

TREATING TYPE 2 DIABETES USING SHARED MEDICAL APPOINTMENTS:  
PATIENT SATISFACTION AND PERSPECTIVES

by

Sandra Kay Milling

A dissertation submitted to the faculty of  
The University of North Carolina at Charlotte  
in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy in  
Health Psychology

Charlotte

2018

Approved by:

---

Dr. Amy Peterman

---

Dr. Jennifer Webb

---

Dr. Maren Coffman

---

Dr. Theresa Rhodes

©2018  
Sandra Kay Milling  
ALL RIGHTS RESERVED

## ABSTRACT

SANDRA KAY MILLING. Treating type 2 diabetes using shared medical appointments: Patient satisfaction and perspectives. (Under the direction of DR. AMY PETERMAN).

In the U.S., more than 30 million people are living with diabetes. Given the scope of the problem, it is necessary to identify effective, lower cost alternatives to individual medical appointments for diabetes care. Shared medical appointments (SMAs) are a treatment model that addresses many of the mandates outlined in the Affordable Care Act. In SMAs, a group of patients meet with a physician and other healthcare professionals to discuss medical information and self-management behaviors. SMAs have been found to be associated with improved access and enhanced patient outcomes in comparison to usual care. However, patient satisfaction with the SMA intervention model has been vastly understudied. The main goal of this qualitative study was to conduct a detailed exploration of patient satisfaction with the SMA model. Fourteen patients with type 2 diabetes participated in this focus group study. Thematic analysis was used to analyze the data from the focus groups. Five main themes were found, including the following: 1) patients no longer felt alone in managing their diabetes; 2) improving self-efficacy enhanced their diabetes care; 3) diabetes care requires re-contextualizing eating behaviors; 4) diabetes management is complex; and 5) patients frequently use fear-based messages to increase their level of motivation. Overall, patients were satisfied with the SMA model. This research adds to the diabetes SMA literature, as it highlights the components that are important for patient satisfaction with their medical care.

*Keywords:* shared medical appointment, type 2 diabetes, patient satisfaction

## DEDICATION

This dissertation is dedicated to my parents. This achievement would not have been possible without your love and support. I deeply appreciate your wisdom, dedication, and most importantly, your patience. Thank you for always believing in me and for encouraging me throughout this process. I love you both very deeply and I'm honored to be your daughter.

## ACKNOWLEDGEMENTS

There are several people and organizations that I would like to thank. First, let me thank my advisor and dissertation chair, Dr. Amy Peterman. Dr. Peterman, you have provided me with emotional, instrumental, and moral support throughout my academic career at UNC Charlotte, as well as throughout this dissertation process. There was a time when I lost all self-confidence and without you, I would not have made it this far in the program. I know that you had to sacrifice time with your own family to provide support through editing, advising, as well as taking the time to listen to my concerns. Thank you deeply for your time, support, honesty, and wisdom.

I would also like to thank my dissertation committee, Drs. Jennifer Webb, Maren Coffman, and Theresa Rhodes, for your advice, feedback, and patience. Dr. Webb, you provide kindness and support to all of your students and it is deeply appreciated. Dr. Coffman, your patience and knowledge of diabetes care has been instrumental for this dissertation. Dr. Rhodes, I deeply appreciate your willingness to be on my committee. I want to thank you, Dr. Rhodes, for your clinical training, emotional support, and advice that you have provided me throughout my graduate training. I would also like to thank, Dr. Christine Davis, as she was instrumental in assisting me with learning qualitative data analysis. A special thanks to Dr. Carson Rounds. Thank you, Dr. Rounds, for trusting me to work with your patients, for your guidance, and your support. Also, thank you, Dr. Rounds, for your humor and patience, which were vital for the completion of this dissertation.

I would like to thank the Novant Health Care system for allowing me to conduct my study with one of their medical practices. Thank you to all of the staff at Midtown

Family Medicine for your willingness to stay late and help with this study. Finally, I would like to thank the Counseling Center at Appalachian State University for allowing me to alter my schedule and work evening hours on internship in order to collect data for my dissertation.

## Table of Contents

List of Tables	xiv
List of Figures	xv
CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW	1
Overview of Literature Review	2
Rationale for Selected Population	3
Overview and Definition of Diabetes	3
Treatment Concerns with T2DM in Current Primary Care Model	5
SMA Overview and Rationale for Examining the SMA Model	6
Benefits of the SMA Model	8
Physical Health Implications for using SMA Model to Treat T2DM	8
Psychosocial Health Implications for using SMA Model to Treat T2DM	9
Overview of SMA Findings	10
Composition of the SMA Model in the Literature	11
Leadership of Multidisciplinary Teams	12
Number of Participants Per SMA Groups	12
Theoretical Framework of the Studies in this Review	13
Outcomes of the SMA Model	14
Improved Quality of Care	14
SMA Effectiveness with Glycemic Control	14

Patient Satisfaction	16
CHAPTER 2: CONCEPTUAL MODEL	20
Rationale for Conceptual Model	20
Theoretical Influences of Conceptual Model	21
Socioecological Model	21
Chronic Care Model	23
Acceptance and Commitment Therapy	24
Assessing Readiness to Change	26
Stages of Change Model	26
Conceptual Model Utilized in this Study	27
Key concepts in SMA design and overview of the model	27
Purpose and Aims of this Study	33
Research Questions	33
CHAPTER 3: METHODS	35
Overview of Study Design	35
Clinic Setting	36
Participant Inclusion Criteria	37
Participant Exclusion Criteria	37
Procedures	37
Recruitment	37



Pre-Group Meeting	40
Analyzing Pre-Group Meeting Data	41
SMA Intervention	42
Final Focus Group	42
Assessment Instruments	43
Overview of the Assessment Instruments	43
Diabetes Self-Management Questionnaire (DSMQ)	43
Patient Health Questionnaire-9 (PHQ-9)	45
AIM-HI Fitness Inventory	46
Acceptance and Diabetes Questionnaire (AADQ)	48
Overview of Data Analysis	49
Quantitative Analysis	49
Qualitative Data Analysis	49
CHAPTER 4: RESULTS	52
Quantitative Results	52
Participant Screening and Recruitment	52
Participant Demographics	52
A1c Levels and Weight: Pre and Post-SMA Participation	53
Results from Assessment Instruments	54
DSMQ	54

PHQ-9	55
AIM-HI Fitness Inventory	56
AADQ	59
Attendance of SMAs	60
Qualitative Results	60
Overview of Qualitative Section	61
Summary of Overarching Themes	62
Research Objective 1	63
Supportive group dynamics sub-theme.	65
Increased connection with physician sub-theme.	67
Desire to continue participating in the SMA format sub-theme.	68
Desire for more structure sub-theme.	69
Research Objective 2	69
Lack of confidence in nutritional knowledge sub-theme.	70
Learning to read food labels sub-theme.	71
Prioritization of self sub-theme.	72
Making decisions based on values sub-theme.	73
Research Objective 3	74
Overarching Themes for Research Objective 3	76
Recontextualizing eating behaviors overarching theme.	76

Diabetes management is complex overarching theme.	77
Stress management sub-theme.	78
Loss vs. gain-framed messages overarching theme.	80
Summary of Research Objective 3.	81
CHAPTER 5: DISCUSSION	83
Overview of Discussion	83
Quantitative Results Summary and Discussion	83
Patient Characteristics	83
A1c and Weight Findings	85
Discussion of Results from Measures	87
DSMQ	87
PHQ-9.	89
AIM-HI.	90
AADQ.	92
Summary of Qualitative Results	92
Overarching Themes	92
Patient Satisfaction (Research Objective 1)	93
Helpful Components of SMA Model (Research Objective 2)	95
Suggestions for Future SMA Design (Research Objective 3)	97
Loss-Framed versus Gain-Framed Messages	98

Other Recommendations for Future SMA Studies	100
Examining Sustainability of SMA Intervention Effects	100
Exploring the Costs and Benefits of SMAs	100
Strengths and Limitations	101
Strengths	101
Limitations	103
Conclusion	105
REFERENCES	107
APPENDIX A. CHARACTERISTICS OF THE SMA STUDIES	121
APPENDIX B: SMA INTERVENTIONS	131
APPENDIX C. SCRIPT FOR RECRUITMENT CALLS FOR SMA	141
APPENDIX D. CONFIDENTIALITY AND CONSENT FORM	142
APPENDIX E. SAMPLE PLEDGE AGREEMENT	144
APPENDIX F. HIPAA NOTICE	145
APPENDIX G: FOCUS GROUP QUESTIONS FOR INITIAL SMA	146
APPENDIX H: FINAL FOCUS GROUP QUESTIONS FOR FINAL SMA	148
APPENDIX I: DIABETES SELF-MANAGEMENT QUESTIONNAIRE	151
APPENDIX J: PATIENT HEALTH QUESTIONNAIRE-9	152
APPENDIX K: AIM-HI FITNESS INVENTORY	153
APPENDIX L: AADQ	155

APPENDIX M: LIST OF CATEGORIES FOR CODES

## List of Tables

Table 1: Preparation for SMAs	39
Table 2: Participant Demographics	53
Table 3: A1c levels and weight: Pre and post-SMA participation	54
Table 4: PHQ-9 scores pre and post-SMA participation	56
Table 5: Patient responses on AIM-HI Fitness Inventory pre and post-SMA participation	58
Table 6: Patient responses on the AADQ at 3-month follow-up	59
Table 7: Attendance for both SMA groups 1 and 2	60
Table 8: Themes from the focus groups	62

List of Figures

Figure 1: SMA Conceptual Model	32
--------------------------------	----

## CHAPTER 1: INTRODUCTION AND LITERATURE REVIEW

Today's health care landscape has markedly changed, as approximately half of all American adults, roughly 117 million people, have one or more chronic illnesses (Ward, 2014). Chronic health conditions, such as cancer, stroke, heart disease, obesity, and type 2 diabetes are not only some of the most common health problems in the United States, they are also the most costly and potentially preventable of all health conditions (Centers for Disease Control and Prevention [CDC], 2015). Management of chronic diseases is an ever-increasing challenge in primary healthcare. Over a decade ago, the Institute of Medicine published a report that identified that the quality of medicine is suffering due to the rapid increase in chronic disease and the inefficiency of the current delivery system (Institute of Medicine, 2001). Traditional health care practices have been designed to address acute illnesses and provide care based on current symptoms, which poorly fits the need of those with chronic illnesses such as type 2 diabetes mellitus (T2DM) (Siminerio, Zgibor, & Solano, 2004).

In recognition of the inefficiency of the current healthcare delivery system, the Affordable Care Act (ACA) of 2010 was developed (Kocher, Emanuel, & DeParle, 2010). The ACA mandates that quality of care must be improved by improving access to care, increasing patient engagement, enhancing collaborative decision-making, and inquiring about patient satisfaction (Millenson & Macri, 2012). Shared medical appointments (SMAs) are becoming more common in the primary care setting, as this treatment model addresses many of the mandates outlined in the ACA. SMAs have been found to be associated with improved access (Burke & O'Grady, 2012) and enhanced patient outcomes (Menon, Mousa, de Courten, Soldatos, Egger & de Courten, 2017).



However, patient satisfaction with the SMA intervention model has been vastly understudied. To be truly patient-centered and in compliance with ACA recommendations, an examination of patient satisfaction regarding the SMA model is critical. To address this evidence gap in the literature, the purpose of this study was to provide a deeper understanding of patient satisfaction with the SMA intervention model by using focus groups of SMA participants to gather in-depth qualitative data on this topic. Given that T2DM is one of the fastest growing health conditions in the United States, patients with this chronic health problem were the selected population for this study.

### **Overview of Literature Review**

The background section of this paper will begin by providing a rationale for the selected population (i.e., patients with T2DM). Next, the population will be defined and treatment concerns for this population will be identified (e.g., health behavior changes are often difficult to make, depression is highly comorbid with T2DM, etc.). Following this, the SMA treatment model as an alternative to traditional care will be discussed. The history of the SMA model will be reviewed prior to examining how this intervention model can offer unique benefits to patients with T2DM. The benefits of using the SMA intervention model with patients with T2DM will be broken down into two major categories: 1) physical health implications for using SMA model to treat T2DM; and 2) psychosocial health implications for using the SMA model to treat T2DM.

Subsequently, the diabetes SMA literature will be examined. First, the composition of the SMAs will be discussed (i.e., the make-up of the multidisciplinary teams, the leadership of the teams, number of participants per group, and theoretical

framework of the studies). Next, the outcomes of the diabetes SMA literature will be reported (i.e., examining how participating in a diabetes SMA impacted patient quality of care, A1c scores, and patient satisfaction). After the diabetes SMA literature has been reviewed, evidence gaps will be outlined (i.e., diabetes SMA literature is largely not theory-based, readiness to change is often not assessed, and most importantly, there is a lack of examination of patient satisfaction). The theoretical framework for this study and the proposed conceptual model will then be addressed. Finally, the research questions and specific aims for this study will be described.

### **Rationale for Selected Population**

In the United States, more than 30 million adults are living with diabetes (CDC, 2018). Alarming, approximately 86 million Americans have prediabetes and 90% of them are unaware of their diagnosis (CDC, 2016). Diabetes has major implications for health. Not only is diabetes the seventh most common cause of death in the U.S. (CDC, 2014), but it is also the number one leading cause of blindness, cardiovascular disease, lower limb amputation, and kidney failure (International Diabetes Federation [IDF], 2015). Individuals with diabetes are twice as likely to have heart disease or a stroke in comparison to non-diabetics (CDC, 2018).

### **Overview and Definition of Diabetes**

Type 2 diabetes is the chronic health condition that is the focus of this study, as T2DM accounts for approximately 90% to 95% of all diagnosed cases of diabetes (CDC, 2018). Diabetes is a metabolic disease characterized by hyperglycemia, which is the result of a combination of insulin resistance and an insufficient insulin secretion response (American Diabetes Association [ADA], 2011). Most patients with T2DM are obese and

it is believed that obesity itself contributes to insulin resistance. T2DM often goes undiagnosed for an extended period of time due to the fact that hyperglycemia develops gradually and symptoms are often not severe enough to be noticed. As individuals become older, levels of physical activity typically decrease and weight increases, the chances of developing T2DM significantly increases (ADA, 2011). Initial symptoms of diabetes may include blurry vision, thirst, polyuria, and weight loss (World Health Organization [WHO], 1999). Long-term problems associated with T2DM include shortened life span, microvascular complications, ischemic heart disease, stroke, and poorer quality of life (WHO, 1999).

Using the diagnostic criteria set forth by the ADA, T2DM is diagnosed when the hemoglobin HbA1c (A1c) value is greater than 6.5% on two independent occasions (ADA, 2010). The A1c measure is the most common method for assessing glycemic levels for diagnostic purposes and for examining treatment response. One of the most popular ways to measure A1c is the immunoassay approach using a point-of-care instrument, as it is fully automated and meets the requirements set forth by the National Glycohemoglobin Standardized Program (Koch, 2014). Over the course of two to three months, the higher the glucose levels, the higher the A1c scores will be. The recommended A1c target level for patients with T2DM is approximately 6.0% -7.5% (IDF, 2012).

A large body of evidence indicates that reductions in A1c for patients with T2DM is vital for improved health outcomes (The Diabetes Control and Complications Trial Research Group [DCCT], 1993; DCCT, 2002; IDF 2015). Glycemic control is not only assessed by reductions in A1c scores but is also assessed through use of blood glucose

devices to examine blood glucose scores. A1c scores represent an average of glucose levels over a 2 to 3-month time frame, while blood glucose scores reflect what is occurring in the body in the present moment. Daily glucose monitoring using a blood glucose device is recommended for patients that meet any of the following criteria: taking insulin; pregnant; difficulty controlling blood glucose levels; low blood glucose levels; and have ketones from high blood glucose levels (ADA, 2016).

### **Treatment Concerns with T2DM in Current Primary Care Model**

The ADA has three main objectives for treating T2DM including regular medical care, ongoing diabetes support, and self-management education (ADA, 2011). Ongoing diabetes support recommended by the ADA (2011) includes patients receiving screening and treatment for heart disease, neuropathy, kidney disease, and psychosocial needs. The guidelines also specify that physicians should provide nutrition counseling, physical activity recommendations, foot care, smoking cessation tips, and immunizations. Given that medical visits are typically limited to 15 minutes in the traditional face-to-face acute healthcare model, physicians are often unable to fully address the patient's diabetic health needs as recommended by the ADA (Burke & O'Grady, 2012).

Moreover, achieving glycemic control for patients with T2DM requires changes in health behaviors such as taking diabetic medications as prescribed, increasing physical activity, and eating healthier foods. Lifestyle changes, particularly those aimed at developing a healthy diet and increasing physical activity, are notoriously difficult to make: thus, psychosocial interventions, which target healthy eating and exercise are needed (Gonder-Frederick, Cox, & Ritterband, 2002). However, as mentioned earlier, in traditional care, there is only a 15-minute time allotment with the physician and as such,

psychosocial interventions are often difficult to make due to time restrictions (Burke & O'Grady, 2012). In addition, physicians in the primary care setting have varying levels of success in administering psychosocial interventions on their own given that this type of intervention is not a major focus of their educational training (Vickers et al., 2013).

Depression is also a major treatment concern with patients with T2DM, as it is the most common psychiatric disorder associated with diabetes (Ismail, 2009). In comparison to their non-diabetic counterparts, Ali and colleagues (2006) found that depression was twice as likely for those diagnosed with T2DM. Depression is known to cause significant problems for patients with T2DM. In a meta-analysis conducted by Gonzaelez and colleagues (2008), the authors found a significant association between depression and treatment non-adherence in patients that have been diagnosed with diabetes. Depression is associated with poorer quality of life, increases in hyperglycemia (Lustman et al., 2005), increased health care utilization (Egede, Zheng, & Simpson, 2002), functional impairment (de Groot et al., 2001), increased chances of mortality (Astle, 2007), and increases in health care costs (Lustman & Clouse, 2005). Moreover, patients with increased levels of depression tend to report less satisfaction with their providers (Desai, Stefanovics, & Rosenheck, 2005). Unfortunately, depression in diabetes often goes undetected, therefore it is frequently under-diagnosed and undertreated (Ismail, 2009). Lack of time availability with the patient in the traditional care model and lack of specific training with depression are likely significant contributing factors to this problem.

### **SMA Overview and Rationale for Examining the SMA Model**

It is clear based on what has been described in the literature, that the current acute healthcare delivery system is limited in its ability to treat the chronic disease of T2DM.

This leads to the following question: What is a SMA and how can it be used to treat T2DM in order to address some of the limitations found in the current healthcare delivery system? The term *shared medical appointment* (SMA) was first developed in 1996 by Dr. Edward Noffsinger, a psychologist on staff with Kaiser Permanente (Bartley & Haney, 2010). The SMA term has often been used interchangeably with the following phrases: group medical visits (GMV), cluster visits (CV), drop-in-group-medical visits (DIGMA), and group medical appointments (GMA). What makes the SMA model unique in comparison to other models is that groups tend to be homogenous in diagnosis, whereas other models such as DIGMAs tend to use groups with varying diagnoses (Pfizer, 2010). SMAs typically involve a multidisciplinary team (e.g., physician or nurse practitioner, pharmacist, diabetes educator, health psychologist, nutritionist, case manager, etc.) that typically meets with a group 8-20 patients, in a 1 to 2-hour appointment, at least once a month (Kirsh et al., 2007).

SMAs are an alternative to the traditional one-on-one treatment method for T2DM (T2DM) and have the potential to enhance diabetes self-management, increase access to healthcare, and improve efficiency of healthcare for patients with T2DM (Schmucker, 2006). Given that management of T2DM is complex and requires modifications in behavior, lifestyle, and diet, it is clear that the traditional 15-minute doctor's appointment in the current acute care model is insufficient in addressing the needs of patients with this condition (Burke & O'Grady, 2012). The literature regarding the effectiveness of SMAs to treat T2DM is promising and several recent systematic reviews have noted that this intervention model is associated with better glycemic control

and improved self-management behaviors (Edelman et al., 2015; Housden, Wong, & Dawes, 2013; Menon et al., 2017; Sumego & Bronson, 2014).

### **Benefits of the SMA Model**

#### **Physical Health Implications for using SMA Model to Treat T2DM**

As described in earlier sections, A1c levels are a measure of glycemic control. A reduction in A1C levels represents the primary treatment goal for treating T2DM. A 1% reduction in A1c equates to a 21% reduction in diabetes-related deaths, a 37% decreased chance of microvascular complications, and a 14% reduction in myocardial infarction (IDF, 2015). Psychosocial interventions, which require time and specific training to implement, have been found to be important for glycemic control in treating T2DM. For example, a systematic review and meta-analysis identified 25 randomized controlled trials that examined the use of psychosocial interventions for the treatment of T2DM (Ismail, Winkley, & Roabe-Hesketh, 2004). The meta-analysis revealed that 12 of the identified trials that used psychological interventions had significantly better glycemic control in comparison to the control group. The results indicated that there was a -.76% reduction in glycated hemoglobin. Furthermore, when less intensive psychological interventions were removed from the analysis, indicating heavier use of psychosocial interventions, the results showed a 1% overall reduction in A1c (Ismail, et al., 2004). Although the studies included in the Ismail et al. review were not using the SMA treatment intervention model, the findings from this study supports the assertion that incorporating psychological interventions into the treatment of T2DM can result in significant improvements in physical health. Given that SMAs utilize a multidisciplinary team approach, often including a health behaviorist or psychologist, there are more

opportunities to have trained professionals administer the psychosocial interventions. In addition, in comparison to traditional care, SMAs have more time resources, as the sessions are longer in duration. Therefore, there are more opportunities to take advantage of the psychosocial interventions during a medical appointment.

In summary, achieving glycemic control involves several lifestyle changes including improvements in diet and exercise, as well as health management skills such as medication adherence, testing blood glucose levels, and having an awareness of symptoms (IDF, 2015). The increased amount of time offered in the SMA model allows more opportunities for the patient/provider relationship to develop and it provides more opportunities for psychosocial interventions to be conducted.

### **Psychosocial Health Implications for using SMA Model to Treat T2DM**

Increased opportunities for detection of psychosocial issues is important, as T2DM is often complicated by several psychological problems including depression, stress and anxiety, eating disorders, self-destructive behaviors, and interpersonal/family conflicts (Snoek & Skinner, 2002). SMAs not only allow for more time with a multidisciplinary team, but also because of the increased time, there are more opportunities to detect psychosocial issues or medical conditions that may not have been previously noticed (Noffsinger & Scott, 2010). In addition, given that the SMA approach often uses mental health professionals as part of the multidisciplinary team, this intervention method offers the opportunity for more education regarding motivation and self-management, as these are areas of expertise for mental health professionals (Burke & O'Grady, 2012). For example, a key focus in providing psychosocial interventions for diabetes treatment largely includes goal setting, increasing coping skills, self-monitoring,



and social support (Peyrot & Rubin, 2007), all of which represent areas of extensive training for mental health professionals.

In addition, the increased time with physician and other providers offers more opportunities to establish rapport, provide interventions, and monitor treatment progress.

Establishing rapport is a critical factor, as under-treatment of depression partly occurs because patients are reluctant to discuss emotions with their physicians and health care professionals (van Bastelaar et al., 2011). In addition, many primary care physicians report feeling like they do not have the resources or tools to properly treat depression in their diabetic patients (van Bastelaar et al.). Therefore, the addition of the multidisciplinary team, specifically a health behaviorist, may provide multiple benefits including advanced training on providing psychosocial interventions and advance training on developing rapport. This is an area in the literature which makes it abundantly clear that examining patient perspectives and satisfaction with the SMA model is not only necessary, it is critical for patient-centered care.

### **Overview of SMA Findings**

Recent reviews that have examined the effectiveness of SMA interventions for improving health outcomes indicate that this intervention model is promising. However, examination in this area has been often narrowly focused on clinical outcomes, without a focus on patient perspectives, including the patient's readiness to change. The literature review will begin by describing the composition of the SMAs found in the diabetes SMA literature (i.e., the make-up of the multidisciplinary teams, the leadership of the teams, number of participants per group, and theoretical framework of the studies). Next, the outcomes of the diabetes SMA literature will be discussed (i.e., quality of care, A1c

scores, and patient satisfaction). After the diabetes SMA literature has been reviewed, evidence gaps will be identified. The theoretical framework and the conceptual model used in this study will then be discussed. Lastly, the research questions and specific aims for this study will be described. The goal of the literature review is to synthesize the findings on this topic and to provide a description of how this study addresses the evidence gaps in the literature.

### **Composition of the SMA Model in the Literature**

Studies included in this review were only selected if A1c levels were examined, T2DM was the study population, and the study was conducted in the United States. Non-U.S. studies were excluded, as medical systems are not universal. As can be seen in Appendix A, of the 28 studies included in this review, 16 of the original studies examined in this diabetes SMA literature review used a multidisciplinary team (Bray, Thompson, Wynn, Cummings, & Whetstone, 2005; Cohen et al., 2011; Gutierrez, Gimple, Dallo, Foster, & Ohagi, 2011; Hartzler et al., 2018; Jessee & Rutledge, 2012; Kahkoska et al., 2018; Kirsh et al., 2007; Omogbai & Milner, 2018; Reitz et al., 2012; Sadur et al., 1999; Taveira et al., 2010; Taveria et al., 2011; Tsang et al., 2010; Wagner et al., 2001; Watts et al., 2015; Wu et al., 2018). Teams that consisted only of medical and/or nursing providers (i.e., physicians, internists, residents, nurses, or nurse practitioners) were not deemed to be multidisciplinary. Of the 16 studies that used a multidisciplinary team, only six studies used a health behaviorist, psychologist, social worker, or counselor (Hartzler et al., 2018; Gutierrez et al., 2011; Jessee & Rutledge, 2012; Kirsh et al., 2007; Omogbai & Milner, 2018; Sadur et al., 1999; Watts et al., 2015). Ten of the 16 studies that used a multidisciplinary team included a nutritionist or registered dietician as part of its

multidisciplinary team (Bray et al., 2005; Cohen et al., 2011; Jessee & Rutledge, 2012; Omogbai & Milner, 2018; Sadur et al., 1999; Taveira et al., 2010; Taveira et al., 2011; Tsang et al., 2010; Watts et al., 2015; Wu et al., 2018). Other professions that were represented on the multidisciplinary teams included diabetes health educators, pharmacists, pharmacy residents, endocrinologists, physical therapists, peer educators, and diabetologists.

### **Leadership of Multidisciplinary Teams**

Regarding leadership on the multidisciplinary teams, three studies included in this diabetes SMA review were led by clinical pharmacists (Taveira et al., 2010; Taveira et al., 2011; Wu et al., 2018); two were led by certified diabetes educators (Dickman, Pintz, Gold & Kivlahan, 2012; Sadur et al., 1999); one was led by a nurse practitioner (Jessee & Rutledge, 2012); three studies had varying team members take the lead (Bray et al., 2005; Cohen et al., 2011; Kahkoska et al., 2018); two were led by physicians (Naik et al., 2011; Wheelock et al., 2001); and five were co-led (Clancy et al., 2003; Cunningham et al., 2018; Riley et al., 2015; Schillenger et al., 2009; Tsang et al., 2010). None of the studies included in this review were led by a health psychologist or health behaviorist. Twelve studies did not indicate a team leader (Cunningham et al., 2018; Edelman et al., 2010; Gutierrez et al., 2011; Harris et al., 2016; Hartzler et al., 2018; Kirsh et al., 2007; Omogbai & Milner, 2018; Reitz et al., 2012; Sanchez, 2011; Trento et al., 2001; Wagner et al., 2001; Watts et al., 2015).

### **Number of Participants Per SMA Groups**

The number of participants per SMA groups across the studies ranged from as little as three group members per session (Bray et al., 2005) to as many as 20 participants

per group (Clancy et al., 2003). The most common number of participants per group across the studies in this review was approximately 7 to 9 patients per group. The duration of the studies included in this review ranged from as little as 3 weeks (approximately one month) to 56 months (4 years and 8 months). The most common study duration was 12 months, as seven of the 28 studies used this time frame (Bray et al., 2005; Edelman et al., 2010; Hartlzer et al., 2018; Naik et al., 2011; Sadur et al, 1999; Schillinger et al., 2005; Wheelock et al, 2009). The most common duration of each individual SMA session was 2 hours (11 of the 28 studies used this length of time). The next most common duration length was 90 minutes (7 of the 28 studies used this time frame).

### **Theoretical Framework of the Studies in this Review**

As can be seen in Appendix A, of the selected 28 studies that were included in this review, only nine indicated that their interventions were guided by a theoretical framework. Six studies were framed using the Chronic Care Model (Dickman et al., 2012; Harris et al., 2016; Kirsh et al., 2007; Omogbai & Milner, 2018; Sanchez, 2011; Watts et al., 2015). One study used Social Cognitive Theory (Taveira et al., 2011) and one study used Bandura's Self-Efficacy Model (Jessee & Rutledge, 2012). Lastly, one study used the Stages of Change model as its theoretical framework (Riley, 2015). Given that 19 of the 28 original studies in this review did not report the use of a theoretical framework, the diabetes SMA literature appears to underutilize health behavior change theories for intervention design. Of the nine studies that did report using a theoretical framework, those theories were not typically used to develop, tailor, or evaluate the interventions.

## **Outcomes of the SMA Model**

### **Improved Quality of Care**

Participation in SMA groups has been associated with several indicators for improved quality of care. Regarding trust in healthcare, patients have indicated that participation in the SMA treatment model has led to increased feelings of trust with their physician (Clancy et al., 2003; Jaber, Braksmajer, & Trilling, 2006; Lavoie et al., 2013). Patients also had a tendency to report better coordination of their care (Clancy et al., 2003) and increased diabetes-related knowledge after participating in a SMA intervention (Rygg, Rise, Grønning, & Steinsbekk, 2012; Trento et al., 2001; Trento et al., 2002; Jessee & Routledge, 2012). Improvements in diabetes self-care have also been reported (Cohen et al., 2011; Hartzler et al., 2018; Sadur et al., 1991; and Naik, 2011). For example, in the Cohen et al. study, there was a significant increase in the number of days on which patients tested their blood glucose levels post-SMA participation, indicating better diabetes self-care. Moreover, increases in feelings of diabetes self-efficacy have also been reported (Jessee & Routledge, 2012). However, the literature has been mixed with regard to improvements in mental health symptoms, as the SMA treatment design did not appear to improve symptoms of depression associated with chronic disease in one study (Jaber et al., 2006). It is important to note that the findings regarding improved quality of care described above were all ascertained using patient satisfaction surveys; thus, nuances are likely to have been missed.

### **SMA Effectiveness with Glycemic Control**

Several recent systematic reviews have concluded that SMAs are effective in reducing A1c for patients with T2DM (Edelman et al., 2015; Housden, Wong, & Dawes,

2013; Menon et al., 2017; Sumego & Bronson, 2014; Trickett et al., 2016). Overall, the literature indicates that SMAs have been effective for reducing A1c levels (Housden et al., 2013) and show promise for reducing lipids (Crowley et al., 2014), LDL, and blood pressure (Taveira et al., 2010), as well as improving diabetes management (Sanchez, 2011). However, as the diabetes SMA literature is still emerging, conclusions cannot be drawn as to whether or not the SMA intervention model is more effective with treating T2DM in comparison to usual care (Menon et al., 2017).

Despite the uncertainty of the superiority of SMAs to usual care, as can be seen in Appendix A, results indicated that 24 of 28 studies included in this review showed reductions in A1c using the SMA format as its model of care. The only exceptions were the Culhane-Pera et al. (2005), Cunningham et al. (2018), Trento (2001), and Wagner et al. (2001) studies. Any reduction in an A1c value represents a clinically significant change, as it is associated with improved health outcomes (IDF, 2015). Fifteen of the 28 studies included in this review reported statistically significant reductions in A1c levels. It is important to note that 11 of those 15 studies that had statistically significant reductions in A1c levels were not based on any theoretical framework (Bray et al., 2005; Cohen et al., 2011; Gutierrez et al., 2011; Hartzler et al., 2018; Naik et al., 2011; Reitz et al., 2012; Sadur et al., 1999; Taveira et al., 2010; Trento et al., 2004; Watts et al., 2015, Wu et al., 2018). Of the nine studies that used a theoretical framework, two studies did not report significance due to small sample sizes (Dickman et al., 2012; Jessee & Rutledge), three studies did not find significant findings, (Harris et al., 2016; Sanchez 2011; Wagner et al., 2001), and four studies demonstrated significant results (Kirsh et al., 2007; Omogbai & Milner, 2018; Riley (2015); Taveria et al. (2011). Results showed that

two of the four theoretically based studies that had statistically significant reductions in HbA1c levels were based on the CCM (Kirsh et al., 2007; Omogbai & Milner, 2018) and two were based on the Stage of Change model (Taviera et al., 2011; Riley, 2015). It is unclear as to whether or not the studies that did not list a theoretical framework were using principles that aligned with a theory. However, what is certain is that lacking a rationale for interventions due to lack of a theoretical framework makes replication highly challenging and represents a limitation of the diabetes SMA literature.

### **Patient Satisfaction**

Analysis of patient satisfaction in the diabetes SMA literature has mostly been examined through the use of surveys. For example, Heyworth et al. (2014) mailed a patient experience survey to 921 SMA participants and 921 patients in traditional care (the patient population was not limited to diabetes and included other chronic health conditions). Heyworth et al. found that patients that participated in the SMA treatment model were more likely to favorably rate group care, in comparison to traditional care, as having better access to care, more convenient office hours, shorter wait for lab testing, and overall satisfaction with their treatment provider. Interestingly however, patients in the Heyworth et al. study reported lower satisfaction with personal communication with their provider.

Although patient satisfaction was the primary outcome measured in the Heyworth et al. (2014) study, the patient satisfaction measure was a single survey item on the Press Ganey Questionnaire. Of the original studies included in this review, patient satisfaction has been assessed as either a secondary or tertiary outcome of interest and has been solely measured through use of surveys. Survey data from the included studies in this review do

indicate increased patient satisfaction with the SMA treatment model in comparison to traditional care (Riley, 2015; Sadur et al., 1999; Watts et al., 2015; Wagner, 2001). Most of the surveys used to assess patient satisfaction were health surveys that tend to be used regularly at the clinics. For example, Riley (2015) used the Seattle Outpatient Satisfaction Questionnaire and Sadur et al. (1999) used a questionnaire adapted from a health plan survey. Wheelock et al. (2009) used a simple yes/no question regarding patient satisfaction. These findings are similar to the findings conducted by Jaber et al. (2006) in their systematic review of the diabetes SMA literature. Jaber et al. (2006) concluded that overall participation in the diabetes SMA increased patient satisfaction but did not improve diabetes specific quality of life.

Only a handful of qualitative studies that provide deeper understanding of SMA satisfaction have been conducted. Most of these studies have been conducted in nations outside the US, including the UK (Johnson & Goyder, 2005), Scotland (Lawton, Rankin, Peel, & Douglass, 2009), Ireland (Smith et al., 2003), and Canada (Lavoie et al., 2013; Thompson, Meeuwisse, Dahlke, & Drummond, 2014). Only the Lavoie and colleagues (2013) and Thompson et al. (2014) study will be discussed in this review given that these studies are the only ones that examined the patient perspective and used an intervention that was clearly similar to the SMA model used in the United States. For the remaining qualitative studies that examined patient perspectives, it was unclear as to whether or not their treatment intervention model was similar to the SMA model used in the United States (i.e., Lawton et al., 2009; and Smith et al., 2003).

Through use of patient and provider interviews, Lavoie and colleagues (2013) found that patients reported feeling safer in a group setting in comparison to usual care,



as they felt protected from the provider being “in your face” during the medical evaluation. In addition, patients reported feeling as if there was a shift in the provider role in which the provider would switch into more a psychotherapy leader role, which increased feelings of trust. Patients also reported feeling as if the provider had a greater sense of their lived experience on a day-to-day basis. In general, both patients and providers reported there was better information sharing and better self-management from SMA participation. Lastly, patients reported feeling more self-confident after participating in the SMA intervention model (Lavoie et al., 2013).

The Thompson et al. (2014) study used semi-structured interviews of nine patients and found that the participants described feeling as if they could relate to one another due to their medical circumstances. Patients shared that having peers with similar circumstances allowed them to increase access to knowledge and provided them with group problem solving. In addition, they reported that the group provided emotional and moral support, as well as increased accountability. Patients also commented that the information provided felt more credible coming from other patients that have had similar lived-experiences (Thompson et al., 2014).

Though the Lavoie (2013) and Thompson et al. (2014) studies were enlightening, the Canadian medical system has many differences in comparison to the American medical system. The most widely known difference is that medical care coverage is provided to all citizens in Canada, which is not the current model in the U.S. As such, it is clear that there is an evidence gap in the literature regarding patient satisfaction with this intervention model. The main purpose of this study was to address this evidence gap

in the literature, as examining patient satisfaction is crucial for providing patient-centered care and is also a mandate of the ACA.

## CHAPTER 2: CONCEPTUAL MODEL

### **Rationale for Conceptual Model**

Despite significant evidence indicating the effectiveness of SMAs in treating T2DM, most of the diabetes SMA literature lacks a theoretical framework. Use of theory for intervention design and evaluation of behavior change is viewed as best practice (Bartholomew & Mullen, 2011). The atheoretical nature of the diabetes SMA literature makes it difficult to ascertain the elements of SMAs that contribute to their effectiveness. Theories assist with identifying key constructs and for providing a framework from which hypotheses can be derived. Without a theoretical framework to follow, replication of studies that use SMA interventions for the treatment of T2DM becomes challenging.

As can be seen in Figure 1 below, a conceptual model for future SMA design was developed in order to provide a theoretical framework for this study (Milling, unpublished). The model was created in order to address some of the limitations that were found in the studies included in this review. The purpose of developing the model was not only to address some of the limitations in the diabetes SMA literature, but also to provide an overview of the key concepts in the SMA design. The limitations found in this review include the following: 1) diabetes SMAs are often not theory-based; 2) rationales for intervention selection are not clearly explicated; 3) patient readiness to change is often not examined; 4) interventions are often not tailored to meet the individualized needs of the patients; and 5) patient satisfaction with this SMA intervention model is vastly understudied.

To address the first limitation, this study was designed with the Socioecological Model as the overarching theoretical framework, Chronic Care Model as the practical model for intervention design, and Acceptance and Commitment Therapy (ACT) as the approach to enhance coping with diabetes. To address the second limitation, this study provided a rationale for each intervention selected in the SMA design to increase intentionality with intervention selection (see Appendix B). To address the third limitation, one of the components of the conceptual model includes examining patient readiness to change, as this has largely been unexamined in the diabetes SMA literature. Fourth, to address the limitation that interventions are not tailored to the individualized needs of the patient this study includes an initial focus group prior to the SMA intervention that is for the sole purpose of tailoring interventions to meet patient needs (see Methods section for more information). It is the last limitation of the literature review (i.e., the lack of examination of patient satisfaction) that is the primary focus of this study.

### **Theoretical Influences of Conceptual Model**

#### **Socioecological Model**

Individual level factors such as psychological processes (e.g., thoughts, beliefs), biological predispositions, demographic factors (e.g., age, socioeconomic status), etc. are contributing factors to health outcomes in T2DM. However, individuals do not live in a vacuum. External factors such as built environment, geographic location, governmental policies, health care access, etc. also influence the health of the individual (Hill et al., 2013). The socioecological model developed by Bronfenbrenner (1977) is a widely used framework in the field of health psychology, as it examines not only individual level

factors, but also the broader health determinates. The sociological model is a useful framework for future SMA design as it can provide both prevention and intervention strategies for treating T2DM.

The socioecological model (Bronfenbrenner, 1977) was chosen as an overarching framework that informs the entire model. The ecological model was chosen as the overarching framework in order to address the following gaps in the existing diabetes SMA literature: 1) interventions are not tailored to meet the individualized needs of the patients; and 2) interventions are not adjusted to account for broader influences that impact the individual's functioning. The ecological framework recognizes that patients are influenced by multiple external factors including their interpersonal relationships, familial supports, cultural beliefs, available community resources, and access to medical care (Sallis, Owen, & Fisher, 2008). These factors have both direct and indirect influences on health behavior outcomes. Given that ecological models provide a more comprehensive intervention approach for targeting mechanisms of change, it was selected as the base framework in the conceptual model.

At the individual level of the socioecological model, assisting patients with increasing self-management behaviors such as building self-awareness, knowledge, and self-confidence have all been found to have positive impacts on making health behavior changes (Kaplan et al., 2006). At the interpersonal level, social support has been found to have an influential role on health behavior change. Having support from family, friends, co-workers, and neighbors can act as a buffer to life stress and improve well-being (Emmons, 2000). At the community level, promotion of physical activity and consumption of nutritious foods in schools, work, churches, has also been found to

enhance health behavior change (Kaplan et al., 2006). Helping patients elicit support from family and friends can help contribute to healthy lifestyles, particularly in women (Barrera, Stryker, MacKinnon, & Toobert, 2008). In addition, neighborhood level factors including access parks, level of safety, etc. also represent health determinants that impact health (Whittemore, Melkus, & Grey, 2004). Lastly, macro level factors (e.g., public policy, access to health care, built environment, etc.) also influence a patient's ability to obtain the necessary medical care needed for the treatment of T2DM (Whittemore et al., 2004).

### **Chronic Care Model**

The Socioecological Model (SE) is the overarching theoretical framework for the conceptual model; however, the SE model does not provide specific recommendations for intervention design. The Chronic Care Model (CCM), on the other hand, has six components that serve as a practical framework for developing interventions for patients with chronic illnesses, such as T2DM. Given that traditional health care services are based on the acute-care format, this model fits nicely with the treatment of T2DM, as T2DM is a chronic health problem that requires more intensive treatment than acute services can provide. The six core concepts of CCM include self-management support, decision support, health care organization, delivery system design, community resources/policies, and clinical information systems (Wagner et al., 2001). Self-management support involves empowering the patients to better manage their health conditions by assisting patients with setting goals, enacting an action plan, identifying barriers to change, and facilitating problem solving to deal effectively with barriers (Wagner et al., 2001). The core concept of decision support refers to recognizing patient

preferences, offering reminders, and providing recommendations based on disease severity assessments. Regarding the core concept of health care organization, having visible support for the treatment of chronic disease project by organization leaders is important for success according to this model. Health care organization often requires a multi-disciplinary team approach, identification of resources (e.g., staff, office space, etc.), as well as continuous evaluation/feedback. Delivery system design requires planning and coordination among caretakers. Having defined roles and tasks among the multi-disciplinary team is integral for the delivery system design. Developing partnerships and/or referrals with other specialty practices is also a component of the delivery system design. Community resources and policies refers to mobilization of community-based support such as identifying peer support groups, linking patients with nutrition counseling, and including family members. Lastly, clinical information systems refers to documenting and organizing data in a way to develop reports on treatment planning for patients (Wagner et al., 2001).

### **Acceptance and Commitment Therapy**

Glycemic control is strongly dependent upon self-management, which includes self-care behaviors (Norris, Engelgau, & Narayan, 2001). Self-management and self-care necessitates psychological interventions. Self-care is required, as fear of diabetes-related consequences is an important aspect of treatment that is often neglected in diabetes care (Janzen Claude, Hadjistavropoulos, & Friesen, 2013). Diabetes-related complications such as blindness, cardiovascular disease, lower limb amputation, and kidney failure (IDF, 2015) often evoke fear in patients with T2DM. In addition, individuals with diabetes are twice as likely to have heart disease or a stroke in comparison to non-

diabetics (CDC, 2018). As such, diabetes-related thoughts and emotions related to the potential health consequences of T2DM is an important aspect of treatment that needs to be addressed. Acceptance and Commitment Therapy (ACT) has been used as a treatment approach to increase diabetes self-management and self-care behaviors (Gregg, Callaghan, & Hayes, 2007) and provides the psychological interventions framework for this study.

ACT is an empirically-based treatment that uses acceptance of thoughts/feelings, commitment to behavior change, and mindfulness strategies to increase psychological flexibility (Hayes, Strosahl, & Wilson, 2003). An ACT-based manual has been developed to specifically target diabetes self-management behaviors and has demonstrated effectiveness at increasing coping and self-management behaviors (Gregg, Callaghan, & Hayes, 2007; Shayeghian, Gassanabadi, Aguilar-Vafaie, Amiri, & Besharat, 2016). Adding ACT-based interventions to diabetes care has also been associated with better diabetes self-care and improved glycemic control (Gregg et al., 2007). A major component of the ACT-based framework for clinical interventions is that it encourages patients to make decisions based on their own value system, as opposed to making decisions based on fear (e.g., fear of diabetes-related complications) (Gregg et al., 2007).

The Acceptance and Commitment Therapy Educational Diabetes treatment (ACT-ED) patient workbook will be used as the educational guide for this SMA intervention (Gregg et al., 2007). The education modules for ACT-ED are as follows: 1) “Education and Information”; 2) “Food, Diabetes, and Your Health”; 3) “Exercise and Diabetes”; 4) “Coping and Stress Management”; and 5) “Acceptance and Action”) (Gregg et al., 2007).



This patient education workbook was chosen as it addresses diabetes self-management behaviors and offers suggestions for dealing with diabetes-related stress.

### **Assessing Readiness to Change**

#### **Stages of Change Model**

Readiness to change has significant clinical implications. Not only has increased readiness for change found to be correlated with greater reductions in A1c scores for patients with T2DM (Peterson & Hughes, 2002), but also it has found to be associated with greater attendance (Helitzer, Peterson, Sanders, & Thompson, 2007). For example, Peterson and Hughes (2002) found that patients that were in the action and preparation stages of change had significantly improved A1c levels in a shorter time in comparison with patients in the precontemplation and contemplation stages of change combined. Regarding attendance, Helitzer et al. (2007) found that patients in the lower mean stages of changes were less apt to attend all five sessions in comparison to those with higher mean stages of change scores. Given that attendance and reductions in A1c levels are correlated with higher levels of readiness to change, it is important to assess this component.

Although the Stages of Change Model (SOC), also known as the Transtheoretical Model, is not an overarching theoretical framework for the conceptual model presented in this proposal, assessing readiness to change is an important intervention of the proposed SMA and as such will be reviewed. The SOC model represents five different stages (Prochaska & DiClemente, 1983). The five stages of SOC include the following: 1) precontemplation stage in which individuals have no intention of altering their behavior; 2) contemplation stage where individuals start to consider changing their behavior in the

next few months without having a specific time frame; 3) preparation stage whereby individuals start to plan how they will make changes in the immediate future; 4) action stage in which individuals begin the change process by starting to enact behavior change; and 5) maintenance stage where individuals are able to maintain a consistent state of behavior change (Prochaska & Norcross, 2003). There is also a sixth stage of this model called relapse prevention in which the individual is taught to reframe relapses, which are often viewed as failures, as “opportunities” or “new lessons” in order to assist individuals with re-engaging in the change process (Baban & Craciun, 2007). The sixth stage is not considered a main component of this model for the purposes of this review. This model examines outcome variables such as self-efficacy, psychosocial change, biological variables among others. A distinguishing feature of this model is its emphasis on examining readiness for change. According to this model interventions should be adjusted to meet the needs of the individual based on their stage of change (Baban & Craciun, 2007).

### **Conceptual Model Utilized in this Study**

#### **Key concepts in SMA design and overview of the model**

As can be seen in Figure 1, diabetes SMA interventions are designed to have an impact at the individual level. Selection of the multidisciplinary team is the first step in the conceptual model. Each member of the team has unique training that can significantly enhance the care of the patients. For instance physicians can provide the appropriate medical care needs such as prescribing anti-diabetic medications, evaluating glucose levels, completing foot exams, providing eye exams, etc. as recommended by the ADA (2011). Physicians are trained to diagnose and treat disease; however, physicians are not

directly trained in how to motivate patients to make health behavior change such as improving diet and increasing physical activity. Hence, using health psychologists, for example, that have this specific training is likely to enhance patient care. The unique expertise offered by each of the team members illustrates why a team approach is preferable to the individual approach that is offered in traditional care models.

Use of a multidisciplinary team supports criteria 3 (i.e., organizational support) of the CCM framework, as the multidisciplinary team should make a time commitment to deliver services, enforce guidelines, and promote improvement strategies. Also, in order to support criteria 4 of the CCM (i.e., delivery system design) team members' roles should be defined, cross-training among other providers should be given, and proactive services of clinical care are recommended.

The second step in the conceptual model is assessment of patient needs and readiness to change. The second step in the conceptual model is recommended in order to address two gaps in the literature: 1) broader contexts that influence the individual are often not examined and 2) interventions are often not tailored to meet the patient's needs. As such, the conceptual model is designed to address these limitations using a socio-ecological overarching framework, CCM design, and ACT-based individualized interventions.

Tailoring interventions to match patients' readiness for change is a distinguishing feature of the SOC model (Prochaska & DiClemente, 2003). The conceptual model highlights that interventions should be adjusted to meet the needs of the individual based on their stage of change. If interventions are suggested before a patient is ready to make those changes, interventions are not likely to be effective. As such, it is recommended

that the multidisciplinary team assess readiness to change. It is also recommended that the multidisciplinary team assess barriers to change. Barriers to change, which can be based on an individual's interpersonal relationships, environment, cultural norms, access to healthcare etc., should also be assessed. Evaluating these external barriers to change is a distinguishing feature in the socio-ecological model. External factors can have a significant impact on behavior change. For example, if a person with T2DM attempts to eat healthier by altering cooking habits (e.g., adding lean proteins, increasing in vegetable intake, reduction of high-fatty foods, etc.), and family members are not supportive of these changes, a patient's ability and motivation to make these changes is negatively impacted. Moreover, at the community level, if patients live in an unsafe neighborhood, lack access to parks, and do not have the financial resources to purchase a gym membership, typical recommendations for increasing physical activity such as walking around the neighborhood may be ill advised. As such, the interventions provided by the multidisciplinary team should take these factors into account when tailoring interventions to meet the patient's needs. Hence, this highlights the importance of examining the individual from a socio-ecological framework, as it takes into account the broader influences on a person's life.

The third step in the conceptual model is the SMA intervention itself. The SMA intervention is multifaceted, as interventions should not only include medical interventions such as prescribing medications, but should also include interventions that address social, psychological, and community barriers. The recommended interventions listed in the conceptual model below were sourced from the studies listed in Appendix B. There were several common interventions used in the SMAs including education

regarding glucose monitoring, self-management behaviors, prevention of acute and chronic complications associated with diabetes, as well as education regarding nutrition and physical activity. Moreover, goal setting, tailoring, and peer support were some of the most common interventions used across the studies. Given the popularity of these interventions and the results that indicate reductions in A1c outcomes, these interventions were utilized in the current conceptual model.

The fourth step of the conceptual model involves examining the health outcome measures of A1c levels, weight/BMI, and cholesterol. Changes in these outcome measures provide a tangible and concrete assessment of intervention effectiveness. The fifth step in the model involves obtaining information regarding patient satisfaction with the SMA model and eliciting feedback for patient recommendations. It is this fifth step that is the main focus for this current study, as a detailed examination of factors influencing patient satisfaction represents a large evidence gap in the diabetes SMA literature. By eliciting patient feedback, patients may be more likely to return because they feel their voice has been heard. This information is vital for building patient buy-in and for tailoring information to meet the patient needs.

To explain the directionality of the arrows in Figure 1, changes in the outcome measures have a bidirectional relationship with patient satisfaction. For example, patients that are more satisfied with the SMA model are more likely to have improved health outcomes; also patients with better health outcomes are more likely to have higher satisfaction with the SMA model. The final step of the model includes using the information learned from patient satisfaction and perceptions of the most effective components of the SMA model to be used to inform the multidisciplinary team and the

design of future SMA interventions. Identifying the most effective components of the SMA model represents the secondary aim of this study and identifying patient perspectives on future SMA design represents the third aim for this study.

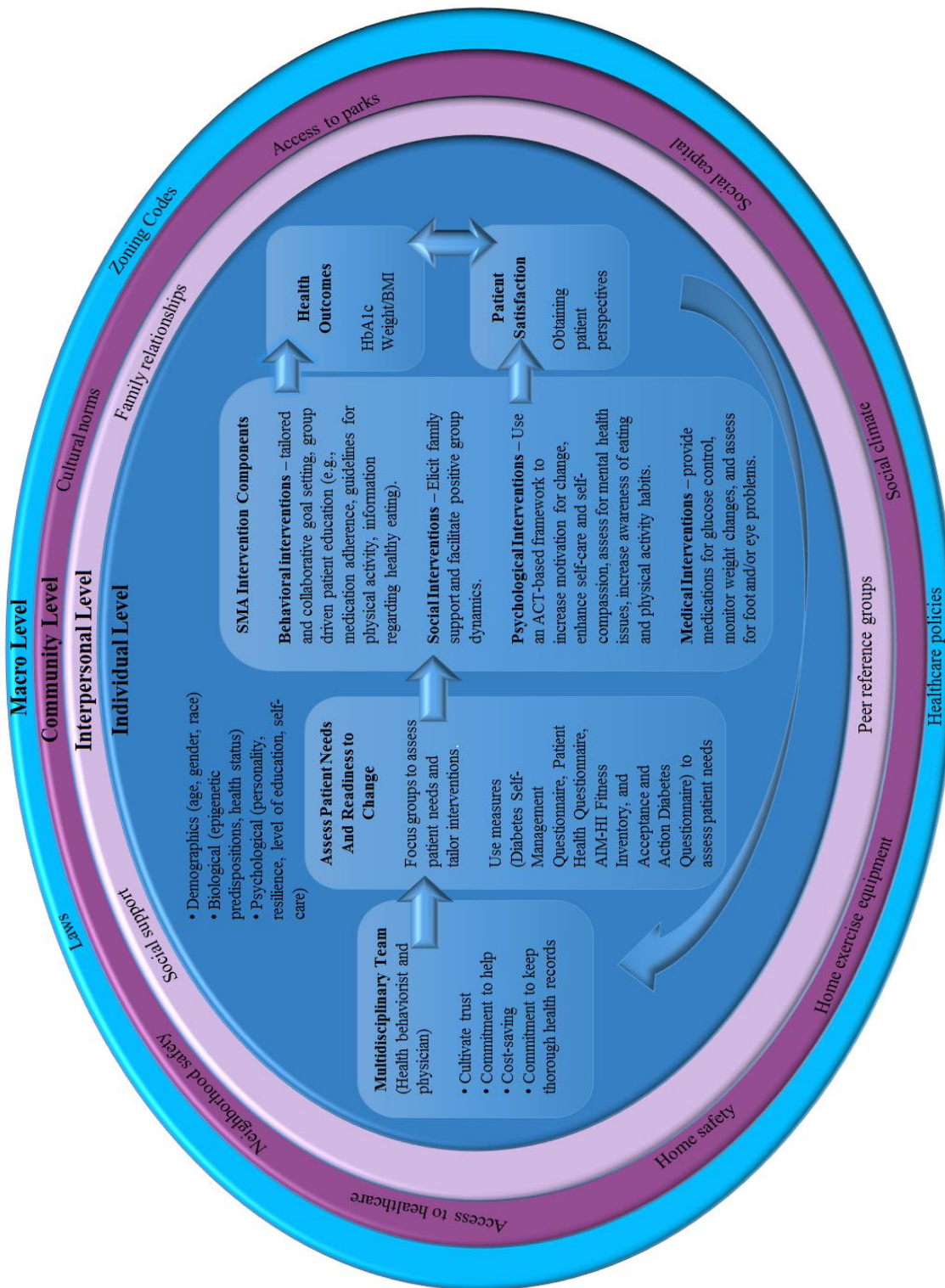


Figure 1: SMA Conceptual Model

### **Purpose and Aims of this Study**

Although the literature indicates that the SMA intervention approach is effective at reducing A1c values, there is still an evidence gap in the medical literature regarding patient satisfaction with the SMA intervention model (Edelman, et al., 2012; Menon et al., 2017). Not only is patient satisfaction with this intervention method still largely unknown, but there is also insufficient information regarding the components of SMA that patients perceive to be the most effective. Given the promising nature of the SMA intervention model, the third purpose of this study is to examine patient recommendations for future SMA design. As mentioned earlier, the primary goal of the current study is to examine step five in the conceptual model depicted in Figure 1.

### **Research Questions**

Research Question 1: How does the experience of participating in the SMA intervention model influence patient satisfaction with their medical care? One reason this question is important is that there is a lack of understanding of patients' general reactions to the SMA intervention model. In addition, the impact SMA participation has on the patient/provider relationship is also largely unknown, thus this dimension of the research question is useful to examine.

Research Question 2: What components of the SMA intervention design do patients with T2DM find to be the most meaningful and effective? Participant opinions regarding the effectiveness of components of the SMA intervention model has been vastly understudied. Moreover, the responses to this question could lead to improvements in future SMA studies.



Research Question 3: What suggestions do participants in the SMA intervention model have for future SMA designs? This question is important as it provides ideas for how SMAs can be improved in the future. In addition, depending on the suggestions offered, answers to this question can provide insight into patient satisfaction.

## CHAPTER 3: METHODS

### **Overview of Study Design**

The SMA intervention model for this study consisted of two intervention groups that met every other week for three months, for a total of five SMA sessions. The groups occurred from mid-January until the beginning of April of 2018. The length of the SMA study had to be extended due to having to cancel one SMA session for both SMA groups as a result of inclement weather during the winter months. The evening group (i.e., SMA group 1) began at 7:00 pm on and ended at 8:30 pm. The evening group was offered in order for participants that work full-time day jobs to be able to attend. The afternoon group (i.e., SMA group 2) began at 3:30 pm and ended at 5:00 pm. The author facilitated SMA group 1 and the author's advisor facilitated SMA group 2. The primary care physician (PCP) and one of the co-facilitators attended all SMA groups with exception of one SMA session, when the PCP was unable to attend. The PCP did not attend the session that was discussing stress management for both SMA groups.

The same interventions were provided across both SMA groups. Please refer to Appendix B for a comprehensive list of the interventions provided during the SMA appointments. The rationale for using the same interventions across both SMA groups was to increase chances of achieving data saturation. Qualitative data were collected at two time points. First, focus groups were held prior to the initial SMA session for both groups in order to obtain information regarding participants' baseline knowledge on T2DM and its management, as well as to solicit feedback regarding effective ways to tailor interventions to meet participant needs. Second, a final focus group was conducted after participants had completed all five sessions in order to obtain participants

perspectives on their overall satisfaction with this model. During the final focus group, participants were also asked to identify the most helpful comments and provide recommendations for future SMA design. The initial and final focus groups lasted approximately 90 minutes per group. All focus groups were audio-recorded for transcription purposes. Thematic analysis was the method for analyzing the qualitative data. Please refer to the procedures section for more information regarding how thematic analysis was conducted for this study.

A secondary goal of this project was to provide descriptive information regarding participant responses on the Diabetes Self-Management Questionnaire (DSMQ), Patient Health Questionnaire (PHQ-9), AIM-HI Fitness inventory, and Acceptance and Action Diabetes Questionnaire (AADQ). All of the assessment measures were administered at the initial focus group (baseline) and again at the final focus group (3-month follow-up) with exception of the AADQ, which was only administered at 3-month follow-up due to human error. These assessment inventories provided information regarding progress made with diabetes self-management behaviors, depressive symptoms, readiness to make behavior changes, and ability to practice acceptance, respectively.

### **Clinic Setting**

The project was conducted at an urban primary care family medicine practice clinic in Mecklenburg County, North Carolina. The practice has two physicians; one full-time, licensed practical nurse; two clerical team members; a phlebotomist; two registered medical assistants; and one office manager. The services offered at this clinic include chronic disease management, acute care, wellness care, and outpatient laboratory services. The majority of the patients seen at the practice have the following diagnoses or

medical needs: T2DM, high blood pressure, asthma, attention deficit-disorder, hormone replacement therapy, and high cholesterol.

### **Participant Inclusion Criteria**

Participants were included if they met the following criteria: (1) English speaking; (2) diagnosed with T2DM; (3) 18 years of age or older; (4) able to understand and provide written consent to treatment; (5) willing and able to sign a written pledge of confidentiality, agreeing to keep participant information that is disclosed during the shared medical appointments protected; (6) willing to provide written consent for the investigators to access their medical records for research purposes; and (7) willing to sign the HIPAA notice form.

### **Participant Exclusion Criteria**

Participants were excluded if they met the following criteria: (1) unwilling/unable to provide informed consent; (2) do not speak English; (3) are decisionally impaired or mentally incompetent; (4) have severe and persistent mental illness; (5) are under the age of 18; (6) do not meet criteria for T2DM; and/or (7) unwilling to sign the HIPAA notice form.

## **Procedures**

### **Recruitment**

IRB approval was received from the Novant Health IRB and the UNC Charlotte IRB prior to recruitment. Participants were recruited from the aforementioned clinic. The physician on the multidisciplinary team downloaded a list of his patients diagnosed with T2DM. Participants were recruited from this list. Recruitment was conducted by the author through phone calls. This sample script for the phone calls was adapted from the

American Academy of Family Physicians (AAFP) guidebook for group medical visits (Theobald, Masley, McMullen, & Barnett, 2009). According to the published AAFP guidebook, it is in the public domain and can be reproduced without permission from the authors for clinical purposes. Please refer to Appendix C for an outline of the script for the recruitment phone calls. For a specific timeline for recruitment and other tasks to be completed in preparation for the SMAs refer to Table 1 below.

Table 1: Preparation for SMAs

Time Frame	Tasks
2 months prior	<ul style="list-style-type: none"> <li>• Physician, clinical staff and health behaviorist selected a date and time for SMA appointments based on participant needs, physician's availability, and health behaviorist's schedule.</li> <li>• Physician identified all patients diagnosed with T2DM.</li> </ul>
1 month prior	<ul style="list-style-type: none"> <li>• Author called all participants to schedule appointments for participation in the pre-group meeting.</li> <li>• Author explained to participants that pre-group meetings would last approximately 1.5 hours and will occur in a group setting.</li> <li>• Author asked participants if they preferred to receive the educational materials for the SMA through email or in-person at the clinic.</li> <li>• Participants were informed that they would be asked to provide their opinions regarding the usefulness of the educational material and would be asked a variety of questions regarding their perspectives on how the SMA groups should be designed.</li> </ul>
1-2 days prior	<ul style="list-style-type: none"> <li>• Author called participants to remind them of the first appointment.</li> <li>• Author reviewed participant lab values.</li> <li>• Author prepared consent forms and assessment inventories.</li> </ul>
Day of Pre-Group Meeting	<ul style="list-style-type: none"> <li>• At the beginning of the pre-group meeting, both co-facilitators informed participants of the group expectations.</li> <li>• Co-facilitators obtained signatures on the pledge and confidentiality form, as well as the HIPAA notice form.</li> <li>• Co-facilitators reminded participants that their participation was completely voluntary.</li> <li>• Co-facilitators conducted the pre-group meeting by asking the questions listed in the procedures section.</li> <li>• Co-facilitators administered the baseline DSMQ, PHQ-9, and AIM-HI Fitness Inventory.</li> </ul>
1 week prior to first SMA group	<ul style="list-style-type: none"> <li>• Author examined qualitative data obtained from the pre-focus group meetings for themes.</li> <li>• Author tailored interventions based on client feedback from the pre-focus group meetings.</li> </ul>

### **Pre-Group Meeting**

At the outset of the pre-group meeting, consent forms were reviewed and participants were asked to sign the forms, indicating they understood the information and agreed to voluntarily participate. The first form that was discussed in the pre-group meeting was the confidentiality form regarding participation in the focus groups and SMA intervention model (see Appendix D). The informed consent reviewed all of the following: 1) purpose of research; 2) investigators for this study; 3) specific procedures; 4) length of participation; 5) risks and benefits for participation; 6) volunteer statement; 7) confidentiality; 8) fair treatment; and 9) participant consent. Participants were informed that any and all information provided would remain confidential by the multidisciplinary team (i.e., physician and health behaviorist).

All participants were required to sign a pledge indicating that they agree to not share any other participants' personal information with anyone outside of the shared medical appointment group setting and agree to pay their provider at every other SMA session (see Appendix E). Included in this pledge document is a disclosure statement from the multidisciplinary team that informed participants that the multidisciplinary team is not responsible for participants confidentiality among other due to the fact that this is not feasible to enforce. Participants were informed that by signing the pledge agreement, they were confirming that they would abide by the honor code to not share other participant information outside of the group setting. Lastly, the HIPAA notification form was reviewed with participants at the beginning of the pre-group meeting (see Appendix F) Appendix E and F are both adapted from the AAFP guidebook for group visits (Theobald, 2009). Participants were informed that they could choose not to participate or

sign the documents without any reprisal other than they would not be eligible to participate in the SMA study.

Following the review of consent forms, participants were asked to fill out the DSMQ, PHQ-9, and AIM-HI Fitness Inventory. (The AADQ was also intended to be filled out, but this form was not included due to investigator error). Participants were provided with a rationale for filling out these measures and were informed that they would repeat these same measures at the end of the 3-month study in order to assess any changes that may have occurred. Participants who attended the final focus group completed the 3-month follow-up of all of the measures, including the AADQ. Listed in Appendix G are the questions that were asked during the initial SMA focus groups. These questions were asked in order to assess participants' baseline knowledge of diabetes and self-care, to obtain their reactions to the ACT-ED manual, to identify what prompted them to participate in the SMA group, to address any concerns, and to tailor interventions to meet participant needs.

### **Analyzing Pre-Group Meeting Data**

After the qualitative data from the pre-group meeting had been collected, modifications to the educational materials were made to tailor the SMA interventions to meet participant needs. One modification that was made was to allot more time during the SMA sessions for participants to ask questions regarding nutrition, as this was a common theme in the pre-group meetings. Given that there was insufficient time in between the initial focus group and the first SMA session to fully transcribe, code, and formally analyze the qualitative data, only a preliminary review of the data was conducted prior to the first SMA session. The preliminary review began by reviewing



notes and memos made during the initial focus groups. Next, the author listened to the audio recordings and identified major themes (i.e., desire to discuss nutrition, request for stress management techniques, and an appeal to have accountability from other group members). Both SMA group facilitators (i.e., health behaviorists) tried to accommodate and tailor each of the SMA sessions to address the feedback provided during the initial focus group meeting.

### **SMA Intervention**

As mentioned earlier, two SMA intervention groups were conducted. Both SMA intervention groups received the same interventions and met every other week over the course of three months for a total of five SMA sessions per group. Both health behaviorists attempted to be faithful to the ACT-ED manual; however, flexibility was required to address participant demand and as such, there were slight differences in the topics covered between the two SMA groups. The five SMA sessions aligned with the five education modules in the ACT-ED patient manual. The PCP attended all but one of the SMA sessions (i.e., ACT-ED Module 4) for both groups. Baseline A1c measures and weight were obtained through patient medical records. The 3-month follow-up measures were obtained and discussed during the final focus group meeting.

### **Final Focus Group**

Two weeks after SMA session 5 (i.e., 3 months after the pre-SMA focus group), a final focus group for both groups was conducted. The purpose of the last focus group was to have participants provide their general reactions to the SMA intervention and to discuss their satisfaction and/or dissatisfaction with the SMA intervention model. The purpose of the last focus group was also to describe the experience of participation,

including group dynamics, to discuss the impact the SMA intervention had on diabetes self-management behaviors, and to explain the impact collaborative goal setting had with regard to participant satisfaction. Listed in Appendix H are the questions that were asked during the final focus group meeting. Moreover, during the final focus group meeting, A1c and weight measures were obtained. In addition, the DSMQ, PHQ-9, AIM HI Fitness Inventory, and AADQ were administered. It was explained to participants that a second administration of the assessment measures was needed in order to inform the treatment team of any progress that may have occurred.

### **Assessment Instruments**

#### **Overview of the Assessment Instruments**

Assessment measures were used to describe the participant sample and to examine treatment response. The DSMQ was used to examine changes made in diabetes self-management from baseline to 3-month follow-up. The PHQ-9 was used as a tool to describe the participant sample and alert the multidisciplinary team to any depressive symptoms that might require a referral. The AIM-HI Fitness inventory was used to assess readiness to make health changes from baseline to 3-month follow-up. The AADQ was used to assess acceptance of diabetes-related feelings and thoughts. The AADQ also measured the degree to which the diabetes-related feelings and thoughts interfered with valued action. (The AADQ was only administered at 3-month follow-up).

#### **Diabetes Self-Management Questionnaire (DSMQ)**

As can be seen in Appendix I, the DSMQ is a 16-item questionnaire that is used to assess self-management behaviors of patients with type 1 or T2DM that are associated with glycemic control (Schmitt et al., 2013). This assessment instrument was used in

order to measure changes in diabetes self-management behaviors including information regarding glucose management, physical activity levels, self-care, dietary management, and use of health care resources from baseline to 3-month follow-up.

The scale used on the DSMQ assessment instrument consists of a 4-point Likert scale (0 = does not apply to me, 1 = applies to me to some degree, 2 = applies to me a considerable degree, and 3 = applies very much to me). The authors report that the 4-point continuum was used in order to prevent neutral responding (Schmitt et al., 2013). There are four main categories of interest, which are as follows: (a) 'Glucose Management' (five items which include questions 1, 4, 6, 10, 12); (b) 'Dietary Control' (four items which include questions 2, 5, 9, 13); (c) 'Physical Activity' (three items which include questions 8, 11, 15); and (d) 'Health-Care Use' (three items which include questions 3, 7, 14) (Schmitt et al., 2013). Lastly, one item (i.e., question 16) refers to self-care management in general. Glucose management refers to regularity of taking medications, glucose monitoring and recording. The dietary control category represents consumptions of foods that impede on glucose control, following dietary recommendations, and food binges. The physical activity category involves assessing regularity with planned exercise. Health-care use represents consistency with attending doctor's appointments.

Overall internal consistency for the DSMQ was good (Cronbach's alpha = 0.84). For all of the subscales, the consistencies were acceptable (Cronbach's alpha = 0.77 for glucose management; 0.77 for dietary control; 0.76 for physical activity; and 0.60 for health-care use) (Schmitt et al., 2013). The confirmatory factor analysis demonstrated that the four-factor structure was an appropriate fit. The DSMQ has been found to

correlate with the scales of the Summary of Diabetes Self-Care Activities Measure (SDSCA; (Schmitt et al, 2013). Convergent correlations with the SDSCA scales were found as follows: glucose management 0.57; dietary control 0.52; physical activity 0.58; and health care use was not applicable). The correlations with A1c using the DSMQ were significantly stronger than those that were found with the SDSCA (Schmitt et al., 2013).

### **Patient Health Questionnaire-9 (PHQ-9)**

As mentioned earlier, depression is common in patients with T2DM (Ismail, 2009). Depressive symptoms have been found to be associated with poor glycemic control (Lustman et al., 2000). Given the importance of glycemic control in diabetes self-management, assessing depressive symptoms is necessary for determining patient progress. Primary care providers often use screening tools such as the PHQ-9 to identify adults with depression (Kroenke & Spitzer, 2002). The PHQ-9 is a public domain measure that was originally developed by Drs. Robert Spitzer, Janet Williams, Kurt Kroenke, and colleagues. This measure was developed to be used at the initial doctor's appointment and to be used as a follow up measure to assess treatment progress. Given the brevity of this measure (i.e., 9 questions), this measure can be administered in a short time frame, thus making it an ideal choice in health care settings where time is a scarce resource. This measure is self-administered and requires the participant to assess their depressive symptoms during the past 7 days.

As can be seen in Appendix J, each item on the PHQ-9 is based on a 4-point Likert scale (0 = not at all, 1= several days, 2 = more than half the days, 3 = nearly every day). Total scores can range between 0 to 27 points. Scoring involves a simple summation of the participant responses. Higher scores represent increased severity of

depressive symptoms. Scores ranging from 0-4 would be classified as “none” regarding depressive symptoms. Scores ranging from 5-9 are labeled as mild depression. Scores in the 10-14 range indicate moderate depression. Scores ranging from 15-19 are labeled as moderately severe depression. Lastly, scores in the 20-17 range are classified as severe depression.

The PHQ-9 measure is well validated. Regarding criterion validity, the PHQ-9 has been found to have good sensitivity and specificity with identifying depressive disorders ( $r = 0.88$  for both sensitivity and specificity) (Kroenke, Spitzer, Williams, & Löwe, 2010). Regarding reliability of the PHQ-9, the Cronbach alpha scores were as follows: internal reliability ( $\alpha = 0.86$  to  $0.89$ ) and test-retest ( $\alpha = 0.84$ ), thus indicating good reliability (Kroenke et al., 2010). The PHQ-9 is comparable to the Hopkins Symptoms Checklist Depression Scale (SCL-20), another measure of depression, in regards to responsiveness to depression treatment. The PHQ-9, however, is half as many items as the SCL-20, thus making it a more attractive measure in primary care settings (Löwe, Unützer, Callahan, Perkins, & Kroenke, 2004).

### **AIM-HI Fitness Inventory**

As mentioned earlier, readiness to change has significant treatment implications, as patients with higher levels for readiness to change are more likely to have greater reductions in A1c levels (Peterson & Hughes, 2002) and have better attendance (Helitzer et al., 2007). Although measuring this component has important treatment implications, unfortunately, there is not a well-validated measure that assesses readiness to change in regards to diabetes self-management behaviors. One study that assessed readiness to change for diabetes self-management used the following prompt: “I am intending to make

changes in my diabetes self-care in the..." and three answer selections: "I'm not planning on making any changes in the next 6 months" (pre – contemplation); "I'm planning to make changes in the next 6 months" (contemplation); and "I'm planning to make changes in the next month" (preparation) (O'Connor et al., 2004). A similar assessment was also used in the Peterson and Hughes (2002) study, as the authors used the same time frame and a similar one-question format to assess readiness to change in the type 2 diabetic population. Given the lack of well-validated measures for readiness to change, the AIM HI Fitness Inventory is the selected measure, as this inventory is recommended by the AAFP (Theobald et al., 2009). This inventory not only assesses readiness to change for making changes with physical activity, but it also assesses readiness to change with eating healthier.

As can be seen in Appendix K, readiness to change for physical activity is measured by asking one question, "How active are you?" Participants have four response choices including the following: "I'm physically active already and don't need help to be more active; I'm ready to get more active and would like help; I'm not sure if I'm ready to be more active, but I'm ready to talk about it; I'm not very active and I'm not interested in being more active at this time (Theobald et al., 2009, p. 7)." These responses correspond with the following stages of change: action, preparation, contemplation, and pre-contemplation, respectively. A similar question and similar responses are used to measure readiness to change with eating behaviors. In addition to assessing readiness to change with making physical activity and eating behaviors, the AIM-HI Fitness Inventory prompts participants to identify the amount of time spent watching television, doing housework, walking, and playing sports. The inventory also assesses for participant life

satisfaction by asking about emotional health, depressive symptoms, and spiritual or cultural activities that may impact life satisfaction (Theobald et al., 2009). These later items were used as guides for collaborative goal setting with the participants. Given that this inventory provides greater clinical information than a simple one-question format for assessing readiness to change and is recommended by the AAFP, it was the chosen inventory for this study to assess readiness to change.

### **Acceptance and Diabetes Questionnaire (AADQ)**

Diabetes acceptance is known as the extent to which a patient is able to practice acceptance of the physical and mental difficulties associated with diabetes and to accept the psychosocial impact on his/her life (Gregg, Callaghan, & Hayes, 2007). Poor glycemic control has been correlated with lower diabetes acceptance (Garay-Sevilla, Malacrara, Gutiérrez-Roa, González, 2001). High diabetes acceptance has been associated with higher coping capabilities (Richardson, Adner, & Nordström, (2008). An independent measure for diabetes acceptance is needed as low diabetes acceptance can be overlooked if a person has minor depressive symptoms and ostensibly lacks distress (Schmitt et al., 2014). As such, the AADQ was included in this study.

The AADQ that was used in this study is a 6-item measure (see Appendix L). This version of the AADQ demonstrated satisfactory psychometric properties and factorial validity of the acceptance construct, thus indicating that it is a reliable and valid measure of diabetes acceptance (Schmitt et al., 2014). The AADQ was only administered at 3-month follow-up. The AADQ was a 6-item measure that used a five-point Likert scale, which ranged from 'never' (1), 'rarely' (2), 'sometimes' (3), 'often' (4), to 'almost always' (5). Item scores were added using simple summation. Scores ranged from a

minimum score of 6 to a maximum score of 30. Higher values on the AADQ represented greater non-acceptance (Schmitt et al., 2014).

## **Overview of Data Analysis**

### **Quantitative Analysis**

Descriptive statistics were evaluated in order to determine the demographic makeup of the study participant, as well as the scores on the questionnaires that were administered. The program used to calculate the measure of central tendency and variability was Microsoft Excel (2016). Descriptive statistics for both groups are provided in the results chapter.

### **Qualitative Data Analysis**

As mentioned earlier, qualitative data were obtained through use of audio recording. The data from the pre-SMA focus group and the final focus group were transcribed verbatim. Transcriptions of the qualitative data were completed by a team of undergraduates. Participant responses to the questions asked during the initial and final focus groups were analyzed by the author using thematic analysis (Green & Thorogood, 2004; Clarke & Braun, 2016; & Terry, 2016). Although the qualitative data collection occurred at two time points during the study, transcription and full data analysis did not transpire until all data had been collected at the end of the study. Although the SMA intervention sessions were not audio-recorded or transcribed, the SMA facilitators for both SMA groups added their memos and observations for analytical purposes.

Thematic analysis involved identifying important and salient themes in regards to patient satisfaction, participant perspectives on the effectiveness of the SMA intervention model, and participant recommendations for future SMA design. The typology of



research questions used in this study were all questions that are suitable for thematic analysis, given that thematic analysis is designed for research questions that inquire about participant's understandings, perceptions, and lived experiences (Clarke & Braun, 2016). Data were coded using semantic meaning and analyzed from a bottom-up approach. Regarding the bottom-up approach, the pre-SMA meeting (i.e., initial focus group) examined participant's perspectives regarding how the SMA intervention should be designed, as opposed to the top-down approach that the vast majority of SMA studies have used in chronic care, in which only the developers design the content of SMA interventions.

Thematic analysis involved six phases including “data familiarization, coding, searching for themes, reviewing themes, defining and naming themes, and write up (Clarke & Braun, 2016, p. 84).” First, data familiarization entailed reading and re-reading the transcripts, as well as reading through personal memos for potential analytical insights. Second, data coding involved capturing key segments of data and breaking it down into discrete units. Third, searching for themes involved identifying organizing concepts and patterns, which included development of a codebook. During the third step, in order to reduce bias, two researchers were instructed to challenge the codebook constructed by the author in order to enhance validity of the study. Researchers discussed discrepancies in the findings until a final consensus regarding main themes in the findings was reached. Fourth, themes were compared to the data set as a whole in order to make sure themes closely reflected the content of the data. Fifth, themes were defined and named. This step in the process narrowed down themes into overarching concepts (Clarke & Braun, 2016). Again, the two other researchers that have reviewed the material

examined the author's conclusions regarding coding and overarching theme development and provided their insight regarding the validity of those perspectives. Lastly, the write up phase of thematic analysis involved producing a polished analysis of the qualitative data and weaving together the broad patterns of data (Terry, 2016).

## CHAPTER 4: RESULTS

### **Quantitative Results**

#### **Participant Screening and Recruitment**

A total of 64 participants with type 2 diabetes were screened for this study by the author. Forty-four (68.75%) participants met eligibility criteria. Of those eligible to participate, 14 participants attended at least one SMA group session (i.e., participated in at least the initial focus group meeting, one of the five SMA groups, and/or attended the final focus group meeting). All participants were recruited through phone contact by the author. Reasons for refusal to participate were not collected and no further information is available about the non-participants.

#### **Participant Demographics**

Participants were an average age of 60.43 years old ( $SD = 14.32$ ) (see Table 2). Ages ranged from 37 to 79 years old, with a median age of 61.5 years. Of the 14 participants, 10 self-identified as female and four as male. Eleven of the 14 participants self-identified as African American or Black; the others identified as White. Two participants indicated that they had some high school education, but no diploma. Two participants reported that their highest level of education earned was their high school diploma. Three people endorsed that they had some college credit, but no degree. One person stated she earned an associate degree and another individual reported she earned a trade degree. Three participants indicated that they had earned a bachelor's degree. Lastly, two participants chose not to disclose their highest level of education earned.

Table 2: Participant Demographics

		Total Sample ( <i>N</i> = 14)	SMA Group 1 ( <i>n</i> = 7)	SMA Group 2 ( <i>n</i> = 7)
Age	Mean (years)	60.43	54.71	66.14
	SD	14.32	17.3	7.66
Gender	Female	10	5	5
	Male	4	2	2
Racial/Ethnic Identity	African American/Black	11	6	5
	Caucasian/White	2	0	2
	Multiracial	1	1	0
Highest Level of Education	Some high school, no diploma	2	2	0
	High school graduate	2	1	1
	Trade/technical/vocational training	1	1	0
	Associate degree	1	1	0
	Some college credit, no degree	3	1	2
	Bachelor's Degree	3	1	2
	Did not disclose	2	0	2

### A1c Levels and Weight: Pre and Post-SMA Participation

The baseline, or Pre-SMA, A1c levels ranged from 6.5% to 12.2% with a mean A1c level of 8.69% ( $SD = 2.06\%$ ) across both groups (see Table 3). The average A1c level at 3-month follow-up, or post-SMA, was 8.09% ( $SD = 1.83\%$ ;  $n = 10$ ). Pre-SMA weight ranged from 157 lbs. to 315 lbs. The average weight of participants prior to SMA participation was 215.00 lbs. ( $SD = 45.64$ ). The average weight of participants post-SMA participation ( $n = 10$ ) was 211.09 ( $SD = 43.96$ ). Overall, on average, across both SMA groups participants were able to reduce their A1c levels and reduce their weight after participating in the SMA study. Given the small sample size in this study, statistical

significance is not reported. It is important to note that four participants that started the SMA study did not return, and thus their post-SMA A1c values and weight are missing.

Table 3: A1c levels and weight: Pre and post-SMA participation

	A1c Pre	A1c Post	Weight Pre	Weight Post
Patient 1	8.2	7.3	244	235
Patient 2	8.1		280	
Patient 3	6.7		209	216
Patient 4	9.3	9.8	206	198
Patient 5	9.7		166	
Patient 6	12.2		256	
Patient 7	6.7	7.5	315	326
Patient 8	6.8	6.7	214	214
Patient 9	7.8	7.4	157	160
Patient 10	12.7	12.1	194	189
Patient 11	6.5	6.8	170	172
Patient 12	7.7	6.9	171	183
Patient 13	8.1	6.5	209	215
Patient 14	11.2	9.9	219	215
Mean	8.50	7.89	215.00	211.09
<i>SD</i>	2.01	1.86	45.64	43.96

### Results from Assessment Instruments

#### DSMQ

The DSMQ assessed six domains including dietary control, medication adherence, blood glucose management, physical activity, physician contact, and self-care. All scores ranged from 0 to 10 (10 representing the highest score) with exception of the self-care domain, which was on a scale from 0 to 3 (3 representing the highest score). Higher scores indicate better diabetes management. For the dietary control domain, participants' average score was a 4.8 ( $SD = 3.3$ ) pre-SMA and a 6.1 ( $SD = 2.8$ ) post-SMA participation. Concerning the medication adherence domain, participants' average score

was a 7.2 ( $SD = 3.1$ ) pre-SMA and a 7.6 ( $SD = 2.4$ ) post-SMA participation. Regarding the blood glucose management domain, participants' average score was a 4.8 ( $SD = 2.6$ ) pre-SMA and a 6.4 ( $SD = 2.6$ ) post-SMA participation. Referring to the physical activity domain, participants average score was a 6.3 ( $SD = 2.6$ ) pre-SMA and a 7.4 ( $SD = 2.2$ ) post-SMA participation. Regarding the physician contact domain, participants' average score was an 8.0 ( $SD = 1.8$ ) pre-SMA and a 7.0 ( $SD = 1.7$ ) post-SMA participation. Participants' self-reporting of their physician contact decreased from pre to post-SMA. Lastly, in reference to the self-care domain, participants average score was a 1.6 ( $SD = 1.4$ ) pre-SMA and a 2.0 ( $SD = 1.1$ ) post-SMA participation. Thus, on average, the scores reflect increased dietary control, medication adherence, blood-glucose management, physical activity, and self-care, as well as decreased physician contact.

### **PHQ-9**

The PHQ-9 is an assessment measure used to assess symptoms of depression. At baseline, six participants ( $N = 11$ ) scored in the “none” range for symptoms; two participants scored in the mild symptoms range; one participant scored in the moderate range; one participant scored in the moderately severe range; and one participant scored in the severe range (see Table 4). At the 3-month follow-up, seven participants ( $n = 10$ ) scored in the “none” range for symptoms; two participants scored in the mild symptoms range; and one participant scored in the moderately severe range. Overall, results from the PHQ-9 suggest that the majority of the sample was not experiencing symptoms of depression at baseline and at 3-month follow up. Participant scores were consistent from baseline to 3-month follow-up with exception of one participant who shifted her score from mild to “none” range. Four participants' follow-up scores were missing due to

attrition. Also, two participants had missing values at baseline and therefore, changes in symptoms for those two participants were unable to be examined.

Table 4: PHQ-9 scores pre and post-SMA participation

Classifier	Score Range	PHQ-9 Total Sample pre-SMA (N=11)	PHQ-9 SMA Group 1 pre-SMA (n=7)	PHQ-9 SMA Group 2 pre-SMA (n=4)	PHQ-9 Total Sample post-SMA (n=10)	PHQ-9 SMA Group 1 post-SMA (n=4)	PHQ-9 SMA Group 2 post-SMA (n=6)
None	0 to 4	6	3	3	7	2	5
Mild	5 to 9	2	1	1	2	1	1
Moderate	10 to 14	1	1	0	0	0	0
Moderately Severe	15 to 19	1	1	0	1	1	0
Severe	20 to 27	1	1	0	0	0	0

### AIM-HI Fitness Inventory

The AIM-HI Fitness Inventory was used to assess participants' readiness to change (see Table 5). There were three domains in which the AIM-HI assessed readiness to change including physical activity behaviors, eating behaviors, and overall satisfaction with life. Regarding the first domain, respondents have four response choices including the following: "I'm physically active already and don't need help to be more active; I'm ready to get more active and would like help; I'm not sure if I'm ready to be more active, but I'm ready to talk about it; I'm not very active and I'm not interested in being more active at this time (Theobald et al., 2009, p. 7)." These responses correspond with the following stages of change: action, preparation, contemplation, and pre-contemplation, respectively. These stages of change are the same across all three of the domains (i.e., physical activity, eating behaviors, and overall satisfaction).

Regarding the first question (i.e., How active are you?), at baseline, 4 participants ( $N = 12$ ) self-reported that they were in the active stage of change; 6 participants endorsed that they were in the preparation stage of change; and 2 participants indicated that they were in the contemplation stage of change. At 3-month follow up, 5 participants ( $N = 10$ ) endorsed that they were in the active stage of change; 4 participants self-reported that they were in the preparation stage of change; and 1 person endorsed being in the pre-contemplation stage of change. Regarding the second question (i.e., How well do you eat?), at baseline 2 participants ( $N = 12$ ) reported that they were in the active stage of change and 10 participants endorsed that they were in the preparation stage of change. At 3-month follow-up, 6 participants ( $N = 10$ ) reported that they were in the action stage of change and 4 participants endorsed being in the preparation stage of change. Regarding the third question, (i.e., How happy or satisfied are you?), at baseline, 6 participants ( $N = 12$ ) reported that they were in the action stage of change and 6 participants endorsed that they were in the preparation stage of change. At 3-month follow-up, 6 participants ( $N = 10$ ) reported that they were in the action stage of change and 4 reported that they were in the preparation stage of change. It is important to note that two of the baseline responses were missing from SMA group 2.



Table 5: Patient responses on AIM-HI Fitness Inventory pre and post-SMA participation

	Total Sample Pre (N=12)	SMA Group 1 Pre (n=7)	SMA Group 2 Pre (n=5)	Total Sample Post (N=10)	SMA Group 1 Post (n=4)	SMA Group 2 Post (n=6)
<b>How Active Are You?</b>						
I'm physically active already and don't need help to be more active.	4	1	3	5	1	4
I'm ready to get more active and would like help.	6	5	1	4	3	1
I'm not sure if I'm ready to be more active, but I'm ready to talk about it.	2	1	1	0	0	0
I'm not very active and not interested in being more active at this time.	0	0	0	1	0	1
<b>How Well Do You Eat?</b>						
I'm eating healthy at this time and don't need help to eat healthier.	2	1	1	6	3	3
I'm ready to make some change to eat healthier and would like help.	10	6	4	4	1	3
I'm not sure if I'm ready to changes the way I eat, but I'm ready to talk about it.	0	0	0	0	0	0
I'm not interested in changing the way I eat at this time.	0	0	0	0	0	0
<b>How Happy or Satisfied Are You?</b>						
I'm happy and satisfied with my life at this time.	6	2	4	6	2	4
I'm ready to make some changes to be happier and would like help.	6	5	1	4	2	2
I'm not sure if I'm ready to work on being happier, but I'm ready to talk about it.	0	0	0	0	0	0
I'm not interested in working on my happiness or satisfaction at this time.	0	0	0	0	0	0

\*Note: Two of the baseline responses were missing from SMA Group 2

## AADQ

The AADQ measure was used to assess acceptance of diabetes-related feelings and thoughts and was only administered at 3-month follow-up. The AADQ is a 6-item measure that used a five-point Likert scale, with responses of ‘never’ (1), ‘rarely’ (2), ‘sometimes’ (3), ‘often’ (4), to ‘almost always’ (5). Item scores were added using simple summation. Scores ranged from a minimum score of 6 to a maximum score of 30. Higher values on the AADQ represented greater non-acceptance (Schmitt et al., 2014). As a total group, the average score for the AADQ measure was 14.50 ( $SD = 6.88$ ) (see Table 6). Participant responses on the AADQ ranged from 6 to 30. The average score for SMA group 1 on the AADQ measure was 15.50 ( $SD = 10.21$ ). The average score for SMA group 2 on the AADQ measure was 13.83 ( $SD = 4.62$ ).

Table 6: Patient responses on the AADQ at 3-month follow-up

	Total Score	SMA Group 1	SMA Group 2
Patient 1	10	10	
Patient 2			
Patient 3	7	7	
Patient 4	15	15	
Patient 5			
Patient 6			
Patient 7	30	30	
Patient 8	17		17
Patient 9	11		11
Patient 10			
Patient 11	14		14
Patient 12	6		6
Patient 13	17		17
Patient 14	18		18
Mean	14.50	15.50	13.83
SD	6.88	10.21	4.62

### Attendance of SMAs

The most attended session was the initial focus group meeting (see Table 7). The least attended group session was session 5 (ACT module 5), which focused on acceptance and action. All participants included in this study attended at least one SMA group.

Table 7: Attendance for both SMA groups 1 and 2

	Initial Focus Group	SMA Session 1	SMA Session 2	SMA Session 3	SMA Session 4	SMA Session 5	Final Focus group
Patient 1	1	1		1		1	1
Patient 2		1					
Patient 3	1		1	1	1		1
Patient 4	1	1	1	1			1
Patient 5	1						
Patient 6	1						
Patient 7	1	1	1	1			1
Patient 8	1						
Patient 9	1	1	1	1	1	1	1
Patient 10	1	1	1	1	1		
Patient 11	1		1				
Patient 12	1	1	1	1	1	1	1
Patient 13	1		1	1	1	1	1
Patient 14	1	1	1		1		1
Total	13	8	9	8	6	4	8

\*Note: White rows represent patients in SMA group 1 and gray rows represent patients in SMA group 2.

### Qualitative Results

The categories used to organize the initial codes derived from the qualitative data are listed in Appendix M. Two research assistants reviewed the initial coding conducted by PI and the consistency of the coding between the PI and two other members of the research team were 95% and 94%, respectively. Coded data were used to develop overarching and related sub-themes across the focus groups. The aim of the current

research was to examine components that influenced patient satisfaction with the SMA group intervention model for treating patients with T2DM, to examine the most helpful components, and to provide suggestions for future SMA groups. A description of themes and representative statements from participants are outlined below. To improve readability, participant statements have been minimally edited. For example, some “umms,” “you know, and “errs” have been removed to remove distraction. However, extreme care was taken by the PI to maintain the original intention and flow of participant statements.

### **Overview of Qualitative Section**

First, a summary of the overarching themes in this study will be provided. Second, a description of how the overarching themes relate to the Research Objectives will be identified. Lastly, sub-themes of the overarching themes will be discussed. Refer to Table 8 for an outline of the overarching and sub-themes found in this study. Table 8 is organized by the three Research Objectives including the following: 1) Research Objective 1 refers to patient satisfaction with the SMA intervention model; 2) Research Objective 2 refers to the most helpful components of the SMA model as identified from the participant perspectives; and 3) Research Objective 3 refers to participant suggestions for future SMA design. Themes and sub-themes were gathered from both the initial and final focus group meetings.

**Table 8: Themes from the focus groups**

Patient Satisfaction with the SMA Intervention Model	Most Helpful Components of the SMA Model	Suggestions for Future SMA Design
No longer feel alone with managing their diabetes	Increasing self-efficacy was most helpful	Diabetes care requires recontextualizing eating behaviors
Supportive group dynamics	Lack of confidence in nutritional knowledge	Desire to eat comfort foods
Increased connection with physician	Learned how to read food labels	Eating provides interpersonal connection
Desire to continue participating	Prioritization of self	Diabetes care is complex
Wanted more structure from SMA sessions	Making decisions based on values	Stress management skills
		Addressing financial limitations
		Assertive communication skills
		Patients tend to use loss-framed messages to increase motivation
		Amputations
		Blindness

\*Note: Gray cells refer to overarching themes. Indented cells refer to sub-themes.

### Summary of Overarching Themes

This thematic analysis study found five overarching themes (see Table 8).

Overarching themes for this study were identified by evaluating context clues, examining the frequency of certain comments, and interpreting meta-messages from participant statements. First, the impact of participating in the SMA study resulted in a shift in perspective such that participants no longer felt alone in managing their diabetes. Second, increasing self-efficacy was found to be most helpful. Misconceptions regarding nutrition

and diabetes were common: even after direct guidance had been provided, most participants lacked confidence in their knowledge of what food-choice decisions would most benefit their diabetes care. Third, diabetes care requires recontextualizing eating behaviors: making food choices for diabetes management is often oversimplified as eating-for-nutritional-content alone. Fourth, diabetes management is complex: developing stress management skills, addressing financial limitations, and assertive communication skills are all essential components of diabetes care. Fifth, participants frequently use fear-based or loss-framed messages to increase their level of motivation. For example, participants endorsed making healthier food choices to avoid diabetes-related complications, as opposed to gain-framed messages such as deciding to become healthier as it supports their value system.

### **Research Objective 1**

Research Objective 1: How does the experience of participating in the SMA intervention model influence patient satisfaction with their medical care? The first overarching theme (i.e., participating in the group SMA resulted in a shift in perspective such that participants no longer felt alone in managing their diabetes) relates directly to Research Objective 1 as it indicates patient satisfaction with this model. Sub-themes related to Research Objective 1 include the following: 1) the SMA groups displayed supportive group dynamics, which improved patient satisfaction; 2) validation, normalization, and self-disclosure on behalf of the physician increased patient satisfaction; 3) all participants report having a desire to continue participating in SMA groups in the future; and 4) regarding dissatisfaction of this model, most participants indicated the desire to have more structure within the SMA groups.

Regarding the first overarching theme, participants shared that they commonly felt “alone” in managing their diabetes. Participants elaborated by saying that they often feel isolated by their diabetes diagnosis, as non-diabetic individuals do not understand the magnitude and difficulty associated with making lifestyle changes required to manage diabetes. Several participants endorsed feeling lonesome, even within their own families, due to their diabetes diagnosis. For example, many mothers in the SMA groups shared the difficulties of being the main person responsible for cooking in their households. They explained that cooking meals for their family was challenging as it either forced them to cook diabetic-friendly foods that their family members frequently disliked or it required them to make less optimal food choices to please their family, which participants found to be enticing to eat. Participants shared the frustration that other family members expressed when meals were altered to be compliant with diabetes management recommendations. Participants endorsed feeling guilty for imposing their needs onto other family members and expressed resentment that they no longer felt they could partake in eating foods that brought them pleasure and comfort. Relatedly, participants expressed feeling misunderstood and/or judged by others for their difficulties with making health behavior changes.

After participating in the SMA study, participants indicated that they no longer felt alone in managing their diabetes. Participants disclosed that they had the sense that they had accountability partners and a social support network as a result of SMA participation. Participants shared that the SMA groups offered a space to discuss their diabetes care in which the people in the group understood the commitment and discipline it takes to make health behavior changes. Moreover, several participants indicated that

hearing other people struggling with adhering to medical recommendations helped decrease feelings of isolation and self-blame.

Some of the information that we got [...] was quite helpful. And then just listening to other people, having other people around, and finding out how they were doing [was also helpful]. Cause you do, you feel like you're by yourself, so [you think to yourself] 'I'm fighting this by myself.' Because you might be the only diabetic in the house [...] So yeah, you've got to be the one to make the good choices, you've got to cook for everyone, where you know you're not going to eat a bunch of carbs [etc.]." (Statement by Patient 4 in SMA group 1 during the final focus group).

That's the thing, when you go home, it's totally different from when you come [here] and talk to everybody [in the SMA group], cause like you [were] saying, in my household, it's just me. So, I'm the only one with diabetes [...]. So, trying to prepare meals is totally different because [my children] want the carbs, and stuff that you know you're not supposed to be eating; but you're sitting there looking at them eat it and it's tempting. (Comment by Patient 7 in SMA group 1 during the final focus group).

Well it was more comfortable I guess being able to talk about it with other people that have it, rather than sitting at home with no one else that has it. I don't think it helps if you talk to someone that doesn't have diabetes 'cause they don't know what you're going through." (Remark by Patient 3 in SMA group 2 during the final focus group).

That's what I was going to say. Just like you [were] saying. Knowing that there's other people, you know, who have the same thing, and sharing their stories, and their problems, and knowing you're not alone in the situation: that made it good. (Statement by Patient 7 in SMA group 2 during the final focus group).

**Supportive group dynamics sub-theme.** An important sub-theme of overarching theme one was that group dynamics amongst participants were supportive. Participants shared personal experiences, gave emotional support, provided advice, and offered accountability to one another, which contributed to patient satisfaction with this model of care. Participants provided personal details about their struggles with diabetes management and voiced their fears with diabetes-related complications. Medication non-compliance, as well as non-compliance with other medical recommendations, was



commonly reported by participants. Many participants stated that they were not monitoring their glucose levels, often ate foods high in carbohydrates and sugar, and did not exercise regularly. In addition, many participants reported that they were not taking their diabetes prescriptions as prescribed. Often these admissions of their struggles elicited feelings of guilt and shame as reported by several participants. Participants shared that when other group members normalized their difficulties with making health behavior changes, it felt validating. Moreover, the mutual understanding that they could ask questions and seek support from one another was valuable according to the participants. Many participants indicated that the normalization of struggling with diabetes management was motivating and empowering. Overall, the lack of judgment and validation received improved participant satisfaction with this model of care.

I guess the thing for me is that when you have other people in the same situation as you is that it's kind of like a support system, kind of helps keep you motivated. (Comment by Patient 7 in SMA group 1 during the pre-SMA focus group meeting).

I mentioned that early on where you couldn't say certain things to friends and they couldn't understand it and here you can just say it. (Statement by Patient 11 in SMA group 2 during the final focus group).

Not even my husband, I don't talk about it with him. Because I have always said, I'm not going to give [diabetes power], it's not the captain of my ship. I'm the captain of my ship. I'm not going to give it credence. I'm not going to give it any glory. I'm just not going to hold it. I'm not going to name it. So, I say nothing. And here, at least I've got to talk about it. (Comment by Patient 9 in SMA group 2 during the final focus group).

I just enjoyed the company, and getting to listen to what everyone else had to say. (Statement by Patient 1 in SMA group 1 during the final focus group).

I think it was just better being in the group versus individual I guess because [...] just one-on-one, I kind of beat myself up a little bit more about the choices that I was making versus [in] the group session [I knew] that I wasn't the only one [struggling to make changes]. It just made it more like okay, 'I'm okay.' You know, like, I'm within, I guess, the realm where it's okay to not always be on

point, you know? So, I guess it was better with the group. Understanding you're going to have your moments where you fail, but just know that you don't have to start over. (Statement by Patient 7 in SMA group 1 during the final focus group).

It was helpful to me. Especially, like she said, knowing that you're not the only person that has this condition and that there [are] other people with the same condition and I'm not the only one that wants the ice-cream! (Comment by Patient 12 in SMA group 2 during the final focus group).

**Increased connection with physician sub-theme.** Another important sub-theme related to Research Objective 1 was that validation, normalization, and self-disclosure on behalf of the physician improved patient satisfaction. Participants identified that having increased time with their physician allowed them to get to know him on a more personal level, which enhanced their degree of comfort with their medical provider. Several participants mentioned that they have never felt more connected to a physician than they did with their doctor in the SMA group. Based on feedback from participants, knowing private details about their physician (e.g., his opinions, his personal struggles with insulin resistance, etc.) increased their comfort level with their doctor. Multiple participants disclosed that they felt more cared for by their doctor in this format as opposed to treatment as usual.

It just made it easier to talk to him... But him being here attending the meetings and talking with us and sharing little, you know, insights, it just helps to talk to him. [...] Yea, I think it is really important because you know doctors, we have all been to the doctor, it's kinda like your lawyer, you know, when you really need them and you don't have that [...] good rapport with them. [...] You know, there is no relationship there. [...] So this is actually the first doctor that I have ever had that I felt that comfortable with. (Remark by Patient 9 in SMA group 2 during the final focus group).

It was all positive. [...] I don't know if any [other] physicians would do this. So that was a positive. Going that extra bit to care for his patients. (Comment by Patient 11 in SMA group 2 during the final focus group).

I mean I guess [...] for him to take time out of his schedule to stay after to you know do this session with us, that speaks volumes for me because I've never had

a doctor to actually do that. You know what I'm saying? (Statement by Patient 7 in SMA group 1 during the final focus group).

To me it was good to have the doctor right there with you. Instead of a regular visit, you know, he is sharing stuff with us too. (Remark by Participant 4 from SMA group 2 during the final focus group).

**Desire to continue participating in the SMA format sub-theme.** The third sub-theme was that participants across both SMA groups indicated that they were satisfied with the SMA intervention model and would like to continue participating in the SMA format. All of the participants that attended the final focus group appointments across both groups (i.e., 8 participants) indicated that they would like to continue the SMA groups in the future should it be offered. Several of the participants made special requests and asked specific questions pertaining to the continuation of SMA services. Although it was not mentioned during the initial or final focus group meeting, participants in SMA group 2 had discussed in one of the SMA sessions that they would like to continue meeting as a group even if the formal SMA sessions were going to be discontinued (A. Peterman, personal communication, April 25, 2018). Participants in SMA group 1 also offered their telephone numbers to other participants to provide continued support.

I liked sharing ideas, even sharing the negative parts, you know. Just the whole thing, I mean I thought it was a really good idea. I'd like to continue. You know, it is good to know that you got people that, you know, have the same issue that you do and so... You know I don't know how to explain this, but if I said to you, "Man I really want that piece of cake," you would already know why I couldn't have that piece of cake. You don't have to ask me a ton of questions. [...] I just want to be the person that did it (completed the SMA program). I wanted everybody to do it. I was just so excited about the fact that I have actually done it. (Comment by Participant 2 in SMA group 2 during the final focus group).

So it's nice to have people that, unfortunately, [...] have the same thing. I think that the primary reason that I came and the primary reason why I want to continue is that I just want to keep being challenged. (Statement by Patient 9 in SMA group 2 during the final focus group).

Well, when she called me and asked me if I wanted to participate, I kind of hesitated because, I don't want everybody knowing that I got diabetes. And, umm, okay there was hesitation, but once I got started, I want to keep going. [...] I think twice a month would be okay. Like what we are doing now. Twice a month is good. (Statement by Patient 7 in SMA group 2 during the final focus group).

**Desire for more structure sub-theme.** Several participants indicated that they disliked it when SMA groups were less structured. Most commonly, participants reported it felt distancing and unproductive when group members would make remarks that were off-topic. Participants indicated that loosely related information, frequent sharing of personal stories not pertaining to diabetes management, and monopolization of group time were all aspects of group participation that group members found unfavorable. Participants expressed a desire for their facilitators to re-direct conversations to the target topic more frequently. Participants indicated that comments about non-diabetes related experiences derailed their education and resulted in disengagement during the group appointments. Patients expressed dissatisfaction with this aspect of their SMA group experience.

Because that packet you gave us was really informative. There was a lot of material. [...] We could have spent the whole time talking about it. But more on a teacher/participant kind of thing, you know where somebody is walking us through it again step by step [would be helpful]. (Remark by Patient 9 in SMA group 2 during the final focus group).

Well everybody was enjoying all the stuff about the church (referring to group discussion about which churches they attended), but I could have done without that because I want to focus on diabetes. So try to keep our focus [would be my recommendation]. (Statement by Patient 11 in SMA group 2 during the final focus group).

## **Research Objective 2**

Research Objective 2: What components of the SMA intervention design do participants with T2DM find to be the most meaningful and effective? The second

overarching theme (i.e., increasing self-efficacy was most helpful) aligns with Research Objective 2. Based on participant feedback, it appears that assisting participants with increasing self-efficacy was the most helpful component. Diabetes management involves dealing with emotional, behavioral, and environmental factors, which participants often commented felt overwhelming. Patients expressed frustration at their lack of knowledge about healthy food choice decisions and indicated that learning to read food labels was highly useful for them. In addition, having permission to engage in self-prioritization was also reportedly helpful. When examining this data together, it indicates that, in general, enhancing self-efficacy was the most helpful component.

**Lack of confidence in nutritional knowledge sub-theme.** Even after direct guidance had been provided, participants lacked confidence in their knowledge of what food-choice decisions would most benefit their diabetes care. This sub-theme was the most pervasive. Participants reported that the most confusing and difficult aspect of diabetes management was understanding what food choices were healthiest for them. Across both groups, questions regarding nutrition and the impact of food choice on glucose levels were consistently a major part of the discourse during all meetings, including the initial focus group meeting, all five SMA sessions, as well as the final focus group meeting. Moreover, the most frequently asked questions were in relation to food choice decisions. Regarding sub-themes within Research Objective 2, participants reported that the most helpful components in the SMA study were learning to read labels, learning to prioritize themselves, and making decisions based on their own value system. Below are some examples of common questions asked in the SMA groups.

Let me ask you a question though. Um, eating those simple carbs, but you pairing that with something else, even with a meal, does that help? (Question by patient 4 in SMA group 1 during the pre-SMA focus group).

I don't know if it's a true or false [question]. Eating oranges or drinking orange juice, will that raise or lower your sugar level? (Question by Patient 7 in SMA group 2 during the pre-SMA focus group).

Whenever you're drinking or eating certain foods that raise your levels, it's better to drink water afterwards to kinda flush it down. Help flush it down a little quicker? (Question by Patient 8 in SMA group 2 during the pre-SMA focus group).

Felt like all the carbs I'm gonna eat I usually try to eat in the morning because then I'm not going to eat anymore during the day. Then, I get more exercise because you're doing more during the day than you are at 6 o'clock at night. So maybe if you ate it in the morning, is that better? (Question by Patient 9 in SMA group 2 during the pre-SMA focus group).

You were saying that [artificial sweeteners] may cause all the good bacteria in our body, to deplete it. Could you not take a probiotic to help with the good bacteria? (Question by Patient 9 in SMA group 2 during the final focus group).

**Learning to read food labels sub-theme.** A related sub-theme was that participants reported that one of the components of the SMA intervention that was most helpful was learning to read food labels. Participants shared that learning about label reading caused them to more closely examine the serving size and to inspect the number of carbohydrates contained in the food items. For several participants, having a better understanding of the nutritional content of their food choices increased their level of confidence and dedication to refusing tempting items. For other participants, they expressed that they already possessed a working knowledge of reading food labels, but indicated appreciation of re-learning this tool, as it reminded them to be more mindful about their selections. Outlined below are examples of comments related to this sub-theme. The first comment is an example of confusion with reading food labels prior to

SMA participation. The following four examples highlight participants' perceptions of the importance of reading food labels.

When I go to the store, I try. [...] So, I'm looking on the labels and stuff. And I'm looking at the sugar, and I get confused with that kind of stuff, and I wind up getting something [saying to myself], 'This is not bad.' [...] I [started] drinking a lot of cranberry juice and [it] had a lot of sugar or something. (Comment made by Patient 5 during the pre-SMA focus group meeting, thus indicating difficulty with understanding food labels).

I kind of enjoyed knowing what I'm looking at when I read a label, knowing what calories and carbohydrates, to me [they're] just words, but now it means something. So, I can look at it and just back away. And I find myself backing away and I didn't know that I could. (Comment made after SMA participation by Patient 12 in SMA group 2 during the final focus group).

Yeah, because, well for me, I learned more than I actually thought I knew, and that was a good deal. I learned how to read cereal boxes and food boxes for nutrition. I [kind of] figured it out a long time ago, but just reiterating how to go about doing it, it made it a lot easier. So now I'm taking the time out to look at items as I purchase them. And see what's good, so yeah. (Remark by Patient 7 in SMA group 1 during the final focus group).

I looked at the label of the green apple [soft drink], 70 grams of sugar in one serving! (Surprised voice). (Comment from P8 in SMA group 2 during the final focus group).

No, you can leave it on the shelf. You can leave it in the freezer. Yea, you can really make a difference in your health by choosing the right thing. (Comment made by Patient 12 in SMA group 2 during the final focus group).

**Prioritization of self sub-theme.** The second important sub-theme of Research Objective 2 was that participants reported it was helpful to receive reassurance that it is wise to prioritize oneself. Several participants across both groups identified that they often give precedence to the needs of others before their own. Participants explained that they feel a sense of guilt when they prioritize their own needs, particularly when they are caregivers in their family. For example, several mothers in the group endorsed that they feel compelled to care for the needs of their children before they provide self-care. Two

other participants shared that their partners also have T2DM and they felt responsible for trying to encourage their partners to choose healthier options. These participants stated that they learned that they did not have to be unduly influenced by their partners' decisions and they learned they were also not obligated to force their partners to change their eating habits. Participants shared that it was relieving to receive feedback that is not only acceptable, but also advisable to prioritize one's own health needs. They shared that the concept of not being able to care for others until one's own needs are met was empowering. Not only did the SMA team promote the message of prioritizing personal health needs, but other participants championed this message as well. Outlined below are statements made by the participants that reflect the sub-theme of embracing the need to prioritize oneself.

[.] You need to put yourself at number one. You got family and you love them, you know, but also you got to think about yourself more right now. (Comment by Patient 3 in SMA group 1 during the final focus group).

No, and you (referring to PI) were telling us about thinking about yourself, and your life, your things that are more important to you [...] and all this stuff. [...] [We] take care of everybody. We're moms and all that, but lots of time you don't think about yourself. [Because you think to yourself], 'I got to take care of them.' So, you have to get somebody sometimes to tell you, "You got to take care of you too." Who's going to take care of them if something happens to you? (Remark by Patient 4 in SMA group 1 during the final focus group).

In spite of [my husband], I can do it. He don't have to [make health behavior changes]. He can eat that stuff if he want[s] to. I don't have to eat it. (Statement by Patient 13 in SMA group 2 during the final focus group).

**Making decisions based on values sub-theme.** Another sub-theme from Research Objective 2 was that participants shared that it was helpful and empowering to learn to make decisions based on their own values instead of making decisions to comply with medical recommendations. Many participants shared that they had not considered,



prior to participating in the SMA group, to make decisions regarding health behavior change because of their own value system. Several participants indicated that spending time with family and being strong enough to play with their grandchildren were highly important to them. Participants stated that the concept of making decisions to support their values (e.g., having strength to play with grandchildren) instead of choosing a health behavior to comply with medical recommendations felt more empowering. Overall, there was strong receptiveness to the notion that intrinsic motivation elicited from engaging in value-congruent actions is preferable to making decisions for external factors (e.g., complying with medical recommendations). Participants indicated that it felt more empowering to make changes based on their own value system versus making decisions to comply with medical advice. Although this was a common sub-theme throughout all the SMA sessions, participants only minimally discussed this concept during the final focus group meeting. As such, direct quotes for this sub-theme are unavailable for review.

### **Research Objective 3**

Research Objective 3: What suggestions do participants in the SMA intervention model have for future SMA designs and what factors influenced their perspectives regarding these recommendations? Participants provided specific suggestions for future SMA interventions including the suggestion to have participants weigh at every session and share their weights with the group as a form of accountability. A common theme was that participants desired being accountable to others and they indicated that only weighing at the beginning and the end was not sufficient to maintain motivation for weight loss over the course of the 3-month intervention. Participants also suggested that

having the opportunity to attend SMA groups on the weekends may be helpful for patients that work during the week. A sub-set of the participants in the evening SMA group (i.e., SMA group 1) stated that they appreciated having a group in the evening while others reported that they preferred to attend appointments during the day. Both groups agreed that offering SMA groups on Saturdays would benefit the patients. Moreover, participants in SMA group 1 reported that they desired to have more concrete and tangible representations of portion size. They suggested it would be a more effective model to display actual foods as opposed to showing images and/or pictures of recommended portion sizes. Lastly, participants shared that they recommended that more information on stress management be provided to group members in the future. They indicated that strategies to reduce stress in the long-term, as well as strategies to deal with acute distress would be helpful. Highlighted below are some comments made by participants that reflect these suggestions.

But like I said we need to weigh every time we come so we can say, ‘Well yeah I fell off this week,’ ‘Yeah I ate that with them kids, but I didn’t eat that,’ ‘I had so-and-so, or I changed from the iceberg lettuce to regular spinach, which I usually get.’ So yeah, those are the few things. You know, maybe once or twice we’d bring in your snack for the week, what you had. Especially when he’s (referring to the doctor) here so you can ask him the questions. (Suggestion by Patient 4 in SMA group 1 during the final focus group).

I honestly didn’t realize that stress would cause your glucose levels to rise. I really had no idea. So, I think that is something that should [be taught], just some exercises on how to de-stress. (Suggested made by Patient 9 in SMA group 2 during the final focus group).

I think we should meet on another day, like on Saturday. Because during the week, you’re coming from work and trying to fight the traffic coming down here. Yeah, we should meet on a Saturday morning or something. [...] We could do stuff on Saturday, go out for a little walk, ten to fifteen minutes, talk about stuff while we’re walking, that kind of thing. A little bit more interaction, don’t you think? (Suggestion by Patient 4 in SMA group 1 during the final focus group).

### **Overarching Themes for Research Objective 3**

There were three main overarching themes that were identified that relate to Research Objective 3. First, diabetes care requires recontextualizing eating behaviors, as making food choices for diabetes management is often oversimplified as eating-for-nutritional-content alone. Individuals eat food for pleasure, interpersonal connection, and comfort. These aspects of eating behaviors should be addressed in future SMA interventions, as these factors can often derail progress with making dietary changes. Second, diabetes management is complex and barriers to change must be addressed. For example, developing stress management skills, addressing financial limitations, and increasing assertive communication skills are all essential components of diabetes care that must be attended to for SMA participation to be successful. Third, participants frequently use fear-based or loss-framed messages to increase their level of motivation. For example, participants endorsed making healthier food choices to avoid diabetes-related complications, as opposed to gain-framed messages such as deciding to become healthier as it supports their value system.

**Recontextualizing eating behaviors overarching theme.** First, several of the participants reported that they eat food for pleasure, comfort and interpersonal connection. Diabetes management is often oversimplified as eating-for-nutritional-content alone. Participants discussed the difficulties with making dietary changes indicating that diabetes care requires recontextualizing eating behaviors. Discussion of their favorite foods and eating for pleasure was a dominating theme across every group session including the initial focus group, all 5 SMA group sessions, and the final focus group. Participants readily discussed foods/meals they enjoy and commiserated with one

another about the difficulty of either reducing and/or eliminating certain foods from their diet. One participant in SMA group 1 suggested having a nutritionist and a personal trainer/fitness expert on the SMA team in the future. Group members in SMA group 1 agreed with this suggestion. Although this suggestion was not directly endorsed by participants in SMA group 2, based on patient feedback, it can be inferred that they agreed with this suggestion. Listed below are comments that represent this overarching theme.

Yeah you need a nutritionist, a real nutritionist. [You need a] nutritionist and maybe a fitness person. That would make up a team. (Suggestion by Patient 4 in SMA group 1 during the final focus group).

I think it is very helpful to them to know what is going on with your body, and what things to eat and what not to eat, you know, and another thing is if you want to live, you'll do these things. You know because I go by the ice-cream thing and I go, 'Oh you can't have that.' (Suggestion by Patient 12 in SMA group 2 during the final focus group).

It's a pain because you have to try and figure it out, you know? You're used to doing whatever you want to do, you're used to eating whatever you want to eat, and all, and then all of a sudden, it just comes up, [you've] got diabetes. [...] I'm used to eating cake and ice cream and whatever, as much food as you want. (Comment by Patient 4 in SMA group 1 during the pre-SMA focus group).

**Diabetes management is complex overarching theme.** Diabetes management requires more than making dietary and physical activity changes. Diabetes management also requires assertive communication skills, stress management skills, and an ability to address financial limitations. Regarding assertive communication skills, participants often shared that they had to assert their needs with their family members. They endorsed that making health behavior changes for diabetes care disrupted family dynamics. Participants often indicated that their family members did not understand either the seriousness of their diabetes diagnosis or displayed an unwillingness to make accommodations for that

family member in relation to altering the family diet. Thus, making health behavior changes required participants to use assertive communication particularly in relation to making dietary changes. This barrier to making health behavior changes was a reoccurring theme throughout this study. Several patients across both groups made references to feeling frustrated, tempted, or discouraged by other family members' responses to their diabetic needs. Outlined below are examples of participants using assertive communication skills.

So, trying to prepare meals is totally different because [my children] want the carbs, and stuff that you know you're not supposed to be eating; but you're sitting there looking at them eat it and it's tempting. So, it makes you want to just go ahead and eat it too. So, you know, you have to be mind-strong, and just be like, 'look I can't do this'[...]. So, I've been trying to [...] change our food. (Comment by Patient 7 in SMA group 1 during the final focus group).

But your children want macaroni and cheese, and they want French fries, and they want hamburgers, or Burger King, or McDonald's. But you can go out. I do, I go out. 'Cause there's nobody but me and my husband now. So, I go out, but I just have to make a better choice wherever we go, [be]cause he gets upset. [...] But I have to make it my business to make that choice of what to eat. (Comment by Patient 4 in SMA group 1 during the final focus group).

**Stress management sub-theme.** Stress is a major consideration in diabetes care.

Three participants reported that grief was a part of their stress and resulted in difficulties with managing their diabetes. They explained that their self-care diminished significantly due to their grief response. Patients elaborated by saying their grief prompted them to eat comfort foods, which negatively impacted their diabetes care. They stated that they were unlikely to monitor their glucose levels, engage in physical activity, or choose healthy foods while grieving. Another common stressor that participants endorsed was child-rearing duties. Participants expressed that stress from monitoring, disciplining, and caring for their children added considerable additional demands, which often resulted in

compromising one's self-care. Moreover, several patients shared that stress from feeling overworked at their jobs or having hectic schedules also prompted patients to make unhealthy food decisions. Participants reported that they often choose foods based on convenience. These convenient meals often consisted of fast food and other options that are inconsistent with a recommended diabetic diet. Outlined below are comments made by participants that highlight the stress management sub-theme.

Well, I was trying to do better. [Exercising] started out okay, but I work, I have a lot of responsibilities. He knows (referring to Dr. R). I work less hours now, but I still have a whole lot to do. So, it's been a lot of stress, and like you said, I had a death in my family. (Comment by Patient 4 in SMA group 1 during the final focus group meeting).

[My motivation level is a] nine, because I know there's situations I'm gonna be in where I can't eat as healthy as I want to. I travel a lot and it's just difficult in a restaurant to [find foods that comply with recommendations for diabetes]. (Comment by Patient 10 in SMA group 2 during the pre-SMA focus group).

The stress, just a lot of stress. Um, my dad's been sick, and I've been trying to juggle life. I guess. Um, just keep things afloat. So, basically [I've] just been not eating as well as I should have. Um, I think I've been eating out just about every day, if not, every other day for the past month. [...] And I don't think I pushed myself far enough due to the fact that I was going through a lot of issues, distress. So, um, I think that was the biggest issue. (Comment by Patient 7 in SMA group 1 during the final focus group).

Another stressor that was commonly mentioned was the cost of foods. Healthy food choices such as fresh fruits and vegetables were reportedly beyond the food budgets of many of the participants. Participants expressed that fruits and vegetables are not only expensive, but they are also highly perishable. Thus, many patients indicated reluctance to purchase healthier food items because of the expense and shorter shelf-life.

Participants clarified that their reluctance to purchase healthier items, particularly organic items, was not due to lack of desire to eat fresh fruits or veggies, but solely because of financial constraints. Some participants expressed that their limited financial resources

were their main barrier to health behavior change. One participant mentioned during one of the SMA sessions (not during the initial or final focus groups when audio-recording data were collected) that she is a single parent and her children are now over-weight in large part due to her difficulty affording healthy food options. This sentiment was reflected in the dialogue of participants across both groups.

**Loss vs. gain-framed messages overarching theme.** Another factor for consideration was the abundance of comments made about loss-framed messages being used by participants to increase intrinsic motivation. Gain-framed messages focus on the positive benefits of making health behavior change and loss-framed messages focus on the cost or risk of not engaging in health behavior change. Most commonly, across both groups, participants used more loss-framed messages for increasing motivation. For example, several participants discussed how they used their fear of having a limb amputated because of their diabetes to motivate themselves to either eat healthier or to exercise. Relatedly, participants often indicated that their motivation to make health behavior changes was due to the desire to eliminate the need for diabetes medications (i.e., pills and insulin). Participants rarely used gain-framed messages to increase motivation for improved diabetes care. However, participants responded well overall to the SMA intervention of making decisions based on one's values as opposed to making decisions based on fear. The most commonly reported value was spending time with family. Participants indicated that they had a strong desire to be healthier so that they could spend more time with family. Listed below are common examples of loss-framed messages used by participants in this study.

I do not want to take insulin, I don't like needles, I couldn't fathom having to do it everyday. (Comment made by P8 in SMA group 2 during the initial focus group).

I just don't want to start taking needles. I'm sick of taking them pills every day. [...] I remember that I want to live. I don't want to be blind. (Statement by Patient 12 in SMA group 2 during the final focus group).

Because I just don't want to ever have to take insulin. (Remark by Patient 9 from A group 2 during the final focus group).

I wish I didn't have [diabetes] at all. I want to do something to get it to go away. I'm always like I don't want nothing to happen to me, I don't want to have no heart attacks (Comment by Patient 4 in SMA group 1 during the final focus group).

Yea you can leave it at the store or you can take it home and let the doctor cut your legs off. (group laughter) I mean it is your choice. You want the ice-cream or do you want the leg? (Statement by Patient 7 from SMA group 1 during the final focus group).

**Summary of Research Objective 3.** Regarding suggestions for future SMA studies, participants recommended that future groups weigh-in at every session and that their weight be shared with others to increase accountability. Patients also suggested that weekend appointments would be helpful for those participants working full time. Moreover, participants suggested that group leaders should bring actual foods to the group appointments to demonstrate portion size. Lastly, participants recommended that providing specific strategies to deal with acute distress would be helpful.

Based on the meta-messages provided by participants and by inferences made based on the group dialogue, three overarching themes were found that relate to Research Objective 3 (i.e., suggestions for future SMA studies). First, diabetes care requires recontextualizing eating behaviors. Second, diabetes care is complex, as it requires addressing stress, financial limitations, and communication issues. Third, participants tend to use loss-framed messages to increase their level of motivation. Please refer to



Chapter 5 for a discussion regarding how these overarching themes should be taken into consideration for future SMA studies.

## CHAPTER 5: DISCUSSION

### **Overview of Discussion**

For each of the main findings from this study, a summary of the results will be outlined, followed by a comparison of the findings to the diabetes SMA literature, and ending with identification of suggestions for future SMA studies. Suggestions for future SMA studies will also include implications for practice. Next, the strengths and limitations of this study will be identified. Finally, an analysis of the significance of this dissertation will conclude the discussion chapter.

### **Quantitative Results Summary and Discussion**

#### **Patient Characteristics**

Fourteen patients participated in this study. Given the small sample size, the results of this study are largely not generalizable. Despite this, it is interesting to note that the individuals that self-selected to participate were mostly elderly and self-identified as Black or African American. Older age is an important treatment consideration, as diabetes is highly prevalent among elderly patients (CDC, 2017). Twenty-five percent of those aged 65 years or older are diagnosed with diabetes (CDC, 2017). Elderly patients have important treatment considerations, predominant among them is the increased likelihood that elderly patients are at higher risk of poorer health outcomes due to social isolation (Cornwell & Waite, 2009; Steptoe, Shankar, Demakoks, & Wardle, 2013). Patients in this study frequently endorsed feeling alone in managing their diabetes care. As is discussed in more detail in later sections of this chapter, patients in this study indicated that participating in the group SMA helped decrease feelings of social isolation.

Given that social isolation is a risk factor for poorer health outcomes (Cornwell & Waite, 2009), increasing feelings of social connectedness is a clinically meaningful finding from this study.

Another important health consideration for elderly patients is that older adults are more likely to have low health literacy in comparison to younger adults (Baker, Wolf, & Feinglass, 2007). Health literacy can be defined as “the degree to which individuals can obtain, process, and understand the basic health information and services they need to make appropriate health decisions (Kindig, Panzer, & Nielsen-Gohlman, 2004).” Based on the frequency and type of questions asked during the SMA groups, sub-optimal health literacy can be credibly suspected with the current sample. This study attempted to obtain baseline knowledge by asking questions about what participants understood regarding diabetes and diabetes management. However, obtaining baseline knowledge through open-ended questioning and the Diabetes Self-Management Questionnaire were not sufficient to determine health literacy. As such, it is highly recommended that future SMA studies formally assess for, and address, low health literacy. One suggested measure to examine health literacy in diabetes SMAs in the future is the Health Literacy (HL) measure developed by Ishikawa, Takeuchi, and Yano (2008). The HL assessment tool measures functional, communicative, and critical health literacy among diabetic patients (Ishikawa, Takeuchi, & Yano, 2008). Given that the literature suggests that health literacy is associated with self-care behaviors, self-efficacy, diabetes knowledge, and glycemic control (Cavanaugh, 2011), it is highly recommended that future SMA studies examine this variable.

Moreover, racial disparities are another important health consideration. The majority of the sample (i.e., 11 out of the 14 participants) in this study self-identified as Black or African American. According to the CDC, the diabetes prevalence are highest among American Indian/Alaska Native, non-Hispanic Black, and Hispanic populations compared to non-Hispanic Whites (CDC, 2017; CDC; 2008). Non-Hispanic Blacks are 77% more likely to have been diagnosed with diabetes compared to non-Hispanic Caucasians (CDC, 2011). Regarding other racial disparities, in a recent systematic review, results showed that disparities in the performance of self-care behavior of medication adherence were found among non-Hispanic Black patients and Hispanic patients in comparison to non-Hispanic White patients (Mayberry, Bergner, Chakkalal, Elasy, & Osborn, 2016). Non-Hispanic Blacks and Hispanics were more likely to have medication non-adherence in comparison to non-Hispanic Whites (Mayberry et al., 2016). Lack of medication adherence was frequently reported in the current study. Although this study is not generalizable due to the small sample size, findings from this study appear consistent with the literature. The literature examining the understanding of racial disparities with diabetes self-care behaviors is limited and future research in this area is needed.

### **A1c and Weight Findings**

Although the main purpose of this study was to examine patient satisfaction with the SMA intervention model, data were collected on weight and A1c values to provide feedback to participants and to monitor patient progress. Regarding weight changes from baseline to 3-month follow-up, only three out of the 14 participants lost weight. Three participants had missing data due to attrition, one patient's weight remained the same,

and six patients gained weight in comparison to baseline measurements. As can be seen in Table 4, the maximum weight increase was 11 lbs. and the maximum weight decrease was 9 lbs. Grief and stress were the most commonly reported reasons for weight increases according to patient feedback. As is discussed in more detail in later sections of the discussion chapter, stress management and coping skills are highly recommended to be addressed in future SMA studies. Using food as a tool for comfort was a common barrier to making health behavior changes according to patient reports and is likely a major contributing factor to the lack of weight loss in this study. As such, interventions that target these barriers are needed.

Regarding other suggestions for future SMA studies in relation to weight loss, patients in SMA group 1 recommend weighing patients at every meeting. They insisted that measuring weight at every appointment instead of at the beginning and end of the SMA intervention would increase accountability and provide concrete data for self-monitoring progress. Moreover, patients across both SMA groups indicated acceptability of posting weight measurements so that weight values were visible to all group members. They agreed that even though displaying weight values may feel uncomfortable at first, in the long-term they believed it would help increase motivation for behavior change. Given patient feedback, weighing at every SMA group should be taken into consideration for future SMA designs.

Regarding A1c values, from baseline to 3-month follow-up, seven of the 14 patients reduced their A1c levels, three patients increased their A1c levels, and four patients had missing data (three values were missing due to attrition and one value was missing due to not being physically present during the final focus group meeting when

samples were obtained). As can be seen in Table 4, Patients 1, 12, 13, and 14 had A1c reductions that were near 1%. A 1% reduction in A1c equates to a 21% reduction in diabetes-related deaths, a 37% decreased chance of microvascular complications (e.g., kidney, eye, nerve disease, etc.), and a 14% reduction in myocardial infarction (IDF, 2015). For example, in a large scale ( $N = 13,477$ ) observational study in Sweden, results showed that a reduction of A1c values from an average of 7.8% to 7.0% resulted in a decreased risk of cardiovascular complications by 40% (Eeg-Olofsoon et al., 2016). Thus, the A1c findings in this study represent clinically significant results, as half the participants ( $n = 7$ ) in this study may have reduced their risk of cardiovascular and microvascular complications. Again, even though effectiveness of the SMA intervention was not the main research objective of this study, these findings suggest that SMA groups are a viable option for treating patients with T2DM given the clinical significance of these results. Based on several systematic reviews that have examined the effectiveness of diabetes SMAs, diabetes SMAs have generally resulted in clinically significant reductions in A1c (Edelman et al., 2015; Housden, Wong, & Dawes, 2013; Menon et al., 2017; Sumego & Bronson, 2014), which is consistent with the findings from this study. Regarding the three patients that had increases in their A1c levels, the participants indicated that stress was the number one barrier to making health behavior changes. A discussion of stress in relation to future SMA designs is outlined in later sections of this chapter.

### **Discussion of Results from Measures**

**DSMQ.** Results from the DSMQ indicate that patients, on average, increased their scores with dietary control, medication adherence, blood-glucose management, physical

activity, and self-care, as well as decreased physician contact from baseline to 3-month follow-up. These scores indicate that patients increased self-management behaviors after participating in the SMA study. Moreover, the scores within the physician contact domain suggests that patients felt that they did not need to meet more frequently with their medical provider after participating in this study. It is likely these scores decreased because patients were seeing their doctor more regularly, and as such, they did not endorse that they needed to see their medical provider more often. This finding also suggests that patients were satisfied with the amount of time spent with their physician. It is important to note that the increases across the six domains, with exception of the physician contact domain, represented slight increases for which statistical significance was not assessed because of the small sample size.

The finding of improved self-management behaviors from this study is consistent with several studies in the diabetes SMA literature (Kirsh et al., 2007; Sanchez, 2011). However, self-management behaviors are often not assessed in diabetes SMA studies and this represents a gap in the literature (Edelman et al., 2015). Therefore, a strength of this study is that it examined different domains of self-management behaviors pre and post-SMA participation. Given this information, a recommendation for future SMA studies is to examine the impact participation can have on self-management behaviors. Another suggestion for future diabetes SMA groups is to use the pre-SMA DSMQ scores to guide the group discussions, as the DSMQ scores could identify areas of deficits.

Notably, regarding the DSMQ results, the self-care domain was particularly low at baseline (i.e., 1.6 out of 10,  $SD = 1.1$ ) and improvement from baseline to 3-month follow-up was also relatively slight (2.0,  $SD = 1.1$ ). Several participants in this study

identified that stress was their main barrier to health behavior change. Stress has been shown to have a positive association with diabetes development (Joseph & Golden, 2017). Moreover, poor stress management has been largely cited as a major barrier to health behavior change with diabetes care (Glasgow, Toobert, & Gillette, 2001; Middleton, Anton, & Perri, 2017). There is a paucity of studies that examine racial disparities in problem solving or coping skills in relation to diabetes management (Mayberry et al., 2016), which have been identified as vital to self-care by the American Association of Diabetes Educators (American Association of Diabetes Educators, 2009). An important treatment implication for future SMA studies is to further examine the role of stress and self-care behaviors in diabetes management. A recommendation for future diabetes SMA groups includes providing patients with concrete skills for stress reduction.

The positive trend found from the DSMQ results for increasing self-management behaviors was promising, however, the results from this study indicate that the trend was relatively minor. It is possible that the 3-month intervention time frame was not sufficient. The recommended duration of SMA treatment for T2DM is vastly understudied. An important research question for future SMA studies is to examine the impact of duration of SMA participation on treatment outcomes (e.g., self-management behaviors, A1c, weight, etc.).

**PHQ-9.** Overall, results from the PHQ-9 suggest that the majority of the sample was not experiencing symptoms of depression at baseline or at 3-month follow up. Thus, PHQ-9 scores indicated that patients in this study were generally not depressed. Depression is less common among older adults in comparison to younger adults (Fiske, Wetherrell, & Gatz, 2009) which is consistent with the findings from this study, as most



of the participants did not have PHQ-9 elevations and most of the participants in this study were elderly.

Assessing for depression is vital, as it is associated with poorer quality of life and increases in hyperglycemia (Lustman et al., 2005). In addition, there is an association between depression and treatment non-adherence for patients with T2DM (Gonzalez et al., 2008). Interestingly, the patients that had higher depressive symptoms on the PHQ-9 in this study also had difficulty with attendance. Depressive symptoms have largely not been assessed in the diabetes SMA literature. A recommendation for future SMA studies is to not only assess for depressive symptoms, but also to examine the association between severity of depressive symptoms and attendance. Moreover, examining the link between depressive symptoms and diabetes self-management in future diabetes SMAs is also recommended, as the literature suggests that depressive symptoms are linked with poor diabetes self-management (Schinckus, Dangoisse, Van den Broucke, & Mikolajczak, 2018; Schmitt et al., 2017). Schmitt and colleagues (2017) found in their cross-sectional study that depression explained up to 17% of the variation of diabetes self-management. Therefore, it is recommended that future SMA studies formally assess depressive symptoms.

**AIM-HI.** In general, responses on this item suggests that, at baseline, most of the patients were motivated to make changes to their physical activity level or to maintain their level of exercise. The AIM-HI findings suggest that, in general, patients remained motivated to make physical activity changes at baseline and 3-month follow-up. A current limitation of the diabetes SMA literature is that readiness to change, as identified by Prochaska and DiClemente (1983), is often not assessed. Therefore, an interesting

research question for future SMA studies is to examine whether higher levels of readiness to change (i.e., preparation, action, maintenance stage of change) predicts SMA participation, including attendance. Based on patient reports from the current study, it is likely that the more motivated patients are to make health behavior change, the more likely patients are willing to participate in SMA groups and the more likely improvements with health outcomes will be made (e.g., reductions in weight, A1c, etc.).

Regarding the first question (i.e., How active are you?), at baseline, 4 patients ( $N = 12$ ) self-reported that they were in the active stage of stage; 6 participants endorsed that they were in the preparation stage of change; and 2 participants indicated that they were in the contemplation stage of change. At 3-month follow up, 5 participants ( $N = 10$ ) endorsed that they were in the active stage of change; 4 patients self-reported that they were in the preparation stage of change; and 1 person endorsed being in the pre-contemplation stage of change. Regarding the second question (i.e., How well do you eat?), at baseline 2 patients ( $N = 12$ ) reported that they were in the active stage of change and 10 patients endorsed that they were in the preparation stage of change. At 3-month follow-up, 6 participants ( $N = 10$ ) reported that they were in the action stage of change and 4 patients endorsed being in the preparation stage of change. Regarding the third question, (i.e., How happy or satisfied are you?), at baseline, 6 participants ( $N = 12$ ) reported that they were in the action stage of change and 6 patients endorsed that they were in the preparation stage of change. At 3-month follow-up, 6 patients ( $N = 10$ ) reported that they were in the action stage of change and 4 reported that they were in the preparation stage of change. It is important to note that two of the baseline responses were missing from SMA group 2.

**AADQ.** Responses on the AADQ suggest that several of the patients continued to struggle with avoidance of diabetes related thoughts and feelings at the 3-month follow-up. Avoidance of thoughts and feelings can be a major barrier to making health behavior changes (Gregg et al., 2007). Given that research indicates avoidance coping behaviors leads to negative health outcomes (Weijman et al., 2005), acceptance of diabetes thoughts and feelings is an important treatment consideration. As such, examining diabetes acceptance is a recommendation for future SMA studies. A core tenet of the ACT framework (i.e., the framework used in the current study) is practicing acceptance. Although preliminary research indicates that ACT is helpful for increasing diabetes self-management behaviors (Gregg et al., 2007) more evidence is necessary to determine causality.

### **Summary of Qualitative Results**

#### **Overarching Themes**

This study found five overarching themes. First, and most importantly, patients shared that after they had participated in the SMA study, they no longer felt alone in managing their diabetes. Second, increasing self-efficacy was a helpful component of the SMA intervention design. Third, as diabetes management is often oversimplified as eating-for-nutritional-content alone, it became clear from talking with the patients that true diabetes care requires recontextualizing eating behaviors. Fourth, as stress, financial limitations, lack of prioritization of one's health, and lack of assertive communication skills were present among the group members, the results of this study indicate that these barriers must be addressed for comprehensive diabetes management. Fifth, patients frequently use fear-based or loss-framed messages to increase their level of motivation.

### **Patient Satisfaction (Research Objective 1)**

The most important finding from this study was that patients reported that they no longer felt alone in managing their diabetes after participating in the SMA study. This finding has important clinical significance, as reducing feelings of social isolation, and enhancing support has been shown to improve self-rated health outcomes, particularly for the elderly (Cornwell & Waite, 2009). In addition, having social support has consistently been associated with decreased rates of morbidity and mortality (Uchino, 2006). The perception that they were no longer alone in managing their diabetes appeared to be the most significant contributing factor to patient satisfaction of this medical intervention model. The finding of feeling “not alone” was also found in a qualitative analysis study that examined group medical visits for patients with chronic pain, which was one of the most important findings from that study (Dresner, Barnett, Resnick, Lard, Gardiner, 2016). In the current study, participants expressed that it was comforting to have others relate to their personal experiences, as it validated and normalized their struggles with diabetes management. Similarly, patients indicated that validation, normalization, and self-disclosure on behalf of their physician also improved patient satisfaction. Displays of vulnerability and fallibility by their doctor elicited feelings of comfort for patients. Overall, the lack of judgment and validation received from the group appeared to improve patient satisfaction with this model of care.

Although it was not mentioned during the initial focus group meeting or final focus group meeting, patients in SMA group 2 had discussed in one of the SMA sessions that they would like to continue meeting as a group even if the formal SMA sessions were going to be discontinued in the future (A. Peterman, personal communication, April

25, 2018). This finding strongly indicates their satisfaction with this model. Participants in SMA group 1 also offered their telephone numbers to other patients to provide continued support. This finding supports the conclusion that patients were satisfied with the SMA model of care. In general, patient satisfaction was evidenced by patients' requests for continued participation in future SMA groups. Using satisfaction surveys, several studies in the diabetes SMA literature have concluded that patients are satisfied with this model of care, which is consistent with the findings from the current study (Egger et al., 2015; Heyworth et al., 2014; Riley, 2015; Sadur et al., 1999; Watts et al., 2015; and Wagner, 2001). Unlike the diabetes SMA literature, however, this study examined patient satisfaction through use of qualitative data analysis. Providing a richer and more in-depth analysis for patient satisfaction is one of the most important strengths of this study and adds a significant contribution to the literature. From a research perspective, the diabetes SMA literature continues to lack studies that fully examine patient satisfaction. It is highly recommended that future SMA studies assess patient satisfaction using qualitative analysis in order to provide greater understanding of patient satisfaction.

Regarding patient dissatisfaction, participants shared their desire to have more structure within the SMA group format in future SMA sessions. They expressed that they wanted to have a heavier emphasis on education, particularly in relation to information regarding nutritional guidelines for diabetes management. Patients recommended that having a nutritionist on the interdisciplinary team would increase satisfaction. Based on the amount of time spent in the diabetes SMA groups discussing nutritional needs, it is advisable that future SMA studies have a nutritionist attend all sessions and that a portion

of each group be dedicated to discussing food choices. Moreover, given patient feedback, it is recommended that future facilitators balance providing educational information and allotting time for group cohesion. Both facilitators of the SMA groups in this study placed emphasis on group cohesion and group dynamics. It is likely that the group felt accountable, understood, and engaged because of the time allotted for group connection. As such, a recommendation for future SMA design is for group facilitators to prioritize provision of educational information and remain flexible with allocating time for group cohesion. Regarding practical application, it is recommended that the first half of group be solely dedicated to the lecture on a specific diabetes topic (e.g., exercise and diabetes care) and then reserve time for group discussion at the end. Group skills and flexibility by the health behaviorist is a prerequisite for future SMA facilitators.

### **Helpful Components of SMA Model (Research Objective 2)**

The overarching theme for Research Objective 2 was that increasing self-efficacy was one of the most helpful components of the SMA intervention. Self-efficacy is an important variable to examine as patients with higher self-efficacy tend to manage their diabetes more effectively (Schinkus et al., 2018). The current study did not formally assess for self-efficacy. Given that increasing the feeling of self-efficacy was an overarching theme in this study, it suggests that using a diabetes specific self-efficacy measure would provide important information. The Diabetes Self-efficacy Scale has been shown to demonstrate reliability and validity (Rapley, Passmore, & Phillips, 2003). One recommendation for future SMA studies to use this instrument as an outcome measure for interventions related to diabetes education.

The most important sub-theme under this overarching theme was that patients lacked confidence in their knowledge of what food-choice decisions would most benefit their diabetes care. Even after the session on nutrition had been provided, patients continued to spend a significant portion of the SMA sessions asking questions about dietary recommendations. Several patients expressed feelings of lack of confidence in their understanding of proper diabetic care. They indicated that reading food labels was one of the most helpful components of this diabetes SMA study. Difficulties with understanding more nuanced knowledge of nutritional requirements for T2DM treatment has been found in the diabetes literature (Breen, Ryan, Gibney, & O-Shea, 2015). In addition, feeling confused about conflicting nutritional information received from medical professionals and other sources (e.g., diabetes organizations, friends, etc.) has also been cited as a reason for patient's having difficulty with understanding nutritional needs for diabetes management (Ball et al., 2016). Confusion and lack of confidence with their understanding of nutritional needs supports the argument that a nutritionist is needed on the interdisciplinary team for future diabetes SMA studies.

Moreover, several patients across both groups made references to feeling frustrated, tempted, or discouraged by other family members' responses to their nutritional needs, particularly in relation to altering the family diet. This finding is consistent with the literature, as it has commonly been reported that families often struggle to change dietary habits to accommodate the needs of the family member with diabetes (Vanstone et al., 2017). The patients in this current study identified that being reminded that prioritization of self is important for diabetes care was another one of the most helpful components of this SMA study. Thus, an important practical consideration

for future SMA studies is to include training on prioritization of self. Helping normalize and validate that it is not only acceptable, but advisable, to prioritize oneself is an important treatment consideration for future SMA studies.

### **Suggestions for Future SMA Design (Research Objective 3)**

The first overarching theme for Research Objective 3 was that diabetes care requires recontextualizing eating behaviors. Patients in this study expressed that they ate foods for comfort and interpersonal connection. Eating behaviors cannot be oversimplified as a simple eating-for-nutritional-content alone. Based on patient responses, altering family dynamics, developing alternative coping skills, and identifying substitutes for other pleasurable activities were all ways in which eating behaviors needed to be recontextualized. These findings are heavily supported by the diabetes literature (Beverly, Miller, & Wray, 2008; Broom & Whittaker, 2004); Gutschall, Onega, & Wright, 2011; Vanstone et al., 2017). It is vital that future SMA studies address these aspects of eating behaviors. In order for long-term behavior change with dietary habits to be made, understanding how to recontextualize eating behaviors is necessary. For example, helping patients understand their triggers for eating comfort food (e.g., arguing with loved ones, conflict at work, etc.) and assisting them with developing alternative coping skills is necessary for SMA groups to be successful in the future.

The second overarching theme for research object 3 was that diabetes care is complex and several external barriers impede on diabetes management. Several patients shared that having hectic work schedules and working late at their jobs prompted patients to make unhealthy food decisions. Participants reported that they often choose foods based on convenience. These convenient meals often consisted of fast food and other



options that are inconsistent with a recommended diabetic diet. Moreover, patients indicated that they often felt they had to sacrifice healthy food choices due to financial limitations. Financial limitations acting as a barrier to health behavior change is consistent with the diabetes literature (Breland, McAndrew, Gross, Leventhal, & Horowitz, 2013). These barriers are important considerations for future SMA groups and therefore, are highly recommended to be addressed. Perceived lack of time, stress, and financial limitations are commonly reported concerns among patients with T2DM in the diabetes literature (Carter-Edwards, Skelly, Cagle, & Appel, 2004; Murrock, Taylor, & Marino, 2013; and Vanstone et al., 2017).

Regarding practical considerations, one patient mentioned during one of the SMA sessions (not during the initial or final focus groups when audio-recording data were collected) that she is a single parent and her children are now over-weight in large part due to her difficulty affording healthy food options. This sentiment was reflected in the dialogue of patients across both groups. Frozen foods, dried beans, and farmers' markets were all interventions mentioned during the SMA appointment. It would strengthen the design of future SMA studies if specific suggestions to overcome this barrier were identified and discussed by stakeholders prior to SMA implementation.

### **Loss-Framed versus Gain-Framed Messages**

Participants in this study endorsed using more loss-framed messages as opposed to using gain-framed messages to increase their motivation level for making health behavior changes. For example, many of the participants reported that what made them feel motivated to improve their diabetes management behaviors was thinking about diabetes-related complications such as leg amputation or blindness. A gain-framed

message might consist of wanting to make health behavior changes as it would lead to better health, which in turn, would allow more energy for spending time with grandchildren. Participants identified the loss-framed content of their internal dialogue was more motivating for increasing physical activity and eating healthier.

In comparison to the literature, the results of effectiveness of loss-framed messages for increasing motivation has been mixed. According to a meta-analysis study by O'Keefe and Jensen (2006), loss-framed messages were no more effective than gain-framed messages at increasing preventative health behaviors (e.g., using sun screen) or disease detection behaviors (e.g., skin cancer examination). The messages did not generally differ in persuasiveness (O'Keefe & Jensen, 2006). More relevant to diabetes management, another meta-analytic study by O'Keefe and Jensen (2007) found no statistically significant differences for either type of appeal (i.e., loss or gain-framed) in regards to making health behavior changes related to altering diet and nutrition. In a more recent study by Li, Cheng, and Fung (2017), researchers examined the use of loss-framed versus gain-framed messages for helping patients with T2DM increase physical activity. Authors from this study found that participants were more likely to engage in more physical activity if patients were in the loss-framed group as opposed to the gain-framed group. The findings from the current study are consistent with the findings from the study by Li, Cheng, and Fung (2017).

Interestingly, the interventions used in this current study were ACT-based, and the ACT framework is inherently biased toward the gain-framed messages, as it encourages patients to make decisions based on their values as opposed to making decisions based on their fears (Gregg et al., 2007). The fact that the majority of the

participants had indicated that they personally use loss-framed messages to increase motivation for health behavior change is somewhat surprising given the type of interventions that were utilized in this study. Effectiveness of the use of loss-framed messages was not examined as part of this study. It is recommended that future SMA studies evaluate the effectiveness of loss-framed versus gain-framed messages for diabetes management, as the literature has been inconclusive. Moreover, given that the literature on message framing for making health behavior changes has typically focused on the persuader being an outside party, as opposed to the persuader being the participants themselves, a recommendation for future studies is to examine the latter.

### **Other Recommendations for Future SMA Studies**

#### **Examining Sustainability of SMA Intervention Effects**

An interesting question for future SMA studies is to examine sustainability of clinical benefits after the SMA participation has occurred. In one recent study, authors found that patients were able to sustain both diabetes and cardiovascular benefits up to three years after participating in the SMAs (Leung, Buckley, & Kurtz, 2018). The ultimate goal of health behavior change interventions are to make alterations that last a lifetime. Given that sustainability of making health behavior change has been vastly understudied in the diabetes SMA literature and it has significant health implications, it is clear that this is an area that is important for future research.

#### **Exploring the Costs and Benefits of SMAs**

A consideration for future SMA studies is to examine cost effectiveness of the SMA intervention design. Wu and colleagues (2018) found that SMAs were just as effective as usual care for treatment of T2DM, but SMAs were most cost effective. Cost

of the SMA intervention was not a Research Objective of this current study. However, it is a recommendation for future SMA studies to examine the potential financial benefits of providing group care appointments for patients with T2DM, as it may be more cost-effective for the patients and for providers.

### **Strengths and Limitations**

#### **Strengths**

The most significant contribution to the literature that the current study provides is that it examined patient satisfaction using a qualitative approach. Given that detailed examination of SMA components influencing patient satisfaction is a major omission in this literature, this study begins to address that gap. As mentioned earlier, overall, patients were highly satisfied with the SMA intervention model. Patient satisfaction was evidenced by their willingness to continue and based on their self-reports. Regarding patient satisfaction, the most important take-away from this study is that the participants indicated feeling as if they were no longer alone in managing their diabetes. This finding has important clinical significance, as reducing feelings of social isolation has been shown to improve self-rated health outcomes, particularly for the elderly (Cornwell & Waite, 2009), and has consistently been associated with decreased rates of morbidity and mortality (Uchino, 2006).

Another important strength of this study is that it was theory-based. A limitation of the diabetes SMA literature is that most studies lack a theoretical framework. This current study addressed this limitation as it used the Socio-Ecological Model as the overarching framework, the Chronic Care Model as the guide for the design, and ACT as the approach for implementing interventions. The atheoretical nature of the diabetes

SMA literature makes it difficult to understand the components of the SMAs that contribute to their effectiveness. Moreover, theories assist with identifying key constructs and for providing a framework from which hypotheses can be derived. Without a theoretical framework to follow, replication of studies that use SMA interventions for the treatment of T2DM becomes challenging. As such, the fact that this study had a theoretical framework that provides guidance and a rationale for interventions represents a major strength of this current study.

Furthermore, this study examined readiness to change, which was often not assessed in the diabetes SMA literature. Readiness to change has significant clinical implications, as it has been found to be associated with greater reductions in A1c scores for patients with T2DM (Peterson & Hughes, 2002) and has found to be correlated with greater attendance (Helitzer et al., 2007). As such, assessing for readiness to change has important treatment implications. Therefore, assessing for readiness for change represents another strength of the current study.

Tailored interventions and collaborative goal setting were two other strengths of the current study. To this author's knowledge, this is one of the only studies in the diabetes SMA literature that requested patient feedback prior to SMA group sessions. Efforts were made to tailor the intervention used in this study to comply with patient requests. For example, several patients requested that decision-making regarding food choices be allotted a significant amount of time in the group sessions. As such, a significant amount of time for each of the SMA sessions was dedicated to discussing food-choice decisions. Tailoring interventions to meet patient needs empowers patients and respects their autonomy. In addition, goals were set with the patients that supported

their values (e.g., value of spending time with family) instead of supplying goals to the patients. Collaborative goal setting also empowered patients, as it allowed them to make their own decisions regarding what progress they wanted to make. As such collaborative goal setting, along with tailoring interventions to meet patient requests, represent strengths of the current study.

Assessing the most useful components of the SMA groups and requesting feedback regarding patients' recommendations for future SMA designs were also strengths of this study. Lastly, allowing family members to participate was also a significant strength of this study. Given that several patients shared that they feel socially isolated because of their diabetes diagnosis, allowing family members to join the SMA groups was a component of the intervention design that could have contributed to the increase in feelings of social support. Moreover, as several patients indicated that they felt misunderstood by family members, having their family present to learn about diabetes management is likely to have helped increase awareness, as well as helped with reducing misconceptions.

### **Limitations**

The small sample size of this study severely limits the generalizability of the results. For example, because of the small sample size, examining effectiveness of the SMA intervention is more challenging, as it would be inappropriate to discuss statistical significance of the findings. Studies with larger sample sizes are needed in future SMA studies to increase generalizability.

Another limitation of the current study is that it did not adequately assess for baseline knowledge of diabetes. Understanding what patients know and do not know

about diabetes management is vital for tailoring interventions. Although this study attempted to assess baseline knowledge through use of the DSMQ and focus group questions, it is recommended that more emphasis be placed on understanding this information through other measures such as health literacy. Health literacy was not formally assessed in the current study, and it is an important component of baseline knowledge. Health literacy is a vital factor that determines whether a person can process and understand basic health information. It is strongly suspected that the current sample had sub-optimal health literacy. Given the importance of health literacy, it is strongly recommended that it is assessed in future SMA studies.

The AADQ was only administered at the end of the 3-month intervention. Baseline measures on the AADQ was therefore not obtained. Unfortunately, due to author error, changes in acceptance with diabetes thoughts and feelings is difficult to determine because of this omission. Based on patient feedback, however, it appears that most patients struggled with acceptance of diabetes thoughts and feelings at baseline and at 3-month follow-up. A common theme throughout the sessions was identification of avoidance coping. Gregg and colleagues (2007) found that patients that received the ACT intervention designed to increase acceptance were more likely to report better diabetes self-care and had lower A1c values in comparison to patients that did not receive this intervention, which indicates that examining acceptance is an important treatment consideration. Given that avoidance coping was a re-occurring theme throughout this current study and that diabetes acceptance has important clinical implications, it is recommended that future SMA studies examine acceptance.

The interdisciplinary team (i.e., the doctor and the health behaviorist) in this study represents a smaller team than is typically found in the diabetes SMA literature. Lacking a nutritionist on this team was a significant limitation of this study. Due to time constraints and physician preference, a nutritionist was not included. Considering that a significant portion of each SMA session was dedicated to discussing food-choices and several patients recommended having a nutritionist on staff, including a nutritionist on the team would enhance future SMA studies. Also due to time constraints, blood pressure was not obtained in the current study. Given the cardiovascular risks associated with diabetes, information on blood pressure progress would be helpful information to have in future SMA studies.

Lastly, the main author of this study was also one of the two facilitators of the SMA groups. It is possible that patients felt compelled to provide more favorable feedback due to a personal connection formed from participating in the SMA groups. To address this concern, the author encouraged patients to provide their honest feedback and expressed that negative feedback would not elicit defensiveness from the facilitator. In addition, in order to reduce bias, the main author of this study also enlisted the help of two other coders to ensure that the author's interpretation of the data were not skewed to find only favorable outcomes.

### **Conclusion**

Overall, these findings suggest that not only is the SMA model acceptable to patients with T2DM, but it may be the preferred option for their medical treatment. Preference for the diabetes SMA intervention model was evidenced by patients' willingness and desire to continue in the future, as well as patients reporting that they no



longer felt alone after participating in the SMA group. No longer feeling alone has major clinical significance, as this can improve self-rated health outcomes (Cornwell & Waite, 2009), as well as reduce rates of morbidity and mortality (Uchino, 2006). Not only were patients satisfied with the SMA model, but participation in the model was likely a major contributing factor to the reduction in A1c levels for seven of the 14 patients in this study. Using SMAs to treat diabetes is an area of promising research. The findings from this study add support to the diabetes SMA literature that this type of intervention model is a viable treatment option for treating patients with T2DM. In conclusion, the findings from the current study make a significant contribution to the literature, as this is one of the only studies known to the author that examines patient satisfaction in detail, identifies the most helpful components, and provides suggestions for future SMA designs based on patient feedback.

## REFERENCES

- Ali, S., Stone, M. A., Peters, J. L., Davies, M. J., & Khunti, K. (2006). The prevalence of co-morbid depression in adults with Type 2 diabetes: a systematic review and meta-analysis. *Diabetic Medicine*, *23*, 1165-1173.
- American Association of Diabetes Educators. (2009). AADE guidelines for the practice of diabetes self-management education and training (DSME/T). *The Diabetes Educator*, *35*(3\_suppl), 85S-107S.
- American Diabetes Association. (2016). *Checking your blood glucose*. Retrieved from <http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-glucose-control/checking-your-blood-glucose.html?referrer=https://www.google.com/>
- American Diabetes Association. (2010). *Diabetes mellitus: Diagnosis and screening*. Retrieved from <http://www.aafp.org/afp/2010/0401/p863.html>
- American Diabetes Association. (2011). Diagnosis and classification of diabetes mellitus. *Diabetes Care*, *34*, 262-S69.
- American Diabetes Association. (2011). Executive summary: Standards of medical care in diabetes--2011. *Diabetes Care*, *34*, S11-S71.
- Astle, F. (2007). Diabetes and depression: a review of the literature. *Nursing Clinics of North America*, *42*, 67-78.
- Baban, A., & Craciun, C. (2007). Changing health-risk behaviors: A review of theory and evidence-based interventions in health psychology. *Journal of Cognitive and Behavioral Psychotherapies*, *7*(1), 45-67.
- Baker, D. W., Wolf, M. S., Feinglass, J., Thompson, J. A., Gazmararian, J. A., & Huang, J. (2007). Health literacy and mortality among elderly persons. *Archives of Internal Medicine*, *167*, 1503-1509.
- Ball, L., Davmor, R., Leveritt, M., Desbrow, B., Ehrlich, C., & Chaboyer, W. (2016). Understanding the nutrition care needs of patients newly diagnosed with type 2 diabetes: A need for open communication and patient-focused consultations. *Australian Journal of Primary Health*, *22*, 416-422.
- Bartholomew, L. K., & Mullen, P. D. (2011). Five roles for using theory and evidence in the design and testing of behavior change interventions. *Journal of Public Health Dentistry*, *71*(s1), S20-S33.

- Beverly, E. A., Miller, C. K., & Wray, L. A. (2008). Spousal support and food-related behavior change in middle-aged and older adults living with type 2 diabetes. *Health Education & Behavior, 35*, 707-720.
- Bray, P., Thompson, D., Wynn, J.D., Cummings, D.M., & Whetstone, L. (2005). Confronting disparities in diabetes care: The clinical effectiveness of redesigning care management for minority patients in rural primary care practices. *The Journal of Rural Health 21*(4), 317-321.
- Breen, C., Ryan, M., Gibney, M. J., & O'Shea, D. (2015). Diabetes-related nutrition knowledge and dietary intake among adults with type 2 diabetes. *British Journal of Nutrition, 114*, 439-447.
- Breland, J. Y., McAndrew, L. M., Gross, R. L., Leventhal, H., & Horowitz, C. R. (2013). Challenges to healthy eating for people with diabetes in a low-income, minority neighborhood. *Diabetes Care, 36*, 2895-2901.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*(7), 513-531.
- Broom, D., & Whittaker, A. (2004). Controlling diabetes, controlling diabetics: moral language in the management of diabetes type 2. *Social Science & Medicine, 58*, 2371-2382.
- Burke, R. E., & O'Grady, E. T. (2012). Group visits hold great potential for improving diabetes care and outcomes, but best practices must be developed. *Health Affairs, 31*, 103-109.
- Carter-Edwards, L., Skelly, A. H., Cagle, C. S., & Appel, S. J. (2004). "They care but don't understand": family support of African American women with type 2 diabetes. *The Diabetes Educator, 30*, 493-501.
- Cavanaugh, K. L. (2011). Health literacy in diabetes care: Explanation, evidence and equipment. *Diabetes Management, 1*, 191-199.
- Centers for Disease Control and Prevention. (2015). *Chronic disease prevention and health promotion*. Retrieved from <http://www.cdc.gov/chronicdisease/overview/>
- Centers for Disease Control and Prevention. (2018). *Diabetes quick facts*. Retrieved from <https://www.cdc.gov/diabetes/basics/quick-facts.html>
- Centers for Disease Control and Prevention. (2011). *National diabetes fact sheet: Fast facts on diabetes*. Retrieved from <http://sunshinepando.com/wp-content/uploads/2015/01/national-diabetes-fact-sheet-2011-Sunshine-Prosthetics-and-Orthotics-Wayne-NJ.pdf>

- Centers for Disease Control and Prevention. (2014). *National diabetes statistics report*. Retrieved from <http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf>
- Centers for Disease Control and Prevention. (2017). *National diabetes statistics report. Estimates of Diabetes and its burden in the United States*. Retrieved from <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>
- Centers for Disease Control and Prevention. (2008). *Summary health statistics for U.S. adults: National health interview survey*. Retrieved from [https://www.cdc.gov/nchs/data/series/sr\\_10/sr10\\_242.pdf](https://www.cdc.gov/nchs/data/series/sr_10/sr10_242.pdf)
- Centers for Disease Control and Prevention. (2016). *Working to Reverse the US Epidemic At A Glance 2016*. Retrieved from <http://www.cdc.gov/chronicdisease/resources/publications/aag/diabetes.htm>
- Clancy, D. E., Brown, S. B., Magruder, K. M., & Huang, P. (2003). Group visits in medically and economically disadvantaged patients with type 2 diabetes and their relationships to clinical outcomes. *Topics in Health Information Management*, 24(1), 8-14.
- Clarke, V., & Braun, V. (2016). Thematic analysis. In Lyons & Coyle (Eds.), *Analysing Qualitative Data in Psychology* (2<sup>nd</sup> ed., pp. 84-102). London: Sage Publications.
- Cohen, L. B., Taveira, T. H., Khatana, S. A. M., Dooley, A. G., Pirraglia, P. A., & Wu, W. C. (2011). Pharmacist-led shared medical appointments for multiple cardiovascular risk reduction in patients with type 2 diabetes. *The Diabetes Educator*, 37(6), 801-812.
- Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior*, 50, 31-48.
- Crowley, M. J., Melnyk, S. D., Ostroff, J. L., Fredrickson, S. K., Jeffreys, A. S., Coffman, C. J., & Edelman, D. (2014). Can group medical clinics improve lipid management in diabetes? *The American Journal of Medicine*, 127(2), 145-151.
- Culhane-Pera, K., Center, B. A., Crain, A. L., Peterson, K. A., Her, B., Lee, M., & Xiong, T. (2005). Group visits for Hmong adults with type 2 diabetes mellitus: A pre-post analysis. *Journal of Health Care for the Poor and Underserved*, 16(2), 315-327.
- Cunningham, A. T., Delgado, D. J., Jackson, J. D., Crawford, A. G., Jabbour, S., Lieberthal, R. D., ... & LaNoue, M. (2018). Evaluation of an ongoing diabetes group medical visit in a family medicine practice. *The Journal of the American Board of Family Medicine*, 31, 279-281.

- de Groot, M., Anderson, R., Freedland, K. E., Clouse, R. E., & Lustman, P. J. (2001). Association of depression and diabetes complications: a meta-analysis. *Psychosomatic Medicine*, *63*, 619-630.
- Desai, R. A., Stefanovics, E. A., & Rosenheck, R. A. (2005). The role of psychiatric diagnosis in satisfaction with primary care: data from the department of veterans affairs. *Medical Care*, *43*, 1208-1216.
- Diabetes Control and Complications Trial Research Group. (1993). The Effect of Intensive Treatment of Diabetes on the Development and Progression of Long-term Complications in Insulin-dependent Diabetes Mellitus. *Retina*, *14*, 286-287.
- Diabetes Control and Complications Trial Research Group. (2002). Effect of intensive therapy on the microvascular complications of type 1 diabetes mellitus. *Journal of the American Medical Association*, *287*, 2563.
- Dickman, K., Pintz, C., Gold, K., & Kivlahan, C. (2012). Behavior changes in patients with diabetes and hypertension after experiencing shared medical appointments. *Journal of the American Academy of Nurse Practitioners*, *24*(1), 43-51.
- Dresner, D., Gergen Barnett, K., Resnick, K., Laird, L. D., & Gardiner, P. (2016). Listening to their words: A qualitative analysis of integrative medicine group visits in an urban underserved medical setting. *Pain Medicine*, *17*, 1183-1191.
- Edelman, D., Gierisch, J. M., McDuffie, J. R., Oddone, E., & Williams Jr, J. W. (2015). Shared medical appointments for patients with diabetes mellitus: A systematic review. *Journal of general internal medicine*, *30*, 99-106.
- Edelman, D., McDuffie, J. R., Oddone, E., Gierisch, J. M., Nagi, A., & Williams Jr, J. W. (2012). *Shared medical appointments for chronic medical conditions: A systematic review*. Retrieved from <http://www.hsrp.research.va.gov/publications/esp/shared-med-appt-REPORT.pdf>
- Egede, L. E., Zheng, D., & Simpson, K. (2002). Comorbid depression is associated with increased health care use and expenditures in individuals with diabetes. *Diabetes care*, *25*, 464-470.
- Garay-Sevilla, M. E., Malacara, J. M., Gutiérrez-Roa, A., & González, E. (2001). Denial of disease in type 2 diabetes mellitus: Its influence on metabolic control and associated factors. *Diabetic Medicine*, *16*, 238-244.
- Glasgow, R. E., Toobert, D. J., & Gillette, C. D. (2001). Psychosocial barriers to diabetes self-management and quality of life. *Diabetes Spectrum*, *14*, 33-41.

- Gonder-Frederick, L.A., Cox, D.J., & Ritterband, L.M. Diabetes and behavioral medicine: The second decade. *Journal of Consulting Clinical Psychology*, 70, 611-625.
- Gonzalez, J. S., Peyrot, M., McCarl, L. A., Collins, E. M., Serpa, L., Mimiaga, M. J., & Safren, S. A. (2008). Depression and diabetes treatment nonadherence: A meta-analysis. *Diabetes Care*, 31, 2398-2403.
- Green, J., & Thorogood, N. (2004). Analyzing qualitative data. In D. Silverman (Ed.), *Qualitative Methods for Health Research* (173-200). London: Sage Publications.
- Gregg, J. A., Callaghan, G. M., & Hayes, S. C. (2007). *The diabetes lifestyle book*. Oakland, CA: New Harbinger Publications, Inc.
- Gregg, J. A., Callaghan, G. M., Hayes, S. C., & Glenn-Lawson, J. L. (2007). Improving diabetes self-management through acceptance, mindfulness, and values: a randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 75(2), 336.
- Gregg, J., Hayes, S.C., & Callaghan, G.M. (2007). *Acceptance and Commitment Therapy for Diabetes Self-Management*. Retrieved from [http://www.sjsu.edu/people/jennifer.gregg/courses/c3/s1/ACT\\_ED\\_therapist\\_manual.pdf](http://www.sjsu.edu/people/jennifer.gregg/courses/c3/s1/ACT_ED_therapist_manual.pdf)
- Gutierrez, N., Gimple, N. E., Dallo, F. J., Foster, B. M., & Ohagi, E. J. (2011). Shared medical appointments in a residency clinic: An exploratory study among Hispanics with diabetes. *The American Journal of Managed Care*, 17, e212-4.
- Gutschall, M., Onega, L. L., & Wright, W. K. (2011). Patients' perspectives about dietary maintenance in Type 2 diabetes. *Topics in Clinical Nutrition*, 26, 180-189.
- Eeg-Olofsson, K., Zethelius, B., Gudbjörnsdottir, S., Eliasson, B., Svensson, A. M., & Cederholm, J. (2016). Considerably decreased risk of cardiovascular disease with combined reductions in HbA1c, blood pressure and blood lipids in type 2 diabetes: report from the Swedish National Diabetes Register. *Diabetes and Vascular Disease Research*, 13, 268-277.
- Egger, G., Dixon, J., Meldrum, H., Binns, A., Cole, M. A., Ewald, D., & Stevens, J. (2015). Patients' and providers' satisfaction with shared medical appointments. *Australian Family Physician*, 44, 674.
- Fiske, A., Wetherell, J. L., & Gatz, M. (2009). Depression in older adults. *Annual review of Clinical Psychology*, 5, 363-389.

- Harris, M. D., Kirsh, S., & Higgins, P. A. (2016). Shared medical appointments: Impact on clinical and quality outcomes in veterans with diabetes. *Quality Management in Health Care, 25*, 176-180.
- Hartzler, M. L., Shenk, M., Williams, J., Schoen, J., Dunn, T., & Anderson, D. (2018). Impact of collaborative shared medical appointments on diabetes outcomes in a family medicine clinic. *The Diabetes Educator*.  
<https://doi.org/10.1177/0145721718776597>
- Hayes, S.C., Strosahl, K.D., & Wilson, K.G. (2003). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: NY. The Guilford Press.
- Helitzer, D. L., Bobo Peterson, A., Sanders, M., & Thompson, J. (2007). Relationship of stages of change to attendance in a diabetes prevention program. *American Journal of Health Promotion, 21*(6), 517-520.
- Heyworth, L., Rozenblum, R., Burgess, J. F., Baker, E., Meterko, M., Prescott, D., ... & Simon, S. R. (2014). Influence of shared medical appointments on patient satisfaction: A retrospective 3-year study. *The Annals of Family Medicine, 12*, 324-330.
- Housden, L., Wong, S. T., & Dawes, M. (2013). Effectiveness of group medical visits for improving diabetes care: a systematic review and meta-analysis. *Canadian Medical Association Journal, 185*, E635-E644.
- Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the twenty-first century*. Washington: National Academy Press.
- International Diabetes Federation. (2015). *Complications of Diabetes*. Retrieved from <http://www.idf.org/complications-diabetes>
- International Diabetes Federation Clinical Guidelines Task Force. (2012). *Global guidelines for type 2 diabetes*. Retrieved from <http://www.idf.org/sites/default/files/IDF-Guideline-for-Type-2-Diabetes.pdf>
- Ishikawa, H., Takeuchi, T., & Yano, E. (2008). Measuring functional, communicative, and critical health literacy among diabetes patients. *Diabetes Care, 31*, 874-879.
- Ismail, K. (2009). Depression and diabetes. *Psychiatry, 8*, 203-207.
- Ismail, K., Winkley, K., Rabe-Hesketh, S. (2004). Systematic review and meta-analysis of randomized controlled trials of psychological interventions to improve glycaemic control in patients with type 2 diabetes. *Lancet, 363*, 1589-1597.



- Jaber, R., Braksmajer, A., & Trilling, J. S. (2006). Group visits: A qualitative review of current research. *The Journal of the American Board of Family Medicine*, 19(3), 276-290.
- Janzen Claude, J. A., Hadjistavropoulos, H. D., & Friesen, L. (2013). Exploration of health anxiety among individuals with diabetes: Prevalence and implications. *Journal of Health Psychology*, 19, 312-322.
- Jessee, B. T., & Rutledge, C. M. (2012). Effectiveness of nurse practitioner coordinated team group visits for type 2 diabete in medically underserved Appalachia. *Journal of the American Academy of Nurse Practitioners*, 24(12), 735-743.
- Johnson, M., & Goyder, E. (2005). Changing roles, changing responsibilities and changing relationships: An exploration of the impact of a new model for delivering integrated diabetes care in general practice. *Quality in Primary Care*, 13(2), 85-90.
- Joseph, J. J., & Golden, S. H. (2017). Cortisol dysregulation: The bidirectional link between stress, depression, and type 2 diabetes mellitus. *Annals of the New York Academy of Sciences*, 1391, 20-34.
- Kahkoska, A. R., Brazeau, N. F., & Lynch, K. A. (2018). Implementation and evaluation of shared medical appointments for type 2 diabetes at a free, student-run clinic in Alamance County, North Carolina. *Journal of Medical Education Training*, 2. <http://www.scientificojournals.org/pdf/1032.pdf>
- Kaplan, S. A., Calman, N. S., Golub, M., Ruddock, C., & Billings, J. (2006). Fostering organizational change through a community-based initiative. *Health Promotion Practice*, 7(3 suppl), 181S-190S.
- Kindig, D. A., Panzer, A. M., & Nielsen-Bohlman, L. (Eds.). (2004). *Health literacy: A prescription to end confusion*. National Academies Press.
- Kirsh, S., Watts, S., Pascuzzi, K., O'Day, M. E., Davidson, D., Strauss, G., ... & Aron, D. C. (2007). Shared medical appointments based on the chronic care model: a quality improvement project to address the challenges of patients with diabetes with high cardiovascular risk. *Quality and Safety in Health Care*, 16, 349-353.
- Kirsh, S., Watts, S., Schaub, K., Strauss, G., O'Day, M.E., Ober, S., ... Aron, D.C. (2008). *VA shared medical appointments for patients with diabetes: Maximizing patient and provider expertise to strengthen care management*. Retrieved from <http://www.queri.research.va.gov/tools/diabetes/shared-med-appt.pdf>
- Koch, D. (2014). Choosing the best method for HbA1c testing. Retrieved from <http://iaclid.ir/DL/elm/choosingthebestmethodforhba1ctesting.pdf>



- Kocher, R., Emanuel, E.J., DeParle, N.A. (2010). The Affordable Care Act and the future of clinical medicine: The opportunities and challenges. *Annals of Internal Medicine*, 153(8), 536-539.
- Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2010). The patient health questionnaire somatic, anxiety, and depressive symptom scales: a systematic review. *General Hospital Psychiatry*, 32(4), 345-359.
- Lavoie, J. G., Wong, S. T., Chongo, M., Browne, A. J., MacLeod, M. L., & Ulrich, C. (2013). Group medical visits can deliver on patient-centered care objectives: Results from a qualitative study. *BMC Health Services Research*, 13, 155. <https://doi.org/10.1186/1472-6963-13-155>
- Li, K. K., Ng, L., Cheng, S. T., & Fung, H. H. (2017). Reverse message-framing effects on accelerometer-assessed physical activity among older outpatients with type 2 diabetes. *Journal of Sport and Exercise Psychology*, 3, 222-227.
- Löwe, B., Unützer, J., Callahan, C. M., Perkins, A. J., & Kroenke, K. (2004). Monitoring depression treatment outcomes with the patient health questionnaire-9. *Medical Care*, 42(12), 1194-1201.
- Leung, A. K., Buckley, K., & Kurtz, J. (2018). Sustainability of clinical benefits gained during a multidisciplinary diabetes shared medical appointment after patients return to usual care. *Clinical Diabetes*, [doi.org/10.2337/cd17-0132](https://doi.org/10.2337/cd17-0132).
- Lustman, P. J., Anderson, R. J., Freedland, K. E., De Groot, M., Carney, R. M., & Clouse, R. E. (2000). Depression and poor glycemic control: A meta-analytic review of the literature. *Diabetes Care*, 23(7), 934-942.
- Lustman, P. J., & Clouse, R. E. (2005). Depression in diabetic patients: the relationship between mood and glycemic control. *Journal of Diabetes and its Complications*, 19, 113-122.
- Mayberry, L. S., Bergner, E. M., Chakkalakal, R. J., Elasy, T. A., & Osborn, C. Y. (2016). Self-care disparities among adults with type 2 diabetes in the USA. *Current Diabetes Reports*, 16, 1-13.
- Menon, K., Mousa, A., de Courten, M. P., Soldatos, G., Egger, G., & de Courten, B. (2017). Shared medical appointments may be effective for improving clinical and behavioral outcomes in type 2 diabetes: A narrative review. *Frontiers in Endocrinology*, 8, 1-12.
- Middleton, K. R., Anton, S. D., & Perri, M. G. (2013). Long-term adherence to health behavior change. *American Journal of Lifestyle Medicine*, 7, 395-404.

- Millenson, M. L., & Macri, J. (2012). Will the Affordable Care Act move patient-centeredness to center stage? Retrieved from <http://www.urban.org/sites/default/files/alfresco/publication-pdfs/412525-Summary-Will-the-Affordable-Care-Act-Move-Patient-Centeredness-to-Center-Stage-.PDF>
- Murrock, C. J., Taylor, E., & Marino, D. (2013). Dietary challenges of managing type 2 diabetes in African-American women. *Women & Health, 53*, 173-184.
- Naik, A. D., Palmer, N., Petersen, N. J., Street, R. L., Rao, R., Suarez-Almazor, M., & Haidet, P. (2011). Comparative effectiveness of goal setting in diabetes mellitus group clinics: randomized clinical trial. *Archives of Internal Medicine, 171*, 453-459.
- Noffsinger, E.B., & Scott, J.C. (2010). Understanding today's group-visits models. *Permanente Journal, 48*(2). Retrieved from <http://xnet.kp.org/permanentejournal/spring00pymodel.html>.
- Norris, S. L., Lau, J., Smith, S. J., Schmid, C. H., & Engelgau, M. M. (2002). Self-management education for adults with type 2 diabetes: A meta-analysis of the effect on glycemic control. *Diabetes Care, 25*, 1159-1171.
- O'Connor, P. J., Asche, S. E., Crain, A. L., Rush, W. A., Whitebird, R. R., Solberg, L. I., & Sperl-Hillen, J. M. (2004). Is patient readiness to change a predictor of improved glycemic control?. *Diabetes Care, 27*(10), 2325-2329.
- O'Keefe, D. J., & Jensen, J. D. (2006). The advantages of compliance or the disadvantages of noncompliance? A meta-analytic review of the relative persuasive effectiveness of gain-framed and loss-framed messages. *Annals of the International Communication Association, 30*, 1-43.
- O'Keefe, D. J., & Jensen, J. D. (2007). The relative persuasiveness of gain-framed loss-framed messages for encouraging disease prevention behaviors: A meta-analytic review. *Journal of Health Communication, 12*, 623-644.
- Omogbai, T., & Milner, K. A. (2018). Implementation and evaluation of shared medical appointments in veterans with diabetes: A Quality Improvement Study. *Journal of Nursing Administration, 48*, 154-159.
- Peterson, K. A., & Hughes, M. (2002). Readiness to change and clinical success in a diabetes educational program. *The Journal of the American Board of Family Practice, 15*(4), 266-271.
- Peyrot, M., & Rubin, R.R. (2007). Behavioral and psychosocial interventions in diabetes. *Diabetes Care, 30*(10), 2433-2440.

- Pfizer. (2010). Understanding shared medical appointments: An introduction to group visits. Retrieved from [http://www.diabetesincontrol.com/wp-content/uploads/2011/03/www.diabetesincontrol.com\\_images\\_Mastery\\_Series\\_2011\\_Mar\\_dcms25\\_intro\\_sma\\_pt1.pdf](http://www.diabetesincontrol.com/wp-content/uploads/2011/03/www.diabetesincontrol.com_images_Mastery_Series_2011_Mar_dcms25_intro_sma_pt1.pdf)
- Prochaska, J.O., & DiClemente, C.C. (1983). Stages of processes of self-change in smoking: toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51*, 390-395.
- Prochaska, J. O., & Norcross, J. C. (2001). Stages of change. *Psychotherapy: Theory, Research, Practice, Training, 38*(4), 443-448.
- Omogbai, T., & Milner, K. A. (2018). Implementation and evaluation of shared medical appointments in veterans with diabetes: A quality improvement study. *Journal of Nursing Administration, 48*, 154-159.
- Rapley, P., Passmore, A., & Phillips, M. (2003). Review of the psychometric properties of the Diabetes Self-Efficacy Scale: Australian longitudinal study. *Nursing & Health Sciences, 5*, 289-297.
- Reitz, J. A., Sarfaty, M., Diamond, J. J., & Salzman, B. (2012). The effects of a group visit program on outcomes of diabetes care in an urban family practice. *Journal of Urban Health, 89*(4), 709-716.
- Richardson, A., Adner, N., & Nordström, G. (2001). Persons with insulin - dependent diabetes mellitus: Acceptance and coping ability. *Journal of Advanced Nursing, 33*, 758-763.
- Riley, S. B. (2015). Improving diabetes outcomes by an innovative group visit model: A pilot study. *Journal of the American Association of Nurse Practitioners, 25*(9), 466-472.
- Rygg, L. Ø., Rise, M. B., Grønning, K., & Steinsbekk, A. (2012). Efficacy of ongoing group based diabetes self-management education for patients with type 2 diabetes mellitus. A randomised controlled trial. *Patient Education and Counseling, 86*(1), 98-105.
- Sadur, C. N., Moline, N., Costa, M., Michalik, D., Mendlowitz, Roller, S., ... Javorski, W. C. (1999). Diabetes management in a health maintenance organization. Efficacy of care management using cluster visits. *Diabetes Care, 22*(12), 2011-2017.
- Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behavior. In K. Glanz, B.K. Rimer, & K. Viswanta (Eds.), *Health behavior and health education: Theory, research, and practice* (465-482). San Francisco, CA: Jossey-Bass.

- Sanchez, I. (2011). Implementation of a diabetes self-management education program in primary care for adults using shared medical appointments. *The Diabetes Educator*, 37(3), 381-391.
- Schillinger, D., Handley, M., Wang, F., & Hammer, H. (2008). Effects of self-management support on structure, process and outcomes among vulnerable patients with diabetes: A 3-arm practical clinical trial. *Diabetes Care*, 32, 559-566.
- Schillinger, D., Hammer, H., Wang, F., Palacios, J., McLean, I., Tang, A., ... & Handley, M. (2008). Seeing in 3-D: examining the reach of diabetes self-management support strategies in a public health care system. *Health Education & Behavior*, 35(5), 664-682.
- Schinckus, L., Dangoisse, F., Van den Broucke, S., & Mikolajczak, M. (2018). When knowing is not enough: Emotional distress and depression reduce the positive effects of health literacy on diabetes self-management. *Patient Education and Counseling*, 101, 324-330.
- Schmitt, A., Gahr, A., Hermanns, N., Kulzer, B., Huber, J., & Haak, T. (2013). The Diabetes Self-Management Questionnaire (DSMQ): Development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control. *Health and Quality of Life Outcomes*, 11(1). Retrieved from <http://hqlo.biomedcentral.com/articles/10.1186/1477-7525-11-138>
- Schmitt, A., Reimer, A., Hermanns, N., Kulzer, B., Ehrmann, D., Krichbaum, M., ... & Haak, T. (2017). Depression is linked to hyperglycaemia via suboptimal diabetes self-management: A cross-sectional mediation analysis. *Journal of Psychosomatic Research*, 94, 17-23.
- Schmitt, A., Reimer, A., Kulzer, B., Haak, T., Gahr, A., & Hermanns, N. (2014). Assessment of diabetes acceptance can help identify patients with ineffective diabetes self-care and poor diabetes control. *Diabetic Medicine*, 31, 1446-1451.
- Schmucker, D. (2006). *Group medical appointments: An introduction for health professionals*. Sudbury, MA: Jones and Bartlett Publishers, Inc.
- Shayeghian, Z., Hassanabadi, H., Aguilar-Vafaie, M. E., Amiri, P., & Besharat, M. A. (2016). A randomized controlled trial of acceptance and commitment therapy for type 2 diabetes management: The moderating role of coping styles. *PloS ONE*, 11(12). <https://doi.org/10.1371/journal.pone.0166599>
- Siminerio, L, Zgibor, J., & Solano, F. (2004). Implementing the chronic care model for improvements in diabetes practice and outcomes in primary care: The University of Pittsburg Medical Center experience. *Clinical Diabetes*, 22, 54-58.

- Smith, S. M., O'Leary, M., Bury, G., Shannon, W., Tynan, A., Staines, A., & Thompson, C. (2003). A qualitative investigation of the views and health beliefs of patients with Type 2 diabetes following the introduction of a diabetes shared care service. *Diabetic Medicine*, *20*(10), 853-857.
- Snoek, F. J., & Skinner, T. C. (2002). Psychological counseling in problematic diabetes: Does it help? *Diabetic Medicine*, *19*(4), 265-273.
- Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, *110*, 5797-5801.
- Sumego, M., & Bronson, D. L. (2014). ACP Journal Club. Review: In type 1 or type 2 diabetes, group medical visits improve HbA1c levels compared with usual care. *Annals of Internal Medicine*, *160*(4), JC6-JC6.
- Taveira, T. H., Friedmann, P. D., Cohen, L. B., Dooley, A. G., Khatana, S. A. M., Pirraglia, P. A., & Wu, W. C. (2010). Pharmacist-led group medical appointment model in type 2 diabetes. *The Diabetes Educator*, *36*(1), 109-117.
- Taveira, T. H., Dooley, A. G., Cohen, L. B., Khatana, S. A. M., & Wu, W. C. (2011). Pharmacist-led group medical appointments for the management of type 2 diabetes with comorbid depression in older adults. *Annals of Pharmacotherapy*, *45*(11), 1346-1355.
- Terry, G. (2016). Doing thematic analysis. In Lyons & Coyle (Eds.), *Analysing Qualitative Data in Psychology* (2<sup>nd</sup> ed., pp. 104-118). London: Sage Publications.
- Theobald, M., McMullen, S., Barnett, D., & Hughes, C. (2009). A guide to group visits for chronic conditions affected by overweight and obesity. Retrieved from <http://www.ccofsp.com/media/files/groupvisitaim.pdf>
- Trento, M., Passera, P., Tomalino, M., Bajardi, M., Pomerio, F., Allione, A., ... & Porta, M. (2001). Group visits improve metabolic control in type 2 diabetes: A 2-year follow-up. *Diabetes Care*, *24*(6), 995-1000.
- Trickett, K.H., Matiaco, P.M., Jones, K., Howlett, B., & Early, K.B. (2016). Effectiveness of shared medical appointments targeting the triple aim among patients with overweight, obesity, or diabetes. *Journal of American Osteopath Association*, *116*, 780-787.
- Tsang, C. J., Lee, D. F., Reddy, R., & Maskarinec, G. G. (2010). Resident-driven group medical visits for diabetes mellitus in an ethnically diverse clinic population. *Hawaii Medical Journal*, *69*(6 Suppl 3), 27-30.

- Uchino, B. N. (2006). Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine, 29*, 377-387.
- U.S. Census Bureau. (2015). *Quick Facts; Charlotte City, North Carolina*. Retrieved from <http://www.census.gov/quickfacts/table/PST045215/3712000>
- van Bastelaar, K. M., Pouwer, F., Cuijpers, P., Riper, H., & Snoek, F. J. (2011). Web-Based Depression Treatment for Type 1 and Type 2 Diabetic Patients A randomized, controlled trial. *Diabetes Care, 34*, 320-325.
- Vanstone, M., Rewegan, A., Brundisini, F., Giacomini, M., Kandasamy, S., & DeJean, D. (2017). Diet modification challenges faced by marginalized and nonmarginalized adults with type 2 diabetes: A systematic review and qualitative meta-synthesis. *Chronic Illness, 13*, 217-235.
- Vickers, K. S., Ridgeway, J. L., Hathaway, J. C., Egginton, J. S., Kaderlik, A. B., & Katzelnick, D. J. (2013). Integration of mental health resources in a primary care setting leads to increased provider satisfaction and patient access. *General Hospital Psychiatry, 35*(5), 461-467.
- Wagner, E. H., Austin, B. T., Davis, C., Hindmarsh, M., Schaefer, J., & Bonomi, A. (2001). Improving chronic illness care: Translating evidence into action. *Health affairs, 20*, 64-78.
- Wagner, E. H., Grothaus, L. C., Sandhu, N., Galvin, M. S., McGregor, M., Artz, K., & Coleman, E. A. (2001). Chronic care clinics for diabetes in primary care: a system-wide randomized trial. *Diabetes Care, 24*, 695-700.
- Ward, B. W. (2014). Multiple chronic conditions among US adults: a 2012 update. *Preventing Chronic Disease, 11*. DOI: <http://dx.doi.org/10.5888/pcd11.130389>
- Watts, S. A., Strauss, G. J., Pascuzzi, K., O'Day, M. E., Young, K., Aron, D. C., & Kirsh, S. R. (2015). Shared medical appointments for patients with diabetes: Glycemic reduction in high-risk patients. *Journal of the American Association of Nurse Practitioners, 27*(8), 450-456.
- Weijman, I., Ros, W. J., Rutten, G. E., Schaufeli, W. B., Schabracq, M. J., & Winnubst, J. A. (2005). The role of work-related and personal factors in diabetes self-management. *Patient Education and Counseling, 59*, 87-96.
- Wheelock, C., Savageau, J. A., Silk, H., & Lee, S. (2009). Improving the health of diabetic patients through resident-initiated group visits. *Family Medicine and Community Health, 41*(2), 116-119.

Whittemore, R., Bak, P. S., Melkus, G. D. E., & Grey, M. (2003). Promoting lifestyle change in the prevention and management of type 2 diabetes. *Journal of the American Academy of Nurse Practitioners*, 15(8), 341-349.

World Health Organization. (2006). *Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia*. Retrieved from [https://www.idf.org/webdata/docs/WHO\\_IDF\\_definition\\_diagnosis\\_of\\_diabetes.pdf](https://www.idf.org/webdata/docs/WHO_IDF_definition_diagnosis_of_diabetes.pdf)

World Health Organization (1999). Definition, diagnosis and classification of diabetes mellitus and its complications. Retrieved from [http://apps.who.int/iris/bitstream/10665/66040/1/WHO\\_NCD\\_NCS\\_99.2.pdf](http://apps.who.int/iris/bitstream/10665/66040/1/WHO_NCD_NCS_99.2.pdf)

Wu, W. C., Taveira, T. H., Jeffery, S., Jiang, L., Tokuda, L., Musial, J., ... & Uhrle, F. (2018). Costs and effectiveness of pharmacist-led group medical visits for type-2 diabetes: A multi-center randomized controlled trial. *PLoS ONE*, 13. <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0195898&type=printable>

## APPENDIX A. CHARACTERISTICS OF THE SMA STUDIES

Author(s)	Theory	Number of Participants	Study population	Study Duration	Frequency of group medical visits	Number of People per group	Intervention Facilitators	A1c Outcomes
Bray et al. (2005)	N/A	N = 160. Intervention Group (n = 112). Control-Usual care (n = 48).	Predominantly rural African American patients with T2DM with A1c > 7% and BP > 135/85 mm Hg.	Approx. 12 months	Four 2-hour sessions over approx. 6 months. Once a week care management sessions for 12 months.	3 to 12	Care management led by advanced practice nurse. Group sessions led by physician, nurse, pharmacist, and nutritionist.	Int. group: median A1c at baseline $8.2\% \pm 2.6$ at 12 months $7.1\% \pm 2.3$ ( $p < .0001$ ). Con. group: median A1c at baseline $8.3\% \pm 2.0$ at 12 months $8.2\% \pm 2.3$ ( $p < .05$ ). Significant difference between groups at follow-up ( $p < .05$ ).
Clancy et al. (2003)	N/A	N = 120. Intervention (n = 59) Control (n = 61).	Predominantly uninsured or inadequately insured African American patients, age $\geq 18$ years; T2DM with A1c > 8.5% at most recent testing	6 months	2-hour sessions; once per month	3 groups with 19 to 20 patients in each group	Led by a primary care internal medicine physician and a diabetes nurse educator.	Baseline (avg. A1c was 10.3% for int. group and 10.6% for con group). 6 months, (avg. A1c was 9.51% for int. group and 9.714% for con group. No sig difference.
Cohen et al. (2011)	N/A	N = 99 VA (n = 50) Intervention Group. Primary Care (n = 49) Control Group.	Veteran patients with T2DM with A1c > 7% and BP > 130/80 mmHg and LDL > 100 mg/dL or LDL > 70 mg/dL for those patients with coronary artery disease. Intgroup received primary care plus intervention.	6 months	Four 2-hour weekly group sessions followed by five 90-minute monthly booster sessions.	4 to 6	Week 1- Pharmacist. Week 2- Dietitian. Week 3- Pharmacist/physical therapist. Week 4-Nurse. Monthly booster sessions- Pharmacist.	40.8% of the patients in the intervention group reached target goals and 20.4% of patients in control group reached target goals ( $p = 0.03$ ).



<b>Culhane-Pera et al (2005)</b>	N/A	N = 277. Int. group (N = 39). Con. group (N = 238). 22 patients in the con. group were refusers to participate and 216 were in usual care.	Hmong refugees with T2DM. A1c inclusion criteria not specified. Average age 58.6 (range 37-91).	13 months	Groups met once a month for 3 months and then quarterly, for a total of 7 visits.	Three groups with 10, 13, and 16 per group, with a median of 7 per session (range 5-9).	Led by Hmong health care professionals in Hmong.	Changes in A1c pre-and-post group visits were not statistically different across all 3 groups. Average A1c increased from 9.46% at pre-group to 9.58% at post-group. Clinical outcomes did not significantly improve.
<b>Cunningham et al (2018)</b>	N/A	N = 460. SMA group (n = 230) and matched non-participants (n = 230)	Adults ≥ 18 years old with T2DM with at least one medical visit. Predominantly female (69.1%) and African American (87%) with a mean age of 59 years.	Not reported	Four 2-hour sessions (more is provided if desired by patient)	Not reported	Family medicine resident, certified diabetes educator.	Retrospective study found A1c scores were 9.37% ± 2.37 for the group medical visit participants and 8.24% ± 2.21. Differences between groups were not statistically significant.
<b>Dickman et al (2012)</b>	Chronic Care Model	N = 37. English (n=11); Spanish (n=15); Bilingual (n=11).	Uninsured patients with diabetes (A1c > 9) and/or hypertension (BP > 160/90) with income levels <200% below federal poverty level.	4 months	90 min sessions once monthly.	8 to 12	Nurse practitioner, a physician, a medical assistant, and a certified diabetes educator (CDE). CDE led the shared medical groups.	The baseline average A1c was 7.25% and at 4 month follow-up the average was 7.0%. 89% of patients had improved.

<b>Edelman et al. (2010)</b>	N/A	N = 239. Int. (n = 133). Con. (n = 106).	Veteran patients with poorly controlled diabetes, type unspecified, treated with medication for diabetes. A1c $\geq$ 7.5% and hypertension (SBP >140 mm Hg or DBP >90 mm Hg).	12 months	90 to 120-minute sessions that met once every 2 months (7 meetings over 1 year).	7 to 8	Primary care general internist, a nurse or other certified diabetes educator, and a pharmacist.	Mean baseline was 9.2% (SD 1.4) and post intervention, the A1c level improved by 0.8% in the int. group compared to a 0.5% reduction in the con group (p=0.159). Glycemic control was not statistically significant between groups [odds ratio, 1.5 [CI, 0.7 to 3.3]].
<b>Gutierrez et al. (2011)</b>	N/A	N = 103 SMA group (n = 50) and control group (n = 53)	Hispanic patients diagnosed with T2DM with A1c levels of 7% or higher receiving medical care at a family medicine residency clinic. Mean age and gender of participants not reported.	17 months	36 SMA sessions offered every other week	Average of 9 patients per SMA	Resident or fellow researcher, faculty member, pharmacist, lead nurse, medical assistant, registration clerk, and social worker.	Comparing baseline and post-SMA A1c values, the mean decrease in A1c level for the SMA group A1c was 1.19% (p < .01) and 0.67% for the control group (p = .02).
<b>Harris et al. (2016)</b>	Chronic Care Model	N = 988. SMA group (n = 371) and Usual Care (n = 617)	Retrospective study included veterans 51 years or older with T2DM who participated in SMAs for 2 consecutive years within a 5-year period (at least once a year participation). Mean age was 70.1 years (SD = 9.4). 98% male, 72% white, 20% African American.	3 years	Not reported	Not reported	Not reported	No statistically significant differences in A1c values between groups. Mean A1c for the SMAs was 8.55 (SD = 1.72) and for usual care it was 7.49 (SD = 1.28). Authors reported that all outcomes were worse at baseline for the SMA group

<b>Hartzler et al. (2018)</b>	N/A	N = 59 enrolled. n = 38 completed the study.	Participants were mostly female, older than 50 years, and were more likely to have been diagnosed with diabetes for more than 10 years.	12 months	Groups lasted approx. 120 minutes per session. Once every 4 weeks if A1c was $\geq 8\%$ and every 6-8 weeks if A1c $< 8\%$ .	Max of 10 patients per group	Team included a physician, clinical pharmacist, and psychologist.	A1c scores decreased from $9.98 \pm 1.83$ to $8.44 \pm 1.77$ at 6-month follow-up and decreased to $8.10 \pm 1.65$ at 12 months follow-up ( $p < .001$ ). A1c scores decreased significantly from baseline to 6 months and baseline to 12-month follow-up.
<b>Jessee &amp; Rutledge (2012)</b>	Bandura's Model of Self-Efficacy	N = 26. Int. Group (n = 11). Control (n = 15).	Medically underserved patients in Appalachia. Average age of participants was 56.	3 weeks	Once a week for 3 weeks (4-hour group visits for the 1st and 3rd visit; 2-hour visit on week 2).	11 participants were in the int. group. It is unclear if all patients attended each session.	Nurse practitioner led, faculty advisor, two pharmacists, a registered dietitian, two counselors, a nurse, and a medical doctor.	Int. group's average A1c levels improved $27.24$ mg/dL compared to the control group's average improvement of $0.8\%$ . Sample size too small to establish statistical significance.
<b>Kahkoska et al. (2018)</b>	N/A	N = 29.	Patients with physician-diagnosed T2DM and an A1c $> 6.5\%$ . Non-English speakers and endocrine referrals not related to diabetes were excluded. Patients were 63% female, 25% Non-Hispanic White with a mean A1c of $9.7\%$ ( $SD = 1.6$ )	Approx. 16 months (Nov 2015 to Jan 2017).	Monthly visits, lasting 60-90 minutes per group.	4-12 patients per group	Student led and patient-driven SMA. Monthly rotations of students, physician assistant, undergraduate students, pharmacy residents, and endocrinologist.	The A1c means prior to SMA participation was $9.7\% \pm 1.7\%$ and after post-SMA it was $9.2\% \pm 1.8\%$ . Statistical significance not reported. 6/8 participants reduced A1c from pre to post-SMA.

<b>Kirsh et al. (2007)</b>	Chronic Care Model	<i>N</i> = 79. Int. group ( <i>n</i> = 44). Control ( <i>n</i> = 35).	Patients with T2DM with A1c >9%, SBP >160 mm Hg and LDL-c > 130 mg/dL in the Veterans healthcare system. Int. vs. Con. Age (60.6 ± 8.9 vs 61.5 ± 11.0).	5 months	7 total visits. 1-2 hour visits.	Each group had up to 8 patients.	One general internist, one nurse practitioner, one pharmacist, one health psychologist, and one nurse.	At baseline 83.3% had A1c levels of > 9%. Post-intervention A1c levels decreased with an average (95% CI) of 1.4 (0.8, 2.1) ( <i>p</i> < 0.002). A1c reductions were greater in the int. group compared to the con group: 1.44 vs -0.30% ( <i>p</i> = 0.002).
<b>Naik et al. (2011)</b>	N/A	<i>N</i> = 87. Int. group ( <i>n</i> = 45). Control ( <i>n</i> = 42).	Veterans with T2DM with A1c levels ≥ 7.5%, SBP > 140 mm Hg, DBP > 90 mm Hg.	12 months	60 min sessions; 4 total sessions every 3 weeks over a 3 month period.	5 to 7 patients per group	3 study clinicians led the sessions, each were primary care physicians at the VA clinic.	3 months: 8.04 ± 1.35 in int. group versus 8.70 ± 1.38 in con group ( <i>p</i> = .03). 12 months: 8.05% ± 1.40% in int. group compared to 8.64% ± 1.39% in control group ( <i>p</i> = .05). Int group had significant reductions in A1c.
<b>Omogbai &amp; Milner (2018)</b>	Chronic Care Model	<i>N</i> = 30 (outcomes measured at baseline, 3 months, and 6 months)	Veterans with T2DM with uncontrolled diabetes (A1c >8.0%), prediabetes (A1c = 5.7-6.4%), or well-controlled diabetes (A1c = 6.5-8.0%)	6 months	Not reported	Not reported	Team consisted of a Registered Nurse, licensed practical nurse, physician, pharmacist, social worker, dietitian, and clerical staff member.	A1c declined by 0.42% ( <i>SD</i> = .85) at 3 months follow-up and decreased by 1.07% ( <i>SD</i> = .87) at 6 months follow-up, which was statistically significant ( <i>p</i> < .02).

<b>Reitz et al. (2012)</b>	N/A	N = 288. Int. (n = 52). Con. (n = 236).	Patients were at least 18-years-old, had a diagnosis of T2DM, and had at least 1 office visit from July to Sep 2009.	2 months	Patients were only required to attend at least 1 SMA. Length of SMA not reported.	Not reported	Diabetes health educator, a nurse, a pharmacist, an attending physician, and a resident	A1c declined 76.9% in the int. compared to 54.3% in the comparison group (p = 0.0027). Int group had significant reductions in A1c.
<b>Riley (2015)</b>	Stage of Change	N = 22.	Patients with a diagnosis of T1DM or T2DM with an A1c of $\geq 7.5$ . Patients were matched on gender and age. 80% were female and 32% were African American.	3 months	Once a month for 3 months.	3 groups of 10 patients per group. (8 patients dropped out).	One family nurse practitioner (FNP was a certified diabetes educator) and one medical assistant.	The average A1c level improved by 1.1 points (p=.028). Reductions in A1c were significant.
<b>Sadur et al. (1999)</b>	N/A	N = 156. Int. (n = 82). Con. (n = 74).	Patients from diabetes registry with either T1DM or T2DM; age 16-75 years old. Patients with poorly controlled diabetes (A1c > 8.5%) or no A1c test conducted in the prior year.	12 months	2 hour sessions; once monthly over 6 months	7 groups with 10-18 patients.	Led by a diabetes nurse educator supported by two diabetologists, a dietitian, a behaviorist, and a pharmacist.	A1c levels at 6 months after randomization reduced by 1.3% in the int. group versus 0.22% in control group (p < 0.0001).

<b>Sanchez (2011)</b>	Chronic Care Model	<i>N</i> = 70 patients. No control group as this was a quality improvement project.	Mexican American patients with T2DM. Avg age was 66 with a range of 21-86. Inclusion criteria for A1c not specified.	2 months	90-min sessions	13 SMAs. (Ranged from 4-12 patients per group).	A physician and 2 nurse practitioners (one of which was a certified diabetes educator).	Average A1c reduced from 7.95 to 7.51 from visit 1 until visit 3 ( $p = .97$ ) indicating no statistical change.
<b>Schillinger et al. (2008)</b>	N/A	<i>N</i> = 305. Automated Telephone Self-management Support (ATSM) ( $n = 101$ ). Group medical visit (GMV) ( $n = 99$ ). Usual care (UC) ( $n = 105$ ).	Uninsured patients in the Community Health Network of San Francisco with poorly controlled T2DM (A1c $\geq 8.0\%$ ) with $\geq 1$ primary care visit in one year.	12 months	90-minute sessions; once monthly over 9 months	6-10 patients per group	A primary care physician and health educator	A1c outcomes were not different between groups. Average baseline A1c scores for ATSM, GMV, and UC were as follows: 9.3% ( $SD = 1.7$ ); 9.3% ( $SD = 1.9$ ); 9.8% ( $SD = 2.1$ ). Average 12-month follow-up A1c scores were as follows: 8.7% ( $SD = 1.9$ ); 9.0% ( $SD = 2.0$ ); 9.0% ( $SD = 2.2$ ). The reduction in A1c in the GMV between 6 and 12 months was not statistically significant ( $p = 0.3$ )

<b>Taveira et al. (2010)</b>	N/A	$N = 109$ . Int. ( $n = 58$ ). Con. ( $n = 51$ ).	Veteran patients with T2DM, aged $\geq 18$ years old, referred by primary care provider. Patients with cardiac risk factors including poorly controlled T2DM (A1c 7%-9%) in prior 6 months were included.	4 months	Education 40-60 min and intervention 60-80 min; once weekly over 4 weeks.	4-8 patients per group	Led by clinical pharmacist, along with a nurse, nutritionist, and physical therapist	Statistically significant reductions in A1c in int group compared to usual care. Baseline A1c was $8.15 \pm 1.5$ for int group and $7.0 \pm 1.1$ in con group. At four months: Absolute mean change in A1c was $-0.9 \pm 1.6$ in int group compared to $0.0 \pm 1.5$ in con group.
<b>Taveira et al. (2011)</b>	Social Cognitive Theory	$N = 88$ . Int. ( $n = 44$ ). Con. ( $n = 44$ ).	Veterans with either T1DM or T2DM with comorbid depression. Included patients with A1c $> 6.5\%$ in prior 6 months. (Age not reported).	6 months	120-min sessions: once a week for 4 weeks, then once a month for booster sessions for 5 months	4-6 patients per session	Pharmacist, nurse, and nutritionist. Primarily pharmacist-led.	Statistically significant reductions in A1c in int group compared to usual care. Patients in int group had reduced A1c levels of $-0.9 \pm 1.6$ compared to $0.0 \pm 1.8$ in con group.
<b>Trento et al. (2001), (2002), and (2004)</b>	N/A	$N = 112$ . Int. ( $n = 56$ ). Con. ( $n = 56$ )(42 in each group at year 5)	Patients with non-insulin-treated T2DM that attended a 1-year diabetes clinic. Diabetes was controlled using either diet alone or diet plus hypoglycemic medications.	48 months (4 years)	4 sessions (once every 3 months) in years 1 and 2. Duration of session not specified.	Approx. 9 patients per group	One or two physicians and an educator facilitated the sessions.	Patients in both the int group and con group had baseline A1c levels of $7.4\% \pm 1.4$ . After 5 years post randomization, A1c outcomes for the int group remained stable ( $7.3\% \pm 1.0\%$ ), but significantly increased in the con group ( $9.0 \pm 1.6\%$ ), representing a significant difference between groups ( $p < 0.0001$ ).



<b>Tsang et al. (2010)</b>	N/A	$N = 13$ . No control group.	Mostly Asian or Pacific Islander patients with T2DM. Avg length of duration for T2DM diagnosis was 10.5 years (range 1-20 years).	9 months	Not reported	Not reported	Family medicine resident physician, registered dietitian	Small reductions in A1c were observed. Statistical significance was not reported or specified.
<b>Wagner et al. (2001)</b>	Chronic Care Model	$N = 707$ . Int. ( $n = 278$ ). Con. ( $n = 429$ ).	Patients with diabetes (type unspecified) $\geq 30$ years of age, selected from an automated diabetes registry. Patients that were treated using insulin or hypoglycemic medications were selected "preferentially."	24 months (2 years)	1-hour group sessions for intervals of 3-6 months over 2 years.	Approx. 8 patients per group	Primary care physician, nurse, clinical pharmacist, and educator/peer support.	Baseline A1c scores were 7.5% for the int. group and 7.4% for the control group. At 24 months follow-up A1c scores increased to 7.9% for the int. group and 7.9% in the control group. No difference in A1c was found between groups (A1c levels were 7.9% in both groups; $p = 0.99$ ) at the 2 year time point.
<b>Watts et al. (2015)</b>	N/A	$N = 1290$ . Patients served as their own controls.	Veterans with T2DM with high-risk status for A1c ( $A1c > 9$ ), blood pressure (SBP $> 140$ mmHg), and lipids (LDL-c $> 130$ mg/dL). Average age 62.6 (SD=9.09 years).	56 months (4 years and 8 months). (All patients who attended $\geq 1$ SMA from 4/06 to 12/10).	90-min sessions	Not reported	Certified diabetes educator (either nurse practitioner or clinical pharmacy specialist), health psychologist, registered dietitian, and general internist.	For patients with $\geq 1$ A1c measurement ( $n=815$ ) 180 days pre and post intervention had an average A1c level of $9.30 \pm 2.10$ at pretreatment and an average of $8.24 \pm 1.73$ post-treatment. Indicating a reduction of 1.06. ( $p < .001$ ).



<b>Wheelock et al. (2009)</b>	N/A	N = 50. Intervention (n = 25). Control (n = 25).	Patients >18 years old with diabetes (type not specified). Average age was 60 (range of 34-70) for both groups. A1c inclusion criteria not specified.	12 months	6 visits, once every 2 months; 2 hours per session	Not reported	Family medicine 1st and 2nd year residents led the visits, along with a diabetes nurse, and two faculty members.	Baseline A1c was 8.23% for the int. group and 7.85% for the control group. At 1 year follow-up, A1c scores were 7.85% and 7.82%, respectively. A1c reductions from baseline to follow-up was not significant for the int group (p = .49).
<b>Wu et al. (2018)</b>	N/A	N = 250. SMA group (n = 117). Standard Care (n = 133).	Patients > 18 years old with T2DM with an A1c of > 7.0% and at least one of the following: being a smoker, having an LDL > 100 mg/dl and/or blood pressure of > 13/80 mm Hg.	13-months duration	Once a week for 4 weeks, followed by quarterly visits. 2-hour sessions.	4-6 patients per group	Led by clinical pharmacists. One hour education sessions were provided by a nutritionist, nurse, or physical therapist.	Baseline A1c values were as follows: 8.2% ± 1.5 for the int. group and 8.2% ± 1.3 for the control group. A1c reduced to 7.84% in the int. group and 8.09% in the control group at 6-month follow-up. At 13-month follow-up, A1c scores were 7.9% for the int. group and 8.04% for con. group Both arms significantly reduced A1c values from baseline to 13-month follow-up (-0.02 ± 0.09 and -0.04 ± 0.09, int. and con., respectively, adjusted p < 0.05 for both). There were no significant differences between group visit and standard care for A1c changes (-0.17 ± 1.25% versus -0.14 ± 1.23%, adjusted p = 0.12).

Notes. Int. = Intervention; Con. = Control; Approx. = Approximately; SBP = Systolic Blood Pressure; LDL = Low-Density Lipoprotein

## APPENDIX B: SMA INTERVENTIONS

SMA Interventions, adherence to theory, and rationale for interventions.

Interventions	Component of the SE Model Intervention Supports	Component of the CCM Intervention Supports	Rationale for Intervention
<b>SMA Session 1 - ACT Module 1 (Education and Info)</b>			
Introductions of patients and multidisciplinary team	Individual level	Self-management	Allows patients and staff to get to know one another.
Explanation of multidisciplinary team	Individual level	Delivery system design	This intervention informs patients about what to expect from the SMA facilitators.
Inform patients that their preferences are important and the team is relying on them to enhance the SMA by sharing their preferences and needs	Individual level	Decision support	Patients are more likely to commit to SMA if their preferences are supported.
Education on what diabetes is and how it develops	Individual level	Self-management	Patients are more likely to make behavioral changes if they have an increased awareness about their diagnosis.
Diabetes education - glucose management	Individual level	Self-management	Understanding how to manage glucose levels is critical for effective diabetes self-management.
Diabetes education - insulin info.	Individual level	Self-management	For patients that are recommended to take insulin, understanding the purpose, correct dosage, and different types of insulin is useful information for managing diabetes.
Diabetes education - how to check blood sugar levels	Individual level	Self-management	Patients that regularly check blood sugar levels are more likely to achieve glycemic control.

Diabetes education - hemoglobin A1c	Individual level	Self-management support	Many patients are unaware that a 1% reduction in HbA1c equates to a 21% reduction in diabetes-related deaths, a 37% decreased chance of microvascular complications, and a 14% reduction in myocardial infarction (IDF, 2015).
Collaborative goal setting based on information gathered from DSMQ, AIM Fitness Inventory, and PHQ-9	Individual level	Self-management	Individuals are more likely to make positive health changes if goals are set. Collaboration with goal setting is likely to enhance patient satisfaction.
Values clarification (see pgs. 25-26 of ACT-ED manual)	Individual level	Self-management	Patients that find meaning in making health behavior changes are more likely to be successful.
Encourage patients to invite family and friends to attend	Interpersonal level	Community resources and policies	Patients are more likely to be successful in making health behavior changes if they have support from others.
15-min discussion regarding patient perspectives on ACT module 1	Individual level	Organizational support	Feedback on patient perspectives on the education module allows facilitators and future researchers to tailor SMA programs effectively.
Provide opportunity for patients to ask questions.	Individual level	Organizational support	Patients can empower themselves by asking questions.
Diabetes education - potential complications	Individual level	Self-management	Patients should be aware of symptoms that could indicate health risks.
Diabetes education - the importance of hydration	Individual level	Self-management	Many patients are unaware of how important hydration is to effective diabetes self-management.
Diabetes education - symptoms of high and low blood sugar	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Diabetes education - foot care	Individual level	Self-management	The American Diabetes Association recommends education on this topic.

Diabetes education - eye care	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Review patient goals	Individual level	Self-management	Reviewing goals helps clients recommit to their goals.
Documentation of patient progress	Individual level	Clinical information systems	Documenting client progress is essential for monitoring patient progress and for processing billing payments.

#### SMA Session 2 - ACT Module 3 (Exercise and Diabetes)

Diabetes education – the importance of exercise	Individual level	Self-management	The American Diabetes Association recommends education on this topic
Provide tips for exercise (e.g., being consistent, monitoring blood glucose before and after, etc.	Individual level	Self-management	The American Diabetes Association recommends education on this topic
Inquire about barriers to exercise	Individual, interpersonal, community, and macro level	Self-management	If patients are unable to exercise due to barriers at home or in the community, this information must be identified in order to develop possible solutions.
Assist patients with developing strategies for overcoming barriers to exercise	Individual level	Self-management	Patients benefit from receiving ideas about ways to overcome their challenges
Encourage patients to choose a partner for exercise in order to increase accountability	Interpersonal level	Self-management	Patients are more likely to keep exercise commitments if they also have a partner that can help keep them accountable.
Provide education regarding the need to take small steps	Individual level	Self-management	Individuals often fail with making behavioral changes as they try to do too much too soon. Making incremental changes increasing chances for success.
Help patients develop SMART exercise goals	Individual level	Self-management	Goals that are more structure are more likely to be followed

Assist patients with understanding how exercise impacts glucose levels	Individual level	Self-management	Patients need to be aware that exercise may cause changes in glucose levels
Demonstrate exercises that can be done at home	Individual level	Self-management	Patients may not have the financial resources, time, or interest in exercising outside of the home. Therefore, home exercises may be particularly helpful.
Inquire about progress made with altering their diet and what patients have learned.	Individual level	Self-management	Reviewing goals helps patients recommit to their goals.
Encourage patients to identify ways to continue to make progress toward goals	Individual level	Self-management	Encouraging patients to exchange ideas increases group cohesiveness and helps patients to learn to problem solve.
Ask patients how they are doing with being value congruent	Individual level	Self-management	Being value congruent is an integral part of the ACT framework.
Multidisciplinary team will assist patients with identifying strategies for goal success as needed	Individual level	Self-management	The multidisciplinary team can also assist with patient with identifying strategies for success, as this may also increase motivation for behavior change.
Remind patients that their preferences and perspectives are important and valued.	Individual level	Decision support	Patients are more likely to commit to SMA program if their preferences are supported.
15-min discussion regarding patient perspectives on ACT module 3.	Individual level	Organizational support	Feedback on patient perspectives on the education module allows facilitators and future researchers to tailor SMA program effectively.
Provide opportunity for patients to ask questions.	Individual level	Organizational support	Patients can empower themselves by asking questions.
Documentation of patient progress	Individual level	Clinical information systems	Documenting patient progress is essential for monitoring patient progress and for processing billing payments.

## SMA Session 3 - ACT Module 2 (Food, Diabetes, and Your Health)

Diabetes education - the importance of food in diabetes management	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Diabetes education - nutrition recommendations	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Diabetes education - weight loss tips	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Diabetes education - smoking and alcohol risks	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Diabetes education - nutrition and insulin	Individual level	Self-management	The American Diabetes Association recommends education on this topic.
Patients have the opportunity to exchange healthy recipes	Individual level	Self-management	Exchanging of recipes can allow patients to expand their home menus and builds cohesiveness among group members.
Review patient goals	Individual level	Self-management	Reviewing goals helps clients recommit to their goals.
Inquire about progress made toward goals and celebrating successes	Individual level	Self-management	Inquiring about progress toward goals can help patients identify small successes. Celebrating small successes helps clients stay motivated for behavior change.
Encourage patients to identify ways to continue to make progress toward goals	Individual level	Self-management	Encouraging patients to exchange ideas increases group cohesiveness and helps clients learn to problem solve.
Ask patients how they are doing with being value congruent	Individual level	Self-management	Being value congruent is a major component of the ACT framework.
Multidisciplinary team will assist patients with identifying strategies for goal success as needed	Individual level	Self-management	The multidisciplinary team can also assist with patients with identifying strategies for success, as this may also increase motivation for behavior change.

Remind patients that their preferences and perspectives are important and <u>valued</u> .	Individual level	Decision support	Patients are more likely to commit to SMA if their preferences are supported.
15-min discussion regarding patient perspectives on ACT module 2	Individual level	Organizational support	Feedback on patient perspectives on the education module allows facilitators and future researchers to tailor SMA programs effectively.
Provide opportunity for patients to ask questions.	Individual level	Organizational support	Patients can empower themselves by asking questions.
Documentation of patient progress	Individual level	Clinical information systems	Documenting client progress is essential for monitoring patient progress and for processing billing payments.

#### SMA Session 4 - ACT Module 4 (Coping and Stress Management)

Normalize stress stemming from diabetes	Individual level	Self-management	Individuals often struggle with judgmental thoughts toward self. Normalizing these thoughts can make patients feel more at ease.
Encourage patients to share with the group their strategies for stress management	Individual level	Self-management	Patients may feel more empowered with discussing how they have been successful. Also, sharing information increases group cohesiveness.
Inquire about personal feelings of diabetes	Individual level	Self-management	By asking about personal feelings, interventions can be more tailored to the person.
Encourage group members to relate to one another	Interpersonal level	Self-management	Relating to one another increases group cohesiveness.
Teach patients about acceptance	Individual level	Self-management	Acceptance is a foundational principal of the ACT framework.
Inquire about any hesitancy with practicing acceptance	Individual level	Self-management	Identifying barriers to acceptance may help patients identify solutions for achieving acceptance.

Encourage patients to fill out the worksheet on diabetes related thoughts (see pages 45-46 of the ACT-ED manual)	Individual level	Self-management	Filling out the worksheet on diabetes related thoughts might help patients increase self-awareness.
Ask group members to relate to one another's experiences	Interpersonal level	Self-management	Relating to one another increases group cohesiveness.
Encourage patients to brainstorm about ways to deal with stress	Individual level	Self-management	Empowering patients to problem solve will increase their changes of making successful behavior changes.
Ask patients to share methods that have been effective for them regarding handling stress	Interpersonal level	Self-management	By providing information about their success with handling stress, other patients may learn new coping skills.
Inquire about progress made with food/exercise journal and what patients have learned.	Individual level	Self-management	Inquiring about progress toward goals can help patients identify small successes. Celebrating small successes helps clients stay motivated for behavior change.
Review patient goals	Individual level	Self-management	Reviewing goals helps clients recommit to their goals.
Inquire about progress made toward goals and celebrating successes	Individual level	Self-management	Inquiring about progress toward goals can help patients identify small successes. Celebrating small successes helps clients stay motivated for behavior change.
Encourage patients to identify ways to continue to make progress toward goals	Individual level	Self-management	Encouraging patients to exchange ideas increases group cohesiveness and helps clients learn to problem solve.
Ask patients how they are doing with being value congruent	Individual level	Self-management	As being value congruent is an integral part of the ACT framework, this is a question that should be revisited



			throughout the entirety of the SMA, so that patients can be self-reflective on this topic.
Multidisciplinary team will assist patients with identifying strategies for goal success as needed	Individual level	Self-management	The multidisciplinary team can also assist with patients with identifying strategies for success, as this may also increase motivation for behavior change.
Remind patients that their preferences and perspectives are important and valued.	Individual level	Decision support	Patients are more likely to commit to SMA if their preferences are supported.
15-min discussion regarding patient perspectives on ACT module 4	Individual level	Organizational support	Feedback on patient perspectives on the education module allows facilitators and future researchers to tailor SMA programs effectively.
Provide opportunity for patients to ask questions.	Individual level	Organizational support	Patients can empower themselves by asking questions.
Documentation of patient progress	Individual level	Clinical information systems	Documenting client progress is essential for monitoring patient progress and for processing billing payments.

#### SMA Session 5 - ACT Module 5 (Acceptance and Action)

Explain why it is important to understand thoughts and feelings associated with diabetes	Individual level	Self-management	Avoidance of negative thoughts and feelings can lead to self-destructive behaviors. This is a core principle of ACT.
Encourage patients to notice what they are feeling	Individual level	Self-management	Noticing one's feelings is a core tenant of ACT.
Ask patients to check in with their values	Individual level	Self-management	Understanding one's value is a foundation principle of ACT.
Ask patients to identify ways to move in the direction of their values	Individual level	Self-management	Being value congruent is a major goal of the ACT framework.
Explain what acceptance is and what it is not	Individual level	Self-management	Understanding acceptance is a core tenant of ACT.

Discuss commitment to behavior change	Individual level	Self-management	Committing to behavior change is a core tenant of ACT.
Help patients identify ways to commit to behavior change	Individual level	Self-management	Committing to behavior change is a core tenant of ACT.
Inquire about progress made with food/exercise journal and what patients have learned.	Individual level	Self-management	Reviewing goals helps clients recommit to their goals.
Review patient goals	Individual level	Self-management	Reviewing goals helps clients recommit to their goals.
Inquire about progress made toward goals and celebrating successes	Individual level	Self-management	Inquiring about progress toward goals can help patients identify small successes. Celebrating small successes helps clients stay motivated for behavior change.
Encourage patients to identify ways to continue to make progress toward goals	Individual level	Self-management	Encouraging patients to exchange ideas increases group cohesiveness and helps clients learn to problem solve.
Ask patients how they are doing with being value congruent	Individual level	Self-management	As being value congruent is an integral part of the ACT framework, this is a question that should be revisited throughout the entirety of the SMA, so that patients can be self-reflective on this topic.
Multidisciplinary team will assist patients with identifying strategies for goal success as needed	Individual level	Self-management	The multidisciplinary team can also assist with patients with identifying strategies for success, as this may also increase motivation for behavior change.
Remind patients that their preferences and perspectives are important and valued.	Individual level	Decision support	Patients are more likely to commit to SMA if their preferences are supported.
15-min discussion regarding patient perspectives on ACT module 4	Individual level	Organizational support	Feedback on patient perspectives on the education module allows facilitators and

future researchers to tailor SMA programs effectively.

Provide opportunity for patients to ask questions.	Individual level	Organizational support	Patients can empower themselves by asking questions.
Documentation of patient progress	Individual level	Clinical information systems	Documenting client progress is essential for monitoring patient progress and for processing billing payments.

## APPENDIX C. SCRIPT FOR RECRUITMENT CALLS FOR SMA

Hello Mr./Ms./Mrs. \_\_Patient's last name\_\_\_\_\_

Dr. Rounds is offering a group visit in three weeks, and he asked me to call and invite you to attend. The group visit is for patients whose medical conditions could be improved through healthy lifestyle changes. The appointment will last about two hours, which will give Dr. Rounds ample time to review specific changes you might want to make to address your type 2 diabetes.

Dr. Rounds feels it would benefit you to attend this session. Would you like me to schedule you for the appointment?

Of course you always have the option of continuing to see Dr. Rounds in a one-on-one setting. Attending a group visit will not change this in any way.

I also want you to understand that this visit will be charged just like any other doctor's appointment, and the usual co-pays and insurance submission will apply. The usual co-pay will apply to every other SMA visit, as every other SMA visit includes a medical evaluation by her Dr. Rounds. I also need you to know that since everyone attending this appointment has a medical condition affected by lifestyle behaviors, it's possible that some of your personal health information, such as your diagnosis, could be disclosed during the appointment.

Your spouse, or another friend or family member, is welcome to attend this visit with you. We look forward to seeing you.

## APPENDIX D. CONFIDENTIALITY AND FOCUS GROUP CONSENT FORM

## Treating Type 2 Diabetes Using Shared Medical Appointments: Patient Satisfaction and Perspectives

Purpose of Research: The purpose of this study is to examine the impact participation in a shared medical appointment has on patient satisfaction, the patient/provider relationship, diabetes self-management behaviors, and readiness to make health behavior changes.

Investigator(s): This study is being conducted by Sandra Milling, PhD Candidate of Health Psychology at UNC Charlotte, under the supervision of Dr. Amy Peterman, Associate Professor of Psychology and Director of Clinical Training at UNC Charlotte. The Principal Investigator (PI), Sandra Milling, would like to disclose that she has no conflicts of interest regarding this study. The PI is not receiving financial compensation from Novant Health Midtown Family Medicine or vice versa.

Specific Procedures to be Used: By signing this consent form you are providing permission for the PI to have access to your medical records including A1c levels, weight, blood pressure results, and cholesterol, as well as demographic information. All information will be de-identified and confidential. (Please see below for further confidentiality information). All information will be published in aggregate form and will not reveal individual patient information. As an overview, the multidisciplinary team will inquire about your perspectives and satisfaction level with the SMA intervention model for treating type 2 diabetes. The pre-group meeting will involve questions regarding your opinions on the educational material (i.e., the ACT-ED manual) and planned interventions for the SMA. During each of the 6 SMA sessions, in the last 15-minutes of each appointment, your feedback regarding effectiveness of the interventions will be solicited. Lastly, at the end of the 3-month participation, the multidisciplinary team will inquire about your overall satisfaction with the SMA intervention in comparison to usual care. Your responses will be audio recorded for later transcription. Identifying information from the audio-recorded sessions will not be used in any future publication or presentation. For the assessment measures (i.e., DSMQ, PHQ-9, AIM-HI Fitness inventory), your name will not be linked with your responses.

Length of Participation: This project will take about 3 months to complete. If you decide to participate, you will also be requested to attend all SMA sessions including the pre-group meeting. Each individual meeting will last approximately 90 minutes.

Risk and Benefits of Participation: Due to the nature of the study, it is possible that you may become distressed. If this happens, you will be given information about Area Mental Health if counseling is needed. In addition, a list of behavioral health providers in the Charlotte area will be given to you. The information gathered from the study will be used with the intention of publication and use for dissertation credit. Your name will not be included in the publication for your protection. Participation is not a requirement of Novant Health Midtown Family Medicine and is not tied to your treatment. In other words, you will not receive punishment or scrutiny from Novant Health Midtown Family

Medicine if you decide not to participate. The benefit of participation is the contribution to the scientific study to improve treatment of type 2 diabetes, as well as to increase your time with your physician.

Volunteer Statement: You are a volunteer. The decision to participate in this study is completely up to you. If you decide not to participate in the study, you may stop at any time without penalty. You will not be treated any differently if you decide not to participate or if you decide to stop once you have started.

Confidentiality: Any information collected during your participation will not be linked back to you. The DSMQ, PHQ-9, and AIM-HI Fitness Inventory will be de-identified by assigning a code to each person as opposed to using birth names. In addition, participation in the focus groups will also not include birth names, but instead a de-identified code to ensure confidentiality. The signed informed consent form will contain identifying information, however, it will be kept in a locked office, separate from all other collected data. Only the Principal Investigator and direct supervisor will be able to access any of the information collected. No identifying information will be used in any future publications or presentations. All materials and data will be kept in a secure location (locked filing cabinet in Principal Investigator's locked office) at all times and treated as confidential information. All identifying information will be destroyed after participation in the study. Please note that after participating in the study, the Principal Investigator cannot control how group members will use the information, so we ask you to please be respectful and not disclose the information shared in group therapy with outside parties.

Fair Treatment and Respect: UNC Charlotte wants to make sure that you are treated in a fair and respectful manner. Contact the University's Research Compliance Office (704) 687-3309 if you have any questions about how you are treated as a study participant. If you have any questions about the project, contact Sandra Milling (919) 606-3892 or Dr. Peterman (704) 687- 1315.

Participant Consent: I have read the information in this consent form. I have had the chance to ask questions about this study, and those questions have been answered to my satisfaction. I am aware that participation in this study will require access to my medical records. I am also aware that should I participate in a focus group at the pre-group meeting, at the end of each SMA session, and at the end of the study, my responses will be audio recorded and transcribed. I am at least 18 years of age, and I agree to participate in this research project. I understand that I will receive a copy of this form after it has been signed by myself and the Principal Investigator.

---

Participant Name (PRINT)

---

Participant Signature

---

Date

---

Investigator Name (PRINT)

---

Investigator Signature

---

Date

## APPENDIX E. SAMPLE PLEDGE AGREEMENT

- I have read and I agree to the following statements:
  - I agree to meet with a group of patients and my doctor. I understand that I have the choice to be seen by my physician in this group or individually.
  - I agree to keep all information regarding other patients attending the group visits private and confidential.
  - Like any doctor's appointment, I agree to be responsible for the bill and/or co-payment associated with this doctor's visit.
  - I'm aware that the multidisciplinary team is not responsible for patient confidentiality among other patients due to the fact that this is not feasible for the team to enforce outside of the clinic.

Signed \_\_\_\_\_

Date \_\_\_\_\_

## APPENDIX F. HIPAA NOTICE

During a group visit, it is possible that some of my individually identifiable health information will be disclosed. For example, at a group visit for fitness and related diseases, it might be assumed that everyone attending has a medical condition that could be improved by better fitness habits. I have read and I understand the following statements about my rights:

- I realize that I have the option to be seen individually.
- I understand that I am not required to sign this form to receive health care treatment.
- I understand that discussions may occur regarding individually identifiable health information during a group visit.
- It is possible that the information that is used or disclosed in a group visit may be redisclosed by other participants in the group visit.
- I have been notified of this potential disclosure, and I voluntarily wish to participate in the group visit.

This Group Visit HIPAA Notice Regarding Use and Disclosure supplements the Notice of Privacy Practice originally provided to me, a copy of which is attached.

Signed \_\_\_\_\_

Date \_\_\_\_\_



## APPENDIX G: FOCUS GROUP QUESTIONS FOR INITIAL SMA

### **Baseline Diabetes Knowledge and Diabetes Self-Care**

- What do you already know about diabetes?
- What have you already tried with making changes with your diabetes self-care?
- What do you feel is still missing in your diabetes self-care?

### **ACT-ED Perspectives**

- What reactions did you have to the modules presented in the ACT-ED manual?
- What modules were most helpful?
- What modules were least helpful?
- What information do you think is lacking?
- How can the multidisciplinary address the gaps in this educational manual?

### **Deciding Factors for SMA Participation**

- What factors affected your decision to participate in the SMA?
- What components of the SMA do you predict will be the most helpful to you?

### **Concerns or Barriers to SMA Participation**

- What reservations do you have about the SMA design?
- Which components do you think will be the least helpful?
- What reservations do you have about sharing medical information?
- What obstacles do you predict will impede on your ability to participate in the SMA?
- How would you rate your readiness to make health behavior changes?

### **How to Address Concerns**

- What would you like to see happen during your participation in the SMA study?
- What do you think would most help you achieve your goals?
- How can we improve the SMA design?
- What would make you feel invested in participating in the SMA?
- What benefits do you see with sharing medical information with your peers?

### **Group Dynamics**

- How do you feel about sharing medical information in a group setting with patients with a similar diagnosis?
- What rules would you like to see enforced in the SMAs?
- What would make you feel more comfortable with participating in the SMA?

### **Patient/Provider Relationship**

- How do you predict this intervention model will impact your relationship with your provider?
- How do you think the SMA model may impact your level of trust with your physician?

**Predicted Outcomes**

- What are your predictions regarding the effectiveness of this intervention model?
- What impact do you think participating in the SMA will have on your diabetes self-management behaviors?

**SMA Design**

- What are your perspectives on the interventions proposed in this study?
- Which interventions were most appealing and why?
- What interventions, if any, seem unnecessary?
- What interventions would you like to see occur during your SMA participation?

## APPENDIX H: FINAL FOCUS GROUP QUESTIONS FOR FINAL SMA

**Focus Group Questions that Align with Research Objective 1:** How does the experience of participating in the SMA intervention model influence patient satisfaction with their medical care?

### **General Reactions to the SMA Intervention Model**

- What are your reactions to the shared medical appointment in which you participated?
- What was most helpful?
- What was least helpful?
- What, if anything, did you enjoy?
- What, if anything, did you dislike or find to be unnecessary?

### **Patient/Provider Relationship**

- How did the SMA impact your relationship with your physician?
- How was your relationship with your physician different with this type of format?
- What was it like to have a treatment team conduct the SMA appointments?
- What are your opinions regarding the make-up of the multidisciplinary team?
- Would you add any additional team members? If so, what kind of team members would you like to see?
- What differences did you notice between the SMA format of care and traditional care (i.e., face-to-face only) with your physician?

### **Group Dynamics**

- What was it like to share medical information with your peers?
- What are your reactions to receiving your medical care in a group format?
- What was your comfort level with this type of treatment format?
- What group dynamics did you notice?
- How did group dynamics impact your patient satisfaction level with your medical care?

### **Overall Patient Satisfaction**

- What is the likelihood that you will continue to receive your medical care with this format for the next 3 months or longer if given the option?
- How satisfied are you with the SMA treatment model?
- Would you recommend this type of healthcare format to others? Why or why not?
- At the pre-group meeting, the team asked for you to provide your baseline knowledge of diabetes and give your opinions regarding the SMA design.
  - To what degree do you feel the multidisciplinary team was able to tailor interventions to meet your needs based on the feedback you provided at the pre-group meeting?
  - What, if anything, did you like about the pre-group meeting?
  - What, if anything, did you dislike about the pre-group meeting?

- How did the pre-group meeting impact your overall patient satisfaction with the SMA intervention design?

**Focus Group Questions that Align with Research Objective 2:** What components of the SMA intervention design do patients with T2DM find to be the most meaningful and effective?

#### **Impact on Diabetes Management and Self-Care Behaviors**

- How did the SMA impact your diabetes care?
- Have your diabetes self-management behaviors changed since participating in the SMA? If so, how?
- Did your scores on the Diabetes Self-Management Questionnaire change at all from the beginning until now? If so, how?
  - For those of you whose scores changed, what is your reaction to these changes?
  - If you feel comfortable sharing, what improvements did you notice in your self-management behaviors?

#### **Perceptions of Collaborative Goal Setting**

- What were your reactions to the collaborative goal setting?
- How do you feel about your progress made toward your goals?
- How effective do you feel the interventions provided in the SMA were in helping you achieve your goal?

#### **Readiness to Change**

- How would you rate your readiness to make health behavior changes?
- Did your readiness to change shift from the beginning of the SMA program to now? If so, how did it shift?
- Have your beliefs about diabetes changed since participating in the SMA? If so, how?
- Have your feelings toward your diabetes diagnosis changed in any way? If so, how?

#### **Perceptions of Effectiveness of SMA Intervention Model**

- What are your opinions regarding the effectiveness of this type of healthcare format?
- What components of the SMA were most effective and important in your opinion?
- What are your opinions regarding the educational modules (e.g., diet, exercise, self-care, etc.)?
- Which ACT-ED module did you find to be the most helpful? Least helpful?
- Was any of the information provided new to you? If so, what was new?
- If you feel comfortable sharing, did you have any improvement in your A1c numbers?
- How do you feel about the improvements or lack-thereof in your A1c numbers?

- If you feel comfortable sharing, did you have any improvement in your A1c numbers?
- How do you feel about the improvements or lack-thereof in your A1c numbers?

**Focus Group Questions that Align with Research Objective 3:** What suggestions do participants in the SMA intervention model have for future SMA designs and what factors influenced their perspectives regarding these recommendations?

**Suggestions for Future SMA Design**

- What suggestions would you make for future SMAs?
- How could the future SMAs be improved?
- What changes could be made to the interventions to be more useful in the future?
- What factors led you to make these recommendations?

## APPENDIX I: DIABETES SELF-MANAGEMENT QUESTIONNAIRE

**Diabetes Self-Management Questionnaire (DSMQ)**

The following statements describe self-care activities related to your diabetes. Thinking about your self-care over the <b>last 8 weeks</b> , please specify the extent to which each statement applies to you.	applies to me very much	applies to me to a considerable degree	applies to me to some degree	does not apply to me
1. I check my blood sugar levels with care and attention. <input type="checkbox"/> <i>Blood sugar measurement is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
2. The food I choose to eat makes it easy to achieve optimal blood sugar levels.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
3. I keep all doctors' appointments recommended for my diabetes treatment.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
4. I take my diabetes medication (e. g. insulin, tablets) as prescribed. <input type="checkbox"/> <i>Diabetes medication/insulin is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
5. Occasionally I eat lots of sweets or other foods rich in carbohydrates.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
6. I record my blood sugar levels regularly (or analyse the value chart with my blood glucose meter). <input type="checkbox"/> <i>Blood sugar measurement is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
7. I tend to avoid diabetes-related doctors' appointments.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
8. I do regular physical activity to achieve optimal blood sugar levels.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
9. I strictly follow the dietary recommendations given by my doctor or diabetes specialist.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
10. I do not check my blood sugar levels frequently enough as would be required for achieving good blood glucose control. <input type="checkbox"/> <i>Blood sugar measurement is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
11. I avoid physical activity, although it would improve my diabetes.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
12. I tend to forget to take or skip my diabetes medication (e. g. insulin, tablets). <input type="checkbox"/> <i>Diabetes medication/insulin is not required as a part of my treatment.</i>	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
13. Sometimes I have real 'food binges' (not triggered by hypoglycaemia).	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
14. Regarding my diabetes care, I should see my medical practitioner(s) more often.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
15. I tend to skip planned physical activity.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0
16. My diabetes self-care is poor.	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0

## APPENDIX J: PATIENT HEALTH QUESTIONNAIRE-9

**Severity Measure for Depression—Adult\***

\*Adapted from the Patient Health Questionnaire–9 (PHQ-9)

Name: \_\_\_\_\_ Age: \_\_\_\_\_ Sex: Male  Female  Date: \_\_\_\_\_**Instructions:** Over the **last 7 days**, how often have you been bothered by any of the following problems? (Use “✓” to indicate your answer)

						Clinician Use
						Item score
		Not at all	Several days	More than half the days	Nearly every day	
1.	Little interest or pleasure in doing things	0	1	2	3	
2.	Feeling down, depressed, or hopeless	0	1	2	3	
3.	Trouble falling or staying asleep, or sleeping too much	0	1	2	3	
4.	Feeling tired or having little energy	0	1	2	3	
5.	Poor appetite or overeating	0	1	2	3	
6.	Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3	
7.	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3	
8.	Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3	
9.	Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3	
<b>Total/Partial Raw Score:</b>						
<b>Prorated Total Raw Score: (if 1-2 items left unanswered)</b>						

Adapted from Patient Health Questionnaire–9 (PHQ-9) for research and evaluation purposes.

## APPENDIX K: AIM-HI FITNESS INVENTORY

**AIM-HI Fitness Inventory**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

We understand that physical activity, healthy eating and emotional well-being are an important part of your health. We want to partner with you to achieve your goals in these areas.

Please answer the following questions to help us better understand your interests and needs in these areas. (Please note: we will work with you on these issues over time and may not attempt to address all of them in this office visit.)

**How Active Are You?**

Please select the one choice that best describes you:

- I'm physically active already and don't need help to be more active.  
 I'm ready to get more active and would like help.  
 I'm not sure if I'm ready to be more active, but I'm ready to talk about it.  
 I'm not very active and not interested in being more active at this time.

1) How many hours each day do you spend watching TV or videos or on the computer?

- less than 1                       1-2                       more than 2

2) How many times a week do you do yard or house work or duties on the job that cause you to work up a sweat?

- 4 or more                       1-3                       Less than 1

3) How many times a week do you get out for a brisk walk of 10 minutes or more?

- 4 or more                       1-3                       Less than 1

4) How many times a week do you participate in sports or an exercise program?

- 4 or more                       1-3                       Less than 1

**(turn over)**

© 2009 American Academy of Family Physicians.

This form may be reproduced for use in clinical settings without permission from the authors or the American Academy of Family Physicians.





### How Well Do You Eat?

Please select the one choice that best describes you:

- I'm eating healthy at this time.**  
 **I'm ready to make some changes to eat healthier and would like help.**  
 **I'm not sure if I'm ready to change the way I eat, but I'm ready to talk about it.**  
 **I'm not interested in changing the way I eat at this time.**

A serving of food is the amount that would fit in the palm of your hand.

- 1) How many servings of fruits or vegetables do you eat each day?  
 5 or more       3-4       2 or less
- 2) How many servings of whole grains (like whole grain bread or cereal, oatmeal, brown rice, etc.) do you eat each day?  
 3 or more       2       1 or less
- 3) How many times a week do you eat lean protein like chicken, turkey, fish, tofu or beans?  
 6 or more       3-5       2 or less
- 4) How many times a week do you eat high fat foods like fried food, pastries or chips?  
 1 or less       2-3       4 or more
- 5) How many times a week do you eat fast food meals or snacks?  
 1 or less       2-3       4 or more
- 6) How much margarine, butter or meat fat (lard) do you use in your cooking or put on bread, potatoes or other vegetables?  
 very little       some       a lot
- 7) How many sugary drinks (like regular soft drinks, sweet tea or fruit flavored drinks) do you drink each day?  
 none       1-2       3 or more
- 8) How many times a week do you eat desserts or other sweets?  
 3 or less       4-6       7 or more
- 9) How often do you eat when you are not hungry, for example out of habit or for emotional reasons?  
 Rarely       Sometimes       Often       All the time

### How Happy or Satisfied Are You?

Please select the one choice that best describes you:

- I'm happy and satisfied with my life at this time.**  
 **I'm ready to make some changes to be happier and would like help.**  
 **I'm not sure if I'm ready to work on being happier, but I'm ready to talk about it.**  
 **I'm not interested in working on my happiness or satisfaction at this time.**

In the last week, how often did poor physical or emotional health keep you from doing your usual activities?

- Not at all       Some days       Most days       Everyday

How often does stress or depression affect your ability to pursue healthy lifestyle changes?

- Rarely       Sometimes       Often       All the time

How many days per week do you participate in some form of a spiritual or cultural activity that gives you emotional strength?

- Daily       3-6 days       1-2 days       None

© 2009 American Academy of Family Physicians.

This form may be reproduced for use in clinical settings without permission from the authors or the American Academy of Family Physicians.

## APPENDIX L: ACCEPTANCE AND ACTION DIABETES QUESTIONNAIRE

## Acceptance and Action Diabetes Questionnaire

Please circle the item that fits you best.

	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Often</b>	<b>Almost Always</b>
I try to avoid reminders of my diabetes.	1	2	3	4	5
I do not take care of my diabetes because it reminds me that I have diabetes.	1	2	3	4	5
When I have an upsetting feeling or thought about my diabetes, I try to get rid of that feeling or thought.	1	2	3	4	5
I avoid taking or forget to take my medication because it reminds me that I have diabetes.	1	2	3	4	5
I often deny to myself what diabetes can do to my body.	1	2	3	4	5
I avoid thinking about what diabetes can do to me.	1	2	3	4	5

## APPENDIX M: LIST OF CATEGORIES FOR CODES

## SMA Group Dynamics

- Advice/Relating/Sharing
- Discussion of family dynamics
- Self-validation for efforts
- Feel not alone
- Support one another
- Comments related to relationship with doctor
- Patient responses to doctor's prompting
- Change in relationship with doctor

## Feedback Regarding Satisfaction and Ending Results

- Indicators of Satisfaction with SMAs
- Ending Results after SMA (positive or negative)
- Patient Dislikes in SMA

## What Patients Reported they Learned/Indicators of Effectiveness

- Change in mental framework/health beliefs
- Indicators of readiness to change
- How patients are managing diabetes during and/or post SMA
- Comments about diabetes medications
- What patients reported they learned
- Baseline knowledge

## Barriers to Making Health Behavior Changes

- Specific barriers to change
- Health impact of diabetes
- Challenges with food/drink

## Health Beliefs

- General health beliefs
- Moderation is key belief

## Diabetic Feelings/Thoughts

- Specifically mentioned thoughts/feelings
- Patient desires related to diabetes
- Relapse
- Motivation for making health behavior change
- Diabetes diagnosis

## Questions for Doctor

- General questions
- Questions related to food/drinks

### Diabetes Management

- How patients are managing their diabetes (pre-SMA)
- How patients are struggling with diabetes management
- How patients plan to/desire to manage their diabetes
- Motivating factors for making health behavior changes
- Reasons for participating in the SMA
- Pre-SMA level of functioning

### SMA Design

- Suggestions for future SMA designs
- Patient preferences for SMA designs (group norming)
- Barriers to participation
- Suggestions for treatment/what patients are hoping to receive
- Predictions for SMAs
- Patient questions regarding logistics
- Desired impact from group