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AN ASSESSMENT OF THE UNIQUE CONTEXTUAL FACTORS OF INDIVIDUALS WITH DIABETES MELLITUS TYPE 2 LIVING IN RURAL COMMUNITIES

by

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“I think we live in a world where the most important thing is daily life, sharing a space with your family, making meals, being with your people. It’s not only the idea of privacy, it’s the beauty of the moment, at a time in the world when everything goes really fast- too fast.”

~Ana Tijoux

DEDICATION

I dedicate this work to my husband, Steve, my loving children, Sarah and Shawna, my parents, and all the wonderful individuals with whom I have shared the OT journey throughout my career.

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ABSTRACT

Diabetes Mellitus Type 2 (DMT2) is a significant financial burden on the United States (U.S.) economy. DMT2 is a burden financially, physically, and mentally to the individual. In 2022, DMT2 had an estimated cost of $412.9 billion dollars (Parker, 2023). More than 29 million individuals in the U.S. have DMT2 and over 86 million individuals have pre-diabetes (Towne, 2017). In rural communities, the prevalence of DMT2 is 17% higher than those living in non-rural communities (Lin, Y-L, 2016). Research shows links between the social determinants of health and poor health in rural communities (Feltner, 2017; Gordon, 2022; Towne, 2017; Ross, 2015). A literature review, responses from a needs-assessment, and feedback from occupational therapy practitioners were used to develop a holistic, community-based program called *Take Control of Your Diabetes* (TCOYD). TCOYD consists of four modules designed and implemented by occupational therapists. The modules provide education and strategies to reduce the barriers to buying foods recommended by the American Diabetes Association (ADA), decrease barriers to

performing physical movement activity as recommended by the ADA, and medication management for DMT2 (ADA, 2021). The goal of the program is to improve nutrition, physical movement activity, and medication management to reduce Hemoglobin A1c (HbA1C).

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LIST OF ABBREVIATIONS

ADA……American Diabetes Association

AOTA ..... American Occupational Therapy Association

CDC…….Centers for Disease Control and Prevention

CKD……Chronic Kidney Disease

DMT2……Diabetes Mellitus Type 2

ER…….……Emergency Room

FDPIR……...Food Distribution Program on Indian Reservations

HbA1C……...…...…....Hemoglobin A1C

HBM…….The Health Belief Model

IRB…….Institutional Review Board

MOHO……The Model of Human Occupation

OT……...Occupational Therapy

OTP ..... Occupational Therapy Practitioner

OTR/L…….Occupational Therapist, Registered and Licensed

PCP……....Primary Care Provider

PE……....Physical Education

SNAP…….Supplemental Nutrition Assistance Program

SPSS…….Statistical Package for the Social Sciences

TCOYD……...Take Control of Your Diabetes

TU ..... Temple University

US…….United States

CHAPTER ONE - Introduction

Section One

Introduction

Individuals diagnosed with Diabetes Mellitus Type 2(DMT2) living in rural communities possess inherently unique contextual factors hindering disease self-management of DMT2. These contextual factors are barriers to chronic disease self-management such as DMT2 and contribute to decreased health and wellness resulting in a decreased ability to perform occupational roles, routines, and habits (American Occupational Therapy Association, 2014). As a result, the individual will experience a decline in overall quality of life (American Occupational Therapy Association, 2014). In response to the decline, the individual may experience frequent hospitalizations due to complications of poorly managed DMT2, and in some cases, even death (Rubens, 2022). Current research associates certain social determinants of health such as: poor nutrition, lack of access to areas of physical activity, lack of access to quality healthcare, low socioeconomics, and lower educational levels to poor health and wellness in rural communities (Feltner et al. 2017; Gordon et al. 2022; Towne et al. 2017; Ross et al. 2015). Current research establishes evidence of a gap identifying a relationship between the health and wellness and inequality between rural and non-rural communities and occupational therapy interventions that can improve an individual's ability to complete occupational roles, routines, and habits leading to an improvement in health and wellness and overall quality of life in this population. Consequently, identifying the unique contextual factors that hinder poor disease self-management of DMT2 will be helpful in

designing and implementing occupational therapy interventions to improve health and wellness, the ability to perform occupational roles, routines, and overall quality of life.

Background

Diabetes Mellitus Type 2(DMT2) is a significant burden on the United States (U.S.) economy and healthcare system. DMT2 is a burden financially, physically, and mentally. The total estimated cost of diagnosed DMT2 in the U.S. in 2022 is $412.9 billion (Parker, 2023). This figure includes $306.0 billion in direct medical costs and $106.3 billion in indirect costs attributable to DMT2 (Parker, 2023). Over 29 million individuals in the U.S. have DMT2 and over 86 million individuals in the U.S. have pre-diabetes (Towne, 2017). In rural communities, the prevalence of DMT2 is 17% higher than those in more urban areas (Lin, Y-L, 2016). Between 2010 and 2019, there were 78 million diabetes-associated hospital admissions (Rubens, 2022). Once diagnosed with DMT2, the average life expectancy of the individual is reduced by 10 years (American Diabetes Association, 2021).

Diabetes Mellitus Type 2(DMT2) is a physical strain on the United States population. Left poorly managed, DMT2 can lead to the loss of a limb, blindness, kidney disease, coronary artery disease, and in extreme cases, death (American Diabetes Association, 2021). 73,000 Americans have amputations of the lower extremities annually secondary to complications of DMT2 (American Diabetes Association, 2021). One in ten individuals dies within 30 days of an amputation and one in six dies within 90 days of an amputation (American Diabetes Association, 2021).

Diabetes Mellitus Type 2 can lead to diabetic retinopathy, a condition that can cause blindness (American Diabetes Association, 2021). Over 145 million United States (U.S.) citizens currently have diabetic retinopathy (American Diabetes Association, 2021). Approximately 21% of individuals diagnosed with DMT2 already have diabetic retinopathy at the time of the DMT2 diagnosis (American Diabetes Association, 2021).

One in three adults has both Diabetes Mellitus Type 2 and chronic kidney disease (CKD) (CDC, 2021). CKD may begin as soon as ten to fifteen years after the diagnosis of DMT2 (CDC, 2021). Poorly managed, CKD, can result in depression and anxiety and kidney failure requiring the need for dialysis or a kidney transplant (American Diabetes Association, 2021). CKD is the leading cause of death in the U.S. (CDC, 2021).

The Centers for Disease Control and Prevention (CDC) estimates 32.2% of individuals with Diabetes Mellitus Type 2 will develop coronary artery disease (CAD) (CDC, 2021). When blood glucose remains unstable, the elevated levels of glucose can damage the blood vessels and nerves that control the heart (CDC, 2021). Individuals with poorly managed DMT2 are two times more likely to have a heart attack or stroke than an individual without DMT2 (CDC, 2021). DMT2 is a chronic systematic disease that can affect every organ in the body resulting to organ failure and death (CDC, 2021). According to CDC estimates, 104,000 death certificates in 2021 listed DMT2 as the underlying cause of death and 400,000 death certificates in 2021 listed Diabetes Mellitus as having contributed to death (CDC, 2021). DMT2 is a devastating disease, and it is absolute that healthcare professionals use evidence-based practice to bring awareness to the barriers contributing to poor disease self-management and prevention (CDC, 2021).

Statement of the Problem

It is believed that individuals in rural communities possess contextual factors that hinder chronic disease self-management. These factors, known as social determinants of health, include poor nutrition, lack of access to areas of physical activity, lack of access to quality healthcare, lower socioeconomics, and lower educational levels hindering health and wellness in rural areas (Feltner et al. 2017; Gordon et al. 2022; Towne et al. 2017; Ross et al. 2015).

Although current literature provides an aggregation of interventions to improve disease self-management of Diabetes Mellitus Type 2 in rural communities, the literature provides evidence that the prevalence of DMT2 continues to be greater in rural communities than in non-rural communities (Crowley et al. 2022; Griesemer et al. 2022; Satterwhite et al. 2019). The scarcity of current literature clearly identifying the contextual factors providing a negative impact on DMT2 disease self-management and evidence-based interventions to improve outcomes is a problem. It is important to clearly identify the contextual factors of poor nutrition, lack of access to areas of physical activity, lack of access to quality healthcare, lower socioeconomics, and lower educational levels as the primary elements that contribute to the higher prevalence of disease in rural communities (Feltner et al. 2017; Gordon et al. 2022; Towne et al. 2017; Ross et al. 2022). As a result of the clear identification of these unique contextual factors, it is possible for an instant improvement in the ability of an individual to achieve full participation, meaning, and purpose of a chosen occupation regardless of the contextual barriers present (American Occupational Therapy Association, 2014). This dearth of

evidence clearly identifying the contextual factors that negatively impact DMT2 self-management and evidence-based interventions to improve outcomes is a problem. Identifying these factors will contribute to future development of OT interventions to more effectively address the problem.

Role of Occupational Therapy

Common symptoms of Diabetes Mellitus Type 2 are muscle weakness, fatigue, poor vision, decreased sensation, and depression (American Diabetes Association, 2021). These common symptoms often lead to a decreased ability to perform a chosen occupational role, routine, or habit safely and efficiently (Crowley et al. 2022; Griesemer et al. 2022; Satterwhite et al. 2019). Individuals with or at risk of developing a chronic disease like DMT2 can be best supported through interdisciplinary services, including occupational therapy (Donnelly et al. 2023). Treatment of chronic disease like DMT2 falls within the scope of occupational therapy(OT) as OT takes a holistic approach to health and wellness. Growing evidence supports occupational therapy's unique lens to support individuals at risk of impairment or physical ability (Donnelly et al. 2023).

Occupational therapy focuses on replacing poor health routines and unhealthy habits, such as poor nutrition, lack of physical activity, and poor medication management (ADA, 2021) with good health routines and healthier habits, such as meal portion size control, eating foods recommended by the American Diabetes Association (ADA), participating in physical activity as recommended by the ADA, and taking medication to manage blood glucose as prescribed by the physician (ADA, 2021) to promote health and wellness bringing meaning and purpose to life (Donnelly et al. 2023). Occupational

therapy practitioners (OTP) have a rare expertise to help individuals throughout the lifespan to develop, recover, and improve function and the skills required for activities of daily life (Donnelly et al. 2023). The scope of OT includes health promotion and the prevention of chronic disease such as DMT2, disability, and secondary conditions that result from poorly controlled DMT2 (American Occupational Therapy Association, 2014). These secondary conditions include diabetic retinopathy, chronic kidney disease, and coronary artery disease and left unaddressed lead to decline in functional performance even further (Donnelly et al, 2015). Occupational therapy can provide meaningful therapeutic interventions to address the symptoms of the secondary conditions improving one's ability to participate in occupational roles, routines, and habits of choice (American Occupational Therapy Association, 2014).

Proposed Solution: Central Commitment to Bridging Gap

The present needs-assessment study aims to determine the unique contextual barriers of individuals with Diabetes Mellitus Type 2 who live in rural communities through two specific aims. During the first aim, a needs assessment will be administered to current clients previously diagnosed with DMT2 who are receiving occupational therapy services through Amedisys Home Health to determine which contextual barriers are present in individuals who live in rural communities. The needs assessment will consist of demographic questions and general questions developed from open-ended questions typically asked during the occupational therapy evaluation.

The secondary aim of this needs-assessment study will use the generalized deidentified aggregate results to develop a program to design and implement meaningful,

holistic, and client centered interventions to promote health and wellness. This study will also fulfill requirements for a Capstone project to be completed in partial fulfillment of the Temple University Post-professional doctorate in Occupational Therapy.

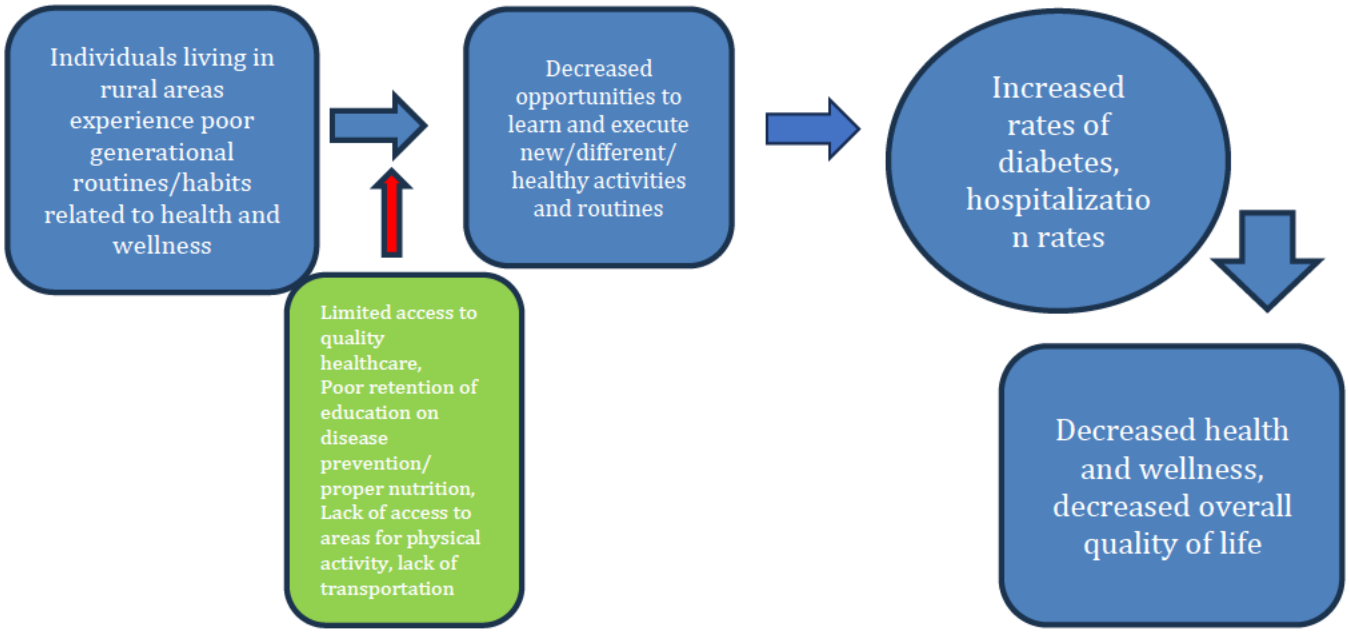
CHAPTER TWO

Project Evidence and Theoretical Base Supporting Central Commitment

Introduction

This chapter will provide support of the hypothesis that individuals diagnosed with Diabetes Mellitus Type 2 living in rural communities possess inherently unique contextual factors hindering disease self-management of DMT2 and theory supporting the proposed solution of OT intervention to promote and establish healthier routines, roles, and habits. A visual model of the problem will be provided. Finally, the guiding questions for the study will be provided to strengthen understanding of the problem and as support of the evidence for prior efforts to address the problem.

Figure 1. Model of the Problem



Individuals from rural communities have unique contextual factors which are barriers to healthy routines and habits (Towne et al. 2017; Ross et al. 2015). These contextual factors are social determinants of health. The social determinants of health that are barriers to health and wellness are lack of quality healthcare, lower educational levels resulting in poor teach-back demonstration of medical information, poor nutrition, lower socioeconomics, lack of transportation to the grocery store and medical appointments, and lack of access to areas to perform physical activity (Griesemer et al. 2022: Ross et al. 2015; Gordon 2022; Brown 2023). Lower educational levels and poor vision because of uncontrolled glucose levels can manifest in an individual being unable to read or completely understand medical pamphlets on the disease process and its management, or medication labels and the purpose and side effects of the medication (Feltner et al. 2017; Fields 2022). Poor nutrition can be a result of lower socioeconomics (Gordon et al. 2022; Brown et al. 2023; Barnidge et al. 2015). Individuals may not be able to afford to purchase healthy vegetables and fruit and may be dependent upon stipends from food banks or Supplemental Nutrition Assistance Program (SNAP) (Gordon et al. 2022; Brown et al. 2023; Barnidge et al. 2015). Rural communities have a limited number of healthcare providers resulting in limited quality of healthcare in rural areas (Ross et al. 2015). Other factors hinder disease self-management and health and wellness. The lack of public transportation hinders the ability of some individuals to go to medical appointments and due to the difficulty of driving on challenging mountainous geography and narrow roadways, individuals often miss medical appointments in bad weather. The lack of public transportation, the inability to afford an automobile, or being

unable to pay for a ride may limit an individual's ability to go to the grocery store. This can lead to individuals keeping carb and sodium packed canned or frozen meals on hand due to the difficulty of getting a ride or paying for the ride to the grocery store (Ross et al. 2015). Often individuals do not always seek medical attention when needed, or individuals may miss medication doses if out of medication if unable to go to the pharmacy due to the difficulty of getting a ride or paying for the ride (Ross et al. 2015) . Finding the limited areas to participate in physical activity in rural areas can be challenging and leads to a more sedentary lifestyle and obesity and weakness (Umstattd Meyer et al. 2016). These moderating factors result in a decreased ability to complete self-care routines, and occupational roles resulting in decreased health and wellness, sense of purpose, and overall quality of life (American Occupational Therapy Association, 2014).

Theory Supporting the Problem and Solution

The Model of Human Occupation (MOHO) is a model that explains how occupations are chosen, patterned, and performed (Kielhofner, 1995). MOHO is occupation-based, client-centered, and holistic (Kielhofner, 1995). MOHO focuses on three intertwining elements: volition, habituation, and performance capacity alongside the social and physical environments to explain how an individual chooses, and occupation, and how the occupation is patterned, and performed (Kielhofner, 1995).

During the initial phase of this study, MOHO will be the theory guiding of the needs-assessment survey. The needs-assessment survey will be used to define the unique contextual factors present in rural communities and how these barriers interact with the

individual's volition, habituation, and performance capacity and how they translate to poorly managed Diabetes Mellitus Type 2(DMT2) of the individuals that live in these communities.

After determination of the aggregate results of the needs-assessment have been completed, the results will be utilized by the occupational therapy practitioners of Amedisys Home Health to design and implement client-centered, holistic, and meaningful interventions using the theory of MOHO. MOHO will allow development of new healthy habits, routines, and behaviors, recover loss from physical dysfunction, and improve functional performance, reducing hospitalization risks, and improve health and wellness and overall quality of life (Donnelly et al. 2023).

Guiding Questions Solidifying Understanding of the Problem

The following questions were developed to guide the literature review for evidence supporting the problem:

1. *Is Diabetes Mellitus Type 2(DMT2) more prevalent in rural communities than in non-rural communities?*
2. *Is there evidence nutritional deficits and lack of exercise promote DMT2?*
3. *Is there evidence of specific factors present in rural communities that are barriers to health and wellness?*
4. *Does lack of access to quality healthcare promote poor disease self-management of DMT2?*

Summary of Evidence

Is Diabetes Mellitus Type 2(DMT2) more prevalent in rural communities than in non-rural communities?

Current research contributes evidence that the prevalence of Diabetes Mellitus Type 2 is greater in rural communities than in non-rural communities (Feltner et al. 2017). In rural communities, the prevalence of DMT2 is 17% greater than in individuals living in non-rural communities (Lin et al., 2018). Rural communities are excessively impacted by health disparities in the management of DMT2 because of the lack of healthcare education, lack of access to healthcare providers, lower socioeconomic status, financial concerns, lower literacy levels, lack of transportation, geography, and climate (Ross et al., 2015). Diabetes left poorly managed can lead to comorbidities such as amputations of the lower extremities (American Diabetes Association, 2021), diabetic retinopathy (American Diabetes Association, 2021), chronic kidney disease (CDC, 2021), and coronary vascular disease (CDC, 2021). These comorbidities can result in severe medical conditions such as kidney failure requiring dialysis or a kidney transplant, a myocardial infarction, cerebrovascular accident, amputation, or in some extreme cases, death (American Diabetes Association, 2021; CDC, 2021; Lin et al., 2018).

It is suspected that individuals in rural communities have unique contextual barriers to health and wellness. These barriers to health include poor nutrition (Gordon et al. 2022), lack of access to areas to participate in physical activity (Barndige et al. 2015), lack of quality healthcare (Crowley et al. 2022). Current research demonstrates a gap in the meaningful, holistic, and client-centered occupational therapy interventions to address

the unique contextual factors that are barriers to health in rural communities (Dugani, 2021).

Is there evidence nutritional deficits and lack of exercise promote Diabetes Mellitus Type 2?

Access to nutritious food is suspected to be a factor contributing to poor health (Gordon, 2022). Many individuals in rural communities exist on incomes below poverty level and often depend heavily on the Supplemental Nutrition Assistance Program (SNAP) and commodities from food banks (Scarton, 2019). The food from these sources are typically foods with a longer shelf life and are full of sugar and sodium (Brown, 2023). It can be extremely difficult to prepare nutritious meals using items from a food pantry (Brown, 2023). At times, individuals may not be able to drive to the store or the funds available to pay to buy fresh produce and meat (Scarton, 2019).

Access to areas to participate in physical activity is scarce in rural communities (Ross et al., 2015). In rural communities, many public areas available to allow one to participate in physical activity, are public schools (Umstattd Meyer et al., 2016). In rural communities, the public schools are almost always located on the outskirts of the community and are not always easily accessible (Umstattd Meyer et al., 2016). The inability to access a location to complete physical activity leads to a sedentary lifestyle and obesity and increases the likelihood of developing DMT2 (Zhang et al., 2020).

Is there evidence of specific factors present in rural communities that are barriers to health and wellness?

Current research provides evidence that individuals living in rural communities possess inherently unique contextual factors hindering disease self-management of DMT2 resulting in decreased health and wellness and decreased ability to perform occupational roles (Feltner et al., 2017). Less healthcare providers practice in rural communities, resulting in decreased access to quality healthcare (Feltner, 2017). Fewer providers and fewer urgent care centers and after-hours clinics mean less individuals can have same day appointments when needed and have less access to healthcare outside of visiting an emergency room to seek medical attention (Lin et al., 2018).

Lack of nutritious food is a barrier to health and wellness (Gordon, 2022). This lack of access to nutritious food can be related to lower socioeconomics as many individuals in rural communities live at or below poverty level (Gordon, 2023). Reliance on food commodities and being unable to afford to buy fresh produce promotes disease (Gordon, 2022). Limited availability of grocery stores and lack of transportation to go to the grocery store is a barrier to an individual's ability to access healthy and high-quality food (Brown, 2023).

Lack of access to areas to participate in physical activity in rural communities promotes poor health (Ross et al., 2015). Individuals who have an unhealthy lifestyle, one with poor nutrition and sedentary behavior, are much more likely to be obese and develop DMT2(Zhang et al., 2020).

Does lack of access to quality healthcare promote poor disease self-management of Diabetes Mellitus Type 2?

A lack of access to quality healthcare is suspected to be a contributing factor to DMT2 (Lin et al., 2018). Rural communities have less primary care providers, less urgent care facilities, and less extended hours clinics (Lin et al., 2018). The lack of access to quality healthcare means that many individuals must wait to see their provider and do not get the preventative care that is needed, or the individual must go to the emergency room to seek medical attention (Feltner, 2017).

Lack of transportation and the lack of available funds to pay to be driven to a medical appointment hinders an individual's ability to go to a medical appointment (Brown, 2023). After the initial Covid epidemic, many healthcare providers began to offer telehealth visits (Crowley, 2022). However, due to the lack of phone and broadband services, many individuals in rural communities are unable to utilize these services (Crowley, 2022). The diverse geography of rural communities creates many challenges to obtain healthcare such as long travel times to providers, extreme weather conditions, environmental climate barriers, and challenging roadways (Ross et al., 2015). Often individuals opt not to go to a medical appointment because of the long travel times to the appointment are taxing and difficult for individuals who already experience generalized muscle weakness and fatigue from a chronic disease like DMT2 (Ross et al., 2015).

Guiding Questions to Support Evidence Review for Previous Interventions, Programs, or Efforts to Address the Problem

The following questions were developed to guide the literature review for evidence on previously implemented initiatives to address the problem:

1. *What interventions exist to improve self-management of diabetes in individuals living in rural communities?*
2. *Is there evidence of interventions to address nutritional deficits and lack of physical activity and are they effective?*
3. *Is there evidence of interventions to prove interventions to improve access to healthcare are effective?*
4. *What occupational therapy interventions exist to improve disease self-management of DMT2?*

Summary of Evidence

What interventions exist to improve self-management of diabetes in individuals living in rural communities?

In a qualitative study by (Brown et al., 2023), 17 participants from a rural, low income, American Indian reservation were chosen to participate in focus groups to determine whether providing education on food budgeting and diabetic meal planning for low-income multigenerational families using FDPIR and SNAP would improve Diabetes Mellitus Type 2 disease self-management. Brown's study (2023) took place over a one-year period. During this time, the participants were provided in group education on how to incorporate food commodities into a diabetic meal and were given access to a website to answer additional dietary questions, two reference videos, and a welcome kit with cooking tools. The research team conducted group questioning to better understand contextual factors present in the community that are barriers to health. The study by Brown et al. (2023) noted limited supermarket availability and transportation hinders

access to healthy and high-quality food. Reliance upon FDPIR and SNAP limits access to healthy food (Brown et al., 2023). The study revealed a main concern of the participants was not knowing what to eat or what to prepare for their children so they would not develop DMT2 (Brown et al., 2023). This intergenerational burden of DMT2 and not knowing how to prevent younger generations from developing the disease leads to mental health instability on the family (Brown et al., 2023). Additional efforts focused on diabetic foot care, exercise, and meal planning (Feltner, 2017).

Interventions to improve nutritional status by providing vouchers to purchase produce have proven to improve HbA1C (Gordon et al., 2022). Telehealth and telemonitoring have been provided for disease self-management support including guidance in diet and exercise, medication management, and monitoring of depression symptoms related to chronic disease (Crowley, 2022).

Is there evidence of interventions to address nutritional deficits and lack of physical activity and are they effective?

Current research provides evidence that interventions to improve nutrition results in improved disease self-management of DMT2 (Gordon et al., 2022; Brown et al., 2023; Meendering et al., 2023). A study by Meendering et al. (2023) investigated whether community workers could facilitate improved nutrition in rural South Dakota through policy change to promote healthy behaviors and reduce obesity, a key predictor of DMT2. The study demonstrated community workers were able to develop and implement programs to educate on how to garden with different types of fruits and vegetables, how

to can and freeze the fruits and vegetables when harvested, and how to find diabetic meal plans (Meendering, 2023).

A study by Gordon et al. (2022) investigated whether providing produce to low-income individuals in rural communities would improve HbA1C, a key determinant of controlled DMT2. Vouchers for fruit and vegetables were given to 172 low-income individuals with Diabetes Mellitus type 2 living in rural Idaho and Oregon (Gordon, 2022). Pre and post study levels of HbA1C were taken (Gordon, 2022). A1C readings for more than 13% of the participants were within normal range (Gordon, 2022). Individuals who initially presented with critically high HbA1C range, were reduced by 1/3 (Gordon, 2022). Another study by Brown et al. (2023) provided an educational intervention to improve food budgeting and diabetic meal planning for low-income, multigenerational, American Indians living in rural Missouri. Brown's study (2023) provided evidence that educational interventions to improve food budgeting and diabetic meal planning for low-income, multigenerational families receiving food commodities improves the key indicators of good disease self-management of HbA1C and weight.

Interventions have been successful to promote increased physical activity and prevent obesity, reducing risk factors for DMT2 through increasing opportunities to participate in physical activity, improve access to outdoor recreation facilities, enhance infrastructure for walking, increase the amount of and access to exercise equipment, and improve after-hours access in public buildings for physical activity (Umstattd Meyer et al., 2016). A systematic review by Umstattd Meyer et al. (2016) was conducted to search for evidence relating to whether policy and environmental changes would increase

physical activity and prevent obesity, a leading cause of DMT2. The review included articles between 2002 and 2013, of which 30 met inclusion criteria (Umstattd Meyer et al., 2016). The studies in the review focused on strategies to increase the amount of physical activity in physical education (PE) programs, increase opportunities for extracurricular physical activity, improve access to outdoor recreation facilities, enhance infrastructure for walking, increase the amount of and access to exercise equipment, and improve after-hours access in public buildings for physical activity (Umstattd Meyer et al., 2016). This study by Umstattd Meyer et al. (2016) stated an emphasis needs to be placed on increasing physical activity in school aged children for disease prevention rather than focusing all attention on disease self-management (Umstattd Meyer et al., 2016).

Is there evidence of interventions to prove interventions to improve access to healthcare are effective?

Current research provides evidence that community health workers are successful in coordinating care between the patient and the patient's primary care provider (Feltner, 2017). A mixed study with a rural Appalachian Kentucky population of 215 participants were provided educational interventions to improve diabetic foot care, increase therapeutic exercise, and implement strategies to improve routines to incorporate diabetic meal planning (Feltner, 2017). Community health workers coordinated care between the patient and the primary care provider (Feltner, 2017). In Feltner's study (2017), the community health workers provided education on diabetic foot care, exercise, and meal planning. Participants were given a pre- and post- survey to measure knowledge on

DMT2 knowledge and pre- and post HbA1C levels (Feltner, 2017). The pretests were administered at the start of the study and the posttests were administered after six months of interventions (Feltner, 2017). Forty-five percent of the participants reported an increase in the ability to self-manage DMT2 (Feltner, 2017). The most notable improvement was in HbA1C (pretest, M=7.76, post-test, M=7.42) (Feltner, 2017). This change is approximately 4.5% within a six-month period (Feltner, 2017). When HbA1C levels are greater than 7.5, the rate of improvement occurs much slower (American Diabetes Association, 2021). Feltner's study (2017) noted specific barriers hindering the completion of the study including lack of telephone or internet service to maintain contact with the participant, inadequate transportation, or lack of financial resources to pay for transportation to a medical appointment, and an overall reluctance to keep a medical appointment.

Telehealth interventions have helped to improve access to healthcare in individuals with poorly managed Diabetes Mellitus Type 2 (Crowley, 2022). In a study by Crowley (2022), participants with poorly managed DMT2 from two separate Veteran's Affairs Healthcare System were chosen to participate in a telehealth program over a twelve-month period. The participants who had telehealth interventions had an improvement in HbA1C of 1.59% whereas a group of individuals from the same healthcare system that participated in telemonitoring only had an improvement of only 0.98% (Crowley, 2022). A literature review by Griesemer (2022) investigated the use of telehealth interventions in rural communities to improve DMT2 disease self-management. The review searched PubMed and CINAHL and selected 177 articles

(Griesemer, 2022). The review determined that telehealth interventions are effective in rural communities as they provide motivational support to engage in healthier behaviors and routines to better manage DMT2 (Griesemer, 2022).

What occupational therapy interventions exist to improve disease self-management of DMT2?

Current research provides evidence of occupational therapy interventions being successful in the management of Diabetes Mellitus Type 2 (Pyatek, 2019). In Pyatek's study (2019), occupational therapist provided eight one-hour interventions to incorporate healthy habits and routines by decreasing negative health management behaviors and increase positive health management behaviors. The study noted an improvement in the participant's blood pressure, HbA1C, medication adherence, pain, and diabetic foot care (Pyatek, 2019).

Occupational therapy interventions focus on preventing behaviors that cause illness, and interventions for lifestyle modifications to slow down or prevent further disease (Donnelly, 2023). Other meaningful interventions are educating on foot self-care management, education on disease self-management, and group interventions to provide social support and modeling (Fields, 2022). Education to improve clinical preventative practices and behaviors with a focus on decision-making, problem-solving, and self-care participation (Rutledge, 2016).

Conclusion

The current literature shows a gap between the unique needs of rural communities for disease self-management and occupational therapy interventions to improve health

and wellness and overall quality of life. The prevalence of chronic diseases such as Diabetes Mellitus Type 2 falls within the scope of occupational therapy practice as OT takes a holistic approach to health and wellness. Growing evidence supports OT's unique lens to support individuals at risk of impairment and disability (Donnelly et al., 2023). OT focuses on replacing unhealthy habits and routines with good routines and habits to promote health and well-being. OTs have an expertise to help individuals throughout the lifespan to develop, recover, and improve function and skills required for activities of daily life (Donnelly et al., 2023). The scope of OT includes health promotion, disability, and chronic disease prevention such as DMT2 and secondary illnesses such as diabetic retinopathy, chronic kidney disease, and coronary artery disease (Donnelly et al., 2015). The purpose of this study is to fill the gap and provide insight into the impact of the unique contextual factors resulting in poor disease self-management of DMT2 in rural communities and the meaningful OT interventions to promote health and wellness and overall quality of life. This study also provides a foundation for later program development of OT interventions to improve disease self-management of DMT2.

CHAPTER 3: Description of Central Commitment

Background of Problem

Diabetes is a huge burden on the United States (U.S.) healthcare system. Greater than 115 million individuals in the U.S. have Diabetes Mellitus Type 2 or pre-diabetes (Towne, 2017). The prevalence of DMT2 is 17% greater in rural communities than in non-rural communities (Lin, Y-L, 2018). Individuals diagnosed with DMT2 living in rural communities possess inherently unique contextual factors hindering disease self-management of DMT2 resulting in decreased health, wellness, and overall quality of life (Crowley, 2022). It is suspected that these unique contextual factors include poor nutrition, inadequate physical activity, low ration of quality healthcare to patient ratio, high numbers of individuals living below the poverty level, and lower educational levels (Towne, 2017; Ross et al., 2015).

Introduction to Proposed Solution

Original research was performed to drive the development of the proposed solution. Take Control of Your Diabetes (TCOYD) is a program developed by this writer, Sherry Cunningham Arnold, MSOT, OTR/L. The program consists of learning modules on the topics of nutrition, physical movement activity, and medication management. It is the hypothesis that the original survey will reveal the participants have limited access to nutritious food, areas for exercise, and quality healthcare and have perceived feelings of being less informed on the disease process of Diabetes Mellitus Type 2. The learning modules, including a pre and post-test to examine the effectiveness of the TCOYD program were designed to be presented in person over a six-month period, however, the

program can be modified to last for either a shorter or longer duration. The goal of the TCOYD program is to increase healthy behaviors related to nutrition, exercise, and medication management with the implementation of the newly learned materials.

Description of Artifacts Contributing to Proposed Solution

Literature Review

A review of current literature shows a gap between the unique contextual factors that hinder disease self-management of Diabetes Mellitus Type 2 in rural communities and the occupational therapy interventions to improve health and wellness and overall quality of life(Pyatak, 2019;Donnelly, 2023; Fields, 2022). This gap demonstrates a need for a needs-based assessment to lay a foundation to develop a program to provide meaningful occupation-based interventions to assess these inherently unique needs.

Development of an Original Program

The current needs-assessment study aims to determine the unique needs and cultural, socioeconomic, and geographical barriers to health and wellness of individuals with Diabetes Mellitus Type 2 who live in rural communities through two specific aims. These aims will be used to guide program development for disease self-management of DMT2. During the first aim, a needs-assessment was administered to current clients previously diagnosed with DMT2 who receive occupational therapy services through Amedisys Home Health. The assessment was used to determine which contextual barriers are present in individuals who live in rural communities. The needs-assessment consists of demographic questions and general questions developed from open-ended questions typically asked during the OT evaluation.

The secondary aim of this needs-assessment study will allow the occupational therapy department of Amedisys Home Health to use the generalized deidentified aggregate results to develop a program to design and implement meaningful, holistic, and client centered interventions to promote health and wellness.

The study took place in the homes of current patients of Amedisys Home Health. The needs-assessments were administered independently by Sherry Cunningham-Arnold, OTR/L to patients meeting the inclusion criteria. The inclusion criteria were, the individual must be eighteen years old or older, have a pre-existing diagnosis of Diabetes Mellitus Type 2, and live in a rural community. The exclusion criteria were if the individual is unable to consent for self, English is not the primary language, and the individual has an intellectual disability.

Information included in the survey included basic demographic information such as race, gender, age, and highest level of education as well as the following questions: *Has lack of transportation ever kept you from a medical appointment? (yes/no), Do you receive SNAP benefits or obtain food commodities from a food pantry? (yes/no), Do you limit the number of fruits and vegetables in your household because of the expense of fresh fruits and vegetables? (yes/no), Do either of your parents have/had Diabetes Mellitus Type 2? (no/yes, my mother only/yes, my father only/yes, both parents), Do you ever have to have someone read or explain medical pamphlets or uses for medications and their potential side effects? (yes/no), Do you have access to an area to perform physical activity 2 to 3 times per week? (yes/no), Do you feel well informed of disease self-management of Diabetes Mellitus Type 2? (yes/no), Has lack of transportation ever*

kept you from going to the grocery store? (yes/no), Have you ever had to go to the emergency room because you were unable to see your doctor? (yes/no), Has the lack of money ever kept you from getting an eye exam and new glasses? (yes/no), Do you have to travel more than one hour to see a specialist? (yes/no), Do you go to a podiatrist? (yes/no), Do you go to an endocrinologist? (yes/no), Have you ever had to wait more than one day to see a provider when you are sick? (yes/no), Do you check your blood sugar and feet daily? (yes/no), Do you take your medication to control your blood sugar as directed by your physician? (yes/no), Do you have internet access at home? (yes/no), Do you have and use a smart phone, tablet, or computer? (yes/no), Do you ever feel confused about what is a good diabetic meal? (yes/no).

The full results of the needs-based assessment can be found in Chapter 4.

Program Outline

In person, learning modules from *Take Control of Your Diabetes (TCOYD)* program will provide instruction combining evidence from a literature review and the needs-assessment study described in chapter 4. The four modules outlined below will structure delivery of the information.

- **Module 1:** Food factors- How to read food labels, what foods to avoid, and portion control.
- **Module 2:** Movement Matters- Establishment of exercise routines to increase weekly activity.
- **Module 3:** Medication Matters- Establishment of good routines for medication management.

- **Module 4:** Health Habits- Establishment of habits for healthier choices to follow primary care provider orders and lower HbA1C to healthy ranges as defined by the American Diabetes Association (ADA, n.d).

Contextual Conditions

A typical limitation of administering assessment surveys in rural communities is often a lack of transportation of individuals to go to the researcher to complete the survey, or inadequate phone or internet service for telehealth visits or to complete an online survey. By administering the needs-assessment in the home, these barriers are reduced. Also, when an assessment is administered in the office of the primary care provider (PCP), the individual may not always answer honestly for fear of disappointment of the PCP when sufficient disease self-management education has not been retained (Crowley, 2022). Also, the individual may not answer honestly for fear of embarrassment of answers to questions regarding income and educational levels.

By reducing or removing potential barriers and challenges of an electronic survey or completing a survey in a primary care provider's office, bias may be reduced. The aggregate results of the survey can then be used by the occupational therapy department of Amedisys Home Health to provide information about current disease self-management understanding, and the current occupational roles and routines to develop a program to provide specific meaningful occupational therapy interventions improving health and wellness and quality of one's life and to provide improved awareness of the importance of OT in the management of chronic disease.

Because *Take Control of Your Diabetes* Program was designed as a community program, it will need to be delivered in a brick-and-mortar building that is easily accessible in the community. Finding such a location may be difficult. Lack of adequate transportation is a problem in rural areas. Transportation of the participants to the learning site may be a hindrance. However, similar programs have produced successful outcomes(Pyatak, 2019;Brown, 2023). Since the program is targeting adults over the age of eighteen, the program could take place in an area school, church, or community rec center in the evening after work.

Future Pilot Implementation

Take Control of Your Diabetes is a future pilot program. The intended pilot site is in Johnson County, Tennessee. The program will be run in collaboration with local primary care providers who refer individuals with poorly controlled Diabetes Mellitus Type 2 to participate in the program.

Conclusion

It is the hypothesis of this study that the needs-assessment will confirm the suspicion of the contextual factors of poor nutrition, low socioeconomic factors, lower physical activity levels, lack of access to quality healthcare, lack of transportation, multigenerational components related to routines and roles, and lower educational levels result in poor disease self-management and manifest in decreased health and wellness and overall quality of life. Supported by the Adult Learning Theory, it is the intent to utilize this program to motivate individuals with poorly controlled DMT2 in the rural community of Johnson County, Tennessee to create healthy behaviors and habits to

reduce HbA1C and improve the perceived feelings of managing DMT2. While the program itself has not yet been piloted, its structure has been planned and can readily be implemented to increase health and wellness and overall quality of life.

CHAPTER FOUR- Outcome Measurement Plan for Take Control of Your Diabetes Program

Background of Program and Integration of Artifacts Supporting Central Commitment

Take Control of Your Diabetes is a program that was developed because of the disproportionately higher prevalence of Diabetes Mellitus Type 2 in individuals in rural communities as compared to individuals living in non-rural communities. In the United States, over 29 million individuals have DMT2, and an additional 86 million individuals have prediabetes (Towne, 2017). The prevalence of DMT2 in rural communities is approximately 17% higher than in non-rural communities (Lin, Y-L, 2016). Unique contextual factors are present in rural communities and hinder disease self-management of DMT2. These contextual factors act as barriers to self-management of DMT2 and contribute to decreased health and wellness resulting in a decreased ability to complete occupational roles, routines, and habits (American Occupational Therapy Association, 2014). In response to this decreased ability to complete occupations, the individual may experience a decline in overall quality of life (American Occupational Therapy Association, 2014). The individual may experience frequent hospitalizations due to the poorly controlled DMT2, and in some instances, even death (Rubens, 2022). This chapter will review the outcome measurement plan used for the Take Control of Your Diabetes program and its future use in practice.

The goal of Take Control of Your Diabetes program is to lower HbA1C levels in individuals living in rural communities. To accomplish this, the program will provide

educational sessions led by occupational therapists to teach strategies to improve nutrition, physical movement activity, and medication management as recommended by the American Diabetic Association (ADA)(ADA, 2024). It is important to ensure the program teaches the participants to identify the barriers to improved nutrition, physical movement activity, and medication management and later instruct on strategies to navigate these barriers to ultimately lower HbA1C.

To inform content of this program, in addition to a comprehensive literature review, original study data was collected and analyzed. The purpose of the study was to investigate the relationship between demographic information, the unique contextual barriers present in rural communities that are known to be barriers to adequately managing Diabetes Mellitus Type 2, and the perceived feeling of being well informed of the disease process of DMT2. Objectives, methods, data analyses, and results of the study are described below.

Original Data Collection to Inform Program Development

Objective

The purpose of this study is to better understand the unique contextual factors in rural communities that are barriers to health and wellness for people with Diabetes Mellitus Type 2.

Methods

Guided by the research on Diabetes Mellitus Type 2 in rural communities, a survey was developed consisting of twenty-three multiple choice questions to examine demographics and the participants' knowledge of and perceived ability to properly

manage DMT2. Demographic survey questions collected information on the participant's race, gender, age, and level of highest education. Nineteen additional questions were included to evaluate factors known to be barriers to health including: nutrition, lack of access to quality healthcare, lack of transportation, physical movement activity, lower socioeconomics, and the participants' perceived ability to manage DMT2.

Survey questions were designed to show relationships between the participants' perceived feeling of being well informed of disease self-management of Diabetes Mellitus Type 2 and the unique contextual factors present in rural communities which hinders disease self-management of chronic disease such as DMT2.

Participants who met the criteria of having a pre-existing diagnosis of Diabetes Mellitus Type 2, being 18 years old or older, living in a rural community, speaking English, and who could provide informed consent were invited to participate in the survey. If agreeable to participate, a consent form was signed. The consent was then scanned and uploaded electronically to a password-protected file on an encrypted data base. Between March 17 and May 1, 2024, one hundred individuals meeting the criteria to participate in the survey and who receive occupational therapy services through Amedisys Home Health in the rural community of Johnson County, Tennessee had the opportunity to participate in the study. During this period, participants responded to a paper survey administered by Sherry Cunningham-Arnold, OTR/L in the participant's home environment. After the survey data was collected, the responses were entered into REDCap by Sherry Cunningham-Arnold, OTR/L. All paper surveys and consents are

stored separately in a locked filing cabinet in a locked office. Data from REDCap was then downloaded to SPSS for data analysis.

Outcomes Measures

This study was completed to better understand the relationship between demographic information and the contextual factors such as poor nutrition, lack of access to physical movement activity, lack of access to quality healthcare, lack of adequate transportation, and poor medication management. These factors act as barriers to health and wellness in rural communities. The study measures the study participants' perceived feeling of being well informed of the disease process of Diabetes Mellitus Type 2 and the presence or absence of the barriers to health and wellness in rural communities. A questionnaire was developed by the primary investigator based upon prior literature and the feedback of occupational therapy experts in the field. This questionnaire consists of twenty-three questions of which eighteen were yes/no questions, one fill in the blank question, and four multiple choice questions. Three questions were related to transportation, three questions were related to nutrition, two questions related to internet and telephone access, five questions were related to access to quality healthcare. The remaining questions related to demographics, medication management, and family history. The actual questionnaire used in the study can be found in Appendix A.

Procedures and Data Collection Timeline

If the inclusion criteria were met, a consent form was signed. Paper surveys were administered to the participants in the participant's home by Sherry Cunningham-Arnold, OTR/L. After the survey data was collected, the responses were entered into REDCap by

Sherry Cunningham-Arnold, OTR/L. All paper consents and surveys were stored separately in a locked filing cabinet in a locked office. Data from REDCap was then downloaded into SPSS and analyzed by frequency, Crosstabs, and Chi square. The research process, procedures, and data collection timeline can be seen in Table 1.

Table 1: ***RESEARCH AND DATA COLLECTION TIMELINE***

Research Timeline	**Tasks**
Fall 2023	**Research, literature review, and Gathering evidence**
November 2023-February 2024	**Drafting survey, consent form, and IRB Documents**
February 2024-March 2024	**IRB submission** **IRB corrections** **Approval of IRB documents**
March 2024-June 2024	**Surveys administered to participants**
June 2024-July 2024	**Data Analyses** **Analyzed data incorporated into Capstone**

Participants

Participants included an adult population previously diagnosed with Diabetes Mellitus Type 2(DMT2), who reside in the rural community of Johnson County, Tennessee, and currently receive occupational therapy services through Amedisys Home

Health (n=100). Forty-eight participants were male, and fifty-one participants were female. Ninety-eight participants were White/Caucasian and two were Black/African American. Study participants were between the ages of 28-93 years old, with the mean age of 71.54 years old. Twenty-seven participants had less than a high school diploma, forty-nine participants had a high school diploma, fifteen participants had an associate's degree, and nine had a bachelor's degree.

Data Analysis

Descriptive statistics were completed using SPSS on participant demographic characteristics including frequencies and cross tabulations. Chi-square analyses were used to examine the differences between demographic characteristics and the unique contextual factors present in rural communities and the participant's perceived ability of feeling well informed of disease self-management of Diabetes Mellitus Type 2.

Results

The survey group consisted of one hundred individuals. The group was closely distributed with 48 of the participants identifying as male (48.0%) and 51 of the participants identifying as female (51%). One individual preferred not to identify their gender (1%). Race reported by participants was White/Caucasian (n=89, 98%) and Black/African American (n=2, 2%). Education levels of participants were reported as "less than a high school diploma" (n=27, 27%), "high school diploma" (n=49, 49%), "Associate's Degree" (n=15, 15%), and "Bachelor's Degree" (n=9, 9%) (see Table 2). Participants ranged in age from 28 years old to 93 years old. The mean age of participants was 71.54 with a standard deviation of 11.675.

Table 2

DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS

	Frequency (%)
Gender	
Male	48(48%)
Female	51(51%)
Prefer not to say	1(1%)
Race	
White/Caucasian	89(89%)
Black/African American	2(2%)
Education	
Less than a high school diploma	27(27%)
High school diploma	49(49%)
Associate's degree	15(15%)
Bachelor's degree	9(9%)

Demographic results were further analyzed to compare the frequencies and percentages between gender, race, and education levels and the perceived feeling of being well informed of disease self-management of Diabetes Mellitus Type 2(see Table 3).

Table 3

COMPARISON OF STUDY PARTICIPANT'S DEMOGRAPHICS AND PERCEIVED FEELINGS OF BEING INFORMED OF DISEASE PROCESS OF DIABETES MELLITUS TYPE 2

	Feels well informed Frequency (%)	Does not feel well informed Frequency (%)
Gender		
Male	26(54%)	22(46%)
Female	24(47%)	27(53%)
Race		
White/Caucasian	50(51%)	48(49%)
Black/African American	1(50%)	1(50%)
Education		
Less than a high school diploma	8(30%)	19(70%)
High school diploma	25(51%)	24(49%)
Associate's degree	12(80%)	3(20%)
Bachelor's degree	6(67%)	3(33%)

Chi-square results were computed to evaluate any relationship between gender, race, and education levels and the perceived feeling of being well informed of disease self-management of Diabetes Mellitus Type 2(see Table 4). There were no significant differences between gender (male 54%, female 47%), and race (whites 51%, blacks 50%)

in those who reported being well informed of the DMT2 disease process. There was a significant different in education levels of those who reported being well informed. Specifically, as levels of education increased so did the perceived feeling of being well informed within each level of education (less than a high school diploma 30%, high school diploma 51%, Associate's degree 80%, and Bachelor's degree 67%).

Table 4

CHI-SQUARE RESULTS FOR RELATIONSHIP BETWEEN STUDY PARTICIPANT'S DEMOGRAPHICS AND PERCEIVED FEELINGS OF BEING WELL INFORMED OF DISEASE PROCESS OF DIABETES MELLITUS TYPE 2

	Feels well informed			
	N	*df*	*x2*	*p*
Gender	99	1	.50	.48
Race	100	1	.00	.98
Education	100	1	10.87	.01
Less than a high school diploma	8 (30%)	1		
High school diploma	25 (51%)	1		
Associate's degree	12 (80%)	1		
Bachelor's degree	6(67%)	1		

Descriptive statistics and chi square analyses were completed to explore the relationship between contextual factors and the perception of feeling well- informed about the self-management of DMT2. The first contextual factor analyzed was nutrition

and its relationship with the feeling of being well informed of the disease self-management of DMT2. Nutrition questions were asked to determine if the participants receive SNAP benefits or food commodities, if fresh fruits and vegetables were limited in the participant's household due to the expense of fresh fruits and vegetables, and whether the participant ever feels confused about what a good diabetic meal is. Table 5 provides the percentages and frequencies from the descriptive analyses of the relationships between the survey questions and the study participants' perceived feelings of being well informed of the disease process of Diabetes Mellitus Type 2 .

The second contextual factor analyzed was transportation and its relationship with the feeling of being well informed of the disease self-management of Diabetes Mellitus Type 2. Two questions were asked to determine the relationship between lack of adequate transportation to medical appointments and transportation to the grocery store and the feeling of being well informed of the disease process of DMT2. Table 5 provides the percentages and frequencies from the descriptive analyses of the relationships between the survey questions and the study participants' perceived feelings of being well informed of the disease process of Diabetes Mellitus Type 2.

The third contextual factor analyzed was access to healthcare and its relationship with the feeling of being well informed of the disease self-management of Diabetes Mellitus Type 2. A total of five questions were asked about access to healthcare. The first questions asked if the participant had ever gone to the emergency room (ER) because his or her primary care provider (PCP) was unavailable. The second access to healthcare question asked whether the participant had to travel more than an hour to see a specialist.

The third access to healthcare question asked if the participant is under the care of a podiatrist. The fourth access to healthcare question asks whether the participant is under the care of an endocrinologist. The final access to healthcare question asked the participant if they have ever had to wait more than one day to see the PCP when sick (See Table 4 for the relationships between the survey questions and the study participants' perceived feelings of being well informed of the disease process of Diabetes Mellitus Type 2).

The survey asked questions about family history of Diabetes Mellitus Type 2, whether the participant required someone to read or explain medical pamphlets or uses for medication and their possible side effects, access to areas for physical activity movement, whether finances restrict the participant from an eye exam and glasses, whether the participant checks blood glucose and feet daily, whether the participant takes medication as prescribed by the physician, and if the participant has internet access, a smart phone, tablet, or computer. The responses to these questions were then analyzed to determine any relationship to feelings of being well informed of the disease self-management of DMT2(See Table 5 for more information about the relationships between the survey questions and the study participants' perceived feelings of being well informed of the disease process of Diabetes Mellitus Type 2).

Table 5

RELATIONSHIP BETWEEN SURVEY QUESTIONS AND PERCEIVED FEELINGS OF BEING WELL INFORMED OF DISEASE PROCESS OF DMTS

	Feels well informed	Does not feel well informed
	Frequency (%)	Frequency (%)
Food Commodities		
Receives	n= 24(43%)	n=32(57%)
Doesn't receive	n=27(61%)	n=17(39%)
Fresh fruits and vegetables		
Limits	n=21(36%)	n=37(64%)
Doesn't limit	n=30(71%)	n=12(29%)
Diabetic meal choices		
Confused	n=25(38%)	n=41(72%)
Not confused	n=26(79%)	n=7(21%)
Medical Appointments		
Lacks transportation	n=15(32%)	n=31(67%)
Doesn't lack transportation	n=36(67%)	n=18(33%)
Grocery Store		
Lacks transportation	n=14(33%)	n=29(67%)

Doesn’t lack transportation	n=37(65%)	n=20(35%)
Emergency room visit		
Yes	n=27(42%)	n=37(58%)
No	n=24(67%)	n=12(33%)
Travel time more than one hour		
Yes	n=47(52%)	n=43(48%)
No	n= 4(40%)	n=6(60%)
Seek care from a podiatrist		
Yes	n=6(27%)	n=16(73%)
No	n=45(58%)	n=33(42%)
Seek care from an endocrinologist		
Yes	n=10(53%)	n=9(47%)
No	n=41(51%)	n=40(49%)
Waited more than one day to see PCP		
Yes	n=33(45%)	n=41(55%)
No	n=18(69%)	n=8(31%)
Family History of Diabetes		
No family history	n=12(50%)	n=12(50%)
History on maternal side	n=20(74%)	n=7(26%)
History on paternal side	n=11(61%)	n=7(39%)
History for both parents	n= 8(26%)	n=23(74%)
Requires someone to read medical info		

Yes	n=21(32%)	n=44(68%)
No	n=30(86%)	n=5(14%)
Access to areas of physical activity		
Yes	n=33(79%)	n= 9(21%)
No	n=18(31%)	n=40(61%)
Lack of eye care due to finances		
Yes	n=23(41%)	n=33(59%)
No	n=28(64%)	n=16(36%)
Check blood glucose and feet daily		
Yes	n=37(58%)	n=27(42%)
No	n=14(39%)	n=22(61%)
Take medication as prescribed		
Yes	n=48(55%)	n=39(45%)
No	n=3(23%)	n=10(77%)
Internet access at home		
Yes	n=41(59%)	n=29(41%)
No	n=29(41%)	n=20(67%)
Own and use smartphone, tablet, computer		
Yes	n=40(62%)	n=25(38%)
No	n=11(31%)	n=24(69%)

Chi-square results were computed to evaluate any relationship between the unique contextual factors present in rural communities and the perceived feeling of being well informed of disease self-management of Diabetes Mellitus Type 2. There was a significant relationship between the perceived feelings of being well informed in those participants who report better access to nutritious food and a better understanding of what a good diabetic meal is (does not receive food commodities X^2 (1, N=100)=3.38 , p=0.07, does not limit fresh fruits and vegetables X^2 (1, N=100)=12.09, p=0.00, and understands good diabetic meal choices X^2 (1, N=99)=14.74, p=0.00). Additionally, there was a significant relationship between the perceived feelings of being well informed of the disease process of DMT2 in those participants who report having better access to transportation to the grocery store and to medical appointments (has transportation to grocery store (X^2 (1, N=100)=10.27, p=0.00), has transportation to medical appointments (X^2 (1, N=100)=11.53, p=0.00) . Likewise, there was also a significant relationship between the participants' perceived feelings of being well informed of the disease process of DMT2 in those participants who report having better access to quality healthcare (has not had to go to the ER (X^2 (1, N=100)= 5.53, p=0.02), does not travel more than an hour to a specialist (X^2 (1,N=100)= 0.54 p=0.46), has not had to wait more than one day to see a provider when sick (X^2 (1, N=100)=4.67, p=0.03). Additionally, there is a significant relationship between the perceived feelings of being well informed in those participants who do not require assistance to read or explain medical information for them (X^2 (1, N=100)= 25.97, p=0.00). Furthermore, there is a significant relationship between the perceived feelings of being well informed in those participants who report having better

access to areas to perform physical movement activity (X^2 (1, N=100)=22.03, p=0.00). Conversely, there was no significant relationship with any of the contextual factors (see Table 5 for Chi-Square results for relationship between survey questions and perceived feelings of being well informed of disease process of Diabetes Mellitus Type 2).

Table 6

CHI-SQUARE RESULTS FOR RELATIONSHIP BETWEEN SURVEY QUESTIONS AND PERCEIVED FEELINGS OF BEING WELL INFROMED OF DISEASE PROCESS OF DIABETES MELLITUS TYPE 2

	Feels well informed			
	N	*df*	*x2*	*p*
Does Not Receive Food Commodities	100	1	3.38	.07
Does not limit Fresh fruits and vegetables	100	1	12.09	.00
Understands Diabetic meal choices	99	1	14.74	.00
Has transportation to Medical Appointments	100	1	11.53	.00
Has transportation to Grocery Store	100	1	10.27	.00
Never had an Emergency room visit	100	1	5.53	.02
Must travel time more than one hour	100	1	.54	.46
Seeks care from a podiatrist	100	1	6.36	.01
Seeks care from an endocrinologist	100	1	.25	.87
Has waited more than one day to see PCP	100	1	4.67	.03

Requires someone to read medical info	100	1	25.97	.00
Has access to areas of physical activity	100	1	22.03	.00
Has no eye care due to finances	100	1	5.02	.03
Checks blood glucose and feet daily	100	1	3.30	.07
Takes medication as prescribed	100	1	4.67	.03
Has internet access at home	100	1	5.36	.21
Owns and uses a smartphone, tablet, computer	100	1	8.25	.00

Discussion

The unique contextual factors present in rural areas are known to hinder the self-management of Diabetes Mellitus Type 2(Rubens, 2022). This original study is examined the relationship between these contextual factors and the perceived feelings of being well informed of the disease process of DMT2. The results of this study align with prior research. This study shows when participants lack transportation to medical appointments and to the grocery store, participants report feeling less informed of the disease process of Diabetes Mellitus Type 2. Prior research has identified that lack of transportation is a significant problem in rural communities and hinders health and wellness (Ross et al, 2015).

The results of this study show those who are better educated, feel better informed of the disease process of DMT2. Prior research by Feltner (2017) reported that lower educational levels hinder the self-management of DMT2. Similarly, in this study,

participants who limit fresh fruits and vegetables or receive food commodities report feeling less informed of the disease process of DMT2. Current research states individuals who rely heavily on food commodities and programs such as the Supplemental Nutritional Assistance Program(SNAP) have difficulty preparing healthy diabetic meals (Gordon, 2022; Scarton, 2019).

Additionally, the current study results identified that participants who have access to areas for physical movement activity report feeling well informed of the disease process of DMT2. Earlier research by Umsted Meyer (2016) reported that individuals who participate in regular physical movement activity, better manage their DMT2.

In contrast to prior research (ADA, 2024), which finds not seeking medical attention from specialty providers can lead to amputations, dialysis, and vision loss , the results of this study identified no significant relationships between seeking care from a podiatrist, an endocrinologist, or an ophthalmologist and perceived feelings of being well informed of the disease process. This could be due to the phrasing of the questions or due to the limited number of these types of healthcare professionals in rural communities, primary care providers may be filling in for these specialized providers.

Limitations

There were several limitations of the current study. Participants were all currently receiving occupational therapy services through Amedisys Home Health, which means the participant must be homebound. To be considered homebound, an individual may no longer be able to drive, and thus have more difficulty with lack of transportation than an individual who is not homebound. These individuals are typically older as evidenced by

the mean age of the study participant of 71.54 years old and may be less receptive to technology such as smartphones, tablets, computers, and internet service. Also, the study participants were predominantly White/Caucasian with 98% and Black/African American representing 2% of the study, which limits the applicability of the study. This is the typical ratio between these two races in the rural county from East Tennessee where the study participants resided.

Implications for Future Practice

Participants included an adult population previously diagnosed with Diabetes Mellitus Type 2, who reside in the rural community of Johnson County, Tennessee, and currently receive occupational therapy services through Amedisys Home Health (n=100). The results of the study aligned well with current literature exploring the relationship between nutrition, transportation, physical movement activity, and education and being able to properly manage DMT2.

The original study indicates the participants who receive food commodities, limit fresh fruits and vegetables, and feel confused over what a good diabetic meal is feel less informed of the disease process of DMT2. Lack of transportation to medical appointments and to the grocery store results in individuals feeling less informed of the disease process of DMT2. Lack of quality healthcare results in individuals feeling less informed of the disease process of DMT2. Study participants who require someone to read or explain medical information or have lower educational levels feel less informed about the disease process of DMT2. Those who have access to areas for physical fitness feel better informed of the disease process of DMT2. Those who check their blood

glucose and feet daily feel better informed of the disease process of DMT2. Those who take their medication as prescribed feel better informed of the disease process of DMT2. Those who have access to technology such as a smartphone, computer, tablet, and internet access feel better informed of the disease process of DMT2.

The study found that individuals felt less informed of the disease process of DMT2 when they were less educated, had limited access to transportation, had poor nutrition, less physical movement activity, and did not take their medication as prescribed. The study along with the comprehensive literature review, demonstrates a gap in the disease self-management of DMT2 in rural communities. Occupational therapy has a unique lens to fill the gap through a holistic approach to develop healthy routines and habits to improve the feeling of being well informed of the disease process of DMT2 and improve health and wellness in these individuals. Take Control of Your Diabetes program is a holistic approach to fill these gaps. A logic model is a visual illustration of the program inputs, the problem, the theory behind the problem, strategies, program outputs, and early, intermediate, and long-term goals (See Figure 2).

FIGURE 2

LOGIC MODEL

Program Goals

1. After six 1-hour sessions, participants will prepare a meal per American Diabetes Association (ADA) recommendations.
2. After six 1-hour sessions, participants will shop for ADA recommended foods.
3. After six 1-hour sessions, participants will perform physical movement activity 30 minutes per session, five days per week.
4. After six 1-hour sessions, participants will take medication as prescribed.
5. After six 1-hour sessions, participants will incorporate diet, exercise, and medication management to lower HbA1C.

Program Strategies

The ultimate goal of Take Control of Your Diabetes program is to lower HbA1C levels in individuals living in rural communities. To accomplish this, the program will provide educational sessions led by occupational therapists to teach strategies to improve nutrition, physical movement activity, and medication management as recommended by the American Diabetes Association (ADA)(ADA, 2024). It is important to ensure that the program teaches the participants to identify the barriers to improve nutrition, physical movement activity, and medication management and later instruct on strategies to navigate these barriers to ultimately lower HbA1C. The following are the strategies for the program.

- Strategy 1: Providing materials on how to identify the correct meal portioning process as recommended by the American Diabetic Association(ADA, 2024) to:

increase the number of individuals with DMT2 living in rural communities who choose meal portion size control, increase the number individuals who will prepare a meal per ADA recommendations(ADA, 2024) and decrease HbA1C (ADA,2024).

- Strategy 2: Providing individuals with materials on how to identify barriers to shopping for American Diabetic Association(ADA, 2024) recommended foods to increase the number of individuals with DMT2 living in rural communities who identify the barriers to shopping for ADA recommended foods(ADA,2024) when shopping for ADA recommended foods (ADA, 2024), and decrease HbA1C(ADA, 2024).

- Strategy 3: Providing individuals with materials on strategies to navigate barriers to shopping for American Diabetic Association recommended foods(ADA,2024) to increase in the number of individuals with DMT2 living in rural communities who identify strategies to navigate the barriers to shopping for ADA recommended foods(ADA,2024) when shopping for ADA recommended foods(ADA,2024), and decrease HbA1C(ADA,2024).

- Strategy 4: Providing individuals with materials on barriers to physical movement activity to increase in the number of individuals with DMT2 living in rural communities who identify the barriers to physical movement activity and increase

the number of individuals performing physical movement activity thirty minutes per session, three times per week to decrease HbA1C(ADA, 2024).

- Strategy 5: Providing individuals with materials on strategies to navigate barriers to physical movement activity to increase the number of individuals with DMT2 living in rural communities who identify the strategies to navigate the barriers to physical movement activity and increase the number of individuals performing physical movement activity thirty minutes per session, three times per week to decrease HbA1C(ADA, 2024).

- Strategy 6: Providing individuals with materials on strategies to lower HbA1C to increase in the number of individuals with DMT2 living in rural communities who identify the strategies to lower HbA1C and increase the number of individuals incorporating diet, exercise, and medication management to decrease HbA1C(ADA,2024).

- Strategy 7: Providing individuals with materials on strategies to navigate medication management to increase the number of individuals with DMT2 living in rural communities who identify the strategies to navigate medication management to increase the number of individuals incorporating proper medication management to decrease HbA1C(ADA,2024).

Program Theory

The Health Belief Model (HBM) is a theoretical model that can be used to guide health promotion and disease prevention (CDC, n.d.). The HBM model states that a person's health related behavior depends on the individual's perception of four critical areas: (1) the severity of a potential illness, (2) the person's susceptibility to that illness, (3) the benefits of taking a preventative action, and (4) the barriers to taking that action (CDC, n.d.). The model also includes recommended foods and portion sizes, physical movement activity, and medication management (CDC, n.d.)(ADA, 2024). The HBM theory is utilized throughout the program's strategies, providing education to promote a change to healthier behaviors and improved Diabetes Mellitus Type 2 disease self-management, improving health and wellness, increasing an individual's ability to perform chosen occupational roles, routines, and habits.

Evaluation Approach

Using an approach to evaluation that incorporates four types of evaluation: context evaluation, input evaluation, process evaluation, and product evaluation, the CIPP evaluation approach, is a comprehensive approach to evaluation that uses both qualitative and quantitative methods to allow the evaluator to assess whether the program is successful or unsuccessful (Giancola, 2021). Stufflebeam developed the CIPP model as a response to dissatisfaction of the evaluations designs and approaches available at that time (Giancola, 2021). This approach, developed by Daniel Stufflebeam in the mid-1960s, incorporates four types of evaluation: context evaluation, input evaluation, process evaluation, and product evaluation (Giancola, 2021). A pre-survey will be administered

to all participants to develop a baseline of knowledge. A post survey will then be administered to all participants to measure the increase in knowledge after participation in the program.

Context evaluation relates to a program's needs and contextual conditions (Giancola, 2021). Take Control of Your Diabetes will take place in a rural community. Rural communities possess unique contextual factors which limit health and wellness. The unique contextual factors include poor nutrition, lower physical activity levels, lower educational levels, and lack of access to quality healthcare. These contexts must be addressed to have a successful program. The original program *Take Control of Your Diabetes* is designed to improve knowledge on recommended food portion sizes, barriers to shopping for nutritious food, strategies to navigate the barriers to shopping for nutritious foods, barriers to physical movement activity, strategies to navigate barriers to physical movement activity, and medication management. The program will be implemented in rural communities and addresses the contextual factors within the educational modules. A pre- and post-survey will be administered to all participants to measure the knowledge learned from the educational modules.

Input evaluation relates to the planning of activities that are part of the program (Giancola, 2021). The education activities of the evaluation have been planned to address the unique contextual factors of rural communities to improve nutrition, physical movement activity, and medication management. Activities are planned around the lack of access to transportation through utilizing volunteers to provide transportation for those who have no transportation. Additionally, handouts will be given to those individuals

without access to internet and phone service, and all modules will be disseminated on a level easy to understand by all who attend the program. The pre-survey will include questions related to availability of transportation and access to internet and phone services.

Process evaluation relates to the implementation of the educational activities planned to address poor nutrition, lack of physical movement activity, and poor medication management. (Giancola, 2021). The educational activities are designed and implemented to improve HbA1C during the duration of the program of six months. The educational activities have been chosen based on the areas in the survey that have been identified as those that most commonly hinder disease self-management of Diabetes Mellitus Type 2. To evaluate the process of the implementation of the educational activities, participants will be asked to demonstrate the ability to buy recommended foods, prepare meals with proper portion control sizes, perform recommended exercise, take medication as prescribed, and lower HbA1C.

Product evaluation relates to the intended and unintended outcomes. (Giancola, 2021). The intended outcomes of the Take Control of Your Diabetes program are improved nutrition through the identification of barriers to shopping for foods recommended by the American Diabetes Association(ADA, 2024) and the strategies to navigate the barriers, the identification of barriers to physical movement activity as recommended by the ADA(ADA, 2024) and the strategies to navigate the barriers, strategies to lower HbA1C, and strategies to navigate medication management. The unintended outcomes are a community health program to improve awareness of barriers

and strategies to navigate the barriers to proper Diabetes Mellitus Type 2 (DMT2) disease self-management and increased access and participation in health promotion through DMT2 disease self-management. As the program continues, an evaluation of post-test responses will provide guidance for an adjustment in the learning modules as needed to improve outcomes.

Identification of Evaluation Design

For the Take Control of Your Diabetes Program, a single group pre-test post-test design with data collected through a quantitative survey will be implemented to evaluate the program. Data will be collected at baseline to collect information about participant's knowledge about nutrition, access physical movement activity, and medication management and then again at post-test. The participant's knowledge before the educational sessions about nutrition, physical movement activity, and medication management is the dependent variable and the educational sessions are the independent variable.

Since the program will be implemented at only one site with one group, a single-group design was implemented (Giancola, 2021). The single-group design provides useful data about the effectiveness of the program without the use of a comparison group (Giancola, 2021). Strengths and weaknesses of the single group pre and post-test designs used in the TCOYD program are as follows.

Strengths of the Single Group Pre and Post-test Design

The single group pretest-posttest design is the simplest evaluation design and does not require a large sample size (Giancola, 2021). The program size is approximately 60-

100 participants and has a duration of six months. Since the pre-test provided a measurement of participant knowledge prior to the OT intervention, and the post-test provided a measurement of participant knowledge after the OT intervention, it can be deduced that any improvement in knowledge, after the OT intervention, is a result of effectiveness of the intervention.

Weaknesses of the Single Group Pre and Post-test Design-Threats to Validity

Although the single group pretest-posttest design is the simplest evaluation design, it is also the weakest evaluation design (Giancola, 2021). It is the weakest design because it has no comparison group (Giancola, 2021). There maya be competing explanations as to why the evaluation measured the results it yielded (Giancola, 2021). Although the single group pre and post-test design has potential threats to the validity of Take Control of Your Diabetes, this design is the most appropriate for this program as one group, individuals with Diabetes Mellitus Type 2 living in rural communities, is the only group in the program.

Evaluation Enrichments

To improve the validity of the program, enrichments of the Take Control of Your Diabetes program will be utilized to improve usefulness of the results and the credibility of the findings, make the evaluation more manageable, and expand on the information obtained throughout program implementation (Giancola, 2021). Enrichments in this program include using repeated measures, longitudinal data, and use of the Logic model (Giancola, 2021).

Using the same pre/post-test given midway through the program, these repeated measures not only provide a baseline of knowledge to compare to program end data, but also provides information to allow the occupational therapists to make midcourse corrections and improvements (Giancola, 2021).

This program has been planned to have a duration of six months but could be modified to be less than six months or longer than six months. Future program evaluation will continue and may have longer duration periods. To evaluate the long-term success of the Take Control of Your Diabetes program, a longitudinal design will be implemented. The longitudinal design follows participants and collects data over extended periods of time (Giancola, 2021). Some of the goals of the program may take longer than six months to accomplish. Using the longitudinal design, participants may be interviewed to collect information about long-term goals.

Using the logic model in the evaluation helps strengthen the credibility of the program (Giancola, 2021). The logic model was developed before the implementation of the program to show the program inputs, the problem, the theory behind the problem, strategies, program outputs, and early, intermediate, and long-term goals.

Program Implementation

The *Take Control of Your Diabetes* program was developed as a solution to the problem and has not yet been implemented. Once implemented, participants will be eligible to participate in the program if they have a pre-existing diagnosis of Diabetes Mellitus Type 2 that is poorly managed, is 18 years old or older, lives in a rural community, and speaks English.

The *Take Control of Your Diabetes* program consists of four learning modules. The information in the modules cover nutrition, physical movement activity, medication management, and ways to establish healthy habits and routines.

Methods

A pre-test containing dichotomous questions (N=60 to100) will be administered to explore the beginning knowledge of nutrition, physical movement activity, medication management, and healthy routines and habits to properly manage Diabetes Mellitus Type 2. The participants will attend weekly educational sessions where four modules will be presented to improve the knowledge of nutrition, physical movement activity, medication management, ways to incorporate healthy routines and habits into daily life to reduce the barriers to health and wellness of individuals with DMT2. Weekly modules will educate participants how to identify barriers to shopping for foods recommended by the American Diabetes Association(ADA, n.d), correct food portion sizes, how to navigate barriers to shopping for foods recommended by ADA (ADA, n.d), barriers to physical movement activity, how to navigate the barriers to physical movement activity, how to properly manage medication, and how to develop healthy behaviors and habits to properly manage DMT2. Follow up questions between weekly educational sessions will be used to answer any questions that may arise in between. A post-test will be administered at the conclusion of the educational sessions to determine how impactful the educational modules were.

Participants

Recruitment will be from referrals from local primary care providers of adults previously diagnosed with poorly managed Diabetes Mellitus Type 2.

Outcomes Measures

Data will be compared using descriptive and paired sample t-test to compare the change in knowledge from the pre-test to the post-test and determine the impact of the program materials.

Procedures and Data Collection Timeline

Prior to the start of the educational modules, a pre-test will be administered to measure the amount of beginning knowledge. The sessions will be held once weekly. The program is designed for a six-month period but may be modified to conclude earlier or later. After the completion of all modules, a post-test will be administered. The entire program from start to finish is designed to last for six months.

Data Analysis

The program has not yet been implemented, however, once piloted, a paired sample t-test will be used to determine whether the change in knowledge from the pre-test to post-test are significant. Descriptive statistics will then be used to describe the data.

Results

The program has not yet been implemented, however, after implementation, the data should show improvement in all areas of knowledge. If an improvement in

knowledge is not observed in a specific area, the learning modules will be modified to assist in learning.

CHAPTER FIVE – Artifact Funding Plan & Dissemination Plan

Brief Solution Description

Created from evidence obtained from literature reviews and a needs-based assessment research project, *Take Control of Your Diabetes*, is an in-person educational course designed for individuals diagnosed with poorly managed Diabetes Mellitus Type 2 who live in rural communities. Current literature demonstrates similar community-based interventions result in improved health-related behaviors(Brown, 2023) through hands-on, culturally meaningful activities(Scarton, 2019). The goal of the program is for participants to develop skills to improve their ability to self-manage Diabetes Mellitus Type 2. The program consists of six modules presenting materials on portion control, barriers to buying foods recommended by the American Diabetes Association, strategies to navigate the barriers to buying foods recommended by the ADA, barriers to physical movement activity as recommended by the ADA, strategies to navigate the barriers to physical movement activity as recommended by the ADA, and medication management(ADA, 2024). Table 7 summarizes materials, resources, and the costs necessary to replicate the TCOYD program with potential funding sources listed.

Table 7: ***COSTS AND RESOURCES FOR PROGRAM IMPLEMENTATION***

Resources/Materials	*Cost or Time*	*Total Amount*
Program Implementation		
OT students to teach modules with supervision	6 sessions at 2 hours each=12 hours $100 per hour	$1200/program duration
PowerPoint Handouts for Six Modules	Paper $192 Time 3 hours to make Copies	$192
	If using OT students, Supervision of students $100 per hour	$300
Pre-and Post-test	Paper	$9
Physical Building for educational sessions	~community center (6 sessions)	$600
	~senior center (6 sessions)	$300
	~local school (6 sessions)	$0
Total Cost with OT students or similar supports with supervision	Community center Senior center Local school	$2301 $2001 $1701
Total Hours		~15 hours

Table 8. ***POTENTIAL FUNDING SOURCES***

Funding Source	Contact Information	Funding Amount Available
Project Diabetes- Grants awarded for smaller, community-based projects to prevent Diabetes in Tennessee. Awarded through the State of Tennessee.	Joan Cook, MS,RD Program Lead, Project Officer Joan.Cook@tn.gov https://www.tn.gov/health/fun-dingopportunities.html	Funds not to exceed $15,000 per year, for a maximum total of $30,000 over a two-year period.
Allen Foundation- Grants awarded to encourage the dissemination of information regarding healthful nutritional practices and habits.	https://www.allenfoundation.org	Varies by annual offerings and grant availability
Rural Health Care Services Outreach Program-Listing	https://data.hrsa.gov/tools/rural-health	Varies based on annual offerings, availability, and grant type

92.912

Funding opportunities for community-based organizations in rural areas who have demonstrated experience serving rural, underserved populations.

Chapter 6: Conclusion

Proper meal planning, physical movement activity, and medication management is essential to the self-management of Diabetes Mellitus Type 2(ADA, 2024). Research has proven improving ones' ability to purchase foods recommended for diabetic meals or the ability to use foods received through food banks and identifying correct portion sizes to demonstrate the ability to prepare a diabetic meal as recommended by the American Diabetes Association will result in an improvement in the self-management of DMT2 (ADA, 2024;Brown, 2023). Research also demonstrates using community programs to educate on the importance of performing physical movement activity as recommended by the ADA will result in an improvement in the self-management of DMT2 (ADA, 2024; Meendering, 2023). However, individuals with Diabetes Mellitus Type 2 who live in rural communities possess inherently unique contextual factors that act as barriers to manage DMT2 contributing to decreased health and wellness (American Occupational Therapy Association, 2014). These contextual factors contribute to a decreased ability to perform occupational roles, routines, and habits leading to a decline in quality of life (American Occupational Therapy Association, 2014). A needs-based assessment was developed and distributed to individuals with DMT2 who live in rural communities to determine which contextual factors most significantly affect the perceived feelings of individuals with DMT2 being able to self-manage the chronic disease. The assessment determined access to nutritious food, access to transportation, access to quality healthcare, higher education levels, and access to physical movement activity have the most significant positive contributions to the perceived feelings of properly self-

managing DMT2. Based upon these findings, a program was developed to provide educational modules on nutrition, physical movement activity, and medication management to improve knowledge of the factors most closely related to perceived feelings of properly managing DMT2. The educational modules include materials on the barriers to buying foods recommended for a diabetic meal and performing physical movement activity, the strategies to overcome the barriers to buying foods recommended for a diabetic diet and performing physical movement activity, portion control sizes, and medication management to result in an improvement in HbA1C.

The Health Belief Model (HBM) explains the importance of health promotion and disease prevention (CDC, n.d.). This model explains that one's health related behavior is dependent upon the severity of the Diabetes Mellitus Type 2(DMT2), one's susceptibility to DMT2, the benefits of managing DMT2, and the barriers to managing DMT2 (CDC, n.d.). The needs-based assessment identified the most significant barriers to perceived feelings of properly managing DMT2 are receiving commodities from food banks or Supplemental Nutrition Assistance Program, limiting fresh fruits and vegetables because of the expense of these foods, not understanding what a good diabetic meal consists of, limited access to physical movement activity, limited opportunities for transportation to a grocery store or pharmacy, having to travel more than one hour to see a specialty provider, having to wait more than one day to see a provider, having to go to the emergency room because the primary care provider is unavailable. The HBM explains the importance of eating recommended foods and portion size control, physical movement activity, and medication management (CDC, n.d.)(ADA, 2024). *Take Control*

of Your Diabetes utilizes the HBM to provide educational modules to promote healthier routines and habits by addressing barriers to health, improving disease self-management of DMT2, improving health and wellness, resulting in an increased ability for an individual to perform chosen occupational roles, routines, and habits. The HBM strengthens the premise that educating individuals in rural communities with DMT2 through TCOYD program developed in this study will have a positive impact on the community through improved awareness of the barriers to managing chronic disease in rural areas. It will also promote awareness to the expertise of Occupational therapy practitioners to holistically assist individuals throughout the lifespan to develop, recover, and improve function and the skills required for the activities of daily life (Donnelly et al. 2023).

Integrating current evidence into its development, *Take Control of Your Diabetes* is designed as an in person, group, rural community-based training program with six modules. The six educational modules , led by occupational therapist practitioners, teach strategies to improve nutrition, physical movement activity, and medication management as recommended by the American Diabetes Association(ADA, 2024). These strategies were designed to navigate the unique contextual factors present in rural communities and are culturally relevant. The modules will be disseminated on a level easy to understand by all who attend the program, The program also consists of a pre and post-test to assess the impact of knowledge presented. The pre-test will assess prior participant knowledge so that the modules can be graded with more emphasis on areas where the participant has perceived feelings of being less informed. Upon completion of the modules, participants

will be asked to demonstrate the ability to buy recommended foods, prepare a simple meal with appropriate portion control sizes, perform recommended exercises, and take medication as prescribed. In addition to these demonstrations, participants will take a post-test. The post-test acts as part of the embedded evaluation process to ensure the program's relevance and efficacy.

The program, *Take Control of Your Diabetes*, is designed to be low cost in implementation. Any occupational therapist can replicate this community-based program with minimal costs depending upon fee of the brick-and-mortar location for the program (~$1701 to $2301 and ~ 15 hours). The dissemination of this program will be piloted through the rural community in which the author lives and works, then to other rural communities throughout Tennessee, North Carolina, and Virginia.

Research exists on the importance of self-management of Diabetes Mellitus Type 2 and the contextual factors present in rural communities which hinders disease self-management of chronic disease. The *Take Control of Your Diabetes* program strategies are also evident in literature to promote improved health and wellness and overall quality of life. The TCOYD program incorporates a culturally relevant perspective that highlights the importance of good nutrition, adequate physical movement activity, and medication management to lower HbA1C. It goes beyond educating what foods to eat, movement to perform, and how to take medication. By instructing on the barriers to these goals and strategies to navigate the barriers to these goals, the TCOYD program utilizes the unique lens of occupational therapy to develop sustainable healthy routines and habits

to last throughout the lifespan of the participants bringing meaning and purpose to life (Donnelly et al. 2023).

REFERENCES

American Diabetes Association. (2021, July 21). *Addressing disparities in life expectancy.* Senate health, Education, Labor, and Pensions (HELP) Committee, Primary Health and Retirement Security Subcommittee Hearing. www.2diabetes.org

American Diabetes Association. (2024). *You can manage and thrive with Diabetes.* https:www.diabetes.org

American Occupational Therapy Association. (2020). *Occupational therapy practice framework: Domain & process* (4th ed.).

Barnidge, E., Baker, E., Estlund, A., Motton, F., Hipp, P., Brownson, R. (2015). A Participatory regional partnership approach to promote nutrition and physical activity through environmental and policy change in rural Missouri. *Preventing Chronic Disease.* DOI: http://dx.doi.org/10.5888/ped12.140593

Brown, M., Hawley, C., Ornelas, I., Huber, C., Best, L., Thorndike, A., Beresford, S., Howard, B., Umans, J., Hagar, A., & Frett, A. (2023). Adapting a cooking, food budgeting and nutrition intervention for a rural community of American Indians with type 2 diabetes in north-central United States. *Health Education Research.* 38(1). 13-27. https://doi.org/10.1093/her/cyac033

Centers for Disease Control and Prevention. (2021). *Diabetes.* https://www.cdc.gov

Centers for Disease Control and Prevention. (n.d.). *The health belief model.* https:www.cdc.gov

Crowley, M.J., Tarkington, P., Bosworth, H., Jeffreys, A., Coffman, C., Maciejewski, M., Steinhauser, K., Smith, V., Dar, M., Fredrickson, S.K., Mundy, A.C., Strawbridge,

E., Marcano, T., Overby, D., Majette Elliott, N., Danus, S., Edelman, D.(2022). Effect of a comprehensive telehealth intervention vs telemonitoring and care coordination patients with persistently poor type 2 diabetes control: A randomized clinical trial. *Journal of American Medical Association,* 182(9). 943-952. DOI:10.1001/jamainternmed.2022.2947

Donnelly, C., Leclair, L., Hand, C., Wener, P., Letts, L. (2023). Occupational therapy services in primary care: A scoping review. *Primary Health Care Research and Development,* 24(7). 1-18. DOI:10.1017/ss14634236622000123

Dugani, S., Mielke, M., Vella, A. (2021). Burden and management of type 2 diabetes in Rural United States. *John Wiley and Sons Ltd* 37:3410.https://doi.org/10.1002/dmrr.3410

Feltner, F., Thompson, S., Baker, W., & Slone, M. (2017). Community health workers improving diabetes outcomes in a rural Appalachian population. *Social Work in Health Care,* 56(2), 115-123. https://doi.org/10.1080/00981389.2016.1263269

Fields, B., Smallfield, S.(2022). Practice guideline- Occupational therapy practice guideline for adults with chronic conditions. *The American Journal of Occupational Therapy,* 76(2). 1-30. https://doi.org/10.5014/ajot.2022/762001

Giancola, S.P. (2021). *Program evaluation embedding evaluation into program design and development.* SAGE.

Gordon, E., Ridlinger, B., rick, S., Grosvenor, R., & Charron, R. (2022). Fruit and vegetable prescription program for diabetes control among community health centers in rural Idaho and Oregon. *American Journal of Public Health,* 112(7), 975-979.

DOI:10.20105/AJPH.2022.306853

Griesemer Lepard, M., Joseph, A., Agne, A., Cherrington, A. (2022). Diabetes self-management interventions for adults with type 2 diabetes living in rural areas: A systematic literature review. *The American Journal of Occupational Therapy,* 76(2). 1-30. DOI:10.1007/s11892-015-0608-3

Kielhofner, G. (1995). A model of human occupation. 2nd ed. Baltimore: Williams & Wilkins

Lin, Y-L., Ortiz, J., Boor, C. (2018). ACO's impact on hospitalization rates of rural older adults with diabetes. *Family and Community Health,* 41(4). 265-273. DOI:10.1097/FCH0000000000000204

Meendering, J., McCormack, L., Moore, L., Stluka, S. (2023). Facilitating nutrition and physical activity-focused policy, systems, and environmental change in rural areas: A methodological approach using community wellness coalitions and cooperative extension. *Society for Public Health Education.* 24(1). 68S-79S. DOI:10.1177/15248399221144976

Parker, E., Lin, J., Mahoney, T., Ume, N., Yang, G., Gabbay, R., ElSayed, N., & Bannuru, R. (2023). Economic costs of diabetes in the U.S. in 2022. *Diabetes Care.* https://doi.org.10.2337/di23-0085

Pyatak, E., King, M., Vigen, C., Salazar, E., Diaz, J., Schepens Niemiec, S., Blanchard, J., Jordan, K., Banerjee, J., Shukla, J. (2019). Addressing diabetes in primary care: Hybrid effectiveness- Implementation study of lifestyle redesign occupational therapy. *American Journal of Occupational Therapy.* 73(5). DOI:10.5014/ajot.2019.037317

Ross, S., Benavides-Vaello, S., & Schumann, L. (2015). Issues that impact type-2 diabetes self-management in rural communities. *Journal of the American Association of Nurse Practitioner.* 27(11). DOI:10.1002/23276924.12225

Rubens, M., Ramamoorthy, V., Saxena, A., McGranaghan, P., & McCormack-Granja, E. (2022, Nov 9). Recent trends in diabetes-associated hospitalizations in the United States. *J Clin Med*. 11(22):6636. DOI:10.3390.jcm11226636

Rutledge, S., Masalovich, S., Blacher, R., Saunders, M. (2016). Diabetes self-management education programs in nonmetropolitan counties- United States, 2016. *Morbidity and Mortality Weekly Report Surveil Summ 2017.* 66:1-6

Satterwhite Mayberry, L., Lyles, C., Oldenburg, B., Osborn, C., Parks, M., Peck, M. (2019). Health interventions for disadvantaged and vulnerable people with type 2 diabetes. *Current Diabetes Reports.* 148(19). https://doi.org/10.1007/s11892-019-1280-9

Scarton, L., Velazquez, I., O'Neal, L., Iyer, S., Cannady, T., Choate, A., Mitchell, C., Wilkie, D. (2019). Developing a culturally tailored multigenerational intervention to prevent and manage type 2 diabetes in American Indian families living in rural settings: Findings from a focus group study. *Res Nurs Health*, 42(30). 226-233. DOI:10.1002/nur.21941

Schweda, S., Muller, G., Munz, B., Sudeck, G., Martus, P., Dierkes, K., Krauss, I. (2022). Implementation and evaluation of an individualized physical exercise promotion program in people with manifested risk factors for multimorbidity (MultiPill-Exercise): A study protocol for a pragmatic randomized controlled trial.

BMC public health. 2022-06. 22(1). P.1174

Sykes, M., Copsey, B., Finch, T., Meads, D., Farrin, A., McSharry, J., Holman, N., Young, B., Berry, A., Ellis, K., Moreau, L., Willis, T., Alderson, S., Girling, M., O'Halloran, E., Foy, R. (2023). A cluster randomized controlled trial, process and economic evaluation of quality improvement collaboratives aligned to a national audit to improve the care for people with diabetes (EQUIPD): Study protocol. *Implementation science.* IS, 2023-08, 18(1), 1-37. https://doi.org/10.1186/s13012-023-01293-0

Towne, S., Bolin, J., Ferdinand, A., Nicklett, E., Smith, M., & Ory, M. (2017). Assessing diabetes and factors associated with foregoing medical care among persons with diabetes: Disparities facing American Indian/Alaska Native, Black, Hispanic, low income, and southern adults in the U.S. (2011-2015). *International Journal of Environmental Research and Public Health,* 14(464). DOI:10.3390/ijerph14050464

Umstattd Meyer, M., Perry, C., Sumrall, J., Patterson, M., Walsh, S., Clendennen, S., Hooker, S., Evenson, K., Goins, K., Heinrich, K., O'Hara Tomkins, N., Eyler, A., Jones, S., Tabak, R., & Valko, C. (2016). Physical activity-related policy and environmental strategies to prevent obesity in rural communities: Systematic review of the literature, 2002-2013. *Preventing Chronic Disease.* 2016; 13:150406 DOI:http://doi.org/10.5888/ped13.150406

Zhang, Y., Pan, X-F., Chen, J., Xia, L., Cao, A., Zhang, Y., Wang, J., Li, H., Yang, K., Guo, K., He, M., Pan, A.(2020). Combined lifestyle factors and risk of incident type 2 diabetes and prognosis among individuals with type 2 diabetes: Systematic review

and meta-analysis of prospective cohort studies. *Diabetologia.* 63:21-33. https://doi.org/10.1007/s00125-019- 04985-9

APPENDIX

Appendix A: Needs-Assessment Survey

Survey

The purpose of the following survey is to gather important information to better understand the unique contextual factors contributing to Diabetes Mellitus Type 2 in rural communities.

Please answer the questions to the best of your understanding.

1. Which race do you consider yourself?
    a. White/Caucasian
    b. Black/ African American
    c. Asian/ Pacific Islander
    d. Hispanic/ Latino
    e. Native American/ American Indian
    f. Mixed
    g. Other _____

2. With which gender do you identify?
a. Male
b. Female
c. Other_____
d. Prefer not to specify

3. How old are you?

4. Has lack of transportation ever kept you from a medical appointment?
a. Yes
b. No

5. Do you receive SNAP benefits or obtain food commodities from a food pantry?

a. Yes
b. No

6. What is the highest level of education you have completed?
a. Less than a high school diploma
b. High school diploma
c. Associate's Degree
d. Bachelor’s Degree

7. Do you limit the number of fruits and vegetables in your household because of the expense of fresh fruits and vegetables?
a. Yes
b. No

8. Do either of your parents have/had Diabetes Mellitus Type 2?
a. No
b. Yes, my mother only
c. Yes, my father only
d. Yes, Both parents.

9. Do you ever have to have someone read or explain medical pamphlets or uses for medication and their potential side effects?
a. No
b. Yes

10. Do you have access to an area to perform physical activity 2 to 3 times per week?
a. Yes
b. No

11. Do you feel well informed of disease self-management of Diabetes Mellitus Type 2?
a. Yes
B. No

12. Has the lack of transportation ever kept you from going to the grocery store?
a. Yes
b. No

13. Have you ever had to go to the emergency room because you were unable to see your doctor?
a. Yes
b. No

14. Has the lack of money ever kept you from getting an eye exam and new glasses?
a. Yes
b. No

15. Do you have to travel more than one hour to see a specialist?
a. Yes
b. No

16. Do you go to a podiatrist?
a. Yes
b. No

17. Do you go to an endocrinologist?
a. Yes
b. No

18. Have you ever had to wait more than one day to see a provider when you are sick?
a. Yes
b. No

19. Do you check your blood sugar and feet daily?
a. Yes
b. No

20. Do you take your medication to control your blood sugar as directed by your physician?
a. Yes
b. No

21. Do you have internet access at home?
a. Yes
b. No

22. Do you have and use a smart phone, tablet, or computer?
a. Yes
b. No

23. Do you ever feel confused about what is a good diabetic meal?
a. Yes
b. No

Appendix B: IRB Proposal

Temple University
Office of the Vice President for Research

Research Integrity & Compliance
Student Faculty Center
3340 N. Broad Street, Suite 304
Philadelphia PA 19140

Institutional Review Board
Phone: (215) 707-3390
Fax: (215) 204-4609
e-mail: irb@temple.edu

Approval for a Project Involving Human Subjects Research that is Approved as Exempt

Date: 11-Mar-2024

Protocol Number:	31394
PI:	ELIZABETH PFEIFFER
Review Type:	EXEMPT
Approved On:	11-Mar-2024
Risk:	Minimal risk
Committee:	A2
Sponsor:	NO EXTERNAL SPONSOR
Project Title:	Assessment of the Unique Contextual Factors Contributing to Disease Self-Management of Individuals with Diabetes Mellitus Type 2 Living in Rural Communities

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The IRB approved the protocol 31394.

The study was approved under Exempt review. The IRB determined that the research **does not require a continuing review**, consequently there is not an IRB approval period.

As this research was approved as Exempt, the IRB will not stamp the consent or assent form(s).

Note that all applicable Institutional approvals must also be secured before study implementation. These approvals include, but are not limited to, Medical Radiation Committee (“MRC”); Radiation Safety Committee (“RSC”); Institutional Biosafety Committee ("IBC"); and Temple University Survey Coordinating Committee ("TUSCC"). Please visit these Committees’ websites for further information.

Finally, in conducting this research, you are obligated to submit the following:

- **Amendments - Any changes to the research that may change the Exempt status of this study must be reviewed and approved by the IRB prior to implementation.** Examples of such changes are: including new, sensitive questions to a survey or interview, changing data collection such that de-identified data will now be identifiable, including an intervention in the methods, changing variables to be collected from medical charts, decreasing confidentiality measures, including minors or adults lacking capacity to consent as subjects when previously only adults with capacity to consent were to be enrolled, no longer collecting signed HIPAA Authorization, etc. Please reach out to the IRB Staff with any questions about if a change to the study warrants an Amendment.
- **Reportable New Information** - Using the Reportable New Information e-form, report new information items such as those described in HRP-071 Policy - Prompt Reporting Requirements to the IRB **within 5 days**.
- **Closure report** - Using a closure e-form, submit when the study is permanently closed to enrollment; all subjects have completed all protocol related interventions and interactions; collection of private identifiable information is complete; and analysis of private identifiable information is complete.

For the complete list of investigator responsibilities, please see the HRP–070 Policy – Investigator Obligations, the Investigator Manual (HRP-910), and other Policies and Procedures found on the Temple University IRB website: https://research.temple.edu/irb-forms-standard-operating-procedures

Executive Summary

Diabetes Mellitus Type 2 (DMT2) is a chronic disease. Left poorly managed, DMT2 can lead to increased hospitalizations from complications such as chronic kidney disease, coronary artery disease, diabetic retinopathy, the loss of a limb, and in rare cases death. This chronic disease reduces an individual's ability to participate in everyday activities. Being unable to participate in these activities can result in depression and anxiety and can cause the individual to experience a decline in quality of life (American Diabetes Association, 2021). DMT2 is 17% more common in individuals living in rural communities than in non-rural communities (Lin, 2016). Individuals in rural communities have difficulty managing their Diabetes Mellitus Type 2 (Lin, 2016). Diabetes management is often hindered by social determinants of health such poor nutrition, lack of access to areas of physical movement activity, lack of access to quality healthcare, low socioeconomics, and lower educational levels to poor health and wellness in rural communities (Feltner, 2017; Gordon, 2022; Towne, 2017; Ross, 2015). *Take Control of Your Diabetes* is an original program developed to fill the gap between the needs of individuals in rural communities to self-manage DMT2 with occupational therapy interventions to promote health and wellness. *Take Control of Your Diabetes* can help to address these social determinants of health in rural communities to improve DMT2 self-management and ultimately lower HbA1C, a blood glucose test used to measure the average of blood sugar during the past two or three months.

Occupational therapy practitioners (OTPs) are uniquely trained to support individuals with Diabetes Mellitus Type 2 (DMT2) (American Occupational Therapy

Association, 2014). Occupational therapy interventions are successful in the management of DMT2 (Pyatek, 2019). OTPs have unique expertise to help individuals throughout the entire lifespan in promoting health and wellness through healthy routines and habits to prevent or control chronic disease such as DMT2 (American Occupational Therapy Association, 2020).

Evidence identifies the wellness inequalities between rural and non-rural communities (Feltner, 2017; Crowley, 2022; Lin, 2018). For people living in rural communities, current literature demonstrates that the lack of access to nutritious food contributes to poor health (Gordon, 2022) and individuals existing at or near the poverty level often depend heavily on the Supplemental Nutrition Assistance Program (SNAP) and food banks (Scarton, 2019). It can be extremely difficult to prepare healthy meals using items from a food bank (Brown, 2023). Current literature also provides evidence that education on food budgeting, diabetic meal planning for low-income individuals receiving SNAP, and commodities through food banks can improve the self-management of Diabetes Mellitus Type 2(DMT2) and improve mental health and wellness (Brown, 2023) through improving access to nutritious food through.

There is also evidence that links the lack of access to areas for physical movement activity in rural communities (Ross, 2015) to a sedentary lifestyle, which increases the likeliness of developing Diabetes Mellitus Type 2 (DMT2) (Zhang, 2020). Research also demonstrates improved access to areas to participate in physical movement activity can result in an increase in physical movement activity, reducing obesity, the leading cause of Diabetes Mellitus Type 2 (Umstattd Meyer, 2016).

Current evidence identifies that the lack of access to quality healthcare is a contributing factor to Diabetes Mellitus Type 2 (DMT2) (Lin, 2018). Research also supports improving access to quality healthcare through community health workers as a contributing factor to properly self-manage Diabetes Mellitus Type 2 (Feltner, 2017). Those individuals who receive education on diabetic foot care, exercise, and meal planning had improvements in HbA1C within a six-month period (Feltner, 2017).

For this project, original data collection was obtained through a paper needs-assessment survey to determine the unique needs, cultural, socioeconomic, and geographical barriers to health and wellness of individuals in rural communities. The assessment was administered to English speaking individuals with a minimum age of eighteen, previously diagnosed with Diabetes Mellitus Type 2 (DMT2) who were receiving occupational therapy (OT) services with Amedisys Home Health, an agency providing home health care to people living in rural areas. Information included on the survey included basic demographic information such as race, gender, age, and highest level of education, as well as nineteen additional questions to evaluate nutrition, lack of access to quality healthcare, lack of transportation, physical movement activity, lower socioeconomics, and the participants' perceived ability to manage DMT2.

Results of the original study revealed that there were no significant differences reported in perceived feelings about being well-informed about the DMT2 disease process and the race or gender of participants. Participants who do not limit fresh fruits and vegetables and who understand what a good diabetic meal is report feelings of being well informed of the disease process of Diabetes Mellitus Type 2. Those participants

who report adequate access to transportation to go to the grocery store and medical appointments report perceived feelings of being well informed of the disease process of DMT2. Likewise, those participants who answer having access to quality healthcare, access to areas to perform physical movement activity, and those who have higher educational levels report perceived feelings of being well informed of the disease process of Diabetes Mellitus Type 2. Conversely, the results from the survey also revealed that individuals felt less informed of the disease process of DMT2 when they were less educated, had limited access to transportation, had poor nutrition, less physical movement activity, and did not take their medication as prescribed.

Information obtained through literature review, responses from the needs assessment, and feedback from occupational therapy practitioners were combined to develop *Take Control of Your Diabetes* (TCOYD). TCOYD is a holistic approach to address the areas that result in poor self-management of Diabetes Mellitus Type 2 (DMT2). It is a community-based program consisting of learning modules to teach strategies to improve nutrition, physical movement activity, and medication management as recommended by the American Diabetes Association (ADA) (ADA, 2024). Future work to evaluate the program will include a pre-test to determine the baseline in knowledge prior to the program. The pre-test will include questions related to the availability of transportation and access to phone and internet services. A post-test will be administered to determine the increase in knowledge after completion of the program. Specifically, to evaluate the program effectiveness, the participants will be asked to buy

food, prepare meals with proper food portion control sizes, perform physical movement activity, and take medications as recommended by the ADA (ADA, 2024).

Take Control of Your Diabetes (TCOYD) is a culturally relevant program that goes beyond the foods that we eat, the activity we perform, and how to take medications. It provides specific instruction on both the barriers and strategies to eating good food, physical movement activity, and medication management. TCOYD, led by occupational therapists, helps individuals to develop sustainable healthy habits and routines and bring meaning and purpose to life (American Diabetes Association, 2024; Donnelly, 2023).

FACT SHEET

Take Control of Your Diabetes

Problem: Individuals With Diabetes Mellitus Type 2 Living in Rural Communities Possess Inherently Unique Contextual Factors That Hinder Disease Self-Management.

Diabetes Mellitus Type 2 (DMT2) is a significant burden on the United States economy and healthcare system. It was estimated that the total cost of diagnosed DMT2 in the United States (U.S.) in 2022 was $142.9 billion (Parker, 2023). Over 29 million individuals in the U.S. have DMT2 and over 86 million individuals in the U.S. have pre-diabetes (Towne, 2017). In rural communities, the prevalence of DMT2 is 17% higher than in urban communities (Lin, 2016). Research suggests individuals living in rural communities possess contextual factors that hinder chronic disease self-management (Feltner, 2022; Gordon, 2022; Towne, 2017; Ross, 2015).

Problem: A Gap in Research Exists in Addressing the Self-Management of Diabetes Mellitus Type 2 in Rural Communities.

While there is evidence on properly managing Diabetes Mellitus Type 2 (DMT2), there is a gap in research in this area regarding the contextual factors hindering individuals who live in rural communities from properly managing DMT2 (Crowley, 2022; Griesemer, 2022; Satterwhite, 2019). Contextual factors such lack of nutrition, access to areas of physical activity, quality health care, and access to transportation that contribute to higher prevalence rates need further examination to understand the impact on adults with DMT2 living in rural communities. (Feltner, 2017; Gordon, 2022, Towne, 2107; Ross, 2022).

Take Control of Your Diabetes.

Take Control of Your Diabetes is a community-based program to educate individuals in rural communities with poorly self-managed Diabetes Mellitus Type 2 (DMT2). The program was developed based on a needs-assessment, literature review, and feedback from occupational therapy practitioners and includes 4 learning modules:

1. Food Factors: How to read food labels, what foods to avoid, and portion control
2. Movement Matters: Establishment of exercise routines to increase weekly activity

3. Medication Matters: Establishment of good routines for medication management
4. Health Habits: Establishment of habits for healthier choices to follow primary care provider orders and lower HbA1C to healthy ranges as defined by the American Diabetes Association (ADA).

Purpose:

- Educate adults with Diabetes Mellitus Type 2 to identify barriers to shopping for American Diabetes Association (ADA) recommended foods and identify strategies to navigate barriers to shopping for American Diabetes Association(ADA) recommended foods
- Educate adults with Diabetes Mellitus Type 2 on meal portion control
- Educate adults with Diabetes Mellitus Type 2 to identify barriers to physical movement activity and identify strategies to navigate barriers to physical movement activity
- Educate adults with Diabetes Mellitus Type 2 on medication management
- Educate adults with Diabetes Mellitus Type 2 to lower HbA1C

Theoretical Framework & OT Implications:

The Health Belief Model (HBM) was used as a guide to develop the training modules:

- The individual's health related behavior depends on the individual's perception of (1) the severity of the potential illness, (2) the person's susceptibility to that illness, (3) the benefits of taking preventative actions, and (4) the barriers to taking the preventative action (CDC, n.d.).
- The model supports the self-management of chronic disease through consuming recommended foods with correct portion sizes, physical movement activity, and medication management (CDC, n.d.).

Potential Funding Sites:

- **Project Diabetes, The Allen Foundation, and Rural Health Care Services Outreach Program**

PROGRAM INFOGRAPHIC:
TAKE CONTROL OF YOUR DIABETES

Problem

Individuals in rural communities possess unique factors that result in poorly managed Diabetes Mellitus Type 2

Solution

Take Control of Your Diabetes is a community-based program based on original research including literature review, needs-assessment, and feedback from occupational therapy practitioners.

Issues Adressed

Barriers to and strategies to navigate the barriers to purchasing diabetic friendly foods, physical movement activity, food portion control sizes, and medication management.

Population

Individuals greater than eighteen years old who live in a rural community and have previously diagnosed, poorly managed Diabetes Mellitus Type 2.

Funding

Potential funding sources include **Project Diabetes**, **The Allen Foundation**, and **Rural Health Care Services Outreach Program.**

Access

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Curriculum Vitae

EDUCATION

Clinical Doctorate of Occupational Therapy (OTD), December 2024 – Temple University, Philadelphia, Pennsylvania
Capstone: An Assessment of the Unique Contextual Factors of Individuals with Diabetes Mellitus Type 2 Living in Rural Communities

Master of Science in Occupational Therapy, December 2014 – Milligan University, Johnson City, Tennessee

Thesis: The Interaction of Burnout, Demographic Factors, and Leadership Among Rehabilitation Professionals

PROFESSIONAL EXPERIENCE

Amedisys Home Health, Mountain City, Tennessee
Occupational Therapist (2015-Present)

- Coordinated interventions with multidisciplinary treatment team
- Established compassionate and caring relationships with clients
- Performed evaluations and assessments to recommend the best and most meaningful treatment for individual clients
- Performed assessments during treatment to determine progress according to goals
- Customized treatment plans to meet individuals needs and abilities
- Provided home modification recommendations
- Provided direct supervision of two COTAs
- Advocated rights of clients

East Tennessee Helicopters, Inc Butler, Tennessee
President of 135 Charter (2004-Present)

- Trained and developed new hires to drive efficient performance by teaching and emphasizing key skills, procedures, and performance optimization strategies from day one.

- Conducted departure and arrival briefings

Dr. George Cunningham, Mountain City, Tennessee
Optical Manager (1988-1996)

- Boosted team engagement and workplace satisfaction using managerial and motivational skills
- Explained prescriptions, optical terminology, and products to customers
- Enforced HR policies and procedures to continually meet customer expectations and promote store productivity
- Checked finished eyewear to maintain optical standards, customer requirements, and special requests

PRESENTATIONS

Arthritis Educational Workshops (2014 – 2015)

- Provided educational workshops on arthritis prevention through local senior centers

Fall Risk Prevention Workshops (2015 to 2020)

- Provided educational workshops on fall risk prevention through local senior centers

Scope of OT Lectures (2020)

- Provided lectures to multidisciplinary clinicians with Amedisys Home Health on scope of OT

AOTA Poster Presentation (April 2025)

- Transform Your Town: Empowering OT in Rural Areas Using Leadership Principles

Diabetes Mellitus Type 2 Lectures (November 2024)

- Provided lectures to multidisciplinary clinicians with Amedisys Home Health on role of OT in managing DMT2

Diabetes Mellitus Type 2 Workshop- Upcoming (January 2025)

- Community workshop on healthy routines and habits to self-manage DMT2

MEMBERSHIPS / AFFILIATIONS

American Occupational Therapy Association