigrants among all 50 states (11.9%), with the majority of the community residing in MSP metro (CDC, 2021, March 18). This phenomenon is due to what is known in the Somali culture as “sahan,” literally translated as sending scouts to find rain in their home country. Such practice is beneficial because the Somali people tend to go to regions where their people have become established (Scuglik, 2005).

When Somali people relocated to Minnesota, they brought their language with them. Somali is the third most spoken language in MN, following English and Spanish (Minnesota Department of Transportation, n.d.). The Somali written language was officially established in October 1972, using Latin characters to create the alphabet (Andrezejewski, 1978). Prior to this, Somalis had no written language. Somalis have a rich history of artistic expression in the form of poetry. In the 1940s, broadcasting became popular in Somalia, which gave the local poets a platform to showcase their work. Before the Somali written language was invented, poetry was a big part of the Somali culture and tradition, as it was later reflected in the formation of their language (Andrezejewski, 1978). It is important to remember that as the Somali immigrants left their country behind, they brought their culture and language with them. The culture and the language remain deeply rooted in their identity, regardless of their residence.

Second generation Somali immigrants face many challenges and trauma; their children often join gangs, which causes added stress to their community (Scouglic, 2005). Many people

are stuck in the triad of depression, anxiety, and post-traumatic stress disorder (PTSD); these Somalis often do not know how to resolve the situation (Scouglic, 2005).

The psychological distress of living as an immigrant, in addition to the traumatic past experiences of war and living in refugee camps are also contributing factors to the high prevalence of T2D in their community (Kinzie et al., 2008). Chronic, unresolved stressors related to immediate threat and survival lead to the activation of the HPA axis, resulting in excess release of cortisol in the blood. Cortisol increases gluconeogenesis of the liver, which can lead to a hyperglycemic state (Costanzo, 2018). Furthermore, it has also been reported that stressors that induce epigenetic modifications have been linked to decreased expression of GLUT-4 transporter protein that aids in cellular uptake of glucose (Singh et al., 2020). Decreased expression of GLUT-4 leads to increased extracellular glucose which further exacerbates the serum glucose level. Living in a constant hyperglycemic state can lead to insulin resistance and development of T2D. In a study done by Kinzie et al. of 459 refugee psychiatric patients, participants between 0-44 had a rate of diabetes 10 times higher than the U.S. national average, 11.2% to 1.2%, respectively (2008). For the age range of 45-64, the diabetes rate was 17% for refugees compared to 9.5% for the U.S. national average. In 72 Somali refugees, the diabetes rate was 24%, the highest of any ethnic group (Kinzie et al., 2008). The study is limited in that it only looks at refugee psychiatric patients and given that all refugees had incurred trauma, there was no control group of non-traumatized psychiatric patients to compare too. The study also compares the diabetes rate to the national U.S. average and not the average amongst psychiatric patients. The study associated higher levels of trauma with higher rates of diabetes, implying that trauma does play a causative role in the pathophysiology of diabetes (Kinzie et al., 2008).

Another significant change within Somali immigrants was a change in diet. Although traditional foods such as lahoh are still eaten at many meals, Somalis were introduced to more

deep-fried foods (Schussman, M., personal communication, October 15, 2021). In addition, their traditional diet high in meat and carbohydrates has transitioned to less healthy versions that involve higher-fat meat and more refined carbohydrates (Njeru, Tan, et al., 2016). Finally, sweetened tea is frequently consumed in place of water (Neterer, personal communication, October 15, 2021). Diet, lifestyle changes, and stress are all contributing factors to the rise of diabetes in the Somali community.

The sum of all the life-altering adaptations can be observed when comparing Somali immigrant populations to other populations. The diabetes burden amongst Somali immigrants is 33% higher than their non-Somali neighbors. In a retrospective cohort study of 1007 Somali patients, the prevalence of T2D was 12.1% compared to 5.3% of a cohort of age-matched non-Somalis. The prevalence of prediabetes was 21.3% and 17.2%, respectively (Njeru, Tan, et al., 2016). These results correlate to over 20,000 Somalis in the MSP metro who have either T2D or pre-diabetes.

Diabetes Education

Broadly speaking, the primary components of diabetes education focus on nutrition, exercise, medication management, and the importance of regular checkups to monitor labs and reduce risk for further disease processes (Association of Diabetes Care and Education Specialists [ADCES], n.d.-a). Diabetes education occurs during clinical visits, through diabetes education programs (ADCES, n.d.-b), and through online resources from health websites (Mayo Clinic, 2021) or YouTube (Mayo Clinic, 2014).

Both the American Diabetes Association and the Association of Diabetes Care and Education Specialists (ADCES) accredit comprehensive diabetes education programs nationwide (ADCES, n.d.-b) and there are over 19,000 Certified Diabetes Care and Education Specialists (CDCES) in the US (Certification Board for Diabetes Care and Education [CBDCE], 2021). Traditionally this certification is achieved by a medical doctor, registered nurse, physician

assistant, nurse practitioner, registered dietician or pharmacist, but other health professionals may attain this certification as well (CBDCE, 2021). Between ADA and CBCDE, there are 21 accredited sites that provide diabetes education within a 20-mile radius of downtown Minneapolis (ADA, n.d.-b; ADCES, n.d.-a). Diabetes education is provided to the Somali population in Minnesota through the University of Minnesota (UMN) Extension service. The mission of the UMN Extension service is to use resources of the University to areas of need in local communities across the state in areas such as agricultural, gardening, nutrition, and water management (University of Minnesota, n.d.). UMN Extension's diabetes education focuses on prevention through diet and exercise and is funded through the federal Supplemental Nutritional Assistance Program (SNAP) (University of Minnesota Extension [UMN Extension], n.d.; J. Rasmussen, personal communication, October 15, 2021).

One of the crucial challenges of delivering diabetes education is the health literacy of the target audience. Health literacy includes understanding medical information and being able to use that knowledge to maintain and improve one's health (Njeru, Hagi-Salaad, et al., 2016). A related but distinct aspect of health literacy is numeracy: the ability to understand and process numbers in association with medical treatment (Hersh et al., 2015). Health literacy and numeracy are essential in diabetes management because it is a chronic condition that requires self-care and independence (Rothman et al., 2005; Pembroke et al., 2021). According to the US Department of Education, 36% of Americans have a basic or below basic level of health illiteracy (Kutner et al., 2006; CDC, 2021, September 1), and yet 75% of medical education is written at a high school/college level (Hersh et al., 2015).

Illiteracy presents a considerable problem in medical education to non-natives such as Somalis, many of whom are illiterate even in their own language (Central Intelligence Agency [CIA], 2010). Although the literacy rate of Somalis in Minnesota is unknown to the authors, statistics from the CIA state a 37.8% literacy rate in the country of Somalia (2010) and

anecdotal evidence corroborates a high illiteracy rate among the Minnesota Somali, particularly among those who were adults when they immigrated to the United States (M. Neterer, personal communication, October 5, 2021). What this means is that merely translating available diabetes education literature into Somali would not likely be sufficient to close the barrier to diabetes education.

Several health education strategies exist for illiterate and health-illiterate persons, including videos, visual aids (such as models), and even comic-book style resources (Hersh et al., 2015). One curriculum that is catered toward the health illiterate is the Idaho Plate Method (Idaho Plate Method, 2019). Central to the curriculum is the use of a graphic table plate with the appropriate portion sizes of fruits, vegetables, protein, and carbohydrates visualized. In a study of 117 participants in Idaho that spanned 42 out of 44 counties in a largely rural state, results of the curriculum yielded a three-fold increase in the consumption of vegetables (Raidl, 2007). In a study by Bowen et al., patients with low numeracy had a lower A1C after 6 months of following the Idaho Plate Method intervention versus carbohydrate counting (2016).

Illiteracy can also be a barrier to conducting research to identify a person's level of health literacy (i.e., patients who cannot read will not be able to fill out written surveys). For this reason, a verbally administered test was developed to assess illiterate diabetic's basic understanding of their disease (Rothman et al., 2005). Termed "Spoken Knowledge in Low Literacy patients with Diabetes" (SKILLD), this 10-question test is brief enough to be used in a clinical setting to screen for patients who might have difficulty with compliance (Rothman et al., 2005). The limitation of this test is that there is no gold standard to compare it against to assess its validity in health literacy, although it does show good internal validity because patients with a higher health literacy score also had a lower A1C score (Rothman et al., 2005). Another limitation is that the test does not evaluate a patient's understanding of nutrition or medications management, but simply important self-care practices (Rothman et al., 2005). Pertinent findings

in a study of 50 Somali patients using the SKILLD test showed that less than 20% could identify the normal fasting glucose range or target goals for A1C (Njeru, Hagi-Salaad, et al., 2016). Clearly, there is a need to address diabetes education within the Somali population, with the purpose of achieving better health outcomes associated with good nutrition and medication adherence (Osburn et al., 2011), leading to lower A1C levels (Rothman et al., 2005; Bowen et al., 2016).

Two other factors to be aware of when providing diabetes education are food deserts and food insecurity. According to the United States Department of Agriculture (USDA), a food desert is an area that has a high prevalence of low-income people with low access to grocery stores where affordable nutritious food can be purchased (United States Department of Agriculture [USDA], 2021a). Two of the neighborhoods that a high percentage of Somalis in Minneapolis live in are Phillips and Cedar-Riverside (International Institute of Minnesota, 2017) and both neighborhoods are classified by the USDA as being a low-income area with a distance of greater than one-half mile to a grocery store (USDA, 2021b). The Pittsburgh Hill/Homewood Research on Eating, Shopping, and Health study interviewed low-income, majority African American neighborhoods affected by food deserts, and found that distances to grocery stores and food prices had a positive correlation with obesity (a T2D risk factor) among these populations (Ghosh-Dastidar et al., 2014; Robertson, 2021).

Food insecurity refers to “uncertainty about having enough food to meet the needs of all household members because of insufficient money or other resources” (Caspi et al., 2016). A 2006 study of Somali refugee women living in Maine revealed that 67% experienced food insecurity and that food insecurity positively correlated to obesity among these women (Dharod et al., 2013). It is not known to the authors what the rate of food insecurity is among the Somali community of Minneapolis, but from 2015-2019, 45.8% of Somalis in Minnesota in 2015-2019 lived below the poverty level (Minnesota Compass, n.d.-b). In a longitudinal cohort study done

by the ADA in an urban area, food insecurity is associated with a 0.6% increase in A1C (Berkowitz et al., 2018). Living in an area with low access to food (without food insecurity) has no impact on a patient's A1C level (Berkowitz et al., 2018).

Therefore, when providing diabetes education to a patient, it is important to consider whether a patient is affected by any level of food insecurity and refer to services that may be able to address these needs, as this will have a direct impact on diabetes management. It would also be important to be aware if a patient has low access to food because this presents an added barrier to management of the disease. Although the study by the ADA did not show a change in A1C, low access to a grocery store could still present a significant barrier to acquiring affordable, nutritious food to individual patients.

In summary, diabetes nutrition education directed at the Somali population requires materials that prioritize visual and oral communication over written communication. Although illiteracy presents a barrier to education, it is possible to succeed in achieving higher health literacy through culturally literate education that utilizes oral and visual methods (Raidl, 2007; Bowen et al., 2016). Considering an individual patient's access to food and his/her perception of food scarcity are important factors for inquiry and consideration.

Conclusion

The prevalence of T2D in Somali immigrants revealed the need for proper education in prevention and management of the disease. Due to the relatively recent development of the written Somali language, illiteracy amongst this population provides many challenges for diabetes education. However, by reviewing the literature, it was possible to utilize successful aspects of other patient education models and apply to them the diabetic endemic in the Somali community of Minnesota. Tailoring the effort in a culturally competent manner allowed providers to communicate the most essential information to Somali patients, giving them the best chance to properly manage their diabetes and improve health outcomes. Chapter 3 will discuss the

proposed strategies used to create the clinical application of the information acquired from the literature review.

Chapter Three: Methodology

Introduction

Axis Medical Center in Minneapolis, MN sees a high percentage of Somali patients, who have an accelerated incidence of type 2 diabetes mellitus (M. Fletcher, personal communication, March 24, 2021; Njeru, Tan, et al., 2016). Axis Medical Center has identified a lack of culturally competent diabetes education materials available to their providers for patient instruction. Considering the low overall level of literacy as well as health literacy in the Somali community (CIA, 2011; M. Neterer, personal communication, October 5, 2021; Njeru, Hagi-Salaad, et al., 2016), it was decided that a video would be the most useful tool that a provider at Axis Medical Center could use when counseling with a patient who has a new diagnosis of T2D or prediabetes (M. Fletcher, September 26, 2021; M. Schussman, personal communication, October 15, 2021; H. Sharif, personal communication, February 2, 2022). The video features two Somali employees from Axis Medical Center who simulate a patient-provider interaction. The project incorporated input and feedback from Somali employees of Axis Medical Center in the scriptwriting and production.

Rationale for Project

Axis Medical Center is a non-profit clinic located in Minneapolis (Axis Medical Center, 2022). Originally founded in 2008 by Dr. Crispin Semakula, they seek to serve the Somali and eastern African immigrant populations of Minneapolis. The organization has continued to expand its reach and has started to also focus on the Hispanic and homeless population located near the clinic. The goal of this project was to improve diabetes education for the Somali immigrant population that is served by Axis Medical Center.

The need of the organization is resource material to assist in the diabetes education of Somali immigrants. Providers at Axis Medical Center have faced challenges in successfully managing diabetes in this population. This can be attributed to many factors such as limited

time with patients, language and cultural barriers, and lack of health literacy amongst patients (Njeru, Hagi-Salaad, et al., 2016). However, the organization believed that a culturally aware presentation on core diabetes education in the form of a video resource could help bridge the gap between patient and provider. Unfortunately, the large provider workload prevented the allocation of time toward the creation of the proposed resource material. This created the need for an outside party to assist in the creation of the material.

The predicted outcome of this project was the successful creation and implementation of a diabetes education video that is catered to the Somali immigrant population of Minneapolis, with the intention to improve management of patient diabetes and overall better health outcomes. This was important to this organization because they care deeply about the population they serve but have found that traditional patient education methods have been unsuccessful in proper diabetes management. The success of this project was therefore important to the Minneapolis Somali immigrant population because proper management of the disease could prevent further health complications.

Population

This project aimed to address the T2D concerns within the Somali patient population at Axis Medical Center located in Minneapolis, Minnesota. With plans successfully implemented, the project benefited Somali patients who were either prediabetic or diagnosed with T2D. Clinicians at Axis Medical Center were able to use the educational video to facilitate their patient education on the effect of diet and nutrition on blood sugar level. It is estimated that there are about 70 Somalis with T2D and 120 Somalian patients with pre-diabetes at Axis Medical Center that could have potentially benefited from an educational video (M. Fletcher, personal communication, March 24, 2022; Njeru, Tan, et al., 2016). Patients of Axis Medical Center were given access to the video after they left the clinic so they could incorporate those principles illustrated in the video into their daily lives.

The Twin Cities are a common destination for Somali immigrants. Minnesota houses the largest Somali population outside Somalia in Africa (CDC, 2021, March 18) and the Somali language is the third most spoken language in the state of Minnesota after English and Spanish (Minnesota Department of Transportation, n.d.). Somalis have a relatively low literacy rate, as their written language was not established until 1972 (Johnson, 2006). As a result, verbal communication, music and arts have a rich cultural heritage that has been carried on from Somalia (Neterer, personal communication, October 15, 2021). Since moving to Minnesota, many Somalis have adopted a more sedentary lifestyle and do not walk as much as they did in Somalia (M. Schussman, personal communication, October 15, 2021; H. Sharif, personal communication, April 21, 2022).

Project Plan and Implementation

Video was chosen to be the medium of delivery for diabetes education. This made the diabetes instruction accessible to Somali patients with all levels of literacy (CIA, 2011; M. Neterer, personal communication, October 5, 2021). The plan, in consultation with Axis Medical Center, was to make this video available on a readily available platform such as YouTube. This provided the freedom for Axis Medical Center providers to incorporate this video into their existing diabetes education during a clinical visit, and also have the video available for later viewing. Permission was obtained from Axis Medical Center to create this video (see Appendix A).

The video project began by the authors of this paper consulting Somalis and medical professionals about common misconceptions that Somalis have regarding T2D (M. Schussman, personal communication, October 15, 2021; P. Marino, personal communication, October 22, 2021; H. Sharif, personal communication, February 2, 2022; M. Fletcher, personal communication, September 26, 2021). The authors then wrote a script that conveyed a conversation between a Somali physician assistant and a Somali patient with newly diagnosed

diabetes. During the conversation, the patient asks questions pertaining to areas of misconceptions about T2D and the PA addresses each of these questions, explaining the pathophysiology of T2D, A1C and its relationship to T2D management, the role that diet and nutrition play, and the importance of follow up appointments with medical providers. After the script was completed, feedback was obtained from Mohamed Adan, a Somali Physician Assistant with Axis Medical Center. This feedback was then incorporated into the final script and PA Adan then translated the script into Somali.

Filming of the video took place at Bethel University on July 31, 2022 in the healthcare lab. Two Somali employees from Axis Medical Center served as the physician assistant and patient. They reviewed the script ahead of time and came prepared for the filming. A high-quality DSLR camera, tripod, and microphone borrowed from Bethel University were used to capture the video and audio. The video footage was then uploaded onto YouTube. English subtitles were added to the video by a PA Adan from Axis Medical Center and he then posted the completed video onto a YouTube page he created. After the completion of the initial video, a graphic display of the plate method was added and the final completed video was uploaded to YouTube. The video can be found by going to the following URL: https://youtu.be/VoFC9Fcb6C4. After the video was completed, uploaded, and made public, a link was made available to Somali patients with diabetes in their after-visit summaries and through links being sent electronically via text and the phone application Whatsapp.

Project Tools

This project created an eight-minute video tool that providers can show to patients who are newly diagnosed with diabetes. The video educates Somali patients on the pathophysiology of diabetes, diet substitutions that can delay or reverse the progression of diabetes, and the physiology of how diet affects lab values like A1C and serum glucose. These features of the

video cover education that providers at Axis Medical Center have indicated would be of the greatest assistance (M. Fletcher, personal communication, September 26, 2021).

The video featured a Somali provider discussing a new diagnosis of diabetes with a Somali patient. During the counseling, the patient asked questions of their provider which prompted the provider to address each of the educational topics. The video addresses the questions and misperceptions commonly reported by providers in the clinic (M. Schussman, personal communication, October 15, 2021; P. Marino, personal communication, October 22, 2021; H. Sharif, personal communication, February 2, 2022). By addressing common questions, the video aims to overcome the barriers that Somalis have that prevent them from making dietary changes and seeking regular follow-up with their primary care provider (M. Fletcher, personal communication, September 26, 2021). As the provider explains diabetes to the patient, he uses a whiteboard to aid the viewer in conceptualizing the biochemistry of diet, glucose, and insulin and how dietary interventions can have positive outcomes in the long term.

Potential Project Barriers

There were many barriers that could have made the implementation of this project difficult. The first would be the creation of the actual resource material. The research group had limited experience in the creation of visual infographics. However, the group contacted many resources and had multiple routes they could use to create the material. The second barrier was creating material that is culturally competent and well-received by the immigrant population. It is difficult through a Western lens to ensure that the material is culturally appropriate. Therefore, the project material was screened by Somali members of Axis Medical Center to minimize concerns. The last barrier was the actual implementation and use of the material. The providers need to be aware of this resource in order for it to be successful. The research team received assistance from a collaborating physician assistant at Axis Medical Center who aided in the distribution of the material.

Conclusion

The high prevalence of T2D among Somali patients in Minnesota revealed the need to provide effective educational material to address the concern. The characteristics of the Somali population and the low rate of literacy in their language demanded a more creative means of communication. This project produced a video that educates Somalis about the impact dietary changes can have on health outcomes in the context of a diabetes diagnosis. This video featured a Somali provider and patient, with the provider helping the Somali patient to relate linguistically and culturally to the video and information. Chapter 4 will discuss the reception of the video by Axis Medical Center providers and the analysis of its usefulness for similar future initiatives.

Chapter Four: Discussion

Introduction

The goal of this project was to create diabetes education material tailored to the Somali immigrant population of Minnesota. This was done through the application of a video format to overcome the potential barrier of decreased health literacy currently present in this population (Njeru, Hagi-Salaad, et al., 2016). By utilizing a modern online platform for distribution, the material has been able to reach multiple patients who have benefited from the video's content. Initially, there were concerns about overcoming cultural differences that may hinder the delivery of the content. However, with the assistance and feedback from a Somali physician assistant, the end result was a product that was well received by the community and has now served as a catalyst for future Somali health education material.

Summary of Results

Type 2 diabetes mellitus is a treatable disease that requires the patient to be knowledgeable on the link between food, blood glucose, and insulin (Wexler, 2021). Somali Americans face high rates of diabetes (Njeru, Tan, et al., 2016) and clinicians at Axis Medical Center require culturally literate materials that educate their patients on the effect that diet has on the progression of T2D (M. Fletcher, personal communication, September 26, 2021). Providers at Axis Medical Center have limited resources available in Somali for their patients and requested assistance. Due to low levels of literacy in the Somali population, it was decided that producing a video in Somali would be the most effective way to educate Somalis who have diabetes about the role that diet, glucose monitoring, and clinic appointments play in the management of diabetes.

The primary video, "Macluumaad ku saabsan sonkorta (Diabetes education)," was uploaded onto a YouTube account created by Mohamed Adan, PA-C with Axis Medical Center in January 2023. Shortly afterward, the primary video was minimally edited by having a visual

graphic of the plate method added at the appropriate time in the video. This increased the visual understanding of the plate method. This link was then uploaded onto PA Adan's YouTube account. PA Adan then began sharing this video with Somali patients that he sees who have T2D. PA Adan has primarily been sharing the YouTube link electronically through Whatsapp or text. The majority of his patients with T2D are elderly and have a limited ability to navigate technology; sending a link through text has proved to be the most effective means of making the video available to the majority of his patients. For younger patients, the video is readily available by searching YouTube for PA Adan's name.

As of March 2023, there are a total of 119 views between both videos. Over the course of approximately 60 days, these average to approximately 2 new views per day. Since the launch of the T2D education video, PA Adan has also created two additional videos in Somali that address hypertension. These videos have gained a total of 109 views.

Mohamed Adan has received positive feedback from Somali patients and other providers at Axis Medical Center. According to PA Adan, his patients have found the information on A1C and its correlation to T2D to be particularly helpful (M. Adan, personal communication, March 27, 2023). This corroborates the literature that was studied that shows there's a need to provide health literacy and numeracy to the Somali patient population (Njeru, Hagi-Salaad, et al., 2016). The hope is that the video education tool will increase the health numeracy of Somali patients at Axis Medical Center, leading to a higher compliance in taking T2D medication and returning to follow up appointments. In addition, patients have told PA Adan that the explanations on how different foods impact blood glucose levels and corresponding dietary suggestions included in the video were helpful (M. Adan, personal communication, April 11, 2023). Based on the literature review, the video included a graphic and description of the plate method for managing diet control in T2D (Idaho Plate Method, 2019). The literature review showed that many Somalis, especially elderly ones, have a low rate of health literacy and numeracy. The plate

method presents a plan for managing diet that is easy to remember and apply, avoiding the need to educate a patient on calorie counting.

Both patients and other medical providers at Axis Medical Center have encouraged PA Adan to produce more health education videos for their Somali patients (M. Adan, personal communication, April 11, 2023). As previously mentioned, two such additional videos have already been created. As more videos are produced, the real success of this project would be serving as a catalyst to provide further health education to Somalis, which would hopefully close the gap in health disparities and health literacy between Somalis and other cultural groups.

Limitations

There are several limitations to the process and outcome of this project. Initially, we intended this educational material to be a tool used by Somali patients served by Axis Medical Center, and though we partnered with PA Adan, who is of Somali origin and had the privilege to interview some Somali scholars, it would have been best if we had direct interactions with Somali patients before we created the video. Having that direct interaction with the population that this educational video is designed for would have been helpful in minimizing language and cultural barriers as previously discussed in Chapter 3. We identified some barriers such as low health literacy and different views on diabetes among the Somali population, however, these are more general barriers that can be present in all Somali immigrants across the world. Having interactions with Somali patients from Axis Medical Center would have allowed the researchers to gain a more thorough understanding of certain features of barriers that may be unique to the Somali patients at Axis Medical Center, whether that being the immigrant experiences that is unique to the MSP metro, or a different view of T2D that is influenced by personal and/or family history or past trauma.

This project served as a catalyst to help the Somali patients in Axis Medical Center to further their understanding in T2D, and thereby recognizing the need for T2D prevention and

interventions, whether that being lifestyle modifications or pharmacotherapy. Axis Medical Center currently does not have a diabetic educator and this project's video serves as a resource to facilitate diabetes education delivered by primary care clinicians.

Further Projects

This project is a starting point and serves as a catalyst to facilitate diabetes education among the Somali patients at Axis Medical Center. The project aims to educate patients on the link between diet and blood glucose levels. In the future, if Axis Medical Center chose to pursue this mode of patient education, a more specific population could be used. Future projects could involve shorter, 3-5 minute videos, with a single focus for each video (M. Adan, personal communication, March 27, 2023). In addition, improvements could be made with regard to better lighting and videotaping in a clinic room for a more realistic feeling video (M. Adan, personal communication, April 11, 2023). Furthermore, future projects may benefit from direct interactions with Somali patients at Axis Medical Center, investigating their specific concerns and cultural barriers in the early phase, and producing educational materials based on the results of the interaction. Axis Medical Center may also be exploring the option of a diabetic educator or a registered dietitian, and researchers may consider partnering with them. The direction of future projects may consider an interdisciplinary approach. To enhance patient experience and compliance, educational events including but not limited to diabetes-friendly recipe demonstrations, and nutrition menu planning may be incorporated into the existing methods.

Conclusion

This project sought to address the current barriers that prevent the proper education of diabetes management in the Somali immigrant population of Minnesota served by Axis Medical Center. By performing an extensive literature review on Somali culture, health literacy amongst immigrants, and core diabetes education, the authors were able to propose a visual aid model

through a video medium that could bridge the gap between provider and patient. With the collaboration of Axis Medical staff, a script was created which included aspects of Somali culture and core diabetes education. A video featuring a Somali provider-patient interaction was created to clearly present pertinent information for diabetes management, yet did not require the patient to be literate in English or Somali. The video was then posted on YouTube to make the video accessible from beyond the clinic. Based on feedback, the video has been well received by patients and staff alike (M. Adan, personal communication, March 27, 2023). Although there was not a specific metric to assess the success of the video, this overwhelming positive reception has led the authors to conclude that the project achieved the goal of providing a valuable education tool to the healthcare providers of Axis Medical. This project's reach has extended beyond the original intent of diabetes education. As per the request of Axis Medical Center patients, the collaborating provider has since created additional educational material on other chronic diseases such as hypertension. The authors are grateful for the opportunity to participate in this collaboration. It has acknowledged the importance of providing culturally competent material in order to manage health disparities within local communities. As future providers, learning more about the cultural history of the populations we serve has been of great benefit. As Axis Medical Center continues to create more content following the original video, the authors of this paper hope to implement more culturally tailored material in other clinics and settings to continue the fight against health disparities in the communities in which they reside.

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APPENDIX

Axis Medical Center Approval

Axis Medical Center
1 Lake Street W
Minneapolis, MN 55408
Phone 612-767-1557
Fax 612-767-8758

March 23, 2022

To Whom It May Concern:

This letter is to give a permission to Karl Quickert, Grace Neumair and Alan Falkowski to work with Axis Medical Center to create a diabetes education tool. Mohamed Adan, physician assistant, will be available for any questions them during this project.

If you have any questions in this regard, please do not hesitate to call me.

Sincerely,

Mohamed Adan, MPAC, PA-C
Email. mohamedawadan@gmail.com
Phone: (857)-492-6395
Axis Medical Center
1 W. Lake St Minneapolis, MN 55418