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Expectations of Aging and Goals as Motivation for Type 2 Diabetes Self-Management in Individuals with Early Diagnosis

Lisa M. Blohm
University of Wisconsin-Milwaukee

EXPECTATIONS OF AGING AND GOALS AS MOTIVATION FOR TYPE 2 DIABETES SELF- MANAGEMENT IN INDIVIDUALS WITH EARLY DIAGNOSIS

by

Lisa M Blohm

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ABSTRACT

EXPECTATIONS OF AGING AND GOALS AS MOTIVATION
FOR TYPE 2 DIABETES SELF- MANAGEMENT IN INDIVIDUALS
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Lisa M Blohm

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Under the Supervision of Professor Rachel Schiffman, PhD, RN, FAAN

Type 2 diabetes continues to plague the United States as a major cause of disability, mortality, and healthcare cost. Engagement in self-management before complications develop is the goal for individuals in early stages of the disease. Those newly diagnosed often do not engage in health behaviors to improve their prognosis. Reasons for their lack of engagement vary widely. The purpose of this study was to understand relationships between aging expectations, personal goal setting, perceived quality of life, and self-efficacy on motivation to engage in type 2 diabetes self-management. Social Cognitive Theory provided the framework. Using a cross-sectional design, 99 newly diagnosed individuals age 50 years and older participated. Regression analysis was used to determine the strength and direction of the relationships between the variables. Quality of life, goal setting, and self-efficacy were all significant predictors of motivation. Expectations of aging did not predict motivation for engagement. Both goal setting and outcome expectation were mediators of diabetes self-efficacy and motivation to engage in self-management behaviors. Quality of life and expectations of aging were not significant mediators of self-efficacy and motivation to engage in self-management through goal setting. Goal setting is a crucial consideration when planning interventions to motivate individuals to

engage in diabetes self-management. Assisting individuals to set personal goals should be encouraged as part of diabetes self-management education and support. To provide individualized support, perceived quality of life should also be assessed as a contributing factor of motivation for self-management behaviors in early diagnosis.

This is for my husband Steve

and his patience with my pursuits;

our children Ben, Maggie & Erin,

and our newest motivation to maintain health as we age,

William Bennett.

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Chapter 1

Statement of Problem

Despite increased awareness of the risk factors for developing type 2 diabetes (T2D) and the importance of a healthy diet, healthy weight and physical activity to prevent or delay its onset, the number of individuals being diagnosed with T2D in the U.S. is not declining (Centers for Disease Control and Prevention [CDC], 2017b). Estimates from the most recent National Diabetes Statistics Report show an increase in the number of individuals diagnosed with T2D from previous data (CDC, 2017b). Preventive measures have not been successful in reducing this alarming trend. As the U.S. population ages, T2D prevalence is projected to increase to 33% of adults by 2050 (Caspersen, Thomas, Boseman, Beckles, & Albright, 2012). This national health problem is costly, both financially and in quality of life affected by health complications. Since most of an individual's health related decisions and behaviors occur outside of the healthcare system, self-management is a crucial aspect of successful treatment (Beck et al., 2017). Poor management of T2D can result in increased healthcare utilization, increased incidence of hospitalization, increased morbidity and greater prevalence of chronic complications including retinopathy, nephropathy and peripheral neuropathy and more importantly cardiovascular disease and premature death (American Diabetes Association, 2018).

Medical care accounts for less than 20% of modifiable healthy population outcomes, with the larger percentages being attributed to socioeconomic and environmental factors, as well as health-related behaviors (Magnan, 2017). Self-management of chronic disease is a crucial component of health behavior; individuals make decisions and take actions daily that affect their health. Although some individuals are motivated to actively engage in self-management, others

experience many barriers to changing health behaviors. Further understanding of the motivation and barriers of engagement in self-management of T2D enhances the ability to provide more effective recommendations about individualized self-management support. This study focused on these motivations and barriers of T2D self-management.

Health is not solely based on interventions that are provided by medical professionals. The environments where individuals live and the personal choices they make daily have a great influence on their health (World Health Organization [WHO], 2016). Lifestyle-based decisions influence personal health quality and are affected by many social and economic factors. Recommendations for improved management of T2D are easily accessible (American Diabetes Association, 2018); however, individuals diagnosed with T2D do not readily aim to follow these recommendations. Individual perception of the disease influences the willingness to accept the diagnosis and to engage in its management. Providing education and information alone has been insufficient in motivating affected individuals to maintain healthy habits and avoid complications of T2D (Rutten et al., 2014).

There are many reasons that individuals do not engage in self-managing their T2D. Although some factors are socioeconomic such as poor access to healthy food or lack of safe areas for exercise, other reasons are related to the individual's goals, support system and self-efficacy (Wilkinson, Whitehead, & Ritchie, 2014). The perception of how behaviors will influence health and impact quality of life is also crucial to consider. Some individuals are autonomously motivated, where they view their behavior as "for themselves, not someone else". Controlled motivation is conversely described as "doing exercise because they tell me I have to" (Stewart et al., 2014). Psychological factors such as depression and anxiety affect motivation to self-manage chronic disease (Breaux-Shropshire, Whitt, Griffin, Shropshire, & Calhoun, 2014). The presence

of complications can also influence motivation to maintain behaviors that manage health (van Puffelen, Heijmans, Rijken, Rutten, Nijpels, & Schellveis, 2015). Individuals may be more likely to engage in certain health behaviors when they experience diabetes-related complications or symptoms than when they are experiencing no complications.

Since individuals with newly diagnosed T2D may underestimate the potential impact of their diagnosis and avoid self-management behaviors in the absence of complications, this is a crucial time to engage them in self-management. By maintaining tight glycemic control early during T2D, the risk of long term micro- and macrovascular complications is decreased (Kellow, Savige, & Kahihl, 2011). A reduction of 1% in HgA1C is associated with a 21% risk reduction of diabetes complications. Often, microvascular complications develop early in the course of T2D, even before diagnosis of the disease. Pathologic changes occur with long term hyperglycemia that increase the potential for irreversible vascular complications that can persist even after glucose control is improved (Kellow et al., 2011). This current study of adults with recent onset of T2D who were diagnosed within a two-year time frame focused on individuals who have been diagnosed but who have not yet been influenced by complications that are associated with longer disease duration.

Although there have been successful interventions to improve engagement in T2D self-management, to help individuals develop autonomous motivation for sustained health behavior changes, their own individual strengths and skills must be considered (Meunier et al., 2016). Many questions remain about the most effective, cost-efficient ways to promote self-management and to enhance autonomous motivation (Coppola, Sasso, Bagnasco, Giustina, & Gazzaruso, 2016; Rossi et al., 2015; Teljeur et al., 2017; Vendetti, 2016). Individual goals also affect health related outcomes of function and symptoms or psychosocial aspects of the disease

(Klinker, Yaeger, Brenny- Fitzpatrick, & Vorderstrasse, 2017). The goals that a provider has for patients can be very different than those the patients have for themselves (Nagl & Farin, 2012). This lack of congruence may cause ambiguity and a sense that the provider does not understand the individual's situation leading to poor self-management.

The implications of having diabetes can affect the quality of life for the individuals and their families (Zhu, Fish, Li, Lui, & Lou, 2016). Although the perception of health and quality of life vary greatly, these are essential considerations in promoting self-management. Aging can be another factor of influence. Individuals' perception of age and the expectations that they have about aging and health affect engagement in self-management. Increased age can mean decreased confidence and conviction, depending on individual expectations (Bouchard et al., 2012). Older adults with low expectations of health related to aging are more likely to avoid seeking medical care for symptoms that they attribute to aging such as pain, fatigue and forgetfulness. These individuals are also more likely to disengage from healthy behaviors over time (Meisner & Baker, 2013). Many factors can impact personal and social motivation to engage in T2D self-management. Determining the factors that motivate an individual is a crucial aspect of self-management education and support (Jung, Lee, Kim & Jung, 2015). There is still much to be learned about how to best support and motivate individuals with T2D to effectively self-manage their condition. Study of individuals age 50 and older allows for focus on the prevalent population of those newly diagnosed (CDC, 2017b). Previous study of aging expectations among adults found that various age groups have significantly different expectations for old age. The youngest respondents had the most negative expectations of aging (Brouwer & van Exel, 2005). Using age 50 years as a starting point in the study provided additional understanding of aging expectations of individuals beyond young adulthood.

Prevalence of T2D

Over 30 million people in the U.S. have diabetes. The data provided by the CDC (2017b), show that this number comprises over 12% of adults in the U.S. over age 18. A total of both type 1 and type 2 diabetes diagnoses are estimated to include 17% of all U.S. individuals 45 to 64 years of age. These data are based on fasting glucose or hemoglobin A1C levels. The prevalence of diabetes for U.S. adults over 65 years of age is determined to be greater than 25%. The data do not differentiate between type 1 and type 2 diabetes, however; 90 to 95% of diabetes diagnoses are accounted for by T2D (CDC, 2017b). The estimated number of individuals in the U.S. age 45-64 who have prediabetes is estimated at greater than 40%. Even more staggering is the estimated number of individuals over 65 years with prediabetes with greater than 48% of this population being affected.

Estimates of individuals with prediabetes in the U.S. include over 36% of males and 31% of females. Overall, diabetes prevalence is higher among American Indians/Alaska Natives (15.1%), non-Hispanic blacks (12.7%), and people of Hispanic ethnicity (12.1%) than among non-Hispanic whites (7.4%) and Asians (8.0%). Knowledge of the genetics of T2D has grown within the past few years. Genetic predisposition has been demonstrated in children who were exposed intrauterine to maternal diabetes (Dabelea, 2007). Genetic studies have shown that T2D can be predicted among various ages and ethnicities based on specific genome association (Hivert, Vassy, & Miegs, 2014). Thus, it is known that particular individuals have a greater likelihood of developing the disease dependent upon these non-modifiable factors. An interventional study providing counseling to individuals with greater potential for developing T2D did not find these individuals to be more willing to make healthy lifestyle changes based on this knowledge (Hivert et al., 2014). There has been research focusing on ethnic populations

known to have a higher risk for the development of T2D. Cutrona et al. (2015) found that chronic stress, most often caused by financial instability and racism led to increased inflammatory levels and higher HgA1C levels in African American women. Thus, situational stress is a factor that increases the risk of T2D in some ethnic groups with a higher risk for developing the disease.

The prevalence of T2D varies significantly by education level; over 12% of adults with less than a high school education had diagnosed diabetes versus 9.5% of those with a high school education and 7.2% of those with more than a high school education. Education level is a socioeconomic status indicator which can affect health (CDC, 2017b). Although there are multiple reasons for this relationship, education contributes to the development of skills and traits needed for cognitive and problem-solving skills. Education also provides individuals with increased ability to navigate systems and to find tools to help them to meet their healthcare needs through improved health literacy. These skills may mediate the relationship between education and health (Zimmerman, Woolf, & Haley, 2014). The economic and social resources available to individuals with higher levels of education also impact health outcomes.

The prevalence of T2D in Wisconsin is similar to the national data. The recently available data indicate the number of Wisconsin adults diagnosed with diabetes is over 9%; however, data also indicate that 28% of Wisconsin adults have diabetes and are unaware of their diagnosis. The estimate for adults in Wisconsin with prediabetes is 34% (Wisconsin Department of Health Services, 2018).

Cost Significance

The staggering statistics about the prevalence of diabetes imply that the U.S. population will continue to experience the complications of T2D and the inherent economic and quality of life

costs for years to come. The most recent expense data from the CDC report (2017b) estimated costs for diabetes care in the U.S. in 2012 at $245 billion. These include both the direct cost of healthcare and indirect costs because of loss of work income and productivity. Direct healthcare cost includes inpatient hospital care (43% of the total medical cost), prescription medications to treat the complications of diabetes (18%), diabetic medications and supplies (12%), physician office visits (9%), and nursing/residential facility stays (8%) (American Diabetes Association, 2012). This cost in Wisconsin alone was estimated to be 4.1 billion in 2017 (American Diabetes Association-Wisconsin, 2017).

Direct cost. For individuals diagnosed with either type 1 or type 2 diabetes, their average medical expenditures were $13,700 per year. About $7,900 of this amount was explicitly linked to diabetes. Average medical expenses among those diagnosed with diabetes were about 2.3 times higher than expenditures for those without diabetes (CDC, 2017b). Individuals with T2D are much more likely to have comorbidities of chronic conditions including cardiovascular and kidney disease. The economic burden of chronic disease in the U.S. continues in growth annually. The CDC (2017a) notes that currently 86% of our national healthcare expenses are spent on chronic conditions and the related complications. Striving to determine how to best motivate individuals to self-manage their T2D is a crucial step in alleviating this crisis and providing for a healthier future for the nation overall. There is a finite amount of financial resources available for healthcare, allowing for decreased expense related to chronic illness will provide increased opportunity for other health- related preventive efforts that are so needed.

Indirect cost. Beyond financial implications, quality of life is often affected in individuals with T2D related to perceived limitations of having diabetes and the experience of health complications. Individuals with diabetes experienced an improved quality of life after

involvement in interventions designed to improve their T2D self-management behaviors (Cochran & Conn, 2008). Although the relationship between depression and quality of life has been closely studied, the prevalence of distress in individuals with T2D is noted to be higher than in individuals with depression (Zhu et al., 2016). The inability to self-manage T2D and anxieties that accompany feelings of inadequate management can potentially lead to diabetes distress. Increased distress is associated with poorer quality of life (Carper et al., 2014). Individuals may experience distress related to complex daily maintenance and self-management behaviors required due to their diagnosis. Poor self-management of T2D can lead to illness resulting in loss of work or leisure time. The most recent data provide that among newly diagnosed individuals with T2D aged 18 to 64 years in the U.S. with private insurance coverage, the participation rate in some form of T2D self-management education and support during the first year after diagnosis was only 6.8% (Li et al., 2014).

Gaining greater understanding of individuals' motivations for T2D self-management will then likely provide a better idea of how to best support them in their self-management efforts and thus improve the quality of life for those affected. By determining how perceived quality of life, goals, and expectations of aging affect self-management in T2D, appropriate plans for support can be individually tailored to enhance motivation for engagement. The current study sought to provide greater understanding about motivation to engage in T2D self-management early after diagnosis to work toward decreasing this national health problem.

Purpose of the Study

The purpose of the current study was to further understand the relationships between expectations of aging, goals, perceived quality of life, and self-efficacy on motivation to engage

in T2D self-management. Self-management is a crucial component of living with T2D. Adapting and maintaining healthy behaviors allows for optimal glycemic control of T2D, which helps to minimize the long-term complications associated with the disease. Type 2 diabetes self-management decreases the financial burden of chronic disease and improves the overall quality of life for those individuals affected (Al Khawaldeh, Al Hassan, & Froelicher, 2012). Knowledge and self-efficacy are important factors necessary for individuals to actively engage in the self-management of their T2D. Several studies have demonstrated a strong association between self-efficacy and diabetes self-management behaviors (Luo et al., 2015). Education can improve self-efficacy, but additional motivation is generally needed for individuals to decide to make changes in their behaviors as self-management requires (Bandura, 2004). The current study provided other data to better understand factors as they relate to individuals' motivation to engage in self-management of T2D.

Individuals' perceived quality of life can affect their health behaviors as well as the goals they set in relation to health management. Improved knowledge alone has not demonstrated an improvement in the quality of life of affected individuals (Kueh, Morris, & Ismail, 2017). The current study explored the relationship between perceived quality of life and motivation to engage in T2D self-management. Goal setting is considered a foundation of effective self-management programs; it is generally used to encourage self-efficacy (Funnell, 2009). Goals set within the healthcare environment for individuals with T2D are often related to glycemic control rather than behaviors; this may affect self-management engagement (Klinkner et al., 2017).

T2D self-management requires that individuals are active participants in their healthcare treatment. They must engage in the physical, social, emotional, and lifestyle changes to decrease the burden of the disease and maintain their quality of life. Although patients may not always

comply with the medical treatments recommended by their healthcare providers, their reasons for being unable or unwilling to participate actively in self-management are not often identified (Franklin, Lewis, Willis, Bourke-Taylor, & Smith, 2017). For healthcare professionals to provide appropriate self-management support, a patient-centered collaborative approach is essential. The individuals' needs and preferences should be considered to enhance the success of their self-management. Although healthcare providers may be medical experts on the condition of T2D, the patients are the experts on living with their disease. The traditional model where the healthcare provider relays information and expects this to elicit behavior change is still prevalent (Franklin et al., 2017). The current study examined how individuals' life and health goals related to their motivation to engage in self-management.

Aging expectations also impact health behavior. When individuals have little expectation of healthy aging, their participation in health promoting behaviors may prove unsuccessful (Kim, 2009). Increasing age is associated with decreased expectations of behavior changes and this can affect readiness to make lifestyle changes (Bouchard et al., 2012). Successful aging as defined by Rowe and Khan (1997) includes three aspects: 1) low probability of disease and disability related to disease, 2) high cognitive and physical functional capacity, and 3) active engagement in life. More than just the absence of disease and ability for functional capacity, it is these aspects and their influence on active engagement in life that best define successful aging. Research has repeatedly demonstrated that older individuals often wrongly attribute their symptoms to the natural aging process. Their attention has been misdirected in thinking that normal aging was the rationale for some environmental or disease factors which often leads to poor outcomes (Sarkisian, Hays, Berry, & Mangione, 2002). Individuals viewing the aging process as the reason for their ills are also less likely to engage in health promoting behaviors and preventive care.

The current study analyzed whether expectations of aging either facilitate or act as an impediment to motivation to engage in self-management of T2D.

The national recommendations for diabetes self-management education and support for all individuals with diabetes encourage that the specific needs of the individual be considered. Regardless of the stage of their diabetes diagnosis, individuals each have different needs and varying priorities. Appropriate self-management education and support must consider each individual and allow their values to influence the design of their person-centered care plan (Beck et al., 2017). The current study attempted to provide a better understanding of the relationships between one's expectations of aging, goals, perceived quality of life, and self-efficacy to determine how these affect motivation to engage in T2D self-management.

Significance to Nursing

Providing health promotion and support is a vital role of the nursing profession. Several of the factors that contribute to the high incidence of T2D are modifiable lifestyle factors that serve as the target for the prevention and management of T2D. In working toward the goal for a healthier nation, nurses play an essential role in providing support and education for T2D self-management. They have access to and influence on patients experiencing the implications of T2D in acute inpatient, emergency, community, and preventive care settings. Nurses can perform holistic assessments, make appropriate recommendations and provide education about healthy dietary intake, physical activity, and appropriate follow-up. They can also work with affected individuals in establishing positive attitudes and motivating individuals with T2D to self-manage.

Nurses provide health services intended to promote health and to assist patients to live to their fullest capacity in a broad scope of practice. Working with a primary care provider in a clinic setting provides an opportunity for the nurse to assess how the patient is coping with their diagnosis, their knowledge of the disease and appropriate lifestyle interventions, and their experience with self-management. Nurses working in acute care hospital settings can provide guidance about how to manage T2D to prevent readmission and advice about how to engage in a self-management routine. They also provide support in times of crisis. Diabetes nurse educators provide diabetes self-management education in both inpatient and outpatient settings. They provide interactive and collaborative education by assessing individual education needs, identifying their diabetes self-management goals, helping them to achieve their goals through behaviors, and evaluating the attainment of goals and effectiveness of the plan. Advanced practice nurse practitioners provide patient care as a primary care provider. They counsel patients about their T2D, monitor the patient's condition and their response to the prescribed treatment, and provide recommendations for self-management education programs.

National recommendations have been made to improve healthcare, including a shift toward offering individuals the opportunity to identify their needs and to work collaboratively with the healthcare team to establish care that is relevant to their situation (Sickora & Chase, 2013). The national standards for diabetes self-management education and support include that the plan of care be overseen by individuals with training specific to meet the needs of those with diabetes. Nurses, along with registered dieticians and pharmacists, are well equipped to plan, lead, and manage diabetes self-management programs (Beck et al., 2017).

Research has demonstrated the ability of nurses to guide individuals toward improved health outcomes, including reduced HgA1C through T2D self-management education and support

(Tshiananga et al., 2012). A variety of nurse-led T2D self-management programs including the Diabetes Education and Self-management for Ongoing and Newly Diagnosed (DESMOND) and Rethink Organization to Improve Education and Outcomes (ROMEO), have demonstrated limited success in assisting patients to improve health outcomes in various populations of individuals with T2D (Tshignanga et al., 2012).

Individuals with T2D should engage in self-management education and support throughout various stages after their diagnosis. No matter their stage, individuals have their own needs and priorities. By focusing on their values, there is greater potential for success (Beck et al., 2017). Additional understanding of the motivations of individuals engaging in T2D self-management will enhance the overall effectiveness of diabetes self-management education and support. The expansion of nursing knowledge in this area will provide the greatest opportunity to improve health outcomes for all affected individuals. Tackling this national health problem is no small task. Advancing self-management science is an essential step in assisting individuals with T2D to live better and to decrease their potential for complications. It is also an important step in attempting to contain healthcare costs in the U.S. and to begin to manage the current T2D epidemic better.

Theoretical Framework

Bandura's Social Cognitive Theory has been the framework used in many studies related to behavior change and self-management (Zhao, Suhonen, Koskinen, & Leino-Kilpi, 2016). Although several theories include the concept of self-efficacy as a central tenet, Social Cognitive Theory provides a core set of concepts, the mechanism through which they operate, and the ideal means to turn knowledge into effective health behaviors (Bandura, 2004). The core concepts include: knowledge of health including both the risks and benefits of various associated health

behaviors; perceived self-efficacy to control their health behaviors; outcome expectations about the perceived costs and benefits of performing health behaviors; goals that individuals set and their plans to reach those goals; and the perceived facilitators and socio-structural impediments to the behavior changes they intend to make (Bandura, 2004).

To desire change, individuals must understand both the health risks and benefits of their health behaviors. If there is no understanding as to how their behaviors and decisions affect their health, there is little motivation to make any changes (Bandura, 2004). Knowledge is a precondition of behavior change. Education and knowledge alone are not adequate to promote behavior change. Most individuals with T2D are aware that lifestyle modifications are essential in maintaining their health, but this awareness has not directly influenced the majority of them to change their behaviors dramatically or to regularly engage in self-management behaviors (Wu, Tung, Liang, Lee, & Yu, 2014). Additional motivation is necessary for most people to overcome the barriers of adapting to and maintaining healthy self-management behaviors.

Self-efficacy belief is central to behavior change. This concept is the foundation of human motivation and action (Bandura, 2004). If individuals do not believe they can effect change by following specific actions, they will generally not able to persevere when faced with problems. Although many factors provide motivation for individuals to persevere with their plan when difficulties arise, they are all affected by the belief that an individual has confidence in their power to exert change through their actions.

The expected outcomes that individuals anticipate their actions will produce also affect engagement in self-management behaviors. These outcomes include not only the benefits that they expect from the behavior, but also the perceived loss of what could occur due to their

actions. Behaviors that enhance their feelings of accomplishment and self-satisfaction will generally be repeated; those that cause negative feelings of dissatisfaction will be avoided. The influences of one's social circle also affect behavior. If specific behaviors cause perceived negative social reactions, the individual will be less likely to continue the behavior (Bandura, 2004).

Individual values influence personal goals and often guide behavior when setting a course to meet these goals. These influences, along with many other factors, can either enhance behavior or act as an obstacle. The individuals' perception of health status, quality of life affects their motivation. Their expectations of aging might either facilitate their motivation to engage in self-management or serve as an impediment to successful behavior change (Bandura, 2004).

Much study has been done about self-efficacy and its influence on self-management. It is the most studied construct of factors affecting self-management in T2D (Gonzalez, Tanenbaum, & Commissariat, 2016). There is a gap identified in understanding self-efficacy and the context within which it occurs. It exerts a strong influence on self-management behaviors and is significantly associated with positive behavior and health outcomes (Badedi et al., 2016; Cheng, Sit, Leung, & Li, 2016). Individuals with higher self-efficacy levels tend to set higher goals and have greater commitment to reaching their goals (Bandura, 2004). However, explicitly determining how to improve self-efficacy, other than through education, has not been adequately addressed. Better understanding allows healthcare providers to offer more individualized support for self-management for individuals with T2D.

Social Cognitive Theory and Motivation

Although many theoretical frameworks provide a psychosocial aspect of health behavior change, Bandura (2004) notes that many factors in the models are often variations of outcome

expectations. Various models have proven an ability to predict health behavior; Social Cognitive Theory provides guiding principles about enabling, guiding, and motivating individuals to adopt and maintain habits that promote better health.

Successful use of Social Cognitive Theory has been demonstrated in various chronic disease self-management programs. The importance of self-efficacy and the theory is noted with regard to the successful implementation of the Chronic Disease Self-Management Model (Gilkey & Garcia, 2010). Having knowledge of the disease has been established as a precondition of behavior change. Self-efficacy is also known to play a central role. Although these concepts within the theory are more soundly established, factors that affect self- efficacy and motivation to engage in self-management are not as evident. The current study intended to further develop an understanding of the relationships between perceived quality of life, goals, and expectations of aging as potential impediments or facilitators of motivation to engage in T2D self-management.

Social Cognitive Theory Applied to Current Study

Social Cognitive Theory was used to guide further understanding of the problem using established principles of the framework. Based on the theory, to manage the treatment regimen individuals with T2D must have knowledge as a precondition for change. This knowledge includes an understanding of the health risks of T2D as well as the benefits of appropriately managing the disease. Knowledge is foundational as a means of motivation to engage in behavior change (Bandura, 2004). Individuals must first understand that certain behaviors can be harmful before they position themselves to change behavior. As a precondition, knowledge of the situation creates an incentive for change. Individuals who have been diagnosed with T2D receive information from their healthcare provider about how to manage their condition. The

American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics have provided their position that all individuals diagnosed with T2D be provided with education and support to self-manage (Powers et al., 2015). The primary care provider often provides the initial support at the time of diagnosis. It is an assumption then that the individuals in the current study received the requisite T2D education at the time of diagnosis. Thus, basic knowledge was an antecedent to diabetes self-efficacy and goal setting in the present study.

Self-efficacy affects health habits both directly and indirectly by its impact on outcome expectations, goals, and the perception of socio- structural factors as either facilitators or impediments to health behaviors (Bandura, 2004). Diabetes self-efficacy was measured as well as the perceived quality of life as an outcome expectation. Individuals' expectations of aging were examined as a facilitator or impediment to meeting goals that cause behavior change. These personal expectations were anticipated to either facilitate motivation for self-management or act as a barrier or impediment to their motivation to engage in self-management behaviors. Each of the concepts can directly impact T2D self-management behavior; the current study focused on the named concepts to determine their relationship to motivation for engagement in self-management behaviors.

Conceptual Definitions

The concepts of interest in the study are defined in relation to the Social Cognitive Theory framework and the paths of influence between its concepts (Bandura, 2004).

Self-efficacy

Self-efficacy refers to the individuals' belief in their ability to execute the behaviors that are necessary to produce specific outcomes. It implies confidence in their ability to exert control

over their behavior, social environment, and motivation. Self-efficacy influences the entire lived human experience affecting the goals that are set, the energy spent achieving these goals, and the potential for achieving levels of behavior performance (Bandura, 1977). It is generally measured by asking questions of individuals about their perception of their ability to accomplish or persevere to accomplish a goal and maintain it (Lorig & Holman, 2003). In the current study, this concept was measured in relation to diabetes self-efficacy. The current study defined the concept as the confidence of individuals to make decisions about daily living such as diet, symptom management, and physical activity. It included confidence in the ability to follow through with these decisions to effectively manage T2D.

Outcome Expectations

Outcome expectations are the anticipated outcomes expected as a result of performing some specific action (Bandura, 2004). These outcome expectations can be physical, social, or self-evaluative. Physical outcomes include the benefits or losses associated with performing behaviors. Social outcomes are the reactions received in response to a behavior; there may be approval or disapproval from others. Self-evaluative outcomes are positive and negative reactions to individual actions and health status. These self-evaluations regulate behavior as individuals pursue things that provide satisfaction and self-worth; they avoid behaviors that generate dissatisfaction (Bandura, 2004). As outcome expectations are broadly varied in scope, they are more specifically discussed in this study as the perceived quality of life. Outcome expectations refer to individuals perceived physical, social, and self-evaluative effects of their health behaviors. This includes their perception of quality of life, their wellbeing, and their prevailing attitude about how their T2D self-management impacts their satisfaction with health,

happiness, and relationships. The current study conceptually defined outcome expectation as the overall satisfaction of living as an individual newly diagnosed with T2D.

Goal Setting

Individuals have personal goals that provide self-incentives and guide their health habits. Long term goals help to set the course for behavior change. Many competing influences experienced by the individual can impede the ability to meet distal goals and may interfere with making positive behavior changes (Bandura, 2004). Short term goals are often more attainable and can help individuals to succeed by guiding how to make appropriate behavior changes for their current situation. Based on the premise that goals motivate action, goal setting is an integral part of T2D self-management support. It is an active process of determining what the individual anticipates achieving and how this outcome can be reached (Franklin et al., 2017). There is often a disconnect between the individual goals of people and those of healthcare professionals. Those with chronic conditions such as T2D tend to focus goals on living a normal life with the illness, whereas healthcare providers generally focus on clinical outcomes such as HgA1C (Franklin et al., 2017). The current study defined goal setting as the personal identification of goals pertaining to life overall and those related to T2D self-management behaviors. Goal setting also included the individuals' self-assessment of the importance of meeting their own goals, or those of their family, friends, and healthcare providers.

Socio-structural Facilitators and Impediments

Social and structural elements that individuals view as assisting them to achieve their goals are perceived facilitators (Bandura, 2004). These facilitators will vary between individuals and situations. Impediments are things that make progress difficult or impossible; they are barriers that impair meeting goals or moving forward. As individuals age, their perception of health and

what they might consider “normal” aging can affect their health behaviors and self-management practices. Those who anticipate illness and consider it a normal part of aging have lower expectations of their health and may be less willing to engage in health behavior changes (Kim, 2009). Other individuals who expect to maintain health along with high levels of activity may be positively influenced by these expectations. In the current study, the concept of aging and the expectations associated with the aging process are socio-structural factors that were considered potential facilitators or impediments to motivation to engage in T2D self-management.

Motivation to Engage in Self-Management Behaviors

Motivation and willingness to participate in the management of T2D affects the potential for reaching goals and maintaining health. Engaging in self-management activities is an essential outcome of the motivation to act. Self-management is defined as the tasks that individuals undertake to live with their chronic conditions (Lorig, Ritter, Laurent, & Plant, 2006). Based on the Chronic Care Model, the tasks of self-management include medical management of the condition, maintenance of life roles, and the management of negative emotions like depression that are often associated with chronic conditions (Lorig et al., 2006). The Chronic Care Model explicates the importance of self-management support as an aspect of chronic disease management. Successful self-management requires knowledge, problem- solving skills, and the confidence or self-efficacy to self-manage (Lorig et al., 2006). Chronic disease encompasses aspects of illness and wellness for those affected; self-management focuses on wellness and the behaviors that promote and support it (Lorig & Holman, 2003).

Activation, the act of starting, is measured by the state of participation in one’s health (Insignia, 2018). Activation encompasses many elements of self-management, including knowledge, skills, beliefs, and behaviors that are necessary for managing chronic illness (Moore

et al., 2016). Moving through phases of engagement from passive behavior to awareness to acting and finally to living with adaptive behaviors to manage chronic disease describes various levels of activation that individuals experience as they become motivated to engage in their own self-management (Hibbard, Stockard, Mahoney, & Tusler, 2004). For the current study, motivation was defined as personal desire and willingness to engage in T2D self-management activities. This motivation for engagement is comprised of skills, knowledge, and beliefs individuals possess regarding their T2D and their likelihood for participation in self-management behaviors. A concept map demonstrating how Social Cognitive Theory informed the study using the defined concepts as they influence motivation for engagement in T2D self-management is found in Figure 1. The pathways are labeled using the research question each identifies.

Research Questions

To further understanding of the relationships between expectations of aging, outcome expectations and goal setting as motivation to engage in T2D self-management for individuals age 50 and older with a diagnosis of 2 years or less, the following research questions were posed: The main research question:

Which of the following factors of Social Cognitive Theory (self-efficacy, outcome expectations [quality of life], goals, facilitator/barrier [aging expectations]) are the strongest predictors of motivation to engage in self-management behaviors for individuals with early diagnosis of T2D? To inform the main research question, the following research questions were specifically addressed based on the relationships identified in Figure 1:

1. What is the direct relationship between self-efficacy and motivation to engage in self-management behaviors for individuals with early diagnosis of T2D?

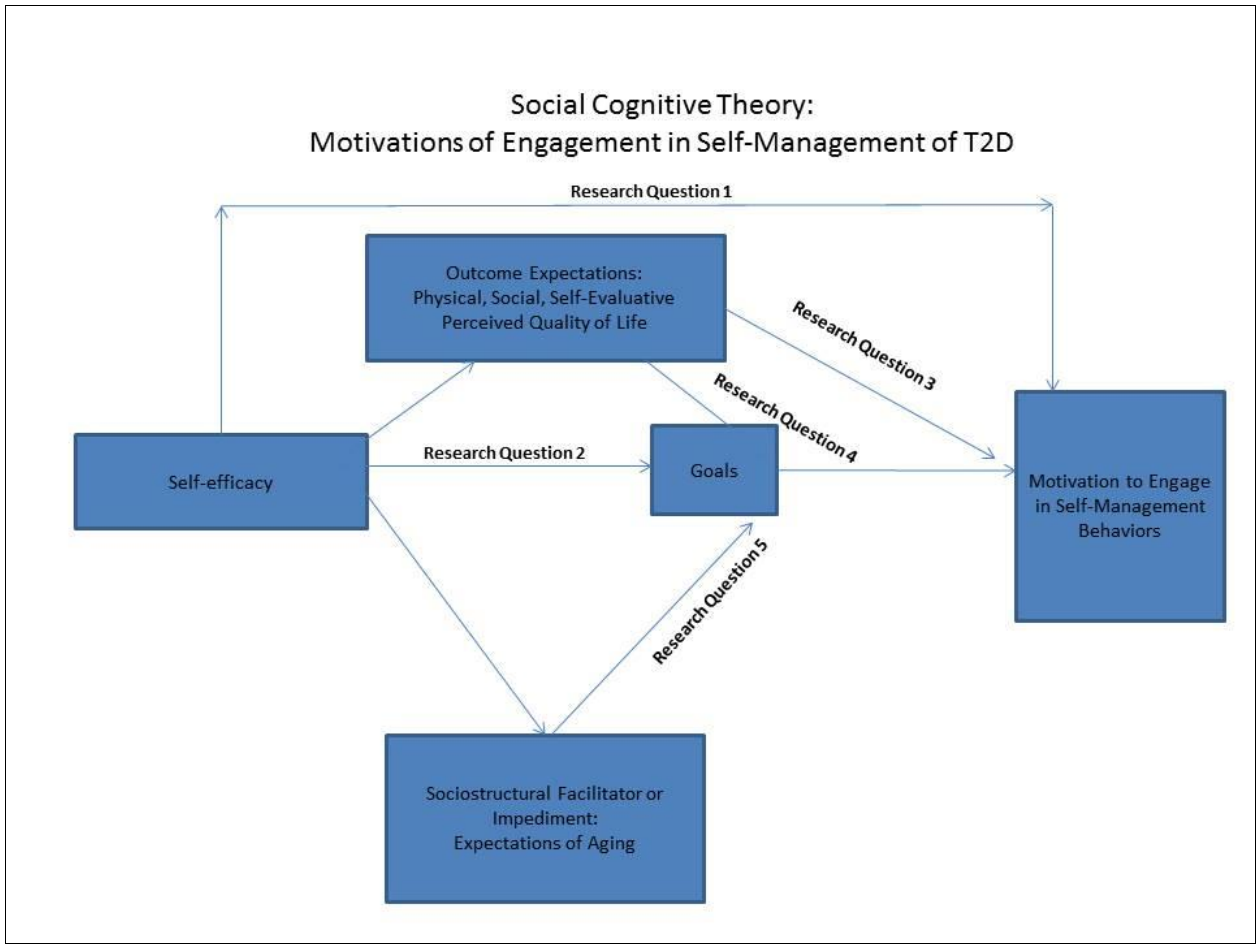

Figure 1. Social Cognitive Theory provides the framework for concepts of the study.

2. Is the indirect relationship between self-efficacy and motivation for engagement in self-management behaviors mediated by goal setting of individuals with early diagnosis of T2D?

3. Is the indirect relationship between self-efficacy and motivation for engagement in self-management behaviors mediated by outcome expectations (quality of life) for individuals with early diagnosis of T2D?

4. Is the indirect relationship between self-efficacy and motivation for engagement in self-management behaviors mediated by outcome expectations (quality of life) through goal setting for individuals with early diagnosis of T2D?

5. Is the indirect relationship between self-efficacy and motivation for engagement in self-management behaviors mediated by expectations of aging through goal setting for individuals with early diagnosis of T2D?

Summary

Successful programs for self-management of T2D have been implemented (Lorig et al., 2016b). Yet, as the number of T2D diagnoses continues to increase, there remains a challenge to engage individuals to actively self-manage their illness. Meeting people where they are and providing individualized support and education to enable them to self-manage is an expectation of healthcare (Beck et al., 2017). It is necessary to understand how factors such as aging expectations, goal setting, and perception of the quality of life affect the willingness to actively self-manage. The current study provided a further understanding of these aspects that either facilitate or hinder motivation to manage T2D.

The following chapter will provide a review of the literature on T2D self-management and factors that affect self-management engagement. Chapter 3 will present a discussion of methods used in the current study; it also contains the study sample details. Chapter 4 will include the results and findings of the research questions with an analysis of data. The final chapter concludes with a description and implications of the study findings including future research needs.

Chapter 2

Review of Literature

Self-management of chronic conditions has been studied through many lenses. Yet, with all the knowledge that has been gained about the information and skills required for individuals to manage their illness, there has been little determination about how to best engage those affected in sustained self-management behaviors. In this chapter, search strategies and information sources are provided. An overview of T2D self-management is presented. Empirical literature about T2D self-management education and support interventions and programs is also reviewed. Additionally, literature of studies focusing on concepts included in the current study is reviewed including: self-efficacy, facilitators and barriers affecting motivation to engage in self-management, quality of life, and goal setting. Literature about aging expectations was also reviewed. Social Cognitive Theory (SCT) is the guiding framework for the use of these concepts relating to the current study. The use of SCT in research studies is also discussed. Gaps in the literature are presented, including factors related to self-management behaviors that have not been widely studied.

Search Strategy

A review of literature related to T2D self-management was completed. A variety of information sources were used including professional journals, books and online resources. Several databases were explored from the years 2005 to 2018 including PubMed, CINAHL, PsychINFO and the Cochrane Library. Literature searches related to T2D self-management began in 2015 using a ten-year scope as a starting point. This time frame has been maintained while updating with new research as appropriate. Additionally, this period overlaps with the

beginnings of many countries implementing self-management support into healthcare policy (Franklin et al., 2017). Secondary searches were also performed on reference lists of potentially relevant literature as well as to retrieve additional information about those areas not adequately addressed using the search methods such as for the review of the use of Social Cognitive Theory in the literature. T2D has been studied through various interdisciplinary lenses. Nursing research has provided much literature in the area; medicine, psychology, and nutrition have also added to the knowledge base.

Key search terms used to compile this review of the literature were: type 2 diabetes, self-management, motivational factors, self-care, goal-setting, goal congruence, quality of life, expectations of aging and self-efficacy. Original search terms, including type 2 diabetes and self-management, returned 3,242 records. Additional search terms provided were then applied to limit records to literature specific to T2D self-management and motivation which retrieved 254 records. Key words to further limit records as listed were used. Studies were selected based on their relevance to self-management of T2D and providing insight into the factors that affect self-management. Inclusion criteria included: published in English, the focus was T2D self-management, participants were age 18 or older. The initial review consisted of viewing title and abstract and excluding based on specific criteria. Articles were excluded if they were not available in English, focused on type 1 diabetes, gestational diabetes, specific populations based on their ethnic or similar identity, specific to insulin or medication use, if the focus included T2D with mental health issues or other chronic disease issues, if focused on one specific aspect of T2D such as amputation or foot care, focused on the development and testing of specific applications or protocols, and if the participants were under age 18. After exclusion, 75 articles were included in the review. See Figure 2 for PRISMA diagram of record inclusion.

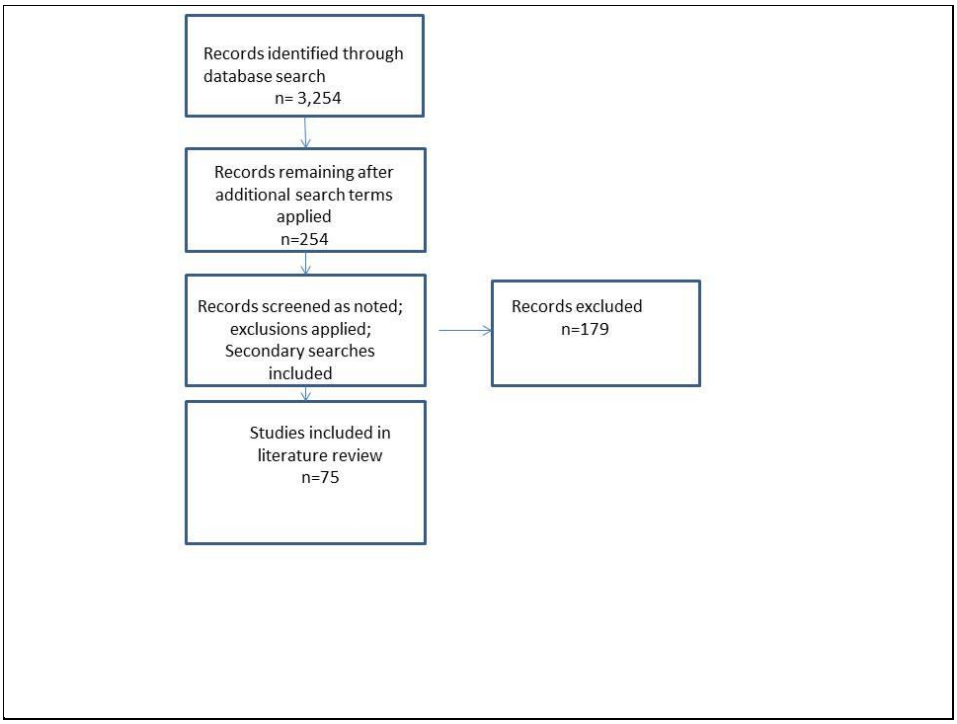

Figure 2. PRISMA diagram demonstrating study inclusion in literature review

T2D Self-Management

The state of the science in T2D self-management is vast. It is widely studied in nursing and many other healthcare disciplines. There have been numerous intervention studies that focus on improving knowledge as a means of improving T2D self-management and its associated health outcomes. Several studies have demonstrated that education programs for diabetes focusing on a psychological or behavioral component motivated individuals to improve their self-management and related outcomes (Seley & Weinger, 2007; Vermiere et al., 2005). Unfortunately, the studies often provided short term improvements for glycemic control, not adequately equipping individuals to support sustained self-management (Seley &Weinger, 2007). Other studies focused on specific aspects of self-management such as self-efficacy, perceived support, barriers to implementation, empowerment, quality of life, expected outcomes, socioeconomic factors, and health literacy. An extensive body of research has been dedicated to the identification of

psychosocial factors that motivate individuals to improve diabetes self-management. This phenomenon has been widely studied from the domains of individual knowledge and beliefs, emotional distress, and the behavioral skills needed for effective self-management (Gonzalez, Tanenbaum, & Commissariat, 2016). Much work has been done to develop the body of knowledge of self-management of T2D. There is much yet to be discovered as the widespread implementation of sustained self-management remains elusive.

T2D Self-Management Educational Interventions

As stated previously, knowledge is an antecedent to self-efficacy and goal setting. To effectively manage T2D, an individual must understand the basic principles of the condition. Knowledge of the importance of diet and physical activity as they influence blood glucose control and management of T2D is foundational; without this, the affected individual will likely struggle with daily maintenance. Social Cognitive Theory explains that without an understanding of the problem, there is little motivation to make changes (Bandura, 2004). The literature provides many examples of studies of educational interventions and their effect on glycemic control and health behaviors for individuals with T2D (Brunisholz et al., 2014; Chrvala, Sherr & Lipman, 2016; Johnson, Richards, & Churilla, 2015; Kim et al., 2012; Kumah, Sciolli, Toraldo, &Murante, 2018;Odgers-Jewell et al., 2017; Sherafali, Bai, Kenny, Warren, & Ali, 2015; Tang, Funnell, Noorulla, Oh & Brown, 2012; Tshignanga et al., 2012; Vas et al., 2017). Additional critique and information about the included studies focused on educational interventions are found in Appendix 1.

Self-management education is intended to offer knowledge, skills, and recommendations to enhance the ability to engage in healthy behaviors (Bagnasco et al., 2014). Improved knowledge

of T2D, along with a positive attitude is correlated with better glycemic control (Badedi et al., 2016). In the literature, education is often provided as part of the medical check-up. It consists of information delivery about lifestyle changes and standard recommendations about how to manage the disease. This is often referred to as standard care. Other educational support interventions are provided to a group or include a prescribed list of topics provided on an individual basis (Coppola et al., 2016).

Although the duration of T2D diagnosis was not a common theme noted in the literature review, a few studies were found to have evaluated the impact of education in newly diagnosed individuals with T2D (Davies et al., 2008; Khunti et al., 2012). The Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) study showed that for 824 individuals newly diagnosed with T2D, group education demonstrated a positive effect on weight, smoking cessation, and beliefs about the illness after one year when compared to the usual care group. Participants were referred for the study between 1 and 3 months of their diagnosis with T2D. There was no significant difference in HgA1C between the education intervention group and the control group at 1 and 3 years (Davies et al., 2008). Khunti et al. (2012) found no significant difference in biomedical measures, including HgA1C and weight or lifestyle outcomes such as physical activity in 824 participants with T2D. The intervention was initiated within three months of their diagnosis and measures were taken three years after the education. The focus of the intervention included lifestyle factors, food choices, physical activity, and cardiovascular risk factors. Participants were also encouraged to choose and develop a specific achievable goal.

A review comparing nine studies of individual education interventions with 1,959 total participants reported that individual education did not significantly differ from group

interventions on HgA1C or other measured psychosocial outcomes (Duke, Colaguiri & Colaguiri, 2009). No significant difference was noted between the two intervention types in outcomes including self-management knowledge, skills, or quality of life. A review including seven studies of peer- supported educational interventions concluded that the interventions were successful in improving knowledge and decreasing HgA1C (Gatlin, Serifika, & Johnson, 2017). Five of the seven studies in the review had greater than 100 participants with an age range of 49 to 71 years. Although two of the studies (Philis-Tsimikas, Fortmann, Lleva-Ocana, Walker, & Gallo, 2011; Shaya et al., 2013) showed significant improvements in HgA1C between the intervention and control group, there was no consistent design, setting, or other outcome measurements among the studies. In general, the research is lacking long term study of the intervention effect. Frequently in the literature, intervention study measures such as HgA1C were taken before and then not more than six months following intervention completion. It is understood that longitudinal studies are challenging, especially those including multiple aspects of patient education. These types of studies decrease the ability to draw overarching conclusions as the results observed in different trials may be variable and not readily reproducible in practice (Coppola et al., 2016). The lack of long-term results in the literature limits the ability to determine long term effectiveness with any intervention.

Individuals demonstrated an improvement in knowledge, lifestyle, and psychosocial outcomes in a study comparing self-management education versus usual care (Coppola et al., 2016). Diabetes knowledge and self-management skills improved significantly; self-efficacy also improved. Group-based education interventions for T2D can effectively improve self-management (Steinsbekk, Rygg, Lisulo, Rise & Fretheim, 2012). However, no differences were found between the intervention and control groups in mortality rate, body mass index, blood

pressure, and lipid profile. The inconsistent results indicate that providing information is only one aspect of consideration to encourage improved lifestyle behaviors and engagement in sustained self-management behaviors in T2D and while a necessary foundation, not generally effective on its own.

The Chronic Disease Self-Management Program (CDSMP), based on the Chronic Care Model, identifies self-management as one of three necessary components of healthcare for affected individuals (Lorig, Ritter, Laurent & Plant, 2006). Because self-management is a lifelong process for those with chronic conditions, it changes along with the needs of the individual. Although many self-management programs implement medical and behavioral aspects of treatment support, Lorig and Holman (2003) found that programs often did not include coaching related to problem solving skills that better allow individuals to navigate life with their chronic disease. Thus, education alone was not found to cause significant changes.

The CDSMP has demonstrated some degrees of success in other chronic health issues including arthritis, HIV, and back pain (Franek, 2013). Participant involvement in T2D programs using the model was associated with improved health behaviors and positive health outcomes such as improved HgA1C (Franek, 2013; Lorig, Ritter, Villa & Armas, 2009; Lorig et al., 2010; Lorig et al., 2016a; Lorig et al., 2016b). The program includes peer support, provided in a traditional group setting and an online platform with varying degrees of success. The Diabetes Self-Management Program is an intervention that specifically provides education about techniques to deal with the symptoms of diabetes, fatigue, pain, hyper/hypoglycemia, stress, and emotional problems such as depression, anger, fear, and frustration (Self-Management Resource Center, 2018). Exercise, healthy eating, medication use, and effective collaboration with health care providers are other areas included in this diabetes self-management and education.

Adequate support includes teaching individuals how to monitor their progress, how to set goals, and how to prepare for problems by having a plan in place. Often T2D support programs target improving an individual's self-efficacy in managing their illness. Changes in health behaviors are then often secondary to improved confidence (Franek, 2013). The theoretical basis for these support programs is self-efficacy or Social Cognitive Theory, which posits that self-efficacy to perform specific actions and the expectation that a goal can be achieved are necessary to have successful behavior change.

A meta-analysis of intervention studies aimed at improving health behaviors included ten randomized controlled trials, including over 6,000 individuals (Franek, 2013). These support care interventions provided statistically significant benefits when compared to regular care, which generally included education at provider visits. Whereas such programs have demonstrated varying positive results, there remains a question of what effectively motivates individuals to engage in such programs for the self-management of chronic diseases such as T2D.

Self-management education programs for T2D in the literature are widely varied and have involved diverse interventions including educational, behavioral, and psychological aspects. The methods used range widely from office visit education to regular group meetings and from web-based programs to interactive cell phone use (Dou et al., 2017; Duke et al., 2009). The amount of time allotted for education (dose) also varied greatly from study to study. Although several successes are noted in the literature, the measures and interventions that are used are highly variable and do not allow for overarching conclusions to be drawn about the most effective methods. One participant characteristic not often noted as a factor of consideration regarding outcomes in the review is duration of T2D diagnosis. Although time from diagnosis was

occasionally mentioned as part of the participant demographics, the duration of T2D was not commonly used in data analysis affecting outcome measures in the literature. Outcomes of self-management interventions vary dependent upon the focus of the study. Improved self-management was often found to be measured in terms of improved HgA1C, lipid levels, or blood pressure. Other outcomes measured were morbidity and mortality rates, and self- reports of adherence or performing self-management behaviors (Vermiere et al., 2005). Much of the literature about interventions to improve self-management behaviors includes discussion of self-efficacy. It is considered an essential component of self-management education (Kumah et al., 2018).

Self-efficacy

Social Cognitive Theory centers self-efficacy as a core concept of behavior change. Self-efficacy affects self-management behavior and impacts the outcome expectations of behavior and goals both directly and through its impact on outcome expectations of behavior, goals, and perceptions of influential social and environmental factors (Allegrante, 2018). In a study of 223 adults with T2D where the average length of diabetes diagnosis was nine years, dietary self-efficacy and diet self-management behaviors were correlated with glycemic control. Participants with higher self-efficacy reported performance of T2D self-management behaviors including monitoring diet and engaging in regular exercise, and glucose testing (Al-Khawaldeha et al., 2012). This finding is not surprising; however, most of the subjects in the study had low self-efficacy. Less than 42% of the individuals claimed to remember receiving T2D education. These individuals were lacking in the performance of self-management behaviors and demonstrated poor diabetes control. Recommendations were made to encourage the use of strategies to

promote self-efficacy in T2D self-management education (Al-Khawaldeh et al., 2012; Lee et al., 2015).

In a study of 378 individuals with T2D focusing on self-efficacy and its role in predicting self-management behaviors, higher self-efficacy was correlated with improved glycemic control, medication adherence, self-management behavior and mental health-related quality of life (Walker, Smalls, Hernandez-Tejada, Campbell & Egede, 2014). Its role in relation to patient attitude has been correlated with disease management; self-efficacy was found to better predict healthy behaviors than other factors, including coping strategies, perceived provider relationship, awareness of risk, and autonomous motivation. Low self-efficacy was noted in patients with T2D who also experienced depressive symptoms; negative feelings of self or the disease negatively affected self-efficacy (Walker et al., 2014).

A random control trial involving 392 participants was done to determine the effectiveness of three different treatment interventions. The aim was to improve care by determining the impact of the participants' conscientiousness and diabetes self-efficacy at baseline on the outcomes of the interventions intended to reduce diabetes distress and improve disease self-management (Fisher, Hessler, Masharani, & Stryker, 2014). Factors assessed at pre-intervention and at 12 months included conscientiousness and self-efficacy, regimen distress, emotional burden, medication adherence, diet, and physical activity. Higher levels of diabetes self-efficacy were strongly associated with individuals being better able to cope with routine, daily management behaviors, and stressors of T2D. Those individuals with the highest levels of self-efficacy before the intervention were noted to experience the greatest improvements in physical activity at the end of the intervention period (Fisher et al., 2014).

Self-efficacy scores in individuals with T2D were affected by their length of diagnosis, the status of neuropathy and HgA1C (Abubakari, Cousins,Thomas,Sharma, & Naderali, 2016). A study of 123 individuals with diabetes aimed to determine whether individual characteristics or self-efficacy significantly affected self-management behaviors (Abubakari et al., 2016). Self-efficacy for diabetes self-management was a significant predictor of self-management behaviors. The mean age of participants in the study was 50 years, and the mean duration of diagnosis was 16 years. Participants who had been diagnosed with diabetes for a longer duration had higher levels of self-efficacy to self-manage their diabetes, but those participants diagnosed with neuropathy and those with higher HgA1C demonstrated lower levels of self-efficacy to self-manage their condition. Adherence to diet, exercise, and self-management recommendations was affected by self-efficacy beliefs (Abukari et al., 2016).

Health behaviors were found to be directly influenced by self-efficacy levels (Lee et al., 2015). A study of 295 individuals with T2D in Taiwan found that self-efficacy affected health behaviors which correlated with better glycemic control. This study also noted that higher health literacy, an individual's ability to gather, process, and understand basic health information and services required to make appropriate health decisions and act accordingly, was correlated with higher levels of self-efficacy (Lee et al., 2015).

Results from a cross-sectional study of 346 individuals with T2D, whose aim was to determine the association between barriers of self-management and self-efficacy, demonstrated that high levels of self-management barriers generally correlated with lower self-efficacy and a negative appraisal of T2D (Cheng et al., 2016). Diabetes appraisal is the patients' cognitive evaluation of the threat posed by their disease and their options to cope with the perceived threats. It is reasonable that individuals who perceive fewer barriers to self-management would

have higher levels of self-efficacy. The importance of self-efficacy in T2D self- management is well noted in self-management literature (Brown et al., 2016; D'Souza et al., 2017). It was found to be the most consistent predictive factor of adherence to self-management behaviors in a systematic review of 775 correlational or predictive studies of glycemic control in T2D (Brown et al., 2016). A review of T2D self-management intervention studies demonstrated that the majority reported an increase in self-efficacy after completion of the intervention (Coppola et al., 2016). Determining that self-efficacy plays a crucial role in explaining variations in individuals' adherence to self-management behaviors is a critical component in understanding the reasons people with T2D engage in self-management (Abubakari et al., 2016). Thus, although self-efficacy cannot be ignored in T2D self-management, it is only a piece of the puzzle. Other factors have demonstrated ability to affect motivation for engagement in T2D self-management behaviors.

Factors Affecting Motivation to Engage in Self-Management: Facilitators and Barriers

Several factors have been identified through research as barriers to self-management in T2D. Individual barriers including depression, cognitive decline, comorbidities, and lack of problem-solving skills account for reported difficulties of self-management (Coppola et al., 2016). Other socio-structural barriers including poor social support, socioeconomic factors, lack of availability of healthcare and access to exercise and nutritious foods are environmental in nature (Ahola & Groop, 2013; Laranjo et al., 2015; Oakes et al., 2017; Smalls, Gregory, Zoller, & Egede, 2015). The importance of identifying individual perceptions of barriers is noted in the literature.

Lack of complications. Individuals who had been newly diagnosed with T2D within 1 to 3 years were found to be optimistic about their ability to maintain health and did not perceive the

diagnosis of T2D to be a threat to their daily life (van Puffelon et al., 2015). Perception of illness influenced the response to their T2D diagnosis in a study of 192 adults in Amsterdam. These illness perceptions included perceived symptoms of T2D, beliefs about how their condition would progress, and the perception of how well the treatment was controlling their disease. Individuals who were not experiencing any complications of T2D did not perceive their diagnosis as very serious. They considered the disease to have a low impact on their daily life and felt as though it was easily controlled. Individuals who reported complications of T2D also had negative perceptions of the illness as having more consequences and felt more emotionally upset about their health. Those with complications performed T2D self-management behaviors more often than those experiencing no complications. The results suggest that individuals are more likely to engage in self-management behaviors when they experience complications of T2D than when they are experiencing no symptoms (van Puffelon et al., 2015). This needs further study in the newly diagnosed.

Motivational Interviewing. Motivational interviewing as an adjunct to self-management education demonstrated positive results in several studies. Having origin in the field of addiction, it is used as a strategy to elicit behavior change. As a counseling approach, motivational interviewing is becoming commonly used as an intervention to assist individuals to make diet, physical activity and other lifestyle modifications (Coyne & Correnti, 2014). It is goal oriented and encourages individuals to explore the reasons for their lack of engagement in health behaviors necessary to achieve positive outcomes. As a tool in self-management education and support, it provides opportunity for individualized patient centered care (Coyne & Correnti, 2014).

In a study comparing regular care to individuals in an intervention group using motivational interviewing, those having received the intervention demonstrated significantly higher levels of confidence in their ability to manage their T2D. This effect, however, waned by two years post intervention when both groups were equal in their perceived confidence levels (Rosenbek Minet, Wagner, Lønvig, Hjelmborg, & Henriksen, 2011).

A review of intervention studies using motivational interviewing to encourage increased physical activity in individuals with T2D reported that 4 of the 9 studies noted improvement (Soderland, 2017). Motivational interviewing approaches that delivered significant improvements in physical activity outcomes emphasized either using frequent sessions or session duration of at least 30 minutes or both. The technique was determined to provide value in improving physical activity outcomes, but recommendations were also made to use the technique to focus on a few health behaviors rather than all the behavior changes needed for T2D self-management (Soderland, 2017).

Despite nearly half of studies included in the review reporting improved health outcomes such as HgA1C (Soderland, 2017), a study of 234 participants randomized into groups receiving self-management support with or without motivational interviewing concluded differently (Welch, Zagarins, Feinberg, & Garb, 2011). Participants in the study who received the motivational intervention had poorer results of HgA1C than those having self-management support alone. There was a high non-completion rate noted; study participants dropped at nearly 35%. It was also noted that the training level of the interviewers was not noted to impact the HgA1C outcome result. Individuals are motivated in different ways; those who are more intrinsically motivated may be less likely to engage in this type of intervention. This adds to the literature that no one factor is the single determinant to successfully engaging individuals in self-management.

Motivation for behavior change. Establishment of a routine is a foundational task of self-management. It is important that healthy behavior changes become habitual. Routines are highly variable depending on individuals' beliefs and needs. Their motivation for self-management affects their approach to making behavior change part of their lifestyle (Newton, Asimakopoulou & Scambler, 2015). Their style of self-management, whether by making it routine, seeing it as a burden, viewing it as maintenance or through delegation or co-management also affects their willingness to make the behavior a routine. Once their regimen is established, the social and individual circumstances that occur often change the motives for self-management. Thus, self-management is a fluid process, shaped by many factors other than the will to manage health and the confidence to do so (Newton et al., 2015; Wilkinson et al., 2014).

A cross sectional study of 110 individuals with T2D looked at styles of motivation and their influence on self-management and glycemic control. Findings included that those who were intrinsically motivated were more likely to have better glucose control (Al-Hassan, Al-Akour & Aburas, 2017). Those who reported being motivated by intrinsic factors were ten times more likely to have glycemic control when compared to individuals with T2D identifying as extrinsically motivated. Although not a large study, results provide evidence to encourage further research about how to best support development of intrinsic motivation for effective self-management and glucose control.

Financial motivation for self-management of T2D has also been studied. Although individuals were interested in engaging in a self-management program with financial incentive, the outcomes demonstrated that this inhibited intrinsic motivation and was not likely sustainable beyond early diagnosis (Blondon, Klasnja, Coleman & Pratt, 2014). Extrinsic motivations have demonstrated to be effective in guiding the learning phase of T2D self-management behavior,

but caution is necessary when planning for long term maintenance (Blondon et al, 2014). This literature adds that we need to look beyond what individuals do and attempt to understand why they are acting in such a way (Newton et al., 2015). Additionally, there are multiple ways to measure the success of self-management stemming from the motivation behind the actions (Newton et al., 2015).

Social support. There is evidence that marriage is associated with improved health outcomes and that social isolation is associated with increased morbidity and mortality (Haines, Coppa, Harris, Wisnevesky & Lin, 2018). A study of partnered individuals included participants who identified as married, living with a partner or in a like-marriage relationship as well as un-partnered individuals who were widowed, divorced, separated or never married. Of these participants, 60% noted their length of T2D diagnosis as ten years or less. The partnered individuals showed better medication adherence and trended toward better diet and exercise management when compared to the un-partnered individuals. Social support, from a variety of sources is another crucial component of T2D self-management (Haines et al., 2018).

Marriage has also been studied and recognized as a factor that has contributed to better health and longer life, but studies have drawn inconclusive results regarding how gender affects this (Liu, Waite, & Shin, 2016). Poor marital quality, measured by negative exchanges between the individuals, was found to be associated with higher prevalence of T2D in men (Whisman, Li, Sbarra &Raison, 2014). Empirical evidence remains mixed with relation to gender differences as a determinant of marriage on health. Some studies note findings of a stronger effect of marital quality on health for women, others for men, and others report no significant differences between the genders (Liu et al., 2016).

A study of the healthcare climate and its effect on glycemic control showed that support for T2D care from friends, family members, others with diabetes, and healthcare professionals positively impacted autonomous motivation for self-management (Koponen, Simonsen, Laamanen**,** & Suominen, 2015). Peer support has been widely studied regarding its effect on glucose control. A meta-analysis including 20 studies that involved 4,494 individuals with T2D noted that peer support interventions had a positive effect on glycemic control. This demonstrates the importance of ensuring that individuals find a support system to help them cope and navigate through their self-management regimen (Zhang, Yang, Sun, Fisher & Sun, 2016).

Another study of individuals with T2D focused on their social networks and the impact on health outcomes (Reeves et al., 2014). Individuals who had a wider variety of social involvement with people and groups were better supported in their self-management. They identified as having better physical and mental well-being than those without a wide scope of social involvement. Participants found that their support network expanded in their need for support. Another benefit of social support is its potential to provide cost savings from traditional health cost. Those with wider social networks had significantly reduced healthcare costs compared to those without support (Reeves et al., 2014). Those who were connected to volunteer and community groups had higher levels of self-management and better physical health. Social involvement was also associated with the long-term maintenance of healthy behaviors; participants not involved in community groups had noted decline in behaviors as time passed.

A systematic review of the role family plays in the self-management of chronic disease noted that positive support from the family of an individual with a chronic condition was correlated with the individual being better able to meet the challenges of self-management (Whitehead, Jacob, Towell, Abu-qamar & Cole-Heath, 2017). By helping families to develop appropriate

supportive environments, individuals can be both supported by their family and encouraged to be autonomous in the self-management behaviors. Research about how families can best support those with chronic disease continues to emerge. Cultures vary in familial tendencies for health support. A systematic review of Chinese adults with T2D revealed that family support is crucial for self-management of T2D (Luo et al., 2015). If family is highly valued culturally; strong family bonds are an important component of self-management. Patients more readily adopted their self-management routines when viewed as the family's shared responsibility (Luo et al., 2015).

In a meta-analysis of 21 T2D group based self-management interventions, 2,833 individuals with an average time since T2D diagnosis of eight years demonstrated positive outcomes with group social support (Steinsbekk et al., 2012). There were significant reductions in HgA1C at both 6 months and 2 years post intervention. Additionally, there were improvements in both knowledge and performance of self-management behaviors. Generalized clinical, psychosocial and lifestyle outcome improvements resulted in recommendation to encourage group education and support (Koetsenruijter et al., 2016; Steinsbekk et al., 2012). Although health care professionals do provide support and education, other individuals experiencing the same illness can be role models for each other. In a group model, when an individual mentions a problem, other group members can provide their advice and experiences. This experience of sharing with someone who has already gone through something similar was noted to be extremely effective in supporting those newly diagnosed (Lorig & Holman, 2003).

Provider support. The role of provider support is another important consideration in T2D self-management. A study exploring the impact of the primary care provider's attitude toward self-management on patient success demonstrated that providers whose beliefs and practices

were more supportive of self-management were more likely to have patients engage in self-management behaviors (Alvarez, Green, Hibbard & Overton, 2016). This study included 10,957 participants who had taken the Patient Activation Measure at two points two years apart and 181 providers who had taken the Clinician Support for Patient Activation Measure. The patients of providers whose philosophy and practice were more collaborative and focused on the patient's ability to manage their T2D also demonstrated greater improvements in their self-management behaviors (Alvarez et al., 2016).

Unfortunately, although collaboration has been noted as key in T2D self-management, a review of both patients and healthcare professionals' perceptions of self-management support demonstrated that this is not the case (Franklin et al., 2017). A review of 14 qualitative studies examining the experience of self-management support in patient–provider interactions noted that provider encounters were generally more traditional in delivery of care which limited collaboration. It is suggested that many healthcare professionals limit opportunities for self-management control to be shared with patients and continue to practice in a position of authority. Healthcare professionals relied on providing information to encourage individuals to adhere to their self-management regiment and to convince them to make appropriate decisions. In general, they provided generic information and focused on medical management of T2D including blood glucose monitoring, diet, medications, managing symptoms and awareness of risk factors (Franklin et al., 2017).

Social support, whether from family, peers, or healthcare providers cannot be overlooked in T2D self-management. Lack of support from significant others and healthcare providers were noted to have significant impact on affected individuals' ability to engage in effective self-management (Wilkenson et al., 2014). Results from a study of the relationship between the

perceived social supports of the individual and their Quality of Life (QOL) reported that with increased support came higher levels of reported QOL. Social support had a direct effect on self-management behaviors and QOL (Goz, Karaoz, Goz, Ekiz & Cetin, 2007).

Aging expectations. The process of aging is often associated with images of health decline and worsening quality of life. Some individuals may attribute complications of chronic disease and pain to the aging process; however, many of the health changes that occur with aging are preventable (Sarkisian et al., 2002). Although there are varied opinions about when symptoms should be considered normal aging, individuals who view aging as a painful process wrought with complications are less likely to actively engage in self-management of their health (Sarkisian et al., 2002). Individuals with a more positive outlook of aging tend to attribute health problems with a potential physiological cause and seek the advice of healthcare providers rather than to simply accept declining health as an expectation of the aging process. The review of literature has resulted in very little research specifically relating to aging expectations and T2D self-management. Only two studies were found focusing on aging expectations and prediabetes or T2D (Bhandari & Kim, 2016; Bouchard et al., 2012). These are discussed along with other research relevant to aging expectations.

A cross sectional analysis was done with 74 patients between the ages of 27 and 78 years to determine whether expectations about readiness to make dietary and exercise modifications differed between young and older adults with prediabetes (Bouchard et al., 2012). Increased age correlated with decreased confidence, conviction, and intention to change physical activity level and to adopt healthier eating habits. Conclusions suggest that age must be taken into account when planning interventions for a lifestyle/behavior modification program for individuals with prediabetes to tailor the program to the needs of specific age groups.

Kim (2009) explored the influence of expectations regarding aging on physical and mental health status. A convenience sample of 99 older Korean adults was queried to determine the influence of the expectations of aging on their health and behaviors. Expectations regarding aging is defined as expecting achievement and maintenance of high levels of physical and mental functioning with aging (Kim, 2009). The results showed that older individuals who had higher expectations of maintaining high levels of health as they aged were more likely to experience better physical and mental health. Their participation in behaviors that promoted health increased this association. The regression analysis demonstrated that expectations regarding aging had more impact on health status than other variables of age, gender and education. This small study provides encouragement for further study exploring aging expectations as it affects engagement in health behaviors.

Expectations regarding aging were found to directly influence self-care through self-efficacy in a study of 230 Nepalese adults with T2D (Bhandari & Kim, 2016). The mean age of participants was 56 years and the mean duration of diagnosis of T2D was 8.7 years. Lower expectations regarding aging was associated significantly with lower levels of diabetes self-efficacy. A limitation of the study is noted that factors influencing self-management behaviors include greater gender differences in health behavior practices in Nepal. As a low-income developing country, socioeconomic factors may play a larger role in self-management behaviors which may decrease generalizability.

A qualitative study of 104 adults aged 65 to 95 years seeking to determine what motivated them to improve their dietary and exercise patterns found that perceptions of old age tended to shape the need for lifestyle behavior changes (Barduch, Schoenberg & Howell, 2016). Expectations of health symptoms and conditions as a regular part of aging interfered with the

participants' ability to see opportunity for improvement. Low expectations of aging provided low motivation to improve diet and exercise habits; a lack of potential to perceive benefits from behavior change was noted. Findings suggest that helping older adults to counteract negative stereotypes of old age could help to improve their expectations and impact their behaviors (Barduch et al., 2016). Negative stereotypes abound even in current times; ageism exists in healthcare even today. Healthcare providers must be cautious to avoid negativity and should work to encourage positive thinking to enhance older adults' wellbeing (Sims, 2017).

Elderly individuals are more likely to set their health goals related to aspects of their daily life rather than to specific aspects of a chronic disease (Huang, Gorawara-Bhat, & Chin, 2005). Most participants described maintaining their independence in the activities of daily living as their primary healthcare goal in the exploratory study of 28 individuals with T2D over age 65. Exploration of their self-reported healthcare goals, factors influencing these goals, and self-care practices of older patients was the reported aim. Individuals over age 75 were more likely to identify the desire to maintain independence more often than individuals younger than 75. The motivating factors for these individuals who wanted to maintain their independence included continuing daily self-care and avoiding becoming a burden on their families (Huang et al., 2005).

Expectations of length and quality of life of 600 adults in was studied in Holland. Individuals in the study reported that their expectation of life after age 70 included very poor health related quality of life (Brouwer & Van Exel, 2005). For individuals aged 70 to 90, their estimated quality of life was largely different from available actual health related quality of life noting that older individuals may underestimate health and associated life quality as they age. This negative association may impact willingness to adapt new behaviors when diagnosed with chronic disease.

A large study (N = 502,548) of age differences in aging perceptions in the United States found that while older adults reported older perceptions of aging; they chose increasingly older ages as the ideal age (Chopik, Bremner, Johnson & Glasson, 2018). Younger and middle-aged adults had poorer perceptions of aging, and tended to disassociate themselves from older adults with self-perceptions of being younger than they were. Older adults tended to report developmental transitions of aging as occurring at later ages than younger adults (Chopik et al., 2018). Transitions of middle and older age were perceived to happen later in the course of life by older adults versus young or middle-aged adults. As aging occurs and individuals become increasingly closer to identifying with older adults as a stigmatized group, they attempt to identify as younger. This is noted as a potential effect of self-preservation. Older adults perceived negative aging effects to occur much later in life than younger adults (Chopik et al., 2018). Aging expectations likely change as individuals grow older.

The number of Americans aged 65 years or older who are diagnosed with T2D is projected to increase from 6.3 million in 2005 to 26.7 million by 2050; the percentage of individuals with T2D over age 65 years is expected to increase to 55% (Caspersen et al., 2012). Looking to the future, assessment of the expectations of aging will be helpful in identifying problems of motivation related to aging as the population continues to gray. There is a gap in the literature regarding expectations of aging as it relates to T2D; it has not been widely researched (Bhandari & Kim, 2016). Individuals' expectations of aging may impact their willingness to engage in self-management behaviors. Higher expectations may act as a facilitator, whereas lower expectations may be a barrier to self-management engagement. Further study of this variable with relation to T2D will enhance knowledge of self-management science.

Quality of Life

Managing diabetes is a lifelong process requiring the ability to adapt to changes as they occur. Individuals with T2D have twice the likelihood of developing either formal clinical depression or clinical symptoms at some point during their illness (Carper et al., 2014). Estimates of time required for self-management routines for T2D are sometimes more than 2 hours per day. The stressors they face in dealing with their self-management routine can lead to diabetes distress, feelings of inadequacy and of being overwhelmed. Poor adherence to healthy behaviors has been linked to distress, which ultimately leads to poor glycemic control. QOL is often affected; individuals report being overwhelmed with their self-management routine and experience poorer QOL (Carper et al., 2014).

A meta-analysis of QOL outcomes following T2D self-management education and support reported that interventions to improve self-management also improved QOL (Cochron & Conn, 2008). Several hypotheses were noted regarding the link between QOL and self-management support. When an individual learns how to better manage T2D, there can be greater self-efficacy that an individual perceives as an improvement in their QOL. The performance of self-management health behaviors leads to better health outcomes which may likely improve QOL. Individuals with T2D may also perceive that making health behavior changes will lead to poorer QOL, deterring them from engagement in T2D self-management (Cochran & Conn, 2008; Franciosi et al., 2001).

Although most literature related to QOL and T2D self-management focuses on improving QOL with an intervention or better glycemic control, some studies have been done to determine if QOL was decreased related to T2D self-management activities (Russo et al., 2016). No associated decrease in perceived QOL was found because of having to perform regular blood

glucose monitoring for 1,024 participants who had been diagnosed with T2D from one to ten years (Russo et al., 2016).

A review of self-management interventions aimed at improving QOL in chronic disease found that although interventions overall provided an improved QOL at both 6 months and 12 months after completion, no specific factors of the intervention were identified as improving QOL (Jonkman et al, 2016). Thus, while it is demonstrated that T2D self-management education and support positively impacts perceived QOL, the mechanism through which this occurs is not well understood.

Another study examined the relationships between knowledge, attitudes, self-management, and QOL with age and diagnosis of T2D duration (Kueh et al., 2017). Blood glucose monitoring and diet control, as tasks of self-management, were significant in predicting QOL. Foot care and exercise were also aspects of self-management that predicted higher QOL and satisfaction with T2D care. No conclusions were made regarding diagnosis duration related to QOL. The 266 participants with T2D, with a mean age of 57 years also demonstrated that increased knowledge of diabetes did not relate to higher levels of reported QOL.

Other studies noted improved QOL as an outcome of T2D self-management support provided by a peer group (Markle-Reid et al., 2018), as a result of patient centered care interventions for T2D (Williams, Walker, Smalls, Hill & Egede, 2016), and of being more affected by confidence and attitude than by glucose control (Zhu et al., 2016). Despite all the research that has been done about T2D and self-management education and support, it remains difficult to determine what specifically impacts QOL as it varies widely (Pal et al., 2013; Trikkalinou, Papazafiropoulou, & Melidonis, 2017). A primary goal of T2D early diagnosis and treatment is maintaining QOL. This term holds diverse meanings across populations, but encompasses

outcome expectations of physical, social and psychological self-evaluative components unique to the individual (Trikkanlinou et al., 2017). Although T2D self-management programs often use goal setting as a strategy, no research was found using a measure of QOL and its impact on goal setting in the literature. This is a noted gap identified by the review.

Goal Setting

Goal setting is regularly recommended as a supportive strategy for T2D self-management (Beck et al., 2017; Huang et al., 2005; Klinker et al., 2017). Motivation to engage in health behaviors is enhanced by helping individuals to visualize how behaviors can help them to meet personal goals and provides self-incentives for engaging in these health behaviors (Bandura, 2004). Participation in goal setting for individuals with T2D demonstrated effectiveness in improving HgA1C. A study of patient reported collaborative goal setting with their healthcare team found that engaging patients in collaborative goal setting during clinical encounters has promise as a means of improved glycemic control (Lafata et al., 2013). Participants were asked how often they engaged in collaborative goal setting with their healthcare providers. Those who reported doing this often also had more trust in their provider and higher confidence in their ability to self-manage. Improved glycemic control was also demonstrated in a study of T2D self-management support for veterans through the practice of goal setting (Naik et al., 2011).

Self-management goals for chronic illness management may be related to function, symptoms, or psychosocial aspects of the disease (Nagl & Farin, 2012). Whereas healthcare providers often set goals for all patients with T2D to maintain long term glycemic control, there is wide variation when comparing these to patients' goals. Individuals relate their own ideas about health implications and determine the significance of each health behavior for themselves as it relates to their everyday life (Nagl & Farin, 2012). Low congruence was found between the

patients and their providers in self-management of chronic illness. There were vast differences between the goals set by patients and those by their healthcare provider; only 5% of the three goals set were agreed upon by both provider and patient. Potential reasons for this lack of congruence are noted: patient preferences may not equate to goals that can be realistically achieved, providers may not consider individual values when setting goals, and some patients may lack the confidence to have conversations of goals with their provider when they perceive the provider as superior (Nagl & Farin, 2012).

A study of hospitalized participants with T2D who set goals related to their diabetes provided little insight into the practice of setting goals (Klinker et al., 2017). After discharge, many of the individuals were not seen for follow-up in primary care clinics where their goal attainment would be assessed. The study highlighted difficulties in continuity of care from one healthcare environment to another and demonstrated the need for better follow through if goal setting was to be effective (Klinker et al., 2017).

In a study broadly measuring goal setting related to self-management, participants worked with a support provider to set individual goals. Participants were noted to set goals about nutrition, physical activity, medication and goal monitoring in the same order of importance (Siminerio, Ruppert, & Gabbay, 2013). All participants in the study noted that the self-management support that they received helped them to work toward achievement of their goals and to overcome barriers. A noted limitation was the calculation of goal achievement. Although healthcare staff may have assigned a percentage score to patient self-reported goal progress, reporting was noted to be very subjective and often not reliable. Further exploration of consistency in measuring and reporting was recommended (Siminerio et al., 2013).

Collaborative goal setting has demonstrated promise in assisting patients to attain better health outcomes such as improved HgA1C, but additional research is needed to further develop this area of T2D self-management (Lafata et al., 2013, O'Donnell et al., 2018). While goal setting is widely accepted as an important aspect of self-management, there is a lack of literature providing any consistency of intervention or tool for measuring goal setting. Having goals to work toward is a likely motivation for engagement in self-management behaviors. Research using similar measures to determine goal setting quality and attainment is needed to provide best practices about its use in T2D self-management support.

Social Cognitive Theory Use in Literature

The literature provides that many factors contribute to health care behaviors. Consideration about how these factors affect individuals' health decisions is important to the study of T2D self-management. Social Cognitive Theory encompasses not only perceived self-efficacy and goals, but also the perceived facilitators and barriers of behavior change. As a theory of health behavior, it offers the ability to both predict health behavior and to inform and motivate individuals to adopt healthy habits (Bandura, 2004). Its usefulness in predicting preventive care for individuals with T2D was demonstrated in a study using the theory (Cooper et al., 2016). The constructs of self-efficacy through diabetes education demonstrated modest ability to predict preventive care behaviors such as eye and dental exams in a study of 148 individuals with T2D.

Although the literature review found that many studies make no mention of use of any specific theoretical framework, several examples of use of the theory are provided in the literature. It has been used to predict activity in adults with T2D (Esmaeily, Peyman, Taghipour, Khorashadizadeh, & Mahdizadeh, 2014; Plotnikoff, Lubans, Penfold, & Courneya, 2014), to

predict health behaviors in elderly individuals with T2D (Borhaninejad et al., 2017), to determine the role of illness perceptions and self-efficacy in poorly controlled diabetes (Abubakari et al., 2016) and to identify personal and environmental factors that predict health promoting behaviors in individuals with prediabetes (Chen, Wang, & Hung, 2015). The theory was used in an intervention study intended to improve self-management (Steed, Barnard, Hurel, Jenkins, & Newman, 2014). Social Cognitive Theory has been used as a framework in the literature to predict self-management behavior and also to develop interventions intended to change health behaviors and outcomes (Allegrante, 2018).

Discussion

The results of this literature review reinforce the premise that T2D education and support is an important aspect of developing self-management behaviors. As knowledge grows, so does confidence in ability. Self-efficacy is a social cognitive concept found to be of great importance in T2D self-management. High levels of self-efficacy generally improve the motivation for an individual to activate engagement in self-management behaviors and to persist in the face of difficulty. Individuals' expectations that their behavior will prevent future problems are affected by their self-efficacy. Goal setting and attainment of goals can activate motivation to engage in and sustain healthy behaviors (Abubakari et al., 2016).

A large body of the literature of self-management of T2D focuses on educational interventions that improve self-efficacy and HgA1C. Other factors affecting engagement in self-management behaviors including social support, relationship with provider and goal congruence, quality of life and expectations of aging are potential barriers or facilitators for T2D self-management. There is little available literature about expectations of aging as it relates to self-management of T2D. A lack of objective measure and consistency in studies using goal setting

for T2D is also noted. Although goal setting is encouraged as part of recommended T2D self-management education and support, this gap creates difficulty in drawing any conclusions about best practices related to goal setting and the objective measures of this process to implement with future research.

Although the literature provides that participants in various self-management programs and interventions have demonstrated positive outcomes, the measures of improved self-management or engagement in self-management are broadly variable. Studies have used body mass index, HgA1C, and lipids as the most common physiologic outcomes and knowledge. QOL, self-efficacy and social support are the most common psychosocial outcomes (Vas et al., 2017). This provides a large body of knowledge with some noted gaps. The ability to compare efficacy between studies poses challenges because the intervention timing, intervention duration, and delivery method vary greatly, resulting in diversity of reported outcomes (Chatterjee et al., 2018). Although it is accepted that T2D self-management education and support can result in improvements of various measure, other factors that impact engagement in self-management behaviors are not fully understood (Beck et al., 2017).

A better understanding and consistent measure of goal setting would provide additional knowledge about how to best engage individuals in setting goals for their T2D. Study of the impact of expectations of aging on willingness to engage in self-management behaviors would fill gaps in knowledge about how to best support individuals related to their age at time of diagnosis. Further study of the impact of duration of diagnosis of T2D on goal setting and engagement in behaviors would fill gaps in knowledge about how to best support newly diagnosed individuals at a crucial time when complications of the disease have not likely developed. There is a need to examine these confounding variables to gain better understanding

of their impact on motivation to engage in T2D self-management behaviors. This knowledge can be used to further individualize self-management support of T2D.

Summary

This chapter provided details about the literature search strategy and discussed research related to diabetes self-management. T2D educational intervention studies were reviewed as well as studies related to the concepts of Social Cognitive Theory. Studies focusing on self-efficacy, goal setting, factors affecting motivation to engage in self-management behaviors**,** and expectations of aging were discussed in the literature review.

Chapter 3 will present methods of research that were used in the current study to develop knowledge of motivation to engage in T2D self-management behaviors for individuals age 50 years and older who have been diagnosed within two years. Design components, tools for conceptual measure, and details used for sampling and screening are included.

Chapter 3

Methods

This chapter includes a description of the methods used to investigate the research questions. Elements including design and sampling criteria along with a completed power analysis to determine sample size are provided. The measures used to operationalize the variables are presented and discussed and include reliability data as appropriate. The procedures used for preliminary and primary data analysis are provided. Finally, human subjects' considerations are discussed.

Design

This was a cross- sectional, correlational study. Survey data were collected to measure participants' perceptions of the theoretical concepts as well as their reported motivation to engage in self-management behaviors. To best understand patient goals, the questionnaire also contained open ended questions pertaining to goal setting.

Sample

A convenience sample of 99 adults was recruited in northeast Wisconsin. Inclusion criteria were: a) age 50 years or older; and, b) diagnosis of T2D within 2 years. Exclusion criteria were: a) inability to understand written English, b) comorbidity of chronic kidney disease or complications of T2D including amputation history, c) diagnosis of dementia, and d) requiring a caregiver/physical or cognitive inability to self-manage. Participant characteristics including gender, age, ethnicity, marital or partner status, perceived financial ability to cover medical expenses, and education level were collected.

The rationale for the timeframe of diagnosis to be within 2 years includes that while health implications are occurring in the body long before the onset of a medical diagnosis of T2D,

motivation to engage in behavior changes is not likely to occur prior to diagnosis (Bergman, 2014). The current study focused on the age where T2D is currently most often diagnosed as well as the age at which individuals may no longer perceive themselves as young adults. To assess expectations of aging in a population of aging adults, age 50 was used as the low limit in the study. In seeking to help older adults achieve better health outcomes, understanding the extent to which older adults themselves expect to attain and maintain high levels of physical and cognitive function is important to ascertain (Sarkisian et al., 2002).

Power analysis. A power analysis was completed using GPower 3.1 software. A sample size of 92 was required to detect a medium sized effect with 80% power and 0.05 significance level when 5 variables are included in the model.

Sample characteristics. The characteristics of the sample are in Table 1. Of the 99 participants in the study, 44 were male and 55 female. Participants ranged from 50 to 82 years of age, with a mean of 62 years of age (*SD* = 8.19). A majority (90.9%) of the participants identified as white; 78.8% of participants were married or partnered. Nearly half (43.4%) were college graduates and regarding perceived financial implications, the majority (57.6%) noted that they had enough money at the end of each month to cover their medical expenses.

Measures

The study variables include diabetes self-efficacy, quality of life as outcome expectation, patient activation as a measure of motivation to engage in self-management behaviors, expectations regarding aging, and goal setting. A brief discussion of each is provided, followed by Figure 3 which provides relevant information for each of the measures used.

Self-efficacy. The concept of self-efficacy is foundational in Social Cognitive Theory. As a direct and indirect influence on health behavior, individuals' beliefs about their ability to

Table 1

Description of Participants (N = 99)

Characteristic	n	%
Gender		
Male	44	44.4%
Female	55	55.6%
Age		
50-59 years	44	44.4%
60-69 years	31	31.3%
70-79 years	23	23.2%
80-89 years	1	1%
Ethnicity		
White	90	90.9%
Black	2	2%
Native American	5	5.1%
Partner status		
Single	21	21.2%
Married	75	75.8%
Partnered	3	3%
Education level		
High school	27	27.3%
Some college	29	29.3%
College graduate	43	43.4%
Finance level		
Not enough money	19	19.2%
Enough money	57	57.6%
More than enough money	23	23.2%

meet their goals impact their decisions (Bandura, 2004). It is an essential factor in enhancing engagement in health behaviors (Ritter, Lorig & Laurent, 2016). Diabetes self-efficacy was measured using the Self-Efficacy for Diabetes scale, an 8-item questionnaire using a 10-point Likert scale from the Chronic Disease Self-Management Program (Lorig et al., 2009). This measure is freely available for use. The scale demonstrated acceptable reliability (Cronbach alpha = .89) for the current study.

Outcome expectations. Individual expectations about health behaviors take several forms including physical outcomes, social outcomes and self-evaluative reactions (Bandura, 2004). This study used global health-mental health quality of life as the measure of outcome expectation. Outcome expectation is measured as the perception of wellbeing and the attitude about the impact of T2D on their quality of life as it impacts their satisfaction with health, happiness, and relationships. The PROMIS Scale Global health v1.2 is a measure of overall perceived mental and physical health which provides a valuable summary of these aspects (Hays, Bjorner, Revicki, Spritzer & Cella, 2009). It is a 10-item questionnaire using a 5-point Likert scale that provides a measure of the physical, social and self-evaluative assessment of health. The scale has demonstrated results that support the use of the measure across several chronic conditions as a determinant of global health (Cook et al., 2016). The global mental health subscale was used as a measure of QOL. This scale is freely available for use via healthmeasures.net and includes a free scoring service. The questionnaire was scored by providing the data anonymously to healthmeasures.net. Scores were submitted via a provided Microsoft Excel® document; they were returned as a score for global physical health and a score for global mental health. The global mental health scale includes 4 items on quality of life, mental health, satisfaction with social activities, and emotional problems. This was used as the

Concept	Tool of Measure	Number of Items	Subscales	Scoring	Interpretation of Score	Reliability
Self-efficacy	Self-Efficacy for Diabetes (Self-Management Resource Center)	8	n/a	10-point Likert scale; not at all confident (1) to totally confident (10)	Higher score = higher levels of self-efficacy Range:1-10	(α = .85) and a test-retest validity of .80 (Lorig, Ritter, Villa & Armas, 2009). Current study (α = .89)
Outcome expectations: Quality of life	PROMIS Scale Global health v1.2	10	1.Physical health (GPH) 2.Mental health (GMH)	5-point Likert scale- Excellent (5) to Poor (1)	Higher score = more of concept measured; GMH Range: Raw scores 4-20; t-scores:21.2-67.6	Global physical health **(.**81) and Global mental health (.86). (Hays et al., 2009).
Expectations of aging	Expectations Regarding Aging (ERA-12)	12	1)Expectations of physical health 2) mental health 3) cognitive function	4 point Likert scale- Definitely true (1) to Definitely false (4)	Higher score = higher expectations in each domain. Range:0-100	.80 (Bhandari & Kim, 2016); .88 (Sarkisian, Steers, Hays & Mangione (2005). Current study (α = .77)
Goal setting: Goal setting rubric: See Figure 5	Goal setting Questions: See Figure 4	1. Goals: Life & T2D-5 years 2. Ability to meet 3.Rationale rating 4. Willingness to follow	n/a	4-point Likert scale- Very willing (4) to Very unwilling (1). No problems meeting (4) to inability to meet goals (1)	Higher score = higher goal setting characteristics Range:3-13	Current study (α = .66)
Motivation to engage in self-management behaviors	Patient Activation Measure (PAM-13)	13	Provides both a score and a level of activation. Sub-domains include knowledge, belief of importance, skills and access of emotional support- does not individualize domain areas	5-point scale Guttman type scale: Strongly Disagree; Disagree; Agree; Strongly Agree; Not applicable	Higher score = higher activation Range: 0-100	α = .91 (Hibbard et al., 2004, 2005; Sacks, Green, Hibbard, Overton, & Parrotta, 2017).

Figure 3. Details of each measure used in study.

QOL measure for the concept of outcome expectation. Reliability statistic was not provided in the output retrieved from healthmeasures.net, however, the measure has been widely used and is reported to have high reliability (Cronbach alpha = .86; Hays et al., 2009).

Expectations of aging. The expectations that an individual has about aging can influence their health outcomes (Sarkisian, Steers, Hays & Mangione, 2005). The 12-item Expectations Regarding Aging survey (ERA-12) has demonstrated acceptable levels of reliability and validity in various population samples as a measure of aging expectations (Sarkisian et al., 2005). Permission was received from Dr. Catherine Sarkisian to use the tool. This study, applying Social Cognitive theory, used aging expectations as the potential facilitator or barrier to motivation for engaging in self-management behaviors. Each question in the scale is rated using a 4-point Likert scale. The reliability for the current study was acceptable (Cronbach alpha = 0.77).

Motivation to Engage in self-management behaviors. The measure of motivation in the study was assessed using the Patient Activation Measure (PAM-13). This is a 13-item tool shortened from the original 22 item inventory that assesses patient knowledge, skill and confidence for self-management of health or chronic condition (Hibbard, Stockard, Mahoney & Tusler, 2004). The tool items form a unidimensional, probabilistic Guttman-like scale questionnaire that has demonstrated reliability in multiple settings. It provides a score and a level of activation that assesses overall ability to manage health rather than assessing one behavior individually (Insignia Health, 2018). Assessment of activation level provides information about the individual's engagement in appropriate self-management behaviors. The phases of activation are described as first believing the patient role is important, next having the confidence and knowledge necessary to take action, third is taking action to maintain and improve one's health.

The fourth stage of activation is staying the course, even in the face of difficulty. The analysis of the PAM-13 demonstrated psychometric properties similar to the original 22-item version (Hibbard et al., 2005). The range of values is essentially unchanged from the original 22-item version. A subscription to use the measure was obtained from Insignia Health. Participants' individual scores were provided by identification number to the online scoring site; the PAM score and activation level were provided by Insignia Health. In the current study, the score was used as the outcome variable. It provided greater range than the activation level. The scoring was completed by Insignia Health and returned via email; no Cronbach alpha was provided for the current study by Insignia Health.

Goal setting. Exploring the healthcare goals of individuals is an important starting point to providing individualized T2D support (Huang et al., 2005). Identifying individuals' goals provides an understanding of their perspective. Older individuals have been found to define their health in ways that integrate physical, mental, spiritual, and social aspects of their lives (Huang et al., 2005). Participants were asked to provide their goals for their life and for their T2D within the next 2 years in an open-ended format. Additionally, they were asked to appraise their goal congruence by rating the importance level of meeting their own goals, their provider's goals, and their significant other's goals for their health. The participants' willingness to follow the advice provided by their healthcare practitioner and their perception of barriers to doing so was assessed. Goal setting was scored using a rubric to rate goals for: a) setting life and T2D goals, b) the T2D goals relation to self-management activities, c) rating of perceived ability to accomplish goal, d) goal ranking rationale for self or others, and e) willingness to follow provider's advice. (Figures 4 and 5). Reliability analysis for the goal setting scale which used 5 questions to derive the score was completed (Cronbach alpha = .66). Although this result is less than .7, which is

considered acceptable, this scale was developed for this study in the absence of finding other appropriate goal setting scales for measuring the concept in the literature (Pallant, 2013). There are no other data available about its reliability.

Goal Setting Questions

1. What are your life goals for the next 2 years?
2. What are your goals for managing your diabetes for the next 2 years?
3. When thinking about your goals for managing your diabetes, rate your current ability to meet them.

I see no problems in meeting my goals 4	There may be some problems 3	There may be a lot of problems 2	I don't think that I can meet my goals 1

4. When thinking about your goals for managing your diabetes, rank each of these statements.

I have goals for my health and I want to meet my goals.

This is very important to me. 3	This is somewhat important to me. 2	This is not at all important to me. 1

My healthcare provider has goals for my health; I want to meet these goals.

This is very important to me. 3	This is somewhat important to me. 2	This is not at all important to me. 1

My family/friends have goals for my health; I want to meet these goals.

This is very important to me. 3	This is somewhat important to me. 2	This is not at all important to me. 1

5. Regarding discussion with your healthcare provider about your diabetes, how willing are you to follow the advice of your provider?

Very willing 4	Willing 3	Unwilling 2	Very unwilling 1

Figure 4. Goal setting questions for participants.

Rubric to Assess Goal Setting	
Criteria	**Points**
1. Sets life goal for 2 years	Yes = 1 No = 0
2. Sets goal for T2D related to self-management behavior for 2 years	Yes = 1 No = 0
3. Rating for goal management problems	Scale 4-1
4. Rating for goal importance to self	Scale 3-1
5. Willingness to follow advice of provider	Scale 4-1
Total	Goal setting score

Figure 5. Rubric to assess goal setting score used in study**.**

Data Collection Procedures

Recruitment

Participants were recruited at various community sites and events such as in Northeast Wisconsin and by using flyers advertising the opportunity to participate in the study. The researcher had a table with information related to T2D and a sign highlighting the opportunity to participate in the study if criteria were met. Individuals visiting the table would ask various questions and if they were interested, screening questions were asked. Screening included that individuals diagnosed with T2D met the criteria of age and length of diagnosis as well as ability to understand written English, were without comorbidity of chronic kidney disease or

complications of T2D including amputation history, without diagnosis of dementia, and without need for a caregiver for physical or cognitive inability to self-manage. Eligible individuals were provided a brief description of the study to inform their consent. Upon consent, participants either completed the questionnaire on-site or requested that it be emailed that they might complete online. An envelope was provided for placement of the completed packet to be placed in at the site of completion and was sealed for transport. Packets were securely maintained; data were de- identified by using a participant identification number which was not maintained with any identifiable data. Participants were also recruited through senior community programs offered at various sites in northeast Wisconsin where health and educational programming and meals are provided. Consent and questionnaire completion were done during visits to the sites in the same manner described above. Additional recruitment included the use of social media/ workplace bulletin to advertise the opportunity; questionnaires were provided via email or mailed to the participant with a stamped return envelope. Although all individuals were screened for study eligibility, review of completed questionnaires found that nine individuals had completed the questionnaire who noted that they had been diagnosed within two years, but then identified their year of diagnosis outside of this time frame. These individuals' data were excluded from the study. A completion incentive of $10 gift card was offered to all participants.

Participants of the Rural Health Initiative, a Northeast Wisconsin tri-county privately supported health organization providing nursing care, screening, education and referrals to any agriculturally employed individuals and their families provided another source for the participant pool. Qualifying individuals were offered the opportunity to participate and completed the questionnaires in their homes during the nurse visit. Forms were returned in a sealed envelope. Upon receipt, the researcher maintained files by an identification number only.

Previous permission had been obtained to work with a large healthcare system in the area to provide the opportunity for participation at their primary care clinics. However, when the study began, the researcher was informed that policies had recently changed and that no research was being supported other than by their own employees as principal researcher. Thus, this opportunity was not able to be utilized. Additional contact with various clinic systems to request the opportunity to provide flyers to patients was met with poor response and not pursued.

Data Collection

Individuals who consented to participate received a packet containing the questionnaires of demographic data, goal setting, ERA-12, PAM-13, Self-Efficacy for Diabetes and PROMIS Global Health v1.2 to complete. A pilot study was done in 2018 to determine feasibility of completion of various tools and it was noted that the mean time for completion was ten minutes. Patient identifiers were not linked to the questionnaire; participant numbers were used to enhance privacy. Nurses involved in providing the questionnaires were trained by the researcher about the procedure. Individuals were instructed to answer the questions in the manner that they felt fit their ideas and current status. Rural Health Initiative nurses were informed to ensure participants that there is no one correct answer. This was noted in the directions and explanation of the study to avoid guiding participants other than to encourage them to answer as they thought appropriate for themselves. The order of questionnaires was: screening questions with demographic data, PAM-13, Goal-setting questions, ERA-12, PROMIS Global Health, and Self-Efficacy for Diabetes. Rationale for this order included that the outcome variable (PAM-13) was placed first to encourage higher completion rates and avoid missing outcome variable data. Goal setting questions and ERA-12 are predictor variables that do not have questions that may overlap

with other measures being used. Self-Efficacy for Diabetes is placed last as the concept of self-efficacy is also included in the PAM-13.

Data for each participant noted by an identification number were entered and maintained on a Microsoft Excel® spreadsheet during data gathering. The data were checked and rechecked for accuracy in entry by the investigator. This file was maintained in the investigator's password protected computer, to which no other individuals have access. The file contained no identifiable data.

Data Analysis

Preliminary data analysis

Data analysis was conducted using SPSS® Version 26.0 software. Demographic data and study variables were summarized using descriptive statistics appropriate for the measurement level. Frequencies and percentage were calculated for categorical variables and means and standard deviations were calculated for continuous variables. Maximum and minimum values were checked to see if they were within reasonable range. Histograms were created for continuous variables to examine their distributions and look for outliers. The data values identified as outliers were double checked to ensure they make sense. The nonsense or impossible values were corrected before data analysis. Cronbach alphas were determined for the reliability of measures scored by the researcher for the current study.

Correlation analysis was conducted between each of the predictor variables and the criterion variable. Decision to include variables in the primary analyses was based on correlations between predictor variables of $r \leq 0.9$ and between predictor variables and the criterion variable of $r \leq 0.9$. Several assumptions were considered for the use of this analysis. There are 5 variables including one criterion variable, active engagement in self-management (PAM-13). There are 4

predictor variables including aging expectations (ERA-12), goal setting score, diabetes self-efficacy, and global health as quality of life. All variables are continuous. Appropriate checks were done to ensure that additional assumptions were met for appropriateness of statistical analysis method used.

Missing Data

Prior to analysis, the data were cleaned and assessed for outliers. Frequencies for each of the categorical variables and individual items that make up the scales were checked. Minimum, maximum and mean values were assessed; valid and missing cases were identified. Missing values were identified and reviewed for patterns.

Primary data analysis

The data analysis plans are provided below for each of the research questions:

1. What is the direct relationship between Self-Efficacy for Diabetes and motivation to engage in self-management behaviors (PAM-13) for individuals with early diagnosis of T2D?

A linear regression was used to examine the direct relationship between self-efficacy and motivation to engage in self-management behaviors for individuals with early diagnosis of T2D. Based on the results of this regression, mediation analyses were done. The determined significance of the direct relationship between Self-Efficacy for Diabetes and motivation to engage in self-management behaviors was the first step in each of the subsequent mediation research questions. Insignificant results of the direct relationship would indicate no grounds for mediation to be considered (Preacher & Hayes, 2004).

2. Is the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by goals (Goal Setting Questions) of individuals with early diagnosis of T2D?

Multiple regression models and the Sobel test were used to examine if the indirect relationship between Self-efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) was mediated by goals (Goal Setting Questions) of individuals with early diagnosis of T2D. Steps to determine mediation included use of regression models.

1. Self-Efficacy for Diabetes was the predictor variable and goals (Goal Setting Questions) was the criterion variable as a mediator. Using the significance of this relationship, determination of the need for further regression was made.
2. The second model used Self-efficacy for Diabetes as a predictor variable; Goals (Goal Setting Questions) was the predictor variable as a mediator and motivation for engagement in self-management behaviors (PAM-13) was the criterion variable.
3. Based on the results of the regression, the models were assessed for statistical significance.
4. A significant model indicated use of the Sobel test to assess if the mediation effect from goals was statistically significant. From the regression models, unstandardized regression coefficients with standard errors were calculated for the associations between self-efficacy and goals and between goals and motivation for engagement in self-management behavior.

3. Is the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by outcome expectations (PROMIS Global Health) for individuals with early diagnosis of T2D?

Multiple regression models and the Sobel test were used to examine if the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) was mediated by outcome expectations (PROMIS Global Health) for individuals with early diagnosis of T2D. Steps to determine mediation included use of regression models.

1. Self-Efficacy for Diabetes was the predictor variable and outcome expectations (PROMIS Global Health) was the criterion variable as a mediator. Using the significance of this relationship, determination of the need for further regression was made.
2. The second model used Self-efficacy for Diabetes as a predictor variable; outcome expectations (PROMIS Global Health) was the predictor variable as a mediator and motivation for engagement in self-management behaviors (PAM-13) was the criterion variable.
3. Based on the results of the regression, the models were assessed for statistical significance.
4. A significant model indicated use of the Sobel test to assess if the mediation effect from outcome expectations was statistically significant. From the regression models, unstandardized regression coefficients with standard errors were calculated for the associations between the self-efficacy and outcome expectations and between outcome expectations and motivation for engagement in self-management behavior.

4. Is the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by outcome expectations (PROMIS Global Health) through goals (Goal Setting Questions) for individuals with early diagnosis of T2D?

Multiple regression models and the Sobel test were used to examine if the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-

management behaviors (PAM-13) was mediated by outcome expectations (PROMIS Global Health) through goals (Goal Setting Questions) for individuals with early diagnosis of T2D. Steps to determine mediation included use of regression models.

1. Self-Efficacy for Diabetes was the predictor variable and outcome expectations (PROMIS Global Health) was the criterion variable as a mediator. This step was completed in research question 3. Using the significance of the relationship, determination of the need for further regression was made at each step.
2. The second model used Self-efficacy for Diabetes and outcome expectation (PROMIS Global Health) as predictor variables and goals (Goal Setting Questions) was the criterion variable as another mediator.
3. The planned third model used outcome expectation (PROMIS Global Health) and goals (Goal Setting Questions) as predictor variables as mediators on the criterion variable, motivation for engagement in self-management (PAM-13). Based on the results of the regression, the models were assessed for statistical significance.
4. A significant model would indicate use of the Sobel test to assess if the mediation effect from outcome expectations through the second mediator, Goal Setting Questions, was statistically significant. From the regression models, unstandardized regression coefficients with standard errors were calculated for the associations between Self-Efficacy for Diabetes and the mediators and between the mediators and motivation for engagement in self-management behavior (PAM-13).

During the multiple steps of determining mediation, if a relationship was not significant as determined by the coefficients of the regression model, no further testing was needed to determine if mediation was significant.

5. Is the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by expectations of aging (ERA-12) through goals (Goal Setting Questions) for individuals with early diagnosis of T2D?

Multiple regression models and the Sobel test were used to examine if the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) was mediated by expectations of aging (ERA-12) through goals (Goal Setting Questions) for individuals with early diagnosis of T2D. Steps to determine mediation included use of regression models.

1. Self-Efficacy for Diabetes was the predictor variable and expectations of aging (ERA-12) was the criterion variable as a mediator. Using the significance of the relationship, determination of the need for further regression was made at each step.
2. The second model used Self-efficacy for Diabetes as a predictor variable and goals (Goal Setting Questions) was the criterion variable as another mediator.
3. The planned third model used expectations of aging (ERA-12) and goals (Goal Setting Questions) as predictor variables as mediators and motivation to engage in self-management behaviors (PAM-13) was the criterion variable. Based on the results of the regression model, the models were assessed for statistical significance.
4. A significant model would indicate use of the Sobel test to assess if the mediation effect from expectations of aging (ERA-12) through the second mediator, Goal Setting Questions, was statistically significant. From the regression models, unstandardized regression coefficients with standard errors were calculated for the associations between Self-Efficacy for Diabetes and the mediators and between the mediators and motivation for engagement in self-management behavior (PAM-13).

Primary Research Question: Which of the aspects of SCT (Self-Efficacy for Diabetes, outcome expectations (PROMIS Global Health), goals (Goal Setting Questions), facilitator/barrier (ERA-12) are the strongest predictors of motivation to engage in self-management behaviors (PAM-13) for individuals with early diagnosis of T2D?

A multiple regression model was planned to determine how each of the variables in the model contributed as predictors of motivation to engage in self-management behaviors. Goal Setting Questions, Self-Efficacy for Diabetes, expectations of aging (ERA-12) and outcome expectation quality of life (PROMIS Global Health) were identified as potential predictor variables on the criterion variable, motivation to engage in self-management behaviors (PAM-13).

Ethical Considerations

Application for Institutional Review Board was completed for the University of Wisconsin Milwaukee. The approval letter is found as Appendix B. None of the community centers or the Rural Health Initiative has an IRB; however appropriate permission was ascertained prior to distributing information about participation. There were no identified individual risks that were posed by this study. Individuals who met criteria for inclusion had the ability to decline completion of the questions as their choice. There was no identifying information on the questionnaires. The names of individuals were maintained separately from the questionnaires and were locked in a drawer accessible by the researcher. Findings were aggregated and presented allowing that no one individual's data be used or identified.

Summary

This chapter described the methods used to investigate the research questions. Design and characteristics of the study sample were provided. The measures used were presented with

appropriate background information and reliability data. The primary data analysis plans were presented; human subjects' considerations and limitations of the research were also discussed. Chapter 4 will provide the results of the data analysis to answer each of the research questions.

Chapter 4

Results

The results of this correlational study are presented in this chapter. Information provided in the chapter includes a description of the data cleaning and preliminary analyses. The chapter includes a presentation of the results of the data analysis used to address each research question using the plan presented in Chapter 3.

Preliminary Data Analysis

Descriptive analyses

Data analysis was conducted using IBM® SPSS® Version 26 software. The preliminary analyses showed that relationships between variables were linear and met the assumption of normality as assessed by visual inspection of Normal Q-Q plots. Each of the continuous variables in the study including: Diabetes Self-Efficacy, PROMIS Global mental health as QOL, Goal Setting score, motivation to engage in T2D self-management (PAM-13) and expectations of aging (ERA-12) were scored for each individual. The mean, SD, minimum and maximum are provided for the continuous variables to give an overview of the sample with descriptive statistics. (Table 2). Data were screened for the range of values, correct coding, as well as outliers. All data were reviewed for deviations from normality and skewness; no significant deviations were noted. The original means were compared to the trimmed mean statistics and demonstrated that the top and bottom 5 percent of scores to determine whether the outliers had strong influence on the mean (Pallant, 2013). No such problems were indicated between the two means for any of the variables.

No participant data were excluded because of missing data. The only missing data noted included one individual not identifying their ethnicity and three individuals did not provide an

answer to one question on the Diabetes Self-Efficacy scale. The missing question was not the same for each. Scoring information provided for the scale notes that if two or more items are missing, the scale should not be scored (Lorig et al., 2009). None of the individuals' scores were deleted considering this recommendation. Cronbach alphas were calculated for measures used in the current study; this information was reported in Chapter 3.

A correlation was done to determine strength of relationships between predictor variables and the criterion variable in the model. Assumptions were met as described previously. None of the variables correlated with another at a level of $r \geq 0.9$. (Table 3).

Table 2

Descriptive Statistics for Continuous Variables

Variable	Mean	SD	Minimum	Maximum	Score Range
PAM score	58.86	10.67	42.20	84.80	0-100
ERA score	47.39	14.38	5.50	94.40	0-100
Goal setting score	10.21	1.75	4.00	13.00	3-13
Global mental health	41.98	6.60	22.40	59.70	21-67
Diabetes self-efficacy	6.27	1.73	1.63	10.00	1-10

Table 3

Pearson Correlations for Study Variables

	DSE	Goals	QOL	ERA	PAM
DSE	-	.50*	.27*	.15	.41*
Goals		-	.18	.20*	.39*
QOL			-	.29*	.36*
ERA				-	.16
PAM					-

Note: DSE = Diabetes Self-Efficacy; QOL = Global Mental Health QOL; ERA = Expectations Regarding Aging; PAM =Motivation for Self-Management

* = statistically significant at p <.05 level.

Goal Setting: Descriptive Preliminary Data

The Goal Setting score was based on individuals having goals for their life for the next 2 years and identification of goals for T2D management for the same time frame as noted in Figure 5 (Chapter 4). More than half (61.6%, n = 61) of individuals noted that they had goals for their life for the next one to two years. All of these individuals also had goals for their T2D; 70.7% (n = 70) provided their goals related to T2D management. Those individuals who did not identify a life goal also did not identify a goal for their T2D. Thus, individuals who provided their goals had higher total Goal Setting scores. Total scores were calculated using criteria for the rating of perceived ability to attain goals. Those who perceived few barriers received higher scores than those who perceived many barriers to reaching their goals. In rating importance to self in meeting their goals, higher rating would equate to higher total score. Self-attainment was rated as very important by 59.6% (n =59); 36.4% (n = 36) rated as somewhat important; and 4% (n= 4) rated as being unimportant to self. Willingness to follow the advice of the healthcare provider

was also rated; 37.4% (n=37) rated themselves as very willing; 58.6 (n = 56) rated as somewhat willing; and 4% (n = 4) rated as unwilling to follow provider advice.

Goal setting themes. Various life goals were noted by participants. The nature of the goals provided by most individuals included spending more time with family, traveling, retiring, changing career, improving finances, and socializing more. Additional goals noted included by individuals were getting married, gaining strength, and volunteering more. Goals set by individuals related to their T2D management were focused on main themes including improved nutrition and weight loss, exercising and becoming more active, and taking prescribed medications or improving condition to be able to stop using medications. Additional goals for T2D included improvement of blood glucose and HgA1C, and to learn how to better control it.

Primary Results

The primary results for each of the posed research questions are presented individually.

Research question 1

What is the direct relationship between self-efficacy for diabetes and motivation to engage in self-management behaviors (PAM-13) for individuals with an early diagnosis of T2D?

A linear regression was used to examine this relationship. Linearity was established by visual inspection of a scatterplot. The Durbin-Watson test was not needed to detect for independence of observations related to the low likelihood of related observations. Homoscedasticity was noted, as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual inspection of a normal probability plot. Diabetes self-efficacy statistically significantly predicted motivation to engage in self-management behaviors, F (1, 97) = 19.60, $p < .001$. Diabetes self-efficacy explains 16.8% of the variation in motivation to engage in self-management behaviors with adjusted $R^2 = .16$.

This established the relationship of the Social Cognitive Theory model. This is the first step on which subsequent research questions are answered when assessing for mediation. A summary of the regression analyses results can be found in Table 4.

Research question 2

Is the indirect relationship between self-efficacy for diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by goals (Goal Setting score) of individuals with early diagnosis of T2D?

Multiple regression models were used to determine if the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) was mediated by goals (Goal Setting Questions) of individuals with early diagnosis of T2D. Assumptions for use of the model were checked. There was no concern of independence of variables. The relationships were assessed for linearity and homoscedasticity by visualizing scatterplots. No evidence of multicollinearity was noted, as assessed by tolerance values greater than 1.0. The normality assumption was met.

Steps to determine mediation included use of regression models (Table 4, Question 2).

1. Self-Efficacy for Diabetes was the predictor variable and goals (Goal Setting Questions) was the criterion variable as a mediator; results of the model: F (1, 97) =32.347, $p < .005$. Adjusted R^2 =.24.
2. The above relationship was significant; therefore, the determination was made to continue with regression.

Table 4

Summary of Multiple Regression Analyses: Presented by Individual Research Question

Variable	b	SE	β	t	Sig.
Question 1: DSE →PAM	2.52	.57	.41	4.42	.000
Question 2: DSE → PAM- Mediation by Goal Setting					
DSE →Goals	.51	.09	.50	5.69	.000
DSE & Goals → PAM					
DSE	1.76	.64	.29	2.74	.007
Goal setting	1.51	.64	.25	2.37	.020
Question 3: DSE → PAM- Mediation by QOL					
DSE → QOL	1.01	.37	.27	2.72	.008
DSE &QOL→PAM					
Diabetes Self-efficacy	2.08	.57	.34	3.65	.000
QOL	.44	.15	.27	2.94	.004
Question 4: DSE → PAM- Mediation by QOL & Goal Setting					
DSE & QOL →Goals					
Diabetes Self-efficacy	.49	.09	.49	5.32	.000
QOL	.01	.02	.05	.55	.582
Question 5: DSE →PAM- Mediation by ERA & Goal Setting					
DSE→ERA	1.27	.83	.15	1.52	.132

Note: b = unstandardized regression coefficient; *SE* = Standard error of the coefficient; β = Beta standardized coefficient; QOL = Global Mental Health Quality of Life; DSE = Diabetes Self-Efficacy; ERA = Expectations Regarding Aging

Significance level $p < .05$

3. Using Diabetes Self-Efficacy as a predictor with goals (Goal Setting Score) as another predictor variable as mediator; the criterion variable was motivation to engage in self-management (PAM-13). (F (2, 96) =13.075, $p < .005$. Adjusted $R^2 = .20$).
4. Significant regression equations were found; thus conditions were met to continue and determine if mediation was demonstrated.
5. To determine mediation, from the regression models, unstandardized regression coefficients and standard errors for each model were calculated for the associations between Diabetes Self-Efficacy and goals and between goals and motivation for engagement in self-management behaviors (PAM-13). These were then used as calculation for the Sobel test. This calculation tests whether a mediator carries the influence of an independent variable to a dependent variable (Preacher & Hayes, 2008).
6. The Sobel test identified that the indirect relationship between Self-efficacy for Diabetes and motivation for engagement in self-management behaviors was significantly mediated by goal setting ($p < .05$). The percent of the effect mediated by goals in this pathway equals 30.2%.

Research question 3

Is the indirect relationship between Self-efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by outcome expectations-QOL (PROMIS Global mental health) for individuals with early diagnosis of T2D?

Multiple regression models and the Sobel test were used to examine if the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) was mediated by outcome expectations-QOL (PROMIS Global mental health) for individuals with early diagnosis of T2D. Assumptions for use of the

model were assessed as previously described. Steps to determine mediation included use of regression models (Table 4, Question 3).

1. The relationship between Self-Efficacy for Diabetes and motivation to engage in self-management (PAM-13) is already established.
2. Using Diabetes Self-Efficacy as a predictor variable and outcome expectation- QOL (PROMIS Global mental health) as criterion variable as a mediator;
   (F (1, 97) = 7.395, p = .008. Adjusted R^2 = .06).
3. This relationship was determined as significant; therefore the determination was made to continue with regression.
4. Self-Efficacy for Diabetes was a predictor variable; outcome expectation- QOL (PROMIS Global mental health) was a predictor variable as a mediator and motivation to engage in self-management behaviors (PAM-13) was the criterion variable.
   (F (2, 96) =14.895, p = .000. Adjusted R^2 = .22).
5. To determine mediation, from the regression models, unstandardized regression coefficients and standard errors for each model were calculated for the associations between Self-Efficacy for Diabetes and outcome expectations-QOL and between outcome expectations-QOL and motivation for engagement in self-management behaviors (PAM). These were then used as calculation for the Sobel test.
6. The Sobel test identified that the indirect relationship between Self-efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) was significantly mediated by outcome expectation-QOL ($p<.05$). The percent of the effect mediated by Global mental health-QOL equals 17.6%.

Research question 4

Is the indirect relationship between Self-Efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by QOL-outcome expectations (PROMIS Global Mental Health) through goals (goal setting score) for individuals with early diagnosis of T2D?

Assumptions for use of the model were assessed as previously described. Steps to determine mediation included use of regression models (Table 4, Question 4).

1. Results from previous regressions demonstrated that outcome expectations-QOL was a mediator of the relationship between Diabetes Self-Efficacy and motivation for engagement in self-management (PAM-13).
2. Using Diabetes Self-Efficacy as a predictor variable and outcome expectation-QOL as a predictor variable as mediator, goals (Goal Setting Questions) was the criterion variable. (F (2, 96) = 3.823, p = .025. Adjusted R^2 = .05).
3. Analysis of the coefficients of the model demonstrated that Goal setting is not a significant path through which Diabetes Self-Efficacy and motivation for engagement in self-management behaviors (PAM-13) were mediated by outcome expectation-QOL.
4. Based on the insignificant relationship between goals and outcome expectations-QOL, no further analyses were done. These results identified that the criteria were not met for further regression or mediation testing. The relationship between self-efficacy and motivation for engagement in self-management was not mediated by outcome expectation (QOL-PROMIS Global mental health) through goal setting.

Research question 5

Is the indirect relationship between Self-efficacy for Diabetes and motivation for engagement in self-management behaviors (PAM-13) mediated by expectations of aging (ERA-12) through goals (Goal Setting Questions) for individuals with early diagnosis of T2D?

Assumptions for use of the model were assessed as previously described. Steps to determine mediation included use of regression models (Table 4, Question 5).

1. Self-efficacy for Diabetes was the predictor variable and expectations of aging (ERA-12) was the criterion variable as a mediator. Results of the model were not significant. (F (1, 97) =2.31, p=.132. Adjusted R^2 =.01).
2. Analysis of the coefficients of the model demonstrated that Expectations of Aging (ERA-12) was not a significant path of mediation of the relationship between Diabetes Self-Efficacy and motivation for engagement in self-management behaviors (PAM-13).
3. Based on the insignificant relationship between Self-Efficacy for Diabetes and Expectations of Aging (ERA-12), no further analyses were done. These results identified that the criteria were not met for further regression or mediation testing. The relationship between self-efficacy and motivation for engagement in self-management was not mediated by Expectations of Aging (ERA) through goals (Goal Setting Questions).

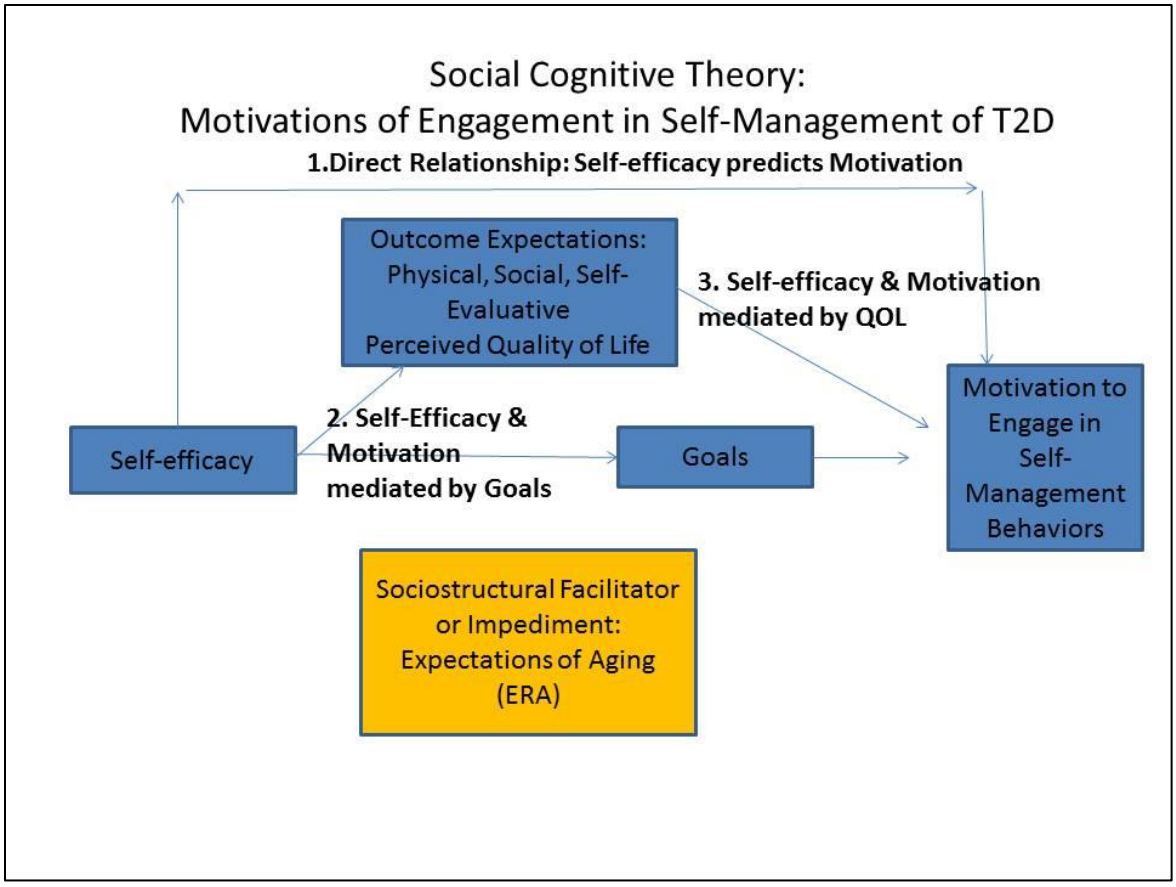

Figure 6. Significant relationships in the model are identified for predicting motivation to engage in T2D self-management. Significant pathways are numbered and labeled according to corresponding research question. Expectations of Aging was not a predictor of motivation and is shown in a different color as this pathway was not identified as significant.

The relationships between the model variables are shown in Figure 6. These relationships determined by answering subsequent research questions provide the basis for answering the primary research question.

Primary research question

Which of the aspects of Social Cognitive Theory (Self-Efficacy for Diabetes, outcome expectations-QOL (PROMIS global mental health), goals, (Goal Setting score), and Expectations

of Aging (ERA-12) are the strongest predictors of motivation to engage in self-management behaviors (PAM-13) for individuals with early diagnosis of T2D?

The planned method for answering this research question was modified after analyses of previous questions. There are multiple mediation pathways explained by the model (Figure 6). The complexity of the multiple mediation pathways determined that linear regression was not fully able to explain the relationships between the variables and the criterion variable, motivation to engage in self-management (PAM-13). The direct relationship of Diabetes Self-Efficacy to motivation to engage in self-management (PAM-13) was demonstrated; Diabetes Self-Efficacy predicts motivation to engage in T2D self-management. This is the only direct pathway to motivation noted in the model.

The pathway from Diabetes Self-Efficacy to motivation to engage in self-management (PAM-13) through goals (Goal Setting score) was demonstrated. Goal Setting was a significant mediator of Diabetes Self-Efficacy. The theory pathway from Diabetes Self-Efficacy to motivation to engage in self-management (PAM-13) through Outcome expectation-QOL (PROMIS Global mental health) was also demonstrated. The mediation effect of Outcome expectation- QOL was significant between the relationship of Diabetes Self-Efficacy and motivation to engage in self-management (PAM-13).

The pathway from Diabetes Self-Efficacy to motivation to engage in self-management through Outcome expectation (QOL) and goals (Goal Setting score) was not demonstrated in the study. QOL and goals were not noted to mediate the relationship as noted in Figure 6. Thus, goals and QOL were each noted to be individual mediators of Diabetes Self-Efficacy and motivation to engage in self-management, but as multiple mediators of the pathway, they were

not significant. Expectations of aging did not significantly mediate motivation to engage in self-management behaviors or predict motivation to engage in self-management (PAM-13).

Summary

Results of the statistical analysis indicated that Diabetes self-efficacy was a significant predictor of motivation to engage in self-management behaviors. Both goal setting and outcome expectation as QOL-PROMIS Global mental health were significant mediators of the relationship between Diabetes self-efficacy and motivation to engage in self-management behaviors. The Social Cognitive Theory model pathways for outcome expectation (QOL-PROMIS Global mental health) and Expectations of Aging as mediators of the relationship between Diabetes self-efficacy and motivation to engage in self-management through goal setting were not demonstrated. Expectations of aging as facilitator/barrier was not a significant predictor of motivation to engage in self-management behavior. Chapter 5 will provide further discussion of these findings and implications for future research.

Chapter 5

Discussion

The discussion includes an interpretation of the research data results related to the study. Each of the research question results are discussed individually with potential implications and posed rationale of the findings. These are discussed with their implications for practice, policy, further research and self-management theory. Limitations of the study are presented.

Major Findings

There are several relevant findings as noted by the outcomes of the research questions. Expectations of aging was not found to predict or mediate motivation to engage in T2D self-management behaviors. Although it did correlate significantly with both Goal setting and QOL, the pathway of influence provided within the Social Cognitive Theory model was not demonstrated. Diabetes Self-Efficacy significantly predicted motivation to engage in T2D self-management. Based on this finding, Goal Setting and QOL both demonstrated significance as individual mediators of self-efficacy on motivation to engage in T2D self-management. Goal Setting plays an important role in motivation to self-manage T2D in the newly diagnosed individual. QOL also demonstrated its importance in affecting the motivation of the individual to engage in self-management behaviors.

Goal setting is recommended as a strategy for promoting behavioral change in the National Standards for Diabetes Self-Management Education and Support (Beck et al., 2017). The literature provides that there is a lack of study about goal setting and implementation for T2D which inhibits the ability to draw specific conclusions about its use (Fredrix, McSharry, Flannery, Dinneen & Byrne, 2018; Miller & Bauman, 2014). The current study adds to the

literature additional acknowledgement of the importance of goal setting as a means of motivating engagement in self-management behaviors for individuals newly diagnosed with T2D.

QOL, as it relates to T2D self-management, is often discussed in the literature as an outcome of knowledge, intervention, or participation in a behavior (Kueh et al., 2017; Williams et al., 2016). This current study adds to the literature the importance of determining motivation to engage in T2D self-management behaviors and provides that the assessment of QOL is important as treatment begins for newly diagnosed individuals. Each of these findings is further discussed as individual research questions.

Self-efficacy and motivation to engage in T2D self-management

Analysis of Diabetes Self-Efficacy scores and Patient Activation Measure (PAM-13) scores as the measure of motivation to engage in self-management behaviors demonstrated that there is a significant relationship between the two factors. Social Cognitive Theory was used to frame this study. This theory asserts that self-efficacy belief is central to behavior change. The concept of self-efficacy is the foundation of human motivation and action (Bandura, 2004). If individuals do not have confidence in their ability to make decisions and lack conviction to successfully meet their goals by following specific actions, they will generally not persevere in their efforts. Self-efficacy is a central tenet of the successful self-management of chronic disease (Lorig & Holman, 2003).

Nearly 17% of the variance in motivation to engage in self-management was explained by self-efficacy in the study. This finding correlates with numerous research studies noting self-efficacy to be an important factor of consideration in T2D self-management (Abubakari et al., 2016; Al-Khawaldeha et al., 2012; Brown et al., 2016; Cheng et al., 2016; D'Souza et al., 2017;

Fisher et al., 2014; Lee et al., 2015; Walker et al., 2014). Self-efficacy continues to be increasingly recognized as a potential predictor of self-management behavior engagement (Emery, Robins, Salyer & Thurby-Hay, 2019). Participants in the current study had Diabetes Self-efficacy scores ranging widely from 1.63 to 10 (scale 0-10), with a mean score of 6.26. This indicates that there was wide variation in their perceived ability to manage T2D as a newly diagnosed person.

Individuals must be confident that they have adequate ability to make appropriate decisions and follow through with them to successfully manage their T2D. The current study demonstrated that participants who rated their confidence in the ability to manage their diet, exercise, and illness complications as high were more likely to be motivated to engage in self-management behaviors of the same nature. These results strengthen previous research findings that individuals must first have self-efficacy in their ability to manage their T2D. Interventions that provide foundational knowledge and support at the onset of T2D should be part of the diabetes self-management education and support for all newly diagnosed individuals. Although self-efficacy is significant, it is important to note that other factors play a role in the motivation to engage in self-management behaviors for individuals age 50 years and older who are newly diagnosed with T2D.

Self-efficacy and motivation: goal setting

Using the Social Cognitive Theory pathway model from self-efficacy to motivation to engage in T2D self-management behaviors, the results of this study demonstrated that goal-setting significantly mediated this relationship. Nearly one-third (30.2%) of the relationship between self-efficacy and motivation was mediated by goal setting. Individuals may have the knowledge

and confidence to self-manage their T2D, but without personal goal setting, there is less potential for maintaining motivation to do so (Bandura, 2004).

Of interest, current study participants who noted having overall life goals for the next one to two years also had goals for the self-management of their diabetes for the same time frame. Similarly, the majority of individuals who denied having life goals also denied having their own goals for T2D self-management. This finding supports the idea that setting personal goals provides additional motivation to engage in behaviors that will assist individuals to attain them. Goal setting is noted in the literature as being an important aspect of successful T2D self-management (Beck et al., 2017; Huang et al., 2005; Klinker et al., 2017). Unfortunately, it is often carried out in the traditional model of healthcare with the provider encouraging weight loss or improvement of HgA1C and the individual agreeing to some degree (Franklin et al., 2017). Individuals noted feeling value in their healthcare providers asking about their personal circumstances and how these were affecting their self-management goals in everyday life. Those who did not perceive their provider as listening to their own perspectives were less likely to keep future appointments and follow through with recommendations (Franklin et al., 2017).

Similarly, the current study found that over half (59.6%) of individuals rated the importance of meeting their T2D self-management goals as very significant to themselves. This demonstrates the importance of assessing the personal situation and goals of the individual in providing T2D self-management education and support. Generic goals are less likely to motivate individuals to engage in self-management. Although goal setting is viewed with importance in T2D self-management, there has been little consideration about whether the goals set are those of the healthcare provider or of the individual. Of note, the current study assessed whether personal goals were specifically related to self-management behaviors. Those who provided

individualized goals that were related to personal behavior outcomes had higher levels of motivation to engage in self-management behaviors as determined by higher goal setting scores.

The current study adds to the literature a measure of assessing goal setting that must be further tested. It also provides rationale for assisting individuals to explore their personal goals for their life and their T2D management to enhance their motivation to self-manage. Authors of a review of T2D self-management programs recommended that individuals be provided self-management education and set goals when they demonstrated readiness rather than at time of diagnosis (Chrvala et al., 2016). However, the results of the current study amplify the importance of encouraging personal goal setting to boost motivation to engage in self-management behaviors. This is an essential consideration in attempting to keep diabetes complications to a minimum by encouraging self-management in early diagnosis. Those who are not able to identify goals may require further probing to determine the reason. They may lack an understanding of the disease or the self-efficacy to manage it. They may not perceive the need to do anything in the absence of complications (von Puffelon et al., 2015). Focusing on improvement of self-efficacy and encouraging newly diagnosed individuals to set personal goals for T2D self-management are crucial considerations to improve motivation for engagement in behaviors necessary for T2D self-management.

Self-efficacy and motivation: Outcome Expectations-Quality of Life

In this study, the theoretical pathway of diabetes self-efficacy influencing motivation to engage in T2D self-management behaviors was mediated by outcome expectations (QOL). The mediation effect of QOL on the relationship between self-efficacy and motivation to engage in self-management behaviors was 17.6%. This demonstrates that individuals' perception of their current physical, social, and self-evaluative outcome expectations impacts motivation and

willingness to engage in self-management behaviors in those newly diagnosed with T2D. If individuals perceived their current QOL negatively, motivation for engagement in T2D self-management behaviors was diminished. Whereas self-efficacy refers to the confidence in abilities to make decisions that will assist in attaining goals, outcome expectancies are the perceived consequences of that attainment. Things like feeling stressed, lacking time, and feeling limited or stigmatized by activities associated with T2D self-management can minimize the perception of QOL leading to poor motivation to self-manage.

When individuals modify health behaviors such as diet and physical activity level, they are continually evaluating their expectations of the outcomes related to these behaviors. If they have positive feelings about the behavior changes and the impact on physical and social aspects of their life, they are more likely to continue with their self-management activities. Negative perceptions of these behaviors on their QOL would mean that individuals are more apt to discontinue the associated behaviors as a means of improving satisfaction (Bandura, 2004).

This study demonstrated that individuals who perceived their current QOL to be high were also more motivated to engage in T2D self-management behaviors. Because the current study focused on newly diagnosed individuals without diabetes complications, their QOL was not likely impacted by complications of the disease. It is concluded that if they perceived their life to be better or not greatly changed by the implications of T2D self-management behaviors, they were more motivated to continue with these behaviors.

The literature generally focused on QOL in T2D self-management as an outcome of a specific intervention. Better glycemic control was expected to improve QOL; this was not always the case as individuals who perceived that health behavior changes decreased their QOL were deterred from engagement in self-management behaviors (Cochran & Conn, 2008; Franciosi et

al., 2001; Jonkman et al., 2016). Also noted in the literature was a lack of focus on newly diagnosed individuals and their perceived QOL.

The current study adds to the literature that perceived QOL should be of consideration early in the T2D diagnosis. Without disease complications, the perceived QOL impacts motivation to begin engaging in self-management behaviors. Self-efficacy is of vital consideration, but ensuring that QOL assessment is part of T2D self-management education and support in the early diagnosis period is also necessary to enhance motivation for engagement in self-management behaviors. Individuals can have knowledge and the confidence in their ability to perform self-management behaviors but if they feel that doing so causes negative consequences, they will be less motivated to follow through with their self-management plan. Issues that are perceived as affecting QOL should be discussed as part of the self-management plan to improve the likelihood of adopting and maintaining behavior changes.

Self-efficacy and motivation: quality of life through goal setting

Although the Social Cognitive Theory pathway from self-efficacy to motivation for engagement in self-management behaviors was not mediated by quality of life through goal setting, both goal setting and quality of life were predictors of motivation. Individually these aspects of the model are important, but quality of life was not found to significantly explain the relationship between self-efficacy and motivation through goal setting. The findings demonstrate that each of the factors has a separate path in mediating motivation to engage in self-management. The theoretical model used in the current study was not able to adequately explain the effects of QOL and goal setting as multiple mediators of self-efficacy on motivation to engage.

Self-efficacy and motivation: expectations of aging

In this study, the pathway from self-efficacy to motivation for engagement in self-management behaviors was not significantly mediated by expectations of aging through goal setting. Expectations of aging did not provide a statistically significant influence on the relationship between self-efficacy and motivation to engage in T2D self-management. It was noted that QOL scores and Goal setting scores individually had significant correlations with Expectations of aging scores. Thus, while aging expectations did not significantly impact motivation via the pathway of the theoretical model, it has relevance in relationship between the variables and should be further considered. Expectations of aging may influence these factors in a complex relationship that is not readily explained by the Social Cognitive Theory model using aging expectations as a facilitator or barrier to motivation through goal setting.

Although there are countless studies focusing on type 2 diabetes self-management, there is little in the literature about aging expectations and its impact on motivation for T2D self-management. The results of the current study differ from the results of a study of 230 adults in Nepal where expectations of aging were found to indirectly mediate self-care through self-efficacy (Bhandari & Kim, 2016). Self-care was defined as the capacity to act and make decisions to successfully manage T2D. Low self-efficacy was correlated with low expectations of aging in the Bhandari and Kim study. The age range of participants was 40 to 88 years with the mean age of 56.9 years; the average duration of diagnosis was 8.7 years. Self-efficacy was found to be lowest among the 40–50 years age group, the authors state that this could have been due to social and familial roles and responsibilities. The current study did not find significant correlations between self-efficacy and expectations of aging; however, all participants were newly diagnosed. The Nepalese study provided that aging expectations were highest among

those individuals aged 71 years and older (Bhandari & Kim, 2016). The current study demographic included few individuals aged 70 and older (n=24); this may contribute to the differing results as younger individuals may perceive aging as more negative than older adults.

The variation of aging expectations through the lifespan correlates with the findings of Chopik et al. (2018). The Chopik study on aging expectations found that younger and middle-aged adults had poorer perceptions of aging than older individuals. As aging is often stereotyped with developing health complications, individuals who have not been negatively affected by health issues may demonstrate higher confidence in their ability to manage. These older adults may have higher expectations of aging than younger individuals who have had negative health experiences and do not yet perceive themselves as beyond middle-age (Barduch et al., 2016; Sims, 2017). This hypothesis could also apply to the current study. Perceptions of aging and the stigma that accompanies the aging process is a socio-structural concept that influences individual decision making (Dannefer & Shura, 2009). Further research is indicated to determine how aging expectations influence QOL and goal setting outside of the context of the Social Cognitive Theory model pathways.

Predictors of motivation to engage in self-management

In the current study, QOL demonstrated a unique contribution as a predictor of motivation to engage in T2D self-management behaviors. Goal setting and diabetes self-efficacy also demonstrated their significance as predictors of motivation. Expectations of aging did not significantly predict motivation. As previously noted, self-efficacy is well documented as having an important role in motivation to engage in new behaviors. This study demonstrates additional support of this relationship. However, self-efficacy alone may not be adequate for motivation to engage in self-management behaviors for individuals newly diagnosed with T2D. This adds to

the literature that QOL in early diagnosis of T2D is an important consideration for helping individuals to determine how behavior changes would best be implemented. If their current perception of QOL is poor, there is less motivation for individuals to change health behaviors. Spending time in conversation, helping them to weigh benefits and perceived losses with regard to changing their health habits would improve the potential for them to be motivated to self-manage. Consideration of their own ideas about how the diagnosis and its implications will impact their life demonstrates that the healthcare provider views the individuals as pilots of their own self-management. Provider support, as opposed to provider dictated goals, helps to improve diabetes self-efficacy and has also improved the rates of follow up healthcare visits (Franklin et al., 2017). Thus, it is important to engage individuals early in the diagnosis period but continued follow up and ongoing care will likely help to maintain motivation for sustained engagement in self-management behaviors through regular visits.

This recommendation aligns with other findings in a study of depression and mental quality of health scores in patients with short duration of T2D (Rathmann et al., 2018). Patients with duration of T2D of 6 years or less were more likely to have poorer quality of mental health than those diagnosed for greater than 6 years. It is likely that there is emotional distress related to the new diagnosis which may impair motivation to engage in self-management behaviors. Close attention should be given to assessment of any change in QOL perception during the early diagnosis period. During this critical time frame, concerns can be readily addressed to improve self-management engagement and decrease the likelihood of developing long term T2D complications.

Goal setting also predicts motivation to engage in self-management behaviors. Although individuals may have self-efficacy, this alone is generally not enough to encourage engagement

in self-management behaviors. Confidence in ability is important but determining meaningful personal health goals enhances the motivation to engage in self-management behaviors. Provider directed goals are often very general in nature such as decreasing HgbA1C or losing weight. Individualized goals provided by participants such as walking twenty minutes daily or eating four servings of vegetables daily are more specific and provide direction about a behavior change that can be modified.

As previously noted, goal setting is widely accepted as an important aspect of self-management (Lafata et al., 2013; O'Donnell et al., 2018; Siminerio et al., 2013). There is, however, inconsistent use of goal setting as an intervention for T2D self-management noted in the literature. There is also inconsistency in the tool used as a measure of goal setting. This study adds to the literature a potential tool for the purpose of measuring goal setting with relation to T2D self-management. Its consideration of life goals and T2D management goals, determination of the importance to self in attaining the goal, and perceived ability to accomplish goals demonstrated a significant relationship between goal setting and motivation for self-management in the current study.

Implications for Future Research

Goal setting demonstrated significance in predicting motivation for engagement inT2D self-management behaviors. Further research using a consistent measure of goal setting would provide additional insight about how developing individualized goals and determining attainment value can influence motivation for behavior change in newly diagnosed individuals. Although goal setting is viewed as an important aspect of self-management in the literature, specific recommendations are lacking. Development and testing of a Common Data Element measuring goal setting would improve generalizability of research findings across diverse populations and

interventions (Moore et al., 2016). The goal setting tool used in the current study was a newly created measure; further use of the tool would provide additional information about its reliability and generalizability. Noting the important influence of goal setting on motivation, additional research is also needed to gain further understanding and rationale for providing relevant goal setting assistance as part of self-management education and support. There remains a gap in understanding how to best assist individuals who have difficulty setting personal goals for T2D self-management. Recommendation is also made for use of the goal setting tool to measure this concept at the onset of diagnosis and then following interventions aimed at improving motivation for T2D self-management. Longitudinal assessment with repeated measures would provide additional data about the usefulness of the tool as well as about goal setting and its complex relationship with motivation.

QOL perceptions impacted motivation to engage in self-management. Further study of newly diagnosed individuals' perceptions of whether engaging in self-management behaviors would improve or diminish their QOL would provide further understanding of this aspect. QOL perceptions impacted expectations of aging in the current study. This pathway of influence was not directly addressed in the research. Thus, further study of QOL in those newly diagnosed with T2D and its influence on their expectations of aging would provide additional understanding of motivation to self-manage. Larger studies including more newly diagnosed adults over age 65 years would provide additional data from which to make determinations about the role of goal setting, QOL and aging expectations in T2D self-management. Future study could focus on alternative pathways of influence not identified by the Social Cognitive Theory model used in the current study.

Although the relationship of QOL and goal setting as mediators of motivation to engage were not identified as significant, further study of the relationship of these factors using a more complex mediation analysis would provide greater understanding of their potential ability to predict motivation to engage in self-management behaviors and of the complex relationship between the factors as multiple mediators or moderators of motivation.

Implications for Practice

The main findings of this study demonstrate the importance of assessing multiple factors at the time of diagnosis of T2D. This is a crucial consideration for developing an appropriate, individualized plan for self-management education and support. Newly diagnosed adults age 50 years and older should be given an assessment of their self-efficacy, QOL, and goal setting as they begin their self-management journey. Based on these considerations, attention should be given to what is specifically important to them regarding their health and what they hope to achieve. Individuals with higher levels of self-efficacy, perceived QOL, and ability to set and pursue personal health goals will likely benefit from minimal guidance and positive feedback from their healthcare provider. However, those with low levels of perceived QOL, self-efficacy, and goal setting ability should be managed differently. Willingness to listen to their perspective regarding a treatment plan and assisting them to develop meaningful goals is recommended over a standardized plan of care for T2D.

It is well noted that education alone does not improve sustained motivation for engagement in T2D self-management (Coppola et al., 2016; Duke et al., 2009; Khunti et al., 2012; & Steinsbekk et al., 2012). However, conversation about setting goals that are meaningful to individuals should be part of the self-management support and care provided for those newly diagnosed with T2D. When these individuals express feeling overwhelmed with the new

diagnosis and all of its implications, it would be appropriate for the healthcare professional to work with them to determine their life goals as a consideration for developing a relevant and meaningful self-management plan. If they have low perceived QOL, it is appropriate to approach this topic asking what aspects of the diagnosis or self-management are causing this perception. Support and resources can be provided to alleviate some of their concerns if possible. For example, if their fear is about maintaining social relationships if they can no longer eat out with friends, encouragement and relevant information should be provided to help them to learn how to adapt their self-management behaviors.

Individuals with higher self-efficacy are more likely to set goals related to their T2D self-management. Individuals with lower self-efficacy when newly diagnosed would likely benefit from the help of a healthcare professional to set appropriate goals. Having specific goals to work toward can improve self-efficacy which leads to better health outcomes (Bandura, 2004; Lafata et al., 2013). Nurses working with patients in various healthcare environments should be encouraged to implement personal health goal setting as part of routine T2D care and education. Helping individuals to explore their own ideas, fears, and expectations of the disease, its implications and how to prevent problems is a crucial consideration when working with those newly diagnosed with T2D. Nurses provide support and education at various points during the patient experience. Advocating that the individuals' goals be assessed at the onset and revisited at subsequent encounters is one step toward improving motivation for self-management behaviors.

Beck et al., (2017) note that T2D self-management support and education must focus on the priorities, concerns and timing of individuals to use a person-centered approach. The goal is to maximize participant outcomes with minimal upset to their lives. Regardless of their preferred

method of healthcare support, it is critical to assess what their goals are for their life and health, what value they place on attaining those goals, and their perception of barriers to meeting set goals. This is a starting point to helping them to create an individualized T2D self-management plan.

Implications for Policy

A main finding of the study was that participants' perceived QOL and goal setting significantly influenced their willingness to engage in self-management behaviors, suggesting a need for stakeholder collaboration. Policies that would encourage such collaboration between the individuals with T2D, healthcare providers and community resources could greatly improve access to resources and improved effectiveness of self-management support programs. Most Medicare eligible adults who are diagnosed with T2D can receive 10 hours of self-management support and education. This includes 1 hour of individual training and up to 9 hours of peer group education and support. After this initial education, individuals are generally eligible for 2 additional hours of diabetes education and support each year (U.S. Centers for Medicare and Medicaid Services, 2019).

This benefit for Medicare eligible individuals age 65 years and older helps to provide education and support for those who require help learning how to manage their disease; it is a valuable asset. However, those individuals under age 65 who are diagnosed with T2D are not always offered this opportunity. Various coverages exist among insurance plans, assuming individuals have insurance coverage. Lack of access to support and education is one of the barriers for younger adults with T2D.

Although evidence exists of the benefits of T2D self-management education and support, lifestyle programs to support such behavior change are not widely available. Unfortunately,

health care insurance companies do not often provide coverage for such programs. Consequently, healthcare providers caring for individuals with T2D may implement medication regimens rather than attempting to motivate and support patients through long-term behavior change (Ades, 2015). Policy providing for improved access to diabetes self-management support is an important aspect of individual assessment of goals and perceptions of QOL as they affect motivation for self-management.

Implications for Theory for Self-Management

Social Cognitive Theory with its components of self-efficacy, goals, outcome expectation, and socio-structural facilitator/barrier and their impact on behavior changes provides a useful structure for framing behavior change intervention and study. It provides foundational concepts that must be considered when examining self-management and the motivations that would enhance engagement in health behaviors. The current study has demonstrated that although the concepts of the theory are important, the pathways through which they influence motivation to engage in self-management are complex. The linear model with its structured path of influence may prove too confining for such complex relationships. Further study of the factors and the relationships between them as mediators may likely demonstrate a model with more overlap of concepts and less linear path modeling.

Limitations

There are limitations noted with the current study. The main limitation of the current study was its measure of all variables from a single study visit; therefore, any changes occurring over time could not be noted. There were also challenges in having multiple sites of data collection with an increased potential for variance to occur in the manner in which individuals are asked if

they are willing to participate. Specific directions and training were provided by the researcher to decrease this potential.

Recruitment opportunities were limited in healthcare settings; use of community centers and events to recruit eligible participants may have affected the demographic of the sample. The sample included a larger number of younger individuals who met the criteria and were willing to participate; this decreased potential for equal population analysis.

The goal setting tool used as a measure of operationalizing the concept in the study was newly created. The tool provided a Cronbach alpha of .66. This is less than the desired acceptable range, .7 or greater, and it has not been tested in any other populations. This is noted as a limitation as well as an opportunity for future research; further testing of the tool to determine consistent reliability is needed.

Lastly, it is recognized that the analysis of expectations of aging, goals, quality of life, self-efficacy, and motivation to engage in self-management does not establish a cause and effect but rather determines the relationships between the study variables.

Summary

In this chapter, a discussion of the findings was addressed. Potential rationales were provided about the results of the research questions. This chapter also included discussion of the implications for practice, policy and self-management theory. The study limitations and recommendations for future research were presented. Future studies are encouraged to further explore QOL and Goal Setting as important factors that influence motivation for engagement in self-management behaviors for individuals newly diagnosed with T2D. Additionally, further study of expectations of aging using a different path of influence is suggested to develop effective strategies to motivate individuals to make positive health behavior changes before long

term effects of the disease occur. Engaging individuals early in their T2D is a crucial intervention to gaining control of the diabetes epidemic and preventing the associated health complications that currently plague the U.S.

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Appendix A: Table of Articles Using Educational Interventions

Author/Year	Aim of Study	Design	Sample	Findings	Strengths/ Limitations
Badedi et al., (2016)	Assess factors associated with glycemic control among Saudi patients with T2D	Analytical cross-sectional study	Random sample of 288 patients with T2D in Saudi Arabia	Sociodemographic factors affected HbA1c. Younger, less educated had higher A1C than older and more informed.	Adds that understanding is important, but also affected by social factors
Brunisholz, et al., (2014)	To determine the impact of diabetes self-management education (DSME) in improving outcomes of diabetes care as measured by a five components & HgA1C, in T2D	Retrospective analysis	384 patients who received DSME; control subjects1,536 patients Mean age 57 years	DSME patients had a significant difference in achievement and in HgA1C % compared to those without DSME. DSME patients had 3-fold decline in HgA1C compared to the control group.	Adds that group education provided positive outcomes. Duration from T2D diagnosis noted from less than 1 year to >10 years.
Coppola et al., (2016)	Clarify the ideal characteristics of a comprehensive patient education programs in clinical practice.	Review of literature re: Therapeutic patient education in T2D	Searches in MEDLINE, Cochrane Central Register of controlled trials, CINHAL, EMBASE, and SCOPUS 1990 – 2014	While group education demonstrated positive outcomes, barriers include logistics of participation. Found lack of consistent intervention and measure.	Adds to the literature that education is widely varied; interventions are not consistent in format or dose. Notes neglected themes in education programs.
Chrvala et al., (2016)	Assess effect of DSME, and contact time on glycemic control in T2D.	Systematic review through year 2013	Searches MEDLINE, CINAHL, EMBASE, ERIC, & Psych INFO - for interventions to improve knowledge, skills, and ability to perform Self-management (SM)	Engagement in DSME results in a statistically significant decrease in HgA1C levels- 118 different interventions used	Duration of diagnosis not considered; dose of intervention found to be significant; >10 hours is beneficial, but no specific guide provided.

Author/Year	Aim of Study	Design	Sample	Findings	Strengths/ Limitations
Davies et al., (2008)	Evaluate effectiveness of a structured group education program on biomedical, psychosocial, and lifestyle measures in newly diagnosed T2D	RCT	824 adults; UK, mean age 59 years	HgbA1C levels at 12 mos. decreased by 1.49% in the intervention group compared with 1.21% in the control group. Not significant. Intervention group had greater weight loss.	No duration since diagnosis considered; adds that type of intervention alone is not main factor of importance.
Duke et al., (2009)	Evaluate the effectiveness of individual patient education on metabolic control, diabetes knowledge and psychosocial outcomes	Cochrane systematic review	RCTs & controlled clinical trials which evaluated individual education for T2D. Intervention was individual patient education while control individuals received usual care or group education. Only studies that assessed outcomes at least 6 months from baseline included. 9 studies/n=1359	No significant differences were found between the various types of individual vs other DSME. Individual education provided greater reduction of HgA1C in those with baseline A1C>8.	Critical assessment of the impact of individual T2D education requires further research based on rigorous methods in high quality studies - including well designed RCTs comparing individual patient education with group education.
Franek (2013)	Systematically assess clinical effectiveness of SM support interventions for persons with chronic diseases.	Meta- analysis and review	OVID EMBASE, EBSCO, CINAHL, the Wiley Cochrane Library, and the Centre for Reviews and Dissemination database published 200-2012; RCTs comparing SM support interventions	10 RCTs met criteria (n = 6,074). 9 evaluated the Stanford CDSMP across various populations; small, improvement with CDSMP across most health status measures, significant improvement in QOL. Small improvement in all healthy behaviors & SE.	Health outcomes measured for chronic disease; not all specific to T2D. Does demonstrate + outcomes with use of Chronic Disease Self-Management Program (CDSMP).

Author/Year	Aim of Study	Design	Sample	Findings	Strengths/ Limitations
Gatlin et al. (2017)	Systematically review RCTs of peer education interventions among adults with T2D	Systematic review	Search revealed 7 studies 2008-2015 with 28-1,231 participants (5 had >100). Age mean 49-71	Peer led groups as effective as control groups. Majority of studies found no differences between groups in outcome of HgA1C; 1 study showed ↑QOL from peer group	No focus on duration of diagnosis; no consistency of program or measure-studies lack heterogeneity for comparison. Most studies provided only 6-month measures.
Johnson et al. (2015)	Examine clinical- and self-care utilization patterns among those receiving varying numbers of hours of DSME	Cross sectional analysis	1,446 adults who were ≥18 years with T2D; Florida Behavioral Risk Factor Surveillance System survey.	Percentage engaging in SM glucose monitoring highest among those who received ≥ 4 hours of DSME. positive association exists between DSME duration and a decreased number of clinical-care utilization.	Focus on dose of DSME; no measure of duration since diagnosis of T2D
Khunti et al. (2012)	To measure whether the benefits of a single education and SM programs for people with newly diagnosed T2D are sustained at three years.	3 year follow up of RCT	UK; 731 of the 824 participants included in the original trial were eligible; data collected on 604 & questionnaire data on 513 participants.	Both groups had improved HgA1at original; No statistically significant biomedical outcomes sustained at 3 years.	One of longest follow-ups noted in review; early referral after diagnosis of T2D. Adds that additional support may be needed beyond original DSME.
Kim et al. (2012)	Focused on the current status of T2D education in clinical practice; to analyze the refusal rate of T2D education prescription & efficacy of T2D education according to compliance.	Retrospective analysis	Korea; 588 individuals; Mean age 56.8 years; mean duration of T2D diagnosis range 5-7 years.	433 received education compliance rate higher in those with a short duration compared to those with a long duration (85.0% vs. 65.1%). GreaterHgA1C ↓ in the compliant group at 12 months.	Those with shorter duration of T2D had better outcomes-implies earlier intervention may be beneficial.

Author/Year	Aim of Study	Design	Sample	Findings	Strengths/ Limitations
Kumah et al. (2017)	To identify the level of integration between usual care and DSME programs & possible differences in outcomes.	Systematic review	PubMed, Scopus and Web of Science - to identify publications on DSME to 2015-49 studies selected	The majority of studies demonstrated some positive outcomes- though highly variable.	Since the studies themselves are so varied, it is difficult to draw any significant conclusions.
Lorig et al. (2016a)	Examined the translation of the Better Choices, Better Health-Diabetes program in both Internet and face-to-face versions	Intervention based; measure at baseline, 6 & 12 months	Online program in U.S. (n=1010). face-to-face workshops in Atlanta, Indianapolis, and St. Louis, (n=232)	Significant improvements in 6 of 7 health indicators including HbA1C &in 7 of 7 behaviors	Mean age 57 years; no duration of diagnosis addressed; no control group
Lorig et al. (2016b)	To determine whether a SM program, offered both Web-based and face-to-face, was associated with improvements in HgA1C and health 1 year after intervention	Follow up and analysis of previous RCT	857 adults with T2D	Participants with 1-year data (69.7% of baseline participants) demonstrated significant 1-year improvements in 13 of 15 outcome measures	Improvements previously noted at 6 months were maintained or amplified at 1 year. Participants >65 years had significantly less increase in stretching and strengthening exercise and in general health. For all other outcomes including HgA1C, change scores were similar to those<age 65.
Lorig et al. (2010)	To test online DSME compared with usual-care subjects, would demonstrate reduced HgA1C at 6 & 18 months, have fewer symptoms, have increased exercise, improved self-efficacy and patient activation.	RCT	761 adults with T2D	At 6 months, HgA1C, patient activation, and self-efficacy (SE) were improved for program participants compared with usual care control subjects. There were no changes in other health or behavioral indicators.	The results were less than expected; note that in analysis of those individuals with baseline higher HgA1C, better outcomes were noted.

Author/Year	Aim of Study	Design	Sample	Findings	Strengths/ Limitations
Lorig et al. (2009)	To determine the effectiveness of a community-based DSME program comparing treatment participants to a randomized usual-care control group at 6 months	RCT	345 adults with T2D	At 6 months, DSME participants did not have improved HgA1C compared with controls. Significant improvements in depression, symptoms of hypoglycemia, communication with physicians, healthy eating, patient activation and self-efficacy.	Baseline A1C was much lower than in similar trials. HgA1c not improved in this study; Both self-efficacy and PAM were strongly improved by participation in the intervention.
Odgers et al. (2017)	To determine the effectiveness of group-based interventions compared with individual interventions or usual care for improving clinical, lifestyle and psychosocial outcomes in T2D	Systematic review	53 publications describing 47 studies (n = 8533 participants). Group-based education programs for adults with T2D that measured HgA1C & followed participants for ≥ 6 months	Group-based education interventions were more effective than usual care, and individual education at improving clinical, lifestyle and psychosocial outcomes in people with T2D.	Although positive outcomes are demonstrated, the wide variations of education and programs are noted.
Sherifali et al. (2015)	To evaluate the effect T2D SM program interventions in older adults.	Systematic review	EMBASE, MEDLINE and Cochrane Trials searched from 1980- 2013, 13 trials met the selection criteria, which included 4517 older adult participants; 2361 randomized to a T2D SM and 2156 to usual care.	DSME programs for older adults demonstrate a small reduction in HgA1C, lipids and blood pressure	Extensive tailoring of conceptual model used to search and use data noted. Studies used age parameter of 65 years or older. Focus on older population but no attention to duration of diagnosis.

Author/Year	Aim of Study	Design	Sample	Findings	Strengths/ Limitations
Steinsbekk et al. (2012)	To assess effects of group-based DSME compared to routine treatment on clinical, lifestyle and psychosocial outcomes in T2D	Systematic review	21 studies (26 publications, 2833 participants) were included. baseline age was 60 years, HgA1C 8.23%, diabetes duration 8 years	HgA1C was significantly reduced at 6, 12& 24 months. For lifestyle outcomes, diabetes knowledge & SM skills improved significantly.SE improved also. For quality of life no conclusion could be drawn	Patients included in studies were similar. Mean age-60 years old, 40% male, duration since diagnosis-7 year mean; mean HgA1C 8.23%.
Tang et al. (2012)	Examine long-term impact of a 24-month, empowerment-based DSME	Longitudinal; descriptive	Michigan; >40 years age;T2D for 1 year or more; previous DSME; n=60	Improvements achieved from the 6-month DSME period, also led to gains in behaviors and psychosocial functioning.	African American population; loosely defined inclusion criteria- differing pre-intervention education; no changes in glycemic control noted
Tshiananga et al. (2012)	To determine the effect of nurse-led DSME on blood glucose control and cardiovascular risk factors.	Meta- analysis	34 RCTs from 1999-2009; n= 5993 patients was identified. Mean patient age was 52.8 years	Nurse-led DSME is associated with improved HgA1C; programs are most effective among seniors and with follow-up periods of 1 to 6months.	Nurse led education found to be more effective in population over age 65; Duration since diagnosis not considered.
Vas et al. (2017).	To assess effectiveness of T2D self-management programs	Review	Science Direct, CINAHL Plus, MEDLINE &Access Medicine. Studies from 2000 to 2015. Of retrieved 37 566 studies, 14 studies were reviewed. 8,514 total participants age 30 or older with T2D	Studies demonstrated favorable DSME outcomes with varied interventions; specific conclusions cannot be drawn r/t inconsistent methods/measures	Duration of T2D diagnosis not considered; studies measured outcomes from 6-24 months post intervention. Outcomes: BMI, HgA1C,lipids, SE, QOL, social support

UNIVERSITY of WISCONSIN
UWMILWAUKEE

Department of University Safety & Assurances

Melody Harries
IRB Administrator
Institutional Review Board Engelmann 270
P. O. Box 413
Milwaukee, WI 53201-0413
(414) 229-3182 *phone*
(414) 229-6729 *fax*

uwm.edu/irb
harries@uwm.edu

New Study - Notice of IRB Exempt Status

Date: April 3, 2019

To: Rachel Schiffman
Dept: Nursing

CC: Lisa Blohm

IRB#: 19.A.256
Title: Expectations of Aging and Goals as Motivation for Type 2 Diabetes Self-Management in Individuals with Early Diagnosis

After review of your research protocol by the University of Wisconsin – Milwaukee Institutional Review Board, your protocol has been granted Exempt Status under Category 2 as governed by 45 CFR 46.104(d). Your protocol has also been granted approval to waive documentation of informed consent as governed by 45 CFR 46.117 (c).

This protocol has been approved as exempt for three years and IRB approval will expire on April 2, 2022. Before the expiration date, you will receive an email explaining how to either keep the study open or close it. If the study is completed before the expiration date, you may notify the IRB by sending an email to irbinfo@uwm.edu with the study number and the status.

Any proposed changes to the protocol must be reviewed by the IRB before implementation, unless the change is specifically necessary to eliminate apparent immediate hazards to the subjects. The principal investigator is responsible for adhering to the policies and guidelines set forth by the UWM IRB, maintaining proper documentation of study records and promptly reporting to the IRB any adverse events which require reporting. The principal investigator is also responsible for ensuring that all study staff receive appropriate training in the ethical guidelines of conducting human subjects research.

As Principal Investigator, it is also your responsibility to adhere to UWM and UW System Policies, and any applicable state and federal laws governing activities which are independent of IRB review/approval (e.g., FERPA, Radiation Safety, UWM Data Security, UW System policy on Prizes, Awards and Gifts, state gambling laws, etc.). When conducting research at institutions outside of UWM, be sure to obtain permission and/or approval as required by their policies.

Contact the IRB office if you have any further questions. Thank you for your cooperation, and best wishes for a successful project.

Respectfully,

Melody Harries

Melody
Harries
IRB
Admini
strator

CURRICULUM VITAE

Lisa Blohm

Place of birth: Green Bay, WI

Education:

A.D., Fox Valley Technical College; Appleton, WI, January 1991
Major: Nursing

B.S., Marian University; Fond du Lac, WI, 2003
Major: Nursing

M.S., Bellin College of Nursing; Green Bay, WI, May 2010
Nursing Education

Dissertation Title: Expectations of Aging and Goals as Motivation for Type 2 Diabetes Self- Management in Individuals with Early Diagnosis