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Diabetes Prevention Program: Exploring Spirituality and Spiritual Interventions on Outcomes

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DIABETES PREVENTION PROGRAM: EXPLORING SPIRITUALITY AND SPIRITUAL INTERVENTIONS ON OUTCOMES

by

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Purpose

The purpose of this study is to explore a relationship between a modified Diabetes Prevention Program (DPP) for adults with pre-diabetes (pre-DM) or type-2 DM with variables of spirituality and religiosity (S/R) to illuminate the potential religion-health connection based on changes in participant weight, body mass index (BMI) and physical activity. A secondary purpose is identifying spiritual interventions used by faith-based DPP coaches in a group setting.

Methods

A mixed-methods study was conducted with 34 DPP participants and 11 DPP coaches who completed the core section (weeks 1–26) of DPP courses held in Macomb County, Michigan. Independent variables are type of coach (faith-based or community-based) and three subscales of the Duke University Religion Index (DUREL). Dependent variables include pre- and post-core program measurements of weight, BMI and physical activity. A 2-round Delphi Survey Technique was completed by six faith-based coaches to identify spiritual interventions used while leading a DPP course.

Results

Chi square and Independent-*t* and Pearson's *r* testing revealed no statistically significant differences in outcomes of weight loss, physical activity, or BMI based on type of coach or the

three DUREL subscales. Chi square testing revealed a statistically significant difference between the men and women with more men meeting physical activity goals ($\chi^2(1) = 6.28$, $p = .02$). Fisher's Exact and Independent-*t* testing revealed no significant difference between type of coach based on the three subscales of the DUREL (OR $p = .06$, NOR $p = .66$ or IR $p = .18$). Results of the Delphi Survey show the faith-based coaches rated most important and used prayer, active listening, and emotional support in leading their DPP courses.

Conclusion

Participants in this study did not achieve greater weight loss, a reduction in BMI, or increased physical activity levels based on variables of S/R or type of coach. Consensus was reported about three spiritual interventions used by all faith-based coaches in a group setting. Further study is needed with a larger, more diverse sample to further explore S/R dimensions related to successes with the DPP.

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CHAPTER I

INTRODUCTION

The need for diabetes education and prevention strategies nationwide is paramount based on data from the Centers for Disease Control and Prevention (CDC) indicating 29.1 million people (9.3% of the U.S. population) have diabetes; another 8.1 million people do not even know they have diabetes (CDC, 2014). Furthermore, it is estimated 86 million Americans in 2016 have pre-diabetes (pre-DM), meaning that they are at risk for type-2 diabetes (T2DM), with nine out of 10 of them not knowing they have it (CDC, 2016a). To increase awareness and educate the public about pre-DM and T2DM, programs need to be taken into the communities across the nation.

Churches and other religious organizations have been the focus of many types of health promotion and treatment interventions for diabetes and other chronic diseases because of the routine gathering of people in a common space based on spiritual belonging, social support, and cultural identity (Campbell et al., 2007; DeHaven, Hunter, Wilder, Walton, & Berry, 2004; Sattin et al., 2016). Diabetes programs offered in churches (or faith-placed) or community settings of various denominations and cultures have reported positive outcomes, such as weight loss and improved glucose control (Baig et al., 2015; DeHaven et al., 2004; Gutierrez et al., 2014; Sattin et al., 2016; Yeary et al., 2015). Other diabetes programs have reported positive outcomes, such as weight loss and lower body mass index (BMI), based on interventions infused with faith-based rituals, such as prayer, meditation, or scripture reading, among others (Campbell et al., 2007; Ziebarth, 2014). This study is looking to determine a relationship between a modified

educational intervention (Diabetes Prevention Program or DPP) for individuals with pre-DM or T2DM with variables of spirituality and religiosity (S/R). This research explores the potential S/R-health connection for persons struggling with the self-management of pre-diabetes and type-2 diabetes and identifies S/R interventions which could be used in diabetes education programs.

This chapter will introduce and give the background of the study. Next, an overview of the theoretical framework along with a description of the problem, purpose, research questions, hypotheses, and the significance for this research will be presented. Finally, a brief overview of the research methodology including limitations will close the chapter.

Background of the Study

Churches and places of worship have the advantage of offering health and prevention programs which are conveniently located in neighborhoods (Koenig, 2011). Research on spirituality and religion has documented positive effects on people suffering from chronic illnesses like diabetes (Namageyo-Funa, Muilenburg, & Wilson, 2015), HIV (Litwinczuk & Groh, 2007), substance abuse and alcoholism (Korinek & Arrendondo, 2004), and palliative care treatments (Selman, Harding, Gysels, Speck, & Higginson, 2011). Spirituality and religion have often been used interchangeably but, in fact, have distinct entities with overlapping concepts.

Spirituality refers to a search for the sacred or a relationship with God or that which is held as Ultimate or Transcendent, such as a set of sacred texts for Buddists (Exline, Pargament, Grubbs, & Yali, 2014; Hodge, 2003). Spirituality can include religious faith or existentialist/humanistic positions in which people search for meaning and purpose which may, or may not, include belief in a higher power (Selman et al., 2011). Religion usually flows from spirituality and refers to the rituals, beliefs, and practices with the goal of facilitating spirituality or a relationship with a Transcendent, such as God or a Higher Power (Exline et al., 2014;

Hodge, 2003; Koenig, 2015). The variables being investigated in this study involve spiritual/religious measures and identifying S/R interventions used to modify DPPs offered in the Macomb County community.

The National Diabetes Prevention Program

The National Diabetes Prevention Program is a community-based initiative which involves education to delay or prevent T2DM in individuals at high-risk for pre-diabetes through lifestyle changes, such as diet modification, stress reduction, support mechanisms and increasing physical activity (National Institute of Diabetes, Digestive and Kidney Diseases [NIDDKD], 2014). The original DPP clinical trial invited 3,234 non-diabetic persons with elevated fasting and random blood sugar levels to be randomized into three groups: (1) placebo, (2) metformin (850 mg twice daily), or (3) a lifestyle-modification program with the goals of a 5% to 7% weight loss and at least 150 minutes of physical activity per week (DPP Research Group, 2002). The subjects were followed for an average of 2.8 years to determine the incidence of diabetes based on cases per 100 person-years. The incidence of diabetes in the placebo group was 11.0 cases, the metformin group 7.8 cases, and the lifestyle group 4.8 cases. The study concluded that medication and lifestyle change can reduce the incidence of diabetes but that lifestyle interventions were more effective than medication (DPP Research Group, 2002). Based on the impressive outcomes of this study, the DPP was further developed, promoted and supported by the U.S. Department of Health and Human Services.

The basic format for the year-long program DPP includes two sections: the “core” program and the “maintenance” program. Weeks 1 through 26 is called the “core” program and involves holding 16 group classes (see Table 1). Weeks 27 through 52 is the “maintenance”

program offering an additional six monthly group classes which allow for a variety of topics to encourage or maintain weight loss and lifestyle changes (CDC, 2016b).

Table 1

Core Program Sessions

Session	Topic	Session	Topic
1	Welcome and Introduction	9	Problem Solving
2	Be a Fat and Calorie Detective	10	Four Keys to Health Eating Out
3	Three Ways to Eat Less Fat and Fewer Calories	11	Talk Back to Negative Thoughts
4	Healthy Eating	12	The Slippery Slope of Lifestyle Change
5	Move Those Muscles	13	Jump Start Your Activity Plan
6	Being Active – A Way of Life	14	Make Social Cues Work for You
7	Tip the Calorie Balance	15	You Can Manage Stress
8	Take Charge of What's Around You	16	Ways to Stay Motivated

The original DPP program was developed to be provided in clinical settings by health care professionals (DPP Research Group, 2002). This approach has changed over the years by adding a variety of venues and using the term *coach* as one who leads and coordinates the classes. Coaches can be multi-disciplinary, professional or para-professional individuals who are interested in health and lifestyle intervention and change. Coaches are required to attend a training program delivered by DPP master trainers (CDC, 2016e). The training includes 16 hours of face-to–face small group facilitation to review program organization, program materials, and overseeing participant safety-related issues (i.e., privacy, exercise coaching). Training also includes role-playing and group facilitation to focus on optimal social interaction, shared learning experience, and group cohesion (CDC, 2015). Lifestyle coaches may have credentials

(e.g., RD, RN), but credentials are not required (CDC, 2015). The coaches for this study include nurses, congregational health team members, and other lay volunteers or health care professionals (dieticians, social workers, pharmacists, etc.).

The DPP has a standard curriculum but has seen modifications by many groups to fit the population being served. Neamah, Kuhlmann, and Tabak (2016) reviewed 26 articles describing 28 programs which modified, or changed, the DPP curriculum or format. The most common program modifications summarized from the 28 programs were concerned with translation, or implementation, strategies such as (a) changes in frequency and timeline of DPP classes—changing the 16 core classes over 6 months, to any different schedule that reduces either the number of sessions or the timeline for delivery; (b) the class format—individual delivery or group; (c) the setting and type of staff (health care professionals and lay coaches); and (d) cultural adaptation to include changes in content based on cultural traditions and knowledge about planning meals or exercise (Neamah et al., 2016). Programs with fewer modifications (<2 strategies) reported greater weight reductions at 12 months follow up (p = .002) and follow-up points measured at points greater than 6 months (p = .02). Follow up at 6-month measures for outcomes was not significant (p = .93 for BMI, and p = .23 for weight reduction). This article suggests that "program fidelity does matter to a certain extent" and that DPPs appear to be effective even when there are modifications to the program (Neamah et al., 2016, p. 160).

Adding activities (faith-based) to the DPP, without changing the curriculum, is seen as a modification or enhancement to the program. Spiritual interventions are therapeutic strategies that use a spiritual or religious dimension as a central component of the intervention (Hodge, 2006). Multiple disciplines (nursing, social work, psychology) have incorporated spiritual interventions for the treatment of anxiety, stress, substance abuse, and depression (Goncalves,

Lucchetti, Menezes, & Vallada, 2015; Hodge, 2006), dementia (Ennis & Kazer, 2013), eating disorders (Richard, Berrett, Hardman, & Eggett, 2006) and cancer (Oh & Kim, 2014), to name a few.

The DPP in Macomb County, Michigan

The DPP courses utilized in this research study were being offered across Macomb County, Michigan, as a collaborative effort among the Greater Detroit Area Health Council (GDAHC), Henry Ford Macomb Hospital (HFMH) in Clinton Township, Michigan, Macomb County Health Department, and St. John Ascension Health. A 4-year annual grant from the Michigan Department of Community Health totaling $440,000 was received to focus on reducing chronic disease with a major emphasis on developing and implementing the DPP county-wide. For this study, Henry Ford Macomb Hospital Faith-Community Nursing Department (FCND) is the only organization involved with the current study. The FCND is providing coordination, recruitment of participants and coaches, and implementation of the DPP courses as part of their role in providing grant services.

The DPP courses were led by coaches who may be faith-based (faith-community nurses or congregational health team members) or community-based (registered nurses from the community, other health professionals or at-large or lay-volunteers). The DPP courses were being held in both faith-based (churches or parishes) and in community settings such as clinics, recreation centers, work-sites, as well as a local university. According to the director of the Henry Ford Macomb Hospital FCND, this grant is unique because it is being implemented through a collaboration of faith-based and community-based partnerships (A. Brown, personal communication, January 8, 2016).

Participants in the DPP may come from a variety of religions with different rituals and beliefs or have no religious affiliation. The course they select to attend may be offered in a faith-based setting or a community setting within Macomb County. The Faith Community Nursing Department is collaborating with several insurance companies, like Health Alliance Plan, to refer clients to courses in Macomb County. Henry Ford Macomb Hospital is also using their clinic and physician office network for referrals. To date, there have been 14 sites offering the DPP program with more sites starting each month.

Recruitment goals for each DPP course are to have 20 to 25 participants to join each course. The commitment to participate in a course is one year and includes the opportunity to attend up to 22 group-based education classes. Participants are not compensated for their participation and the course is offered with no cost or fees. Participants self-select which DPP course they want to attend after being informed of locations and times of the course offerings.

As this is a non-paid commitment, the coaches also self-select which course they are going to lead for the year based on personal availability. The coaches have flexibility in leading the courses as the curriculum offers multiple activities to select from as long as they are covering the content for the lesson. According to A. Brown, Director of the FCN Department, if a faith-based coach chooses to use a spiritual intervention (e.g., prayer, scripture, meditation), they ask for permission from the group as a whole. If anyone feels uncomfortable or objects, no spiritual interventions are used for the rest of the year-long program in order to respect personal boundaries and develop group cohesiveness (A. Brown, personal communication, May, 2016).

Theoretical Framework

The theoretical framework for this study is based on the work of Harold Koenig, who has written, co-authored, and published several books and hundreds of articles on the impact of S/R

in health care. He identifies that spirituality is present in every person, even those who are questioning if there is a God or higher power and asking, “Why me?” (Koenig, 2013). Many of his writings discuss the difference between spirituality and religiosity making the point that in order to measure them, researchers need to define these constructs clearly and distinctly to measure and quantify them (Cohen & Koenig, 2003; Koenig, 2011). Koenig, who started in health care as a registered nurse and then became a medical physician, states that when the terms are used in clinical practice, as compared to clinical research, the definitions frequently overlap and are not measured or quantified as precisely (Cohen & Koenig, 2003; Koenig, 2011, 2012a, 2015).

Spiritual and Religious Dimensions

The definition of religion, as defined by Koenig, involves rituals, beliefs, behaviors and practices with the goal of facilitating spirituality or a relationship with a Transcendent (i.e., God, Allah, Buddha, or a Higher Power) (Koenig, 2015). Religions, also have specific beliefs about life-after-death and rules about conduct in social groups (Koenig, 2012b). He describes at least 16 different aspects of religion: denomination/affiliation, belief/orthodoxy, public religious practices, private religious practices, subjective religiousness, religious motivation, religious well-being, religious coping, religious history, religious support, religious experience, religious attachment, religious giving, religious knowledge, religious growth, and religious quest (Koenig, 2011). From these 16 areas, Koenig developed a simpler, more condensed, summary of these major areas into a three-dimensional categorization. The dimensions are:

- Organizational Religious activity (OR) – which is measured by asking “How frequently do you attend service?” or attend any other group religious activities.

- Nonorganizational Religious activity (NOR) – which is private religious practices, such as personal prayer, reading holy scriptures, or listening to religious music or programs.
- Intrinsic Religiosity (IR) – is the individual's commitment to religious beliefs which may be measured by subjective or cognitive aspects of religious motivation, such as how a person lives committed to their religious beliefs (Boyle, Saklofske, & Matthews, 2014; Koenig, 2011; Koenig & Futterman, 1995).

Koenig describes a spiritual person as one who lives a life dedicated and surrendered to the Divine or Transcendent (Koenig, 2015). The Transcendent can be God, Allah, HaShem, or a Higher Power (Western religions) or Braham, Buddha, Dao, or ultimate truth/reality (Eastern) (Koenig, 2012b). Examples of famously spiritual people include the recently canonized saint, Mother Theresa, Dr. Martin Luther King, Jr., and Mahatma Ghandi, among others.

The concept of spirituality is most often viewed as personal and has a positive influence (Koenig, 2012b). Individuals can define for themselves what, which, and how one believes and behaves as a spiritual person (Koenig, 2011). Thus, spirituality can be difficult to measure because of the element of subjectivity unique to each person. However, the traditional definition of spirituality is linked or rooted in a religious faith or belief with a connection to the Transcendent, which is mystical or supernatural, and an organized religion that "extends beyond the religion (and begins before it)" (Koenig, 2012b, p. 46). Being religious may not mean the person is spiritual if there is not an intrinsic belief or if it is not reflected in relationships with others, themselves and the world.

Secular Dimension

The other definition in Koenig's model, which he has added and refined since his earlier writings, is the definition of "secular." He defines secular as different from both religion and spirituality as a philosophical approach that understands human existence and behavior, but without a relationship to the Transcendent (Koenig, 2011). This concept focuses on the rational-self coupled with human community which can create a source of meaning and hope (Koenig 2011).

The concepts of meaning and hope are frequently studied. In a review and update on articles about S/R from 2001 to 2010, 45 studies examined relationships between S/R and meaning or purpose with 93% reporting a significant, positive relationship (Koenig, 2015). In the same article, 40 of the 45 studies examined the relationship between S/R and hope, with 73% reporting a significant, positive relationship (Koenig, 2015). The scales used to measure these concepts de-emphasized the religion connection and replaced questions with assessment questions about good mental health and psychological well-being. (Koenig, 2012b). Examples of questions on these scales include the following: "I feel peaceful"; "I have a reason for living"; "I feel a sense of purpose in my life." The main point is that concepts need to be defined and recognized as either measures of mental health or psychological well-being (secular dimension) versus spirituality which is related to a belief in a Higher Power.

Koenig (2012b) describes S/R and secular beliefs as a "source" of health, positive or negative, but not a cause. In his model, he shows the "traditional understanding" of S/R where spirituality is generated from a religious perspective/tradition, and thus, are viewed as one source as compared to behaviors generated from secular beliefs (Koenig, 2011). Increased S/R or decreased S/R, as a source, can impact the mental health of a person which may show as any of

the following six elements: meaning, purpose, connectedness, existential well-being, peace and/or hope (Koenig, 2012b). Lacking, or having difficulty with any of the six mental health elements, coupled with S/R or secular beliefs, has the ability to influence the development of depression, suicide, anxiety, and addictions, as well as physical diseases such as cardiovascular disease, cancer, neuroimmunology balance, and even mortality (life or death) (Ellison & Levin, 1998; Koenig, 2011, 2012b). Thus, when looking at prevention in any of the above mentioned physical or mental health areas, therapies coupled with supportive spiritual interventions can be a promising area of interdisciplinary management.

Statement of the Problem

There is a need, based on the literature, to identify spiritual interventions and measure the impact of S/R activities and practices in the support of diabetes self-care management. Research is needed that compares health outcomes in S/R atmospheres or environments (faith-based and faith-placed) as compared to an atmosphere or environment that does not (Koenig, 2011). The need for professional support for research and scholarship regarding the impact of faith community nursing (FCN) and other faith-based programs and treatments continues to mount and yet, empirical studies with solid research designs and evaluation lag in proportion (Ziebarth, 2014). The majority of the research about church-based/faith-based health programs published in the literature are “program descriptions or did not utilize study designs that allowed for rigorous outcome evaluation” (Campbell et al., 2007, p. 219). The outcomes of this research may help to describe the influence of the FCN role and faith-based educators and the use of specific interventions on the outcome of DPP programs. Such results may contribute to the literature in this field and lead to continued research, assessment and evaluation.

Purpose of the Study

This study is looking to explore if there is a relationship between a modified educational intervention (the DPP) for individuals with pre-diabetes (pre-DM) or type-2 diabetes (T2DM) with variables of spirituality and religiosity (S/R) related to participant outcomes of weight, BMI, glycosylated hemoglobin (A1C), and physical activity. Spirituality and religiosity was assessed using the Duke University Religion Index (DUREL) on all participants and coaches. Furthermore, the faith-based coaches were surveyed about what spiritual interventions or practices they may be using in their DPP classes using a Delphi Survey Technique. These results were analyzed and correlated to determine if they have an impact on changes in participant A1C, weight, BMI and physical activity.

Research Questions

Overarching question: Is spirituality/religiosity (S/R) correlated with improved health outcomes for individuals diagnosed with pre-diabetes and diabetes who attend faith-based DPPs?

Defining research questions:

1. In a group of both faith-based and community-based DPP coaches, what is their lived measure of S/R, if any at all?
2. In a group of adults attending a faith-based DPP, what is the correlation with S/R, if any at all, on the participant outcomes for the following variables: weight loss, A1C, BMI, and degree of physical activity?
3. In a group of adults attending a community-based DPP, what is the correlation with S/R, if any at all, on the participant outcomes for the following variables: weight loss, A1C, BMI, and degree of physical activity?

4. What does a comparative analysis of S/R between the participant outcomes for faith-based and community-based DPPs indicate across the following variables: weight loss, A1C, BMI, and degree of physical activity?
5. What does the application of the Delphi Survey Technique reveal in terms of establishing the relative importance of spiritual interventions used by DPP coaches with participants attending a faith-based DPP course?

Hypotheses

Overarching question and questions 2, 3, and 4: Participants who attend a faith-based DPP course will show a greater improvement in reducing A1C, weight, BMI, and increasing physical activity than participants who attend the community-based DPP program.

Question 1: Faith-based coaches will report greater S/R as compared to community-based coaches.

Question 5: There is no hypothesis for question 5 as it is not predicting a relationship or change but is a description for the qualitative data collected on spiritual interventions.

Significance of the Study

There are four overarching goals that make this study significant.

Dimension of Care

Religiosity and spirituality are often overlooked by health care professionals as a dimension of care because of other priorities or thinking other health care professionals (e.g., chaplains) will deal with it (Koenig, 2013). However, the S/R dimension is frequently avoided because many health care professionals are not comfortable communicating with clients about spirituality issues (Taylor, Park, & Pfeiffer, 2014). With the number of new research publications about the positive impact of S/R, practitioners and researchers are looking for ways that motivate

clients to improve health outcomes and promote a more holistic dimension to health care (Koenig, 2015; Weaver, Pargament, Flannelly, & Oppenheimer, 2006).

Influencing Health Behaviors and Decisions

Spirituality can influence health behaviors (i.e., eating, exercise, and lifestyle management) and health care decision making (i.e., taking medication, testing blood glucose routinely, making follow-up appointments) (Bussing et al., 2014, Koenig, 2012a; Selman et al., 2011). This study looks at spirituality/religiosity variables of DPP participants and coaches and the influence of faith-based coaches (FCN and congregational health team members) who value the importance of spiritual interventions to support lifestyle changes. This spiritual influence may maximize the effect of spiritual interventions and practices to improve health outcomes.

Role of the Faith-Community Nurse

An additional significance of this research is to highlight the role of the faith-community nurse (FCN). Faith community nursing is a specialized practice of professional nursing which intentionally integrates faith as part of a process to promote holistic health in order to prevent and minimize illness and practiced in the context of a faith community (Dyess, Chase, & Newlin, 2010; Ziebarth, 2014). The role of the FCN focuses on strengthening the body-mind-spirit connection using interventions like meditation, prayer, guided imagery or various rituals of worship (American Nurses Association & Health Ministries Association [ANA & HMA], 2012). A “gap” in the research is identifying and measuring the impact of faith-based interventions provided by FCNs on the outcome of diabetes prevention programs (Brudenell, 2003; Campbell et al., 2007; Dyess et al., 2010).

Measuring Faith-Based Interventions

Finally, this study also hopes to discover faith-based interventions that may enhance health prevention and promotion programs. A few studies have reported outcomes based on interventions in diabetes programs infused with faith-based rituals, like prayer, meditation or scripture reading, to name a few (Campbell et al., 2007; Kim et al., 2008; Ziebarth, 2014). Other studies state in the title that diabetes self-management classes are held in faith-based or church-based sites but that does not mean spiritual interventions have been incorporated in the classes nor has the spirituality of the participants or coaches been factored into the process (Austin et al., 2013; Cené et al., 2013; DeHaven et al., 2004; Sattin et al., 2016; Tang, Nwankwo, Whitten, & Oney, 2014). This study hopes to identify what faith-based interventions are being used during sessions and compare this to control sessions without faith-based interventions which may impact DPP outcomes.

Glossary/Terms

Religion. Religion is a set of beliefs, practices and rituals related to the Transcendent or the Divine (Koenig, 2011). Religiosity is the behavior of a person to participate in the practices and rituals in a group or community setting. However, being religious is not necessarily a sufficient criterion for being spiritual.

Spirituality. The traditional definition of spirituality describes a person who is a subgroup of religious persons whose lives are rooted in and directed by religious beliefs and, thus, a relationship with the Transcendent or Divine (Koenig, 2011, 2015). These persons would be different from those who are religious but not deeply committed or from those who do not affiliate with a specific religion’s beliefs and rituals .

Coaches. For this study, there are two different categories of coaches: faith-based coaches or community-based coaches. Those two categories were further divided if they were a registered nurse (RN), a para-professional, or a lay- coach. The coaches for the DPP courses can be multi-disciplinary, professional, or para-professional, who attend a training program delivered by DPP master trainers (CDC, 2016e). Coach descriptions are described below.

Faith-based coaches:

1. *Faith-community RN.* Faith community nursing (FCN) is a specialized practice of professional nursing which intentionally integrates faith as part of a process to promote holistic health to prevent and minimize illness but practiced in the context of a faith community (Dyess et al., 2010; Ziebarth, 2014). Specialized training is required to achieve certification (ANA & HMA, 2012). The FCN works in paid or unpaid positions in a variety of religious faiths, cultures, and countries as part of a pastoral team to address health care needs in their place of worship and the community at-large (Church Health Center, n.d.; King, 2011). For this research, the FCN coaches may receive a stipend or may be unpaid for their services.
2. *Faith-based non-nurse coach:* For this research, a lay coach will be a person who may be a health care professional (but not an RN) or a non-health care professional and who is a member of a congregational health team. Many churches have congregational health teams which focus on health promotion and serve as resource to the congregation (Brudenell, 2003; Campbell et al., 2007; Ziebarth, 2014). The congregational health team may include health professionals, but can include lay members who are committed to health promotion and wellness in their church and

community (Gutierrez et al., 2014). These coaches usually are unpaid to provide the DPP but may receive a stipend to support their involvement in the program.

Community-based coaches:

1. *Community RN.* A licensed RN practicing in a variety of settings not necessarily related to the DPP program. The RN may be employed by a community organization to lead a DPP course. Other RN coaches may receive a stipend or provide their services as part of their job or in a volunteer capacity.
2. *Community non-nurse coach.* Lay persons and professionals can be DPP coaches. These coaches usually are unpaid to provide the DPP but may receive a stipend to support their involvement in the program. These coaches may work in the health care field in a capacity not specifically related to diabetes education, such as, social work, pharmacist, dietician, etc. They may also be a member of the community-at-large and interested in wellness.

Spiritual interventions. Spiritual interventions are therapeutic strategies that use spiritual or religious dimension as a central component of the intervention (Hodge, 2006). Ziebarth (2014) describes a wide variety of spiritual interventions which could be used to help participants improve their health, for example with prayer, meditation, faith rituals, and scriptures to name a few. Part of this research is to survey the faith-based coaches to determine interventions they may have used in an educational group setting.

Glycosylated hemoglobin (A1C). A1C is a standard measurement of glucose control evaluated every 3 to 4 months in the primary care setting. The A1C level will be used to evaluate change from pre- to post-intervention and over at least a 6-month period (completion of the core part of the DPP). The diagnosis of diabetes is made by an A1C level greater than 6.5%

(48mmol/mol). The A1C range for a diagnosis of pre-diabetes is from 5.7 to 6.4% (39mmol/mol to 46mmol/mol) (American Diabetes Association, 2016a). The A1C level is reported to the coaches who record the value in the FCND and Health Ministries documentation database.

Body mass index (BMI). BMI is calculated as weight (kg)/height (m^2). Height and weight are measured week one to calculate the initial BMI and at every class. The BMI will be calculated again for the last class completed at the end of the core program. Height and weight measurements are obtained by coaches. Overweight is defined as a BMI 25 kg/m^2 or greater and obese as 30 kg/m^2 or greater (Mahan & Escott-Stump, 2008).

Weight. DPP participants are weighed at each session which is then logged into the FCND and Health Ministries documentation database by the coach. One of the stated goals for the DPP program is for each participant to lose 5% to 7% of their weight during the core program (CDC, 2016b).

Physical activity. DPP participants start logging minutes of activity after week 4 of the program. The DPP has several sessions discussing different strategies to "get moving" (my emphasis) and may include many different types of activities based on personal preferences. The minutes of activity are self-reported which are then logged into the FCND and Health Ministries documentation database by the coach. The goal for the DPP program is for participants to increase moderate-intensity physical activity (such as brisk walking) to at least 150 min/week (CDC, 2016b).

Methods

To answer the research questions, a mixed-methods approach will be utilized to discover if there is an association between participants who attend a modified DPP course with variables of spirituality and religiosity (S/R) and those attend a DPP course without those variables or

interventions. The target population consists of adults attending a DPP, which has been modified with spiritual interventions and practices. This group will serve as a comparison to a second DPP population, which has not been modified with spiritual interventions and practices. Examples of spiritual interventions may include activities such as prayer, scripture or meditation but additional interventions will be identified further through a survey of the faith-based DPP coaches using the Delphi Survey Technique.

The Duke University Religion Index (DUREL) will be administered to all DPP coaches, who include two main groups: faith-based coaches and community-based coaches. A baseline spirituality/religiosity (S/R) measure will also be obtained for all participants attending the DPP using the Duke University Religion Index. Clinical outcomes for the participants will be measured twice, pre- and post-core program (weeks 1–26), to include measurable changes in the following: weight, body mass index (BMI), glycosylated hemoglobin (A1C), and minutes of physical activity. An additional variable to be factored in the study will be the number of sessions attended. Human Subjects Investigational Review Board (IRB) approval was received from Western Michigan University and Henry Ford Health System to access the outcome information from the Faith Community Nursing Department and Health Ministries database.

Spirituality and religiosity was quantitatively assessed in all participants and coaches using the DUREL after they had completed at least the core portion of the DPP (weeks 1–26). DPP participants who have attended four of the 16 classes were invited to participate. Attending four sessions was selected as inclusion criteria based on the requirement of the CDC and DPP Recognition Program who uses four sessions as an attendance criteria for participant inclusion in the national database (CDC, 2015).

The DUREL is a five-question quantitative survey that measures organizational religious activity (ORA), non-organizational religious activity (NORA), and intrinsic religiosity (IR) (Koenig & Bussing, 2010; Koenig & Futterman, 1995; Storch et al., 2004). This was distributed electronically (Survey Monkey). If a participant did not have email, this survey could be given in person at a DPP session or sent by mail.

The qualitative method used in this research is the Delphi Survey Technique to obtain consensus about spiritual interventions used by faith-based coaches providing DPP classes. The Delphi Technique is a multistage, self-completed questionnaire with individual feedback. It was estimated that this research would use a group, or panel, of at least 10 coaches, who are considered to be a "panel of informed individuals," to develop consensus (Hasson, Keeney, & McKenna, 2000; Procter & Hunt, 1994). There were two rounds of questionnaires used, via electronic format (Survey Monkey). The number of rounds is dependent on the level of dissention expected on the topic and can be modified depending on the results from the prior round. In most studies, two rounds are used to decrease panel attrition (Estby, Freel, Hart, Reese, & Clow, 1994; McMillan, King, & Tully, 2016; Ogden, Culp, Villamaria, & Ball, 2016). The rounds will be described further in Chapter III, Research Methodology.

Limitations of the Study

Limitations have been identified for the study at this preliminary stage. There is a limitation of not having the ability to assign participants to a faith-based course or a community-based course. Furthermore, the biologic measurements are not controlled as they are self-reported by DPP participants to the coaches (i.e., A1C lab values and number of minutes of physical exercise) or measured (i.e., height, weight) by a variety of persons and methods (coaches in the classes, no standard laboratory site used to measure A1C).

Organization of the Dissertation

The remaining chapters in this dissertation include:

Chapter II – Review of the Literature

Chapter III – Research Methodology

Chapter IV – Results and Analysis

Chapter V– Discussion of Findings

In this chapter the background, purpose and significance of this research has been described. Research questions, hypotheses, and term/concepts have been stated. The theoretical framework, methods, and limitations have briefly been described. This dissertation continues with the Review of the Literature in Chapter II.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter contains the literature review for the study. There are seven sections to this chapter: (1) epidemiology and trends in diabetes (DM) prevention, (2) principles of diabetes self-management, (3) religious and spiritual interventions, (4) community and faith-based Diabetes Prevention Programs (DPP), (5) Framework: Biopsychosocial theory with a spirituality model, (6) the Duke University Religion Index, and (7) the Delphi Survey Technique.

Databases used to support this study included CINAHL, Scopus, and ProQuest Health and Medical. Psychology and sociology databases (PsychINFO, Social Sciences Citation Index) were also used to gather information about religion and spirituality trends and interventions in health care from other disciplines. Key search words include: *spirituality, religion, religiosity, spiritual interventions, diabetes self-management, Delphi Survey Technique, Diabetes Prevention Program, faith-based community nursing,* and *Duke University Religion Index.*

Epidemiology and Trends in Diabetes Prevention

Diabetes affects almost 29.1 million people (CDC, 2014) equaling to 9.3% of the U.S. population. Another 8.1 million people do not even know they have diabetes (CDC, 2014). Furthermore, it is estimated that 86 million Americans now have pre-diabetes with nine out of 10 of them not knowing they have it (CDC, 2016a). The yearly progression rate from pre-diabetes to type-2 diabetes is 5% to 10% as compared to 1% per year in the general adult population (Albright & Gregg, 2013).

Addressing the diabetes risk for Americans involves finding solutions for prevention through education, counseling, problem-solving, and on-going support for healthy lifestyle behaviors (Ackermann, 2013). Currently, it is estimated that about 1.4 million Americans are diagnosed with type-2 DM annually and diabetes remains the 7th leading cause of death in the U.S. in 2010 (American Diabetes Association, 2016b). The cost to manage and treat DM in 2012 included $245 billion for diagnosis, $176 billion for direct medical costs, and $69 billion in reduced productivity (American Diabetes Association, 2016b). In the article by Ackermann (2013), he estimates that if the Diabetes Prevention Program (DPP; 12-month curriculum led by trained coaches) could be offered for $300 per person per year, $23 billion annually would be needed to reach the 79 million Americans who have pre-diabetes. Furthermore, it is projected that by 2021, the cost of diabetes prevention and care could rise to $512 billion, or about 8% of the total U.S. health spending annually (Vojta, Koehler, Longjohn, Lever, & Caputo, 2013). The overview, history, and successes of the DPP are presented later in this chapter.

Community organizations, including health care agencies, and congregations have offered health care screening to identify individuals at high-risk for pre-diabetes (Ackerman, 2013). The DPP program needs to be delivered through a variety of local venues, such as schools, churches or other organizations yet maintain the fidelity of the DPP program (Ackermann, 2013; Jain, 2013). Christian churches, of many denominations, have offered various forms of diabetes education (Yeary et al., 2015). Several articles focus on high-risk cultures, such as African-American and Latino, who have higher rates of diabetes nationwide as compared to Caucasian ethnicities (Baig et al., 2015; Gutierrez et al., 2014; Sattin et al. 2016). Diabetes prevention is not a “one-size-fits-all” solution. Approaches to prevention need to be scalable, financially sound, easily delivered, sustainable, and meaningful (Ali, Echouffo-

Tcheugui, & Williamson, 2012; Brooks, 2013). This research may increase knowledge about offering DPP programs using faith-based and community partnerships and add to the literature examining faith-based intervention and venues.

Principles of Diabetes Self-Management

Diabetes self-management education (DSME) involves formal education programs to teach the client life style choices about meal planning, exercise, medications, and to gain the skills and abilities necessary to care for and prevent complications of diabetes (American Association of Diabetes Educators, 2011; Powers et al., 2015). The American Association of Diabetes Educators (AADE, 2011) *Guidelines for the Practice of Diabetes Education* identify seven self-care skills for clients, which are healthy eating, being active, monitoring blood glucose, taking medications, problem solving, healthy coping, and reducing risks. The recommendations include education on healthy behaviors, physical activity, dietary changes, weight loss, setting self-care goals to include sensitivity to cultural and religious beliefs, and financial limitations (AADE, 2011). In this section, education for persons with pre-DM or DM will be described and the outcomes or goals for a person who is trying to control or prevent DM.

Diabetes Education for Clients

Ideally, when a client is diagnosed with diabetes or pre-diabetes, he/she should be referred to diabetes education classes. However, the number of people who attend classes is low. Of the clients with diabetes who have been given a referral for diabetes education, about 50% actually attend classes, and only 16.2% report adhering to the recommended self-management activities (Funnell, 2006; Powers et al., 2015). Recently, the Morbidity and Mortality Weekly Report (MMWR) reported that during 2011-2012, “an estimated 6.8% of privately insured, newly-diagnosed adults participated in diabetes self-management education and training

(DSMT) during the first year after diagnosis of diabetes" (Li et al., 2014, p. 1046). The article by Powers et al. (2015) lists many barriers to educating persons at-risk for and who have diabetes, such as the health care systems (access to care and referral systems), the health care providers (not understanding re-imbursement, not providing follow-up visits in the office), and the clients themselves (social-behaviors factors, cost/co-pays). The role of the health care system, including outreach to the community, is to make the client aware of such resources and encourage them to learn about self-care management to be successful in his/her own care.

Client engagement with health care providers or health education classes encourages diabetes self-care management (Powers et al., 2015). Clients with pre-diabetes and diabetes need to understand that this disease can be managed and that they have control over their life situation and lifestyle choices. The DAWN project (Diabetes Attitudes, Wishes, and Needs) revealed that patients with diabetes felt unsupported and experienced diabetes-related stress in dealing with their diabetes (Skovlund & Peyrot, 2005). The DAWN project surveyed 5,000 people with diabetes and 4,000 diabetes care providers from eight countries. The DAWN project identified and developed several initiatives over the next decade which included training health care providers (doctors, nurses, dieticians, etc.) to increase assessment and integration of psychosocial approaches to treating DM with the ultimate goal of improving self-care management (Skovlund & Peyrot, 2005). These changes were occurring at the same time the DPP program was developing. Many of the education initiatives now focus on the patient with pre-DM or diabetes as a co-member with the health care team.

The results of the DAWN study formulated a "Call to Action" to encourage multiple groups of people (health care providers, patients, family members, payers, policy makers, and industry) to implement person-centered diabetes care (Peyrot et al., 2013). The DAWN2 study,

designed in 2011, surveyed over 16,000 people including health care providers (5,000), patients (9,000), and family members (2,000) from 17 countries focusing on disease management, psychosocial distress, and support and the burden of care using multiple survey tools (Peyrot et al., 2013). The results showed that there have been improvements in care, based on the prior DAWN study, with more programs being implemented in communities, increased education and training of healthcare providers, and implementing strategies to promote person-centered diabetes care.

The DAWN2 study included surveying family members as a cohort which was unique to diabetes research (Peyrot et al., 2013). However, there is no mention of spiritual or religious assessment/tools for diabetes management/support in this large study. Personal spirituality/religiosity may have the effect to increase the individual ability to cope with the distress of chronic disease and feel supported through spiritual interventions, like intercessory prayer, rituals, and scriptures (Cohen, Holley, Wengel, & Katzman, 2012). The DPP course allows individuals at-risk for diabetes to get a "jump start" on life-style management in a supportive group environment with trained coaches, who may be nurses, health care professionals, or lay individuals. In this study, DPP courses may be led by faith-based coaches who may have used spiritual interventions to support diabetes self-care management.

Diabetes Education Outcomes

The outcomes for a person identified as "at risk" for diabetes, with or without being pre-DM, is to prevent getting a diagnosis of DM. Both fasting blood glucose and glycosylated *hemoglobin (A1C)* levels can be used to screen for pre-diabetes and diagnose diabetes. The A1C level tends to be used more because the client does not have to be fasting (CDC, 2014). An A1C level below 5.7% is considered normal. The reading for pre-DM is 5.7 to 6.4%. Greater than

6.4% is considered diagnostic for diabetes. The A1C test is the primary test used for diabetes management and diabetes research (NIDDKD, 2016; National Diabetes Education Program [NDEP], 2014). Ideally, the A1C should be measured every 3 to 4 months to help with management of pre-DM and DM (adjustment of medications, changing eating habits, increasing exercise).

The primary outcome for a person with pre-DM or DM is to reduce or prevent an elevation in A1C. However, this is not an outcome for the DPP. The A1C is a lab test and, there are fees for lab tests. Lab testing can be a barrier to participate in the DPP because of cost and also because coaches do not draw blood or take finger-stick measurements. The information the coach records weekly at the DPP class includes weight and physical activity (in minutes). Weight management and physical activity have been identified as the two main lifestyle changes that can prevent or delay the onset of T2DM (NDEP, 2014). The participants, however, are educated about the A1C levels at the DPP course and are encouraged to bring in their results, if any, to be recorded in the FCND and Health Ministries documentation database.

More than two thirds of Americans are considered overweight or obese. Obesity is considered a chronic condition (NIDDKD, 2017). Carrying extra weight may lead to diabetes and heart disease as well as problems with muscles and joints. The National Institutes of Health defines overweight as a body mass index (BMI) greater than 25 and obesity as greater than or equal to 30 (NIH, 2017). Because obesity is an epidemic in the U.S. and is linked to co-morbidities like DM, hypertension, sleep apnea, to name a few, the NIH funds research and community programs (like the DPP) to help combat this problem (NIH, 2011).

The outcomes for the DPP program are to achieve a measured mean weight loss of 5% to 7% during the DPP program (NDEP, 2014). The original DPP study benchmarking these

percentages is described later in this chapter (DPP Research Group, 2002). To promote the weight loss, the program focuses on diet modification, managing stress, managing social situations, and increasing physical activity to be at or greater than 150-minutes of moderate exercise per week (such as brisk walking) (CDC, 2016c). In 2009, a 10-year follow up of the original DPP study was completed. The lifestyle intervention group reduced the incidence of T2DM onset by 34% and delayed the onset of DM by 4 years as compared to the placebo group. The DPP lifestyle intervention was also cost effective at 10 years (Knowler et al., 2009). Thus, achieving weight loss and maintaining physical activity during the program are goals for the DPP program participants and reported as outcomes for DPP funding.

The final outcome for this study is looking at the number of classes the participants attend. The section later in this chapter describes the DPP program origins and research and discusses several studies that show improved outcomes with increased attendance at the classes (Yeary, Klos, & Linnan, 2012).

Religious and Spiritual Interventions

Spiritual interventions are therapeutic strategies that use a spiritual dimension or religious ritual as a central component of the intervention (Hodge, 2006). Multiple disciplines (nursing, social work, psychology, etc.) have used spiritual interventions for treatment of anxiety, stress, substance abuse, and depression (Goncalves et al., 2015; Hodge, 2006), dementia (Ennis & Kazer, 2013), eating disorders (Richard et al., 2006), and cancer (National Cancer Institute, 2015; Oh & Kim, 2014). Significant outcomes from faith-based programs infused with faith-based rituals, like prayer, meditation, or scripture reading include weight loss and lowered BMI (Resnicow, Taylor, Baskin, & McCarty, 2005), improvement in knowledge about fruits and vegetables and healthy behaviors (Gutierrez et al., 2014), and weight loss with tracking food

intake and consumption (Yeary et al., 2011), to name a few (Campbell et al., 2007; Kim et al., 2008; Ziebarth, 2014).

Other studies indicate in their titles that diabetes self-management classes were held in faith-based or church-based sites. However, that does not mean spiritual interventions have been incorporated in the classes nor has the spirituality of the participants or coaches been factored into the process (Austin et al., 2013; Cené et al., 2013; DeHaven et al., 2004; Sattin et al., 2016; Tang et al., 2014). The coaches for this research included faith-community nurses (FCNs) or congregational health team members who were surveyed as to their use of spiritual interventions utilizing the Delphi Survey Technique (discussed later in the chapter).

Research about spiritual interventions are more commonly designed as qualitative or mixed methods studies. Shores (2014) mailed a questionnaire with six open-ended questions to 112 faith community members, clergy, and FCNs. Interventions listed by community members (n = 35) included (a) giving spiritual care or counseling, (b) facilitating spiritual growth, (c) being present, (d) listening, (e) praying, (f) leading devotionals, and (g) facilitating participation in religious services or activities (Shores, 2014). The clergy representatives (n = 6) described (a) praying with individuals, (b) sharing personal faith in God with others, (c) facilitating forgiveness and grieving processes, (d) instilling hope, and (e) providing spiritual care or support including comfort, care compassion, value, and kindness. The FCNs (n = 11) documented interventions of (a) presence, (b) listening, (c) acceptance of individuals, (d) coping enhancement, (e) touch, and (f) facilitation of religious activities (Shores, 2014). This qualitative study described mostly one-on-one interventions but did include some larger group activities within the church or community.

Yeary et al. (2015) describe in their article the curriculum development of the WORD program (Wholeness, Oneness, Righteousness, and Deliverance) supported by the National Institute of Minority Health and Health Disparities, National Institutes of Health, and collaborating with the Arkansas Center for Health Disparities and the University of Arkansas. Within this article is the development of a proposal created in collaboration with a Faith Task Force (made up of 30 Arkansas churches) who have a 10-year relationship with community leaders, academia, and congregations to strive for improved health in the community. The collaborators created 16 faith-infused sessions based on the DPP program. They linked the weekly topic, with learning and behavioral objectives and described the spiritual approach for that session (Yeary et al., 2015). An example of the topic-linking includes: "Walk with Him": learning objective is identifying new ways to be active; the spiritual message is being called to live in a way that is consistent to "how God tells us to treat the body" (Yeary et al., 2015, p. 68). The WORD program is on-going so results have not been published. However, this article describes how the DPP program can be infused with spiritual themes.

A systematic review by Yeary, Klos, and Linnan (2012) asked the question about which aspects of church-based health promotion might drive health behavior change? An analysis of 67 articles from 1990 to 2008 were reviewed in an attempt to describe key components of church-based health promotion programs (which may focus on smoking cessation, blood pressure management, weight loss, diabetes, etc.). Using process evaluation, the article sought to understand why certain aspects of an intervention were successful, or not, and under what conditions the interventions were successful (Yeary et al., 2012).

Yeary et al. (2012) described seven process evaluation components for church-based interventions which include context, reach, dose delivered, dose received, fidelity,

implementation, and recruitment. In this review, the programs delivered in faith-based organizations were classified into three categories: (1) the site was used for recruitment and a place to hold the program (28% of the articles); (2) whether the congregation was involved in delivering the program OR spiritual elements (51% of the articles); and (3) whether the congregation was involved in delivering the program AND spiritual elements (21% of the articles). More than half of the studies (58%) reported using the congregation members to deliver the program. In 34% of the studies, the congregation members delivered and incorporated spiritual interventions into the programs. From the articles reviewed, 79% of church-based intervention reported outcomes with 21% of the articles not reporting outcomes (Yeary et al., 2012). However, one of the conclusions of this review is that many faith-based/church-based programs are not including process evaluation components. Including stronger evaluation processes may identify what is the influence of spirituality or use of religious rituals which may promote health-behavior change.

Community-Based and Faith-Based Diabetes Prevention Programs

This section of Chapter II will give the history and overview of the DPP development. Next, a description of translation studies from the community and from faith-based organizations will be described. Finally, literature about the role of faith-community nursing in providing diabetes education will be presented.

History and Overview of DPP

A clinical trial was conducted from 1996 to 1999 to answer the research hypothesis: Modification of life-style practices in a group of adults at high-risk for diabetes can prevent or delay the development of diabetes as compared to administration of a diabetes drug, metformin, or a placebo (DPP Research Group, 2002). A 16-lession curriculum covering diet, exercise and

behavior modification was designed to achieve the goals of the program (7% weight loss and at least 150 minutes per week of moderate intensity physical activity, such as brisk walking). The curriculum was taught by nurse case managers on a one-to-one format during a 24-week period which was flexible and individualized. Follow-up monthly sessions were offered to reinforce behavioral changes (DPP Research Group, 2002). The study enrolled an ethnically-diverse group of 3,234 persons without diabetes but who had elevated fasting and post-load blood glucose levels.

The subjects, in this original study, were randomized into a life-style modification group, a placebo group or to the medication (metformin) group. The participants were followed for 2.8 years. The life-style group showed a reduced risk of diabetes by 58% and the medication group 31% lower risk as compared to the placebo group (DPP Research Group, 2002). This study estimated the number of persons who would need to be treated for three years to prevent one case of diabetes during this period is 6.9 for lifestyle intervention group and 13.9 for metformin group (DPP Research Group, 2002).

From this original study, the National Diabetes Prevention Program was developed. Recognition and funding for the program came from H.R. 4124 Diabetes Prevention Act of 2009 which authorized the Department of Health and Human Services (HHS) to develop community-based DPP programs including the awarding of grants to provide funding to support program development and ongoing research (Public Health Service Act, 2009). The National DPP is a community based partnership sponsored by the CDC that is now being implemented across the United States (Albright & Gregg, 2013; CDC, 2016d).

The CDC-led National Diabetes Prevention Program is an evidence-based lifestyle change program for preventing type-2 diabetes. This year-long program helps participants make

realistic lifestyle changes such as eating healthier, promoting daily physical activity, and improving problem-solving and coping skills (CDC, 2016d). Participants meet with a trained, lifestyle coach in a group setting to learn about making lifestyle changes. Sixteen sessions are offered weekly over a 6-month period and then monthly for 6 months. The program can help people with pre-diabetes and/or at risk for type-2 diabetes make achievable and realistic lifestyle changes and cut their risk of developing type-2 diabetes by 58% (Albright & Gregg, 2013; CDC, 2016d).

Currently, over 625 organizations offer the program nationally. The process to become a nationally recognized DPP organization takes about three years to show quality, consistency and broad dissemination of the program for people at risk for type-2 DM (Albright & Gregg, 2013). There are only eight CDC-recognized programs in Michigan but several dozen are in the application process, including Henry Ford Macomb Hospital (CDC, n.d.). Curriculum for the CDC-recognized diabetes prevention life-style change program is listed in Table 2.

Community-Based DPP Courses

The process of translating research into community-based programs is a challenge. DPP programs that are offered in the community need to have sustainability, including funding in the planning/research protocols (Jain, 2013). A majority of insurance companies do not cover diabetes education for people with pre-DM (Mullen, Folker, Dagostina, & Desmond, 2014). It is important, especially for funding purposes, to show measureable outcomes (like weight-loss, lowered glucose, and A1C levels) over time with a focus on feasibility and to evaluate and update programs (Albright & Gregg, 2013).

Table 2

DPP Education Class Topics

Topics Covered in First 6 Months	Topics Covered in Second 6 Months (selection based on group choice and interest)
Welcome to the Program	Fats - Saturated, Unsaturated, and Trans Fat
Be a Fat and Calorie Detective	Food Preparation and Recipe Modification
Three Ways to Eat Less Fat and Fewer Calories	Healthy Eating – Taking it One Meal at a Time
Healthy Eating	Healthy Eating with Variety and Balance
Move Those Muscles	More Volume, Fewer Calories
Being Active – A way of Life	Staying on Top of Physical Activity
Tip the Calorie Balance	Stepping up to Physical Activity
Take Charge of What's Around You	Balance Your Thoughts for Long-Term Maintenance
Problem Solving	Handling Holidays, Vacations, and Special Events
Four Keys to Healthy Eating Out	Preventing Relapse
Talk Back to Negative Thoughts	Stress and Time Management
The Slippery Slope of Lifestyle Change	Heart Health
Jump Start Your Activity Plan	A Closer Look at Type 2 Diabetes
Make Social Cues Work for You	Looking Back and Looking Forward
You Can Manage Stress	
Ways to Stay Motivated	

(CDC, 2016c)

A systematic review was conducted by Ali et al. (2012) describing how DPP programs are translated in to real-life weight loss. Twenty-eight DPP studies were reviewed which met the three criteria of being original research, having more than 50% of the research subjects at high-risk for DM and, finally, that a beginning weight and weight loss achieved were reported. The studies needed to include a goal of 7% weight loss and 150 minutes per week of physical activity. The programs included in the review were mostly held in urban areas offered in community centers, recreation centers, and faith-based organizations (Ali et al., 2012). Of the 2,916 participants who had complete follow-up data while in the DPP, the mean weight loss at

12 months was 4%. Furthermore, it was calculated that for every DPP education session attended during the first 6 months (the core part of the program), there was a 26% increase in weight loss (95% CI, –.54, 0.01) (Ali et al., 2012). This review also showed that programs led by lay community staff had significantly more weight loss (6.9%) as compared to a course led by medical and health professionals (2.6%) (Ali et al., 2012). Overall, the important transferable points for community-based DPP programs is to motivate participants to attend classes and using lay community staff for sustainability and cost savings as compared to using health care professionals as DPP coaches.

As stated above, DPP programs are being offered in many community venues. The United Health Group (UHG) and the YMCA of the USA in collaboration with the CDC sought to develop a model and to design a business plan to provide the DPP program at a lower cost per participant while maintaining program fidelity and focus on established program outcomes (Vojta et al., 2013). The YMCA operates non-profit community centers located in 10,000 neighborhoods across the U.S. with nearly 60% of the U.S. population living three miles from a facility (YMCA, 2017). Furthermore, the program could be provided by trained lifestyle coaches employed by the local YMCA. The United Health Group created a community-based partnership initiative called the Diabetes Prevention & Control Alliance (DPCA). The YMCAs worked with the DPCA which provided the business structure, technology, payment adjudication and data management (Vojta et al., 2013).

In the first 18 months (2010 to 2012), the DPP was initiated in 46 communities in 23 states, with more than 500 trained, lifestyle coaches. Within this time period, 1,723 participants successfully completed the core program (attending an average of nine of the 16 sessions in the first 6 months). At the time the article was written, 1,053 more participants were currently active

in the core program (Vojta et al., 2013). Results showed that 73% of the participants who attend four or more core sessions went on to complete the core program.

The YMCAs were compensated by the DPCA for successful program delivery based on enrollment, program completion, and weight loss of the participants. Fees to attend the program ($400 per participant) were paid by insurance companies or out-of-pocket with a subsidy from a grant from the CDC. Persons who were sponsored by their insurance company achieved 5.22% weight loss by attending 13.01 (out of 16) sessions. The self-pay/grant group achieved 4.77% weight loss and attended 12.36 (out of 16) sessions (Vojta et al., 2013). Again, attendance at the sessions makes a difference in weight loss. Keeping costs low or subsidized is important to motivate and engage participants (Mullen et al., 2014).

Another study was conducted within two YMCA facilities in Indianapolis, Indiana, after the initial development of the UHG/YMCA program was initiated. This randomized trial was conducted to compare the DPP program delivered by the YMCA staff, compared to brief counseling alone, with 92 adults at-risk for diabetes focusing on weight loss self-efficacy (Hays, Finch, Saha, Marrero, & Ackermann, 2014). The study surveyed and invited 7,500 randomly selected households from a 5-mile radius of the YMCAs to attend screening events. All participants received brief instruction (5 minutes) about their diabetes risk and educated about modest weight loss (5-6% of baseline body weight) by calorie restriction and increasing physical activity. Forty-six of the 92 participants were randomly selected to be the intervention group. The intervention group showed increased self-efficacy (developed by attending the DPP) associated with a 5% weight reduction at both 6 months and 12 months (Hays et al., 2014).

The CDC-design of providing the DPP over 12 months (at an average cost of $400, but subsidized) provides a great value as compared to the development of new drugs with the

potential for side effects and complications (Vojta et al., 2013). The group format located within neighborhoods allows for comfortable interaction, discussion, and support. There is also the potential to spread the education locally through other community groups and employers.

The DPP program provides group sessions for participant sharing and learning. This cooperative learning has a positive effect on behavioral and psychological variables, such as regular exercise, portion size control, and becoming an educated consumer by reading food labels (Mullen et al., 2014). Delahanty et al. (2013) described the struggle participants may have had with prior weight loss programs and the repeated failures which has an effect on motivation and self-efficacy. Bishop and colleagues (2013) described that life-style plus the social support provided in the DPP program lead to statistically significantly more weight loss (7.7 pounds, BMI lowered by 2.6) than the control group (0.4 pounds, BMI lowered by 0.2) measured every 6 months for 24 months. (Bishop et al., 2013).

The above section described the history of the DPP program, an overview of how the program is designed and implemented, and some changes that have occurred over the past 15 years. The research has shown that the more classes the participants attend, the more weight that is lost. Another important point is that classes led by lay coaches can be just as successful as those being led by professionals (Ali et al., 2012; Sepah, Jiang, & Peters, 2014). This impacts the fiscal sustainability of the programs relating to training and possible stipends or pay for coaches. Planning needs to include mechanisms for the programs to continue in the community and not having the program as a one-time effort (Albright & Gregg, 2013; Campbell et al., 2007). However, engaging and motivating participants for these programs is a struggle. Even with networks of health care providers to refer clients, they are not attending programs (see discussion above). The research by Vojta et al. (2013) working with the YMCAs discussed how they had to

provide an extensive marketing and promotional campaign in local communities targeting individuals to be screened for pre-DM and to emphasize the convenience of the program offerings.

The second YMCA study, described above, randomly selected 7,500 homes to participate with a yield of only enrolling 92 participants (Hays et al., 2014). The CDC is continually looking to bring more partners into the National DPP so the programs are provided locally (Albright & Gregg, 2013). Thus, including faith-based organizations which have established social networks in the community addresses issues like conveniently located, familiarity of neighborhoods and congregational support. The next few paragraphs describe DPP programs provided in faith-based organizations or by faith-based coaches and their implementation and successes.

Faith-Based Organizations and Diabetes Education

Faith-based organizations (FBO) have been providing health promotion activities for years as part of scriptural edicts, holy readings and the religious institution's common values, history, beliefs, and relationship with a higher power (Bopp, Baruth, Peterson, & Webb, 2013; Pope et al., 2013). These organizations are spread across the country and include multi–racial, multi-generational communities which reach into broad geographic areas. National polls state that 80 to 82% of Americans claim a religious preference (Grammich et al., 2012). From a national survey in 2010, there were about 335,000 religious congregations in the U.S. representing 150 million people. Congregations reporting a Christian/Protestant affiliation total to 300,000 with 22,000 as Catholic or Orthodox denominations (Bopp et al., 2013; Grammich et al., 2012). A recent Gallup poll taken in June, 2016 reported that 89% of Americans believe in God (Newport, 2016). However, a Pew Research Center study from 2015 showed that the number of U.S. adults who do not identify with any organized religion is growing which affects

all regions of the country, across different demographic and racial groups (Pew Research Center, 2015).

The big question is, "What role does one's spirituality/religion play in DM self-management behaviors?" There is a gap in the literature because many health care practitioners do not ask the clients about their spirituality/religiosity at the typical office visit (Duke & Wigley, 2016; Koenig, 2013; Newlin Lew, Argauh, Banach, & Melkus, 2015). Furthermore, nurses rarely discuss spirituality with clients because they are unsure how to raise the topic or are unaware that it could impact the client's engagement with the plan of care (Duke & Wigley, 2016). Studies have found positive associations among physical and mental health and religion/spirituality using many different indicators of health status or morbidity statistics (Cohen et al., 2012; Ellison & Levin, 1998; Levin & Chatters, 2008).

This leads to the discussion about health promotion in churches and religious organizations. Public health efforts have focused on churches and other religious organizations for reaching and recruiting participants for public health programs (Campbell et al., 2007).

Little is known about designing and implementing diabetes programs in partnership with church communities (Newlin Lew et al., 2015). Discovering the impact of faith-based programs versus faith-placed programs is important to capture the impact of spirituality in health promotion.

A literature review done by DeHaven and colleagues (2004) described three types of church-based health programs provided from 1990 to 2000. In their review, approximately 25% of the programs were faith-based versus 35% collaborative and 40% faith-placed (i.e., developed by health professionals outside of the congregation). The review showed that all three models were effective in improving health, but the faith-based programs were less likely to report

outcome data. The study recommends collaborative partnerships to shift the focus to the effectiveness of outcomes rather than program evaluations (DeHaven et al., 2004). Furthermore, there has been a call to build relationships among health care organizations, academia, and community organizations to address DM education in the community (Jain, 2013; Newlin Lew et al., 2015).

The literature about offering DPP courses in faith settings mostly describe the programs whose purpose is to achieve the primary DPP outcomes (5–7% weight loss, increasing physical activity) and many include changes in glucose levels (A1C or fasting glucose) and class attendance (Baig et al., 2015; Gutierrez et al., 2014; Tang et al., 2014). Many of the studies do not have control groups but are mostly cross-sectional studies (Newlin, Melkus, Tappen, Chyun, & Koenig, 2008) or use churches as sites to offer the program as pilot or as a feasibility study (Cené et al., 2013). A few studies which have control and intervention groups describe randomization by church or setting, versus individual participant. Randomization by setting serves to promote the social support between the participants who may be familiar with each other in a specific setting (Baig et al., 2015; Sattin et al., 2016).

Overall, many studies and articles describing diabetes programs or DPP programs do not assess the spirituality of the participants or the coaches. There is limited description in the literature specifically identifying if spiritual behaviors and activities have an impact on the outcomes. A few studies have been done to determine relationships between DM self-management and spirituality based on church attendance or participation in religious activities which enhance feelings of wellbeing and provide some social support (How, Ming, & Chin, 2011; Newlin et al., 2008; Unantenne, Warren, Canaway, & Manderson, 2013). The focus of this

study is important to determine baseline spirituality of DPP participants and coaches and what spiritual interventions may have been used to influence the participant outcomes.

Faith Community Nursing and Health Education

Many churches have faith community nurses (FCN, formerly called parish nurses) and congregational health teams which focus on health promotion and serve as resource to the congregation (Brudenell, 2003; Campbell et al., 2007; Ziebarth, 2014). The congregational health teams may include health professionals, but can include lay members who are committed to health promotion and wellness in their church and community (Gutierrez et al., 2014). Many of the DPP classes, in this study, have FCNs as the coach.

The role of the FCN focuses on strengthening the body-mind-spirit connection using interventions like meditation, prayer, guided imagery, or various rituals of worship (ANA & HMA, 2012). The need for professional support for research and scholarship about faith community nursing has lagged resulting in more descriptive literature of programs provided by FCN but without solid research design and evaluation (Ziebarth, 2014). The majority of the research about church based health programs published in the literature are "program descriptions or did not utilize study designs that allowed for rigorous outcome evaluation" (Campbell et al., 2007, p. 219). The outcome of this research may help to describe the role of the FCN and other faith-based educators in diabetes education.

Framework: Biopsychosocial-Spiritual Model

The theoretical framework for this study is based on the work of Harold Koenig, a physician, who has written and/or co-authored extensively in the fields of mental health, geriatrics and religion with more than 400 peer-reviewed articles, 70 book chapters, and more than 40 books (Duke Center for Aging and Human Development, 2014). The underlying premise

of this framework is based on the Biopsychosocial (BPS) Model but with the added dimension of spirituality (BPS-S). His premise is the importance of spirituality/religion (S/R) as a coping mechanism to encourage researchers to investigate relationships between religious variables and health outcomes (Cohen & Koenig, 2003).

The Biopsychosocial Model states that biological (e.g., genetic predispositions), psychological or behavioral (e.g., lifestyles, explanatory styles, and health beliefs) and social factors (e.g., family relationships, socioeconomic status) and social support are all implicated in the various stages of disease and health (see Figure 1; Hatala, 2013). Western medicine continues to focus mostly on the biomedical model which deals with healing based on the physiological processes in the body. Psychological and social factors dimensions have made an impact in health frameworks over the past 50 years.

In an article by Engel (1977), psychological experiences are described along with social and cultural influences that need to be incorporated in the model to understand the events of disease, illness and health. In the 1970s there was an increased interest in spirituality, healing and wellness that was pushed onto the medical field via popular media like books, magazines, TV, and radio shows highlighted by popular physicians such as Chopra, Dossey, and Benson (Ellison & Levin, 1998). The general public was a player in wellness and spirituality evolution. This influence of spirituality and religiosity on health outcomes prompted the change in the BPS model to the BPS-S model.

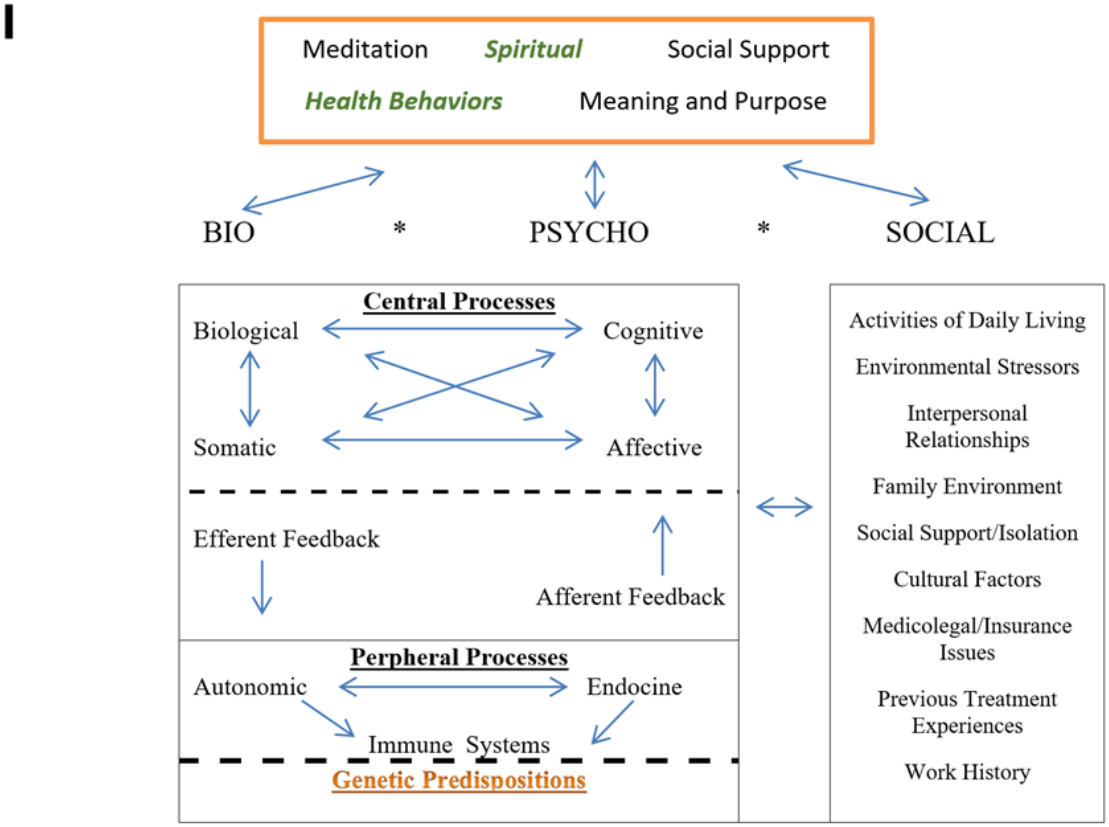

Figure 1. Biopsychosocial-Spiritual Model

Health. Health is more than the absence of disease; it is influenced by social and spiritual factors such as social support, meaning and purpose of life, well-being, optimism and self-esteem (Hatala, 2013; Koenig, 2015). The "spiritual box," in Figure 1, was added on the top of the biopsychosocial model by Hatala (2013). However, other authors have added different spirituality "boxes" onto the model with similar and expanded descriptors like religious coping, spiritual beliefs and practices and religious meetings and church attendance (Taylor, Stotts, Humphreys, Treadwell, & Miaskowski, 2013). There is overlap in the psychological and social dimensions with the spirituality/religiosity dimension, especially in the areas of social support and cultural experiences. When an illness occurs, this tends to disrupt relationships within

families, schools, workplaces, and places of worship (Koenig, 2013). The underlying premise is that health and illness are more than biological/physical manifestations, but includes psychological, behavioral, and spiritual dimensions that embrace the whole person.

S**pirituality.** Koenig identifies that spirituality is present in every person, even those who are questioning whether there is a God or higher power (Koenig, 2013). Many of his writings discuss the difference between spirituality and religiosity making the point that researchers need to define these constructs clearly and distinctly to measure and quantify them when doing research (Cohen & Koenig, 2003; Koenig, 2011). Koenig, who started in healthcare as a registered nurse and then became a physician, states that the terms are used more broadly in clinical practice and that the overlap between the terms may not need to be measured or quantified as precisely (Cohen & Koenig, 2003; Duke Center for Aging and Human Development, 2014; Koenig, 2011, 2012a, 2015).

Religion. The definition of religion, as defined by Koenig, involves rituals, beliefs, behaviors and practices with the goal of facilitating spirituality or a relationship with a Transcendent (i.e., God, Allah, Buddha, or a Higher Power) (Koenig, 2015). Religions also have specific beliefs about life-after-death and rules about conduct in social groups (Koenig, 2012b). He describes at least 16 different aspects of religion: denomination/affiliation, belief/orthodoxy, public religious practices, private religious practices, subjective religiousness, religious motivation, religious well-being, religious coping, religious history, religious support, religious experience, religious attachment, religious giving, religious knowledge, religious growth, and religious quest (Koenig, 2011). From these 16 areas, Koenig developed a simpler, more condensed summary of these major areas into a three-dimensional categorization. The dimensions are:

- *Organizational Religious activity (OR)* – which is measured by asking "How frequently do you attend service?" or attend any other group religious activities.
- *Nonorganizational Religious activity (NOR)* – which is private religious practices, such as personal prayer, reading holy scriptures or listening to religious music or programs.
- *Intrinsic Religiosity (IR)* – is the individual's commitment to religious beliefs and may be measured by subjective or cognitive aspects of religious motivation, for example living the commitment to religious beliefs (Boyle et al., 2014; Koenig, 2011; Koenig & Futterman, 1995).

The definition of spirituality, used by Koenig, describes a person who is deeply religious and lives a life dedicated and surrendered to the Divine or Transcendent (Koenig, 2015). The Transcendent can be God, Allah, HaShem, or a Higher Power (Western religions) or Braham, Buddha, Dao, or ultimate truth/reality (Eastern) (Koenig, 2012b). Examples of famously spiritual people include Mother Theresa, Dr. Martin Luther King, Jr., and Mahatma Ghandi, to name a few.

The concept of spirituality is most often viewed as personal and has a positive influence (Koenig, 2012b). Individuals can define for themselves what, which and how one believes and behaves to be spiritual (Koenig, 2011). This can be difficult to measure because this can be very subjective for each person. However, the "traditional" definition of spirituality is linked or rooted in religious faith or belief with a connection to the Transcendent which is mystical or supernatural and an organized religion that "extends beyond the religion (and begins before it)" (see Figure 2; Koenig, 2012b, p. 46). Being religious, may not mean the person is spiritual if

there is not an intrinsic belief or if it is not reflected in relationships with others, themselves and the world.

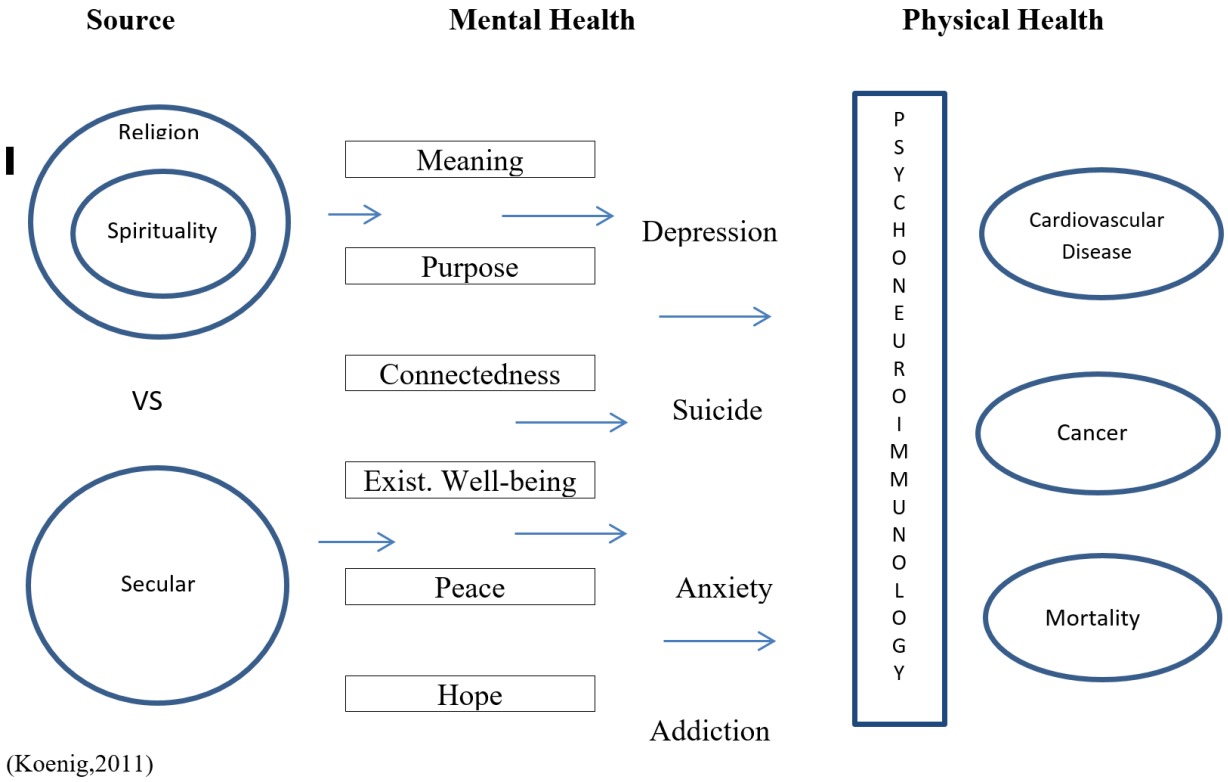

Figure 2. Traditional Historical Understanding

Secular. The other definition in Dr. Koenig's model, which he has added and refined since his earlier writings, is the definition of "secular." Different from both religion and spirituality, secular is a philosophical approach that understands human existence and behavior, but without a relationship to the Transcendent (Koenig, 2011). This concept focuses on the rational-self coupled with human community which can create a source of meaning and hope (Koenig, 2011).

Meaning and purpose. Many studies are involved with measuring the concepts of meaning and purpose. In a review and update on articles about S/R from 2001 to 2010, 45 studies examined relationships between S/R and meaning or purpose with 93% reporting a significant, positive relationship (Koenig, 2015). In the same article, 40 studies examined the relationship between S/R and hope with 73% reporting a significant, positive relationship (Koenig, 2015). The scales used to measure these concepts deemphasize the religion connection and replaced questions with an assessment focus about good mental health and psychological well-being. (Koenig, 2012b). Examples of questions on these scales include "I feel peaceful"; "I have a reason for living"; "I feel a sense of purpose in my life." The main point is the concepts need to be defined and need to be recognized as whether the terms are measuring good mental health or spirituality because the concept is not related to a Higher Power.

Koenig describes S/R and secular beliefs as a "source" of health, positive or negative, but not a cause (2012b). In his model showing the Traditional Historical Understanding of S/R (Figure 2), spirituality is within religion, and thus are viewed as one source as compared to secularism (Koenig, 2011). Increased or decreased S/R, as a source, can impact mental health of a person which may show as meaning, purpose, connectedness, existential well-being, peace, and/or hope (Koenig, 2012b). Lacking, or having difficulty, in any of the six mental health elements, coupled with S/R or secular beliefs, has the ability to influence the development or prevention of depression, suicide, anxiety, addictions (Ellison & Levin, 1998; Koenig, 2011), or physical diseases such as cardiovascular disease, cancer, neuroimmunology imbalance, and even mortality (life or death) (Ellison & Levin, 1998; Koenig, 2012b).

Spirituality has many different aspects such as hope, spiritual coping, coping with illness, values and beliefs, spiritual needs inventories, spiritual interventions, assessment of spiritual

health, and well-being and spiritual support, to name a few. Many of the research studies use several tools to measure these aspects (Selman et al., 2011). In this research study one tool and one method will be used to measure S/R in both DPP participants and coaches. The Duke University Religion Index was developed by Koenig to validate and measure S/R, which is described in the next section. The other method being used is the Delphi Survey Technique to determine spiritual interventions used by coaches when leading the DPP sessions.

Duke University Religion Index

The Duke University Religion Index (DUREL) was first published in the *Journal of Psychiatry* in 1997 to fill the need for a brief, comprehensive, low-burden, non-offensive measure of religiosity (Koenig, Parkerson, & Meador, 1997). The tool has been shown to predict multiple health outcomes in both cross-sectional and longitudinal studies (Koenig & Bussing, 2010; Liu & Koenig, 2013; Boyle et al., 2014). This scale has been translated into 17 different languages and has been used with multiple religions and cultures (Boyle et al., 2014). This section will describe a brief overview of the tool and its development, report several validation studies completed in different languages and cultures and used with samples of people with different health issues.

The DUREL contains five questions that measure three dimensions of spirituality. The overall score range is 5 to 27. However, the tool really consists of three "subscales" with each subscale assessing a particular aspect of religious practice or religious devotion (Koenig & Bussing, 2010). Questions 1 and 2 of the tool were developed during clinical studies using 7,000 people in North Carolina to correlate physical health, mental health and social support outcomes (Koenig, 2011). Question 1 asks about the organizational religiosity (OR) "How often do you attend church, synagogue or other religious meetings?" Responses are on a Likert scale from 1—

more than once a week, to 6—never. The second question asks about the non-organizational religiosity (NOR) and asks "How often do you spend time in private religious activities, such as prayer, meditation or reading the Bible or sacred texts?" Responses range from 1—more than once a day, to 6—rarely or never (Koenig et al., 1997). Lower scores indicate higher religiosity. Scores below three for the OR and NOR characterize high religiosity (Tedrus, Fonseca, Fagundes, & da Salva, 2015). From research completed with DUREL, OR is related to better health outcomes and NOR is related to poorer outcomes (Koenig, 2011).

The final three questions on the index were extracted, by Koenig, from Hoge's 10-item Intrinsic Religiosity (IR) Scale. These three questions measure the more subjective dimension of personal religiosity. In one study, Hoge's IR scale was found to have a strong correlation with minister's judgments ($r = 0.585$) (Hoge, 1972). A second study, using 85 ministers from 18 Christian denominations and two Jewish groups, showed the Hoge's IR scale was able to predict responses from intrinsically religious persons (Liu & Koenig, 2013). These three questions ask the person to mark how "true" the statement is related to experiencing the Divine, if the person's approach to life is based on religious beliefs and the influence of religion in daily living. These statements are rated on a scale from 1—definitely true, to 5—definitely *not* true (Koenig et al., 1997). Psychometric characteristics of the DUREL have been established measuring reliability, Cronbach alpha coefficient ranged from 0.78 to 0.91 across multiple studies and samples (Boyle et al., 2014; Koenig & Bussing, 2010).

Both the Hoge IR Scale and the DUREL were used with a community-based sample of 1,039 adult Chinese women in rural China to assess S/R in non-Western, non-Christian societies. Reliability tests were performed on the two scales which showed statistically significant

correlations between the two scales ($r = 0.80$, $p < 0.001$) and mental health outcomes (scales measuring suicide ideation, depression, anxiety, and life satisfaction) (Liu & Koenig, 2013).

The psychometric properties of the DUREL were used in Brazil, translated into Portuguese, with a group of 383 very low-income community adults who were experiencing headaches. This sample of mostly women (74%) with a mean age of 41.7 (*SD* 8.5) years were recruited from a medical clinic. The DUREL Intrinsic scale correlated with the DUREL total scores demonstrating high internal consistency (coefficient alpha total scale 0.733, IR scale 0.758) (Lucchetti et al., 2012). The researchers stated the scale was well accepted and easily completed by this population. Although this study did not correlate the findings with any health outcomes, the study validated the subscales (OR, NOR, IR) in the translated version with other studies conducted in English (Koenig et al., 1997; Storch et al., 2004). This demonstrated the ease of use with low-income populations in several cultures.

Original testing and development of the Index was used with persons with depression (Koenig et al., 1997). Further research with the DUREL has been used to correlate health outcomes with S/R. The impact of S/R has been identified to reduce or prevent smoking reported by elderly, southern U.S. adults and positively affect (increasing) leisure-time activities (Roff et al., 2005). Spirituality, and not religiosity, improved adherence with taking medications for hypertension in a group of adults in Ghana (Kretchy, Owusu-Daaku, & Danquah, 2013). IR and NOR were higher in persons with seizure disorders in Brazil as compared to controls, and that different types of seizures were predictive of high OR and high NOR was correlated with controlled seizures (Tedrus et al., 2015). No studies were found that used the DUREL with a population of adults with diabetes, pre-diabetes or programs providing the DPP.

Delphi Survey Technique

The qualitative method to be used in this research is the Delphi Survey Technique (herein called Delphi) to identify and gather information about spiritual interventions used by DPP coaches. This technique was mainly developed by the Rand Corporation in the 1950s as a method for achieving convergence of opinion and decision making concerning real-world knowledge solicited from experts within certain topic areas (Estby et al., 1994; Hsu & Sanford, 2007). The Delphi is a multistage, self-completed questionnaire with individual feedback. The stages, called rounds or iterations, allow every participant to complete a questionnaire which is returned to the researcher who collects, edits, and returns a new questionnaire back to the same participants. The feedback process allows and encourages the participants to reassess their initial judgments about the information provided in prior iterations (Hsu & Sanford, 2007; Procter & Hunt, 1994).

The number of rounds in the Delphi is dependent on the level of dissention expected on the topic. This can be modified depending on the results from the prior round. Three rounds are often enough to collect the needed information to reach a consensus in most cases (Hsu & Sanford, 2007). Using two rounds has been shown to decrease panel attrition (Estby et al., 1994; McMillan et al., 2016; Ogden et al., 2016).

The survey participants are called “experts” in the area to stress the fact that the Delphi is not an opinion poll and the views shared may not be the views of the general population (Proctor & Hunt, 1994). In fact, there are no exact criteria in the selection of the participants who are considered eligible to participate. If the group, or persons, have somewhat related backgrounds and experiences concerning the target issue and are capable of contributing helpful insight into the issue at hand, they can be an “expert” (Hsu & Sanford, 2007). This research includes a group

of about 10 coaches, who are considered to be a "panel of informed individuals," to develop consensus (Hasson et al., 2000; Procter & Hunt, 1994). The goal is to have at least 70% of the faith-coaches complete both rounds of the Delphi (Hsu & Sanford, 2007). There will be two rounds of questionnaires used, via electronic format (e.g., Survey Monkey). The rounds are described further in Chapter III, Research Methodology.

Data analysis involves management of qualitative and quantitative data. The first round of the Delphi often involves qualitative, content analysis techniques. Data collected during this first round may be grouped based on terms or ideas to develop a universal description (Hasson et al., 2000). These ideas or terms are listed on the questionnaire for the second round. The second round involves asking the participants to review the summarized items and then to rate or rank-order the items given based on using a Likert scale. It is suggested that 70% of the participants need to rate the items at a 3 or higher on a 4-point Likert scale with a median of 3.25 (Hsu & Sanford, 2007).

The Delphi Technique has been used in various fields such as program planning, needs assessment, policy determination, and resource utilization (Hsu & Sanford, 2007; Ogden et al., 2016). In 1994, Procter and Hunt used the Delphi to develop a definition of professional nursing practice to analyze nursing workload in England. This study used two iterations of which the first round consisted of three patient care scenarios of high, medium and low acuity/dependency for which the participants (n = 113) had to identify the care needs of each patient profiled in the scenario. From the first round, the researchers developed a list of "aims of care" (total 377 aims identified) which were listed on the second-round questionnaire along with two boxes next to each "necessary" and "not necessary." The participants were asked to check the box appropriate for the patient profiled (same three profiles were used). They had a second-round response rate

of 88% which was high for a postal (mailed) questionnaire. Eighty percent of the participants considered 327 aims of care necessary for the three profiles of care acuity used (Procter & Hunt, 1994). The authors stated that the research provided a foundation for a definition of professional nursing and identified basic care needs of patients which reflected aims of nursing care and needs for different staffing (Procter & Hunt, 1994).

The Society of Cardiovascular Anesthesiologists used the Delphi to create a universal checklist of steps to aid anesthesiologists in patient separation from cardiopulmonary bypass (CPB; Ogden et al., 2016). Participants were invited by email (n = 3,350) to volunteer for this research which used four rounds of questionnaires. A small stipend was provided for the first 90 participants who completed all four rounds. In the first round, the participants were provided a list of 28 tasks that may be necessary to prepare a patient for separation from CPB. The participants could accept, delete, or modify each item and submit new tasks. In round two, a new longer list of tasks was sent to 90 experts for them to rate each item on a 5-point Likert scale to denote “least essential” (ranked 1) to “most essential” (ranked 5). Average ratings for each task were calculated and returned to the participants for round three.

In round three, the participants reviewed their prior ratings and compared them with the group’s average rating (Ogden et al., 2016). Again they could modify or change their answers using the same Likert scale. Basic descriptive statistical analysis was completed for round three results. Any tasks not meeting the pre-determined criteria of a mean =/> 4, mode =/> 4 and standard deviation (*SD*) =/< 1.0 were eliminated from the checklist. The fourth round returned the checklist with the same Likert scale rating but the analysis increased the criteria of the mode =/> 5. The process expanded the original checklist with 28 items to 49 items and identified 10 items that were deemed universally essential for safe separation from CPB (Ogden et al., 2016).

The Delphi promoted consensus building within a group of experts to promote patient safety. The current research study used the Delphi as a method to get input about spiritual interventions used in group settings to promote positive health outcomes in DPP sessions.

Conclusion

In conclusion, this chapter has described the epidemiology and trends in DM prevention, along with principles of diabetes self-management. Religious and spiritual interventions as well as research has been described and an attempt to describe the differences between community and faith-based Diabetes Prevention Programs. The Biopsychosocial-Spiritual Model based on the work of Dr. Harold Koenig was described and displayed. Finally, the tools to be used for this study with examples of use for the Duke University Religion Index and the Delphi Survey Technique were described. Chapter III describes the methods used for this research study.

CHAPTER III

RESEARCH METHODOLOGY

The focus of this study is to explore if there is a relationship between a modified educational intervention (DPP) for individuals with pre-diabetes (pre-DM) or type-2 diabetes (T2DM) with variables of spirituality and religiosity (S/R) related to participant outcomes of weight, BMI, A1C, and physical activity. Spirituality and religiosity were assessed (using the Duke University Religion Index [DUREL]) with all participants and coaches who lead the DPP course. Additionally, the faith-based coaches were surveyed using the Delphi Survey Technique about what spiritual interventions or practices they used in the DPP classes. These results were analyzed to determine if there was a relationship with participant glycosylated hemoglobin (A1C), weight, body mass index (BMI), and physical activity.

This chapter will include methods and procedures used to test the hypotheses. The chapter begins with a description of the study design including variables with operational definitions, the research questions, and hypotheses. The research setting, sample population, data collection procedures, and instruments will be described next. Finally, a description of the statistical analysis of the data and protection of human rights will conclude the chapter.

Research Design

This study is a mixed-method design focusing on S/R of coaches and participants involved in DPP courses held in Macomb County, Michigan. The quantitative portion of the study is quasi-experimental using a cross-sectional assessment of S/R of all coaches (faith-based and community) and the participants in the DPP who have completed the core classes (weeks 1–

26) using the Duke University Religion Index (DUREL). The qualitative portion of the study includes using a two-round Delphi Survey Technique to survey faith-based coaches about spiritual interventions used while leading a DPP class after completing the core classes (weeks 1–26). The intervention group included DPP courses led by the faith-based coaches (nurses or para-professionals). The control group included DPP courses led by community-based nurses, health professionals or other para-professionals.

These results were analyzed to determine if there was a relationship between type of coach-led course and the report of S/R had an association with changes in participant A1C, weight, BMI, and physical activity. Data collection began after Institutional Review Board approval from Western Michigan University and Henry Ford Health Systems.

Variables

Background/demographic information was obtained from the DPP coaches which included the following: age, gender, ethnicity, employment status and education level, compensation for conducting a DPP course, religious denomination and membership, and the score on the DUREL subscales. The demographic data obtained from the DPP participants included the following: age, gender, race, ethnicity, education, employment status, insured status, type of diabetes, prior DM education, religious denomination and membership, class attendance, setting of class, and scoring on the DUREL subscales.

Operational Definitions

Independent Variables

Independent variables include the type of coach (faith-based or community-based) leading the DPP course. The control group is the courses led by community-based coaches and the intervention group is the courses led by faith-based coaches.

Faith-based coach. These coaches may be registered nurses or lay persons who serve on a congregational health team who are committed to health promotion and wellness in their church and community. These persons may be paid or unpaid and are trained to be coaches. There may be other health professionals within a church (social worker, dieticians, psychologists, etc.) that are on the congregational health team and can be trained to be a DPP coach. A registered nurse who completes specialized training to become a Faith Community Nursing (FCN) may hold a certification through the American Nurses Association (ANA & HMA, 2010; Ziebarth, 2014). Henry Ford Macomb Hospital–Faith Community Nursing Department (HFMH-FCND) provides faith-community nurse training which includes 40 hours of in-class training as well a mentoring period and pastoral support within their congregation (A. Brown, personal communication, September 16, 2016).

Community-based coach. These coaches may be a registered nurse, other health care professionals, or a lay person (para-professional) who is interested in health promotion who are either paid, receive a stipend or are unpaid. Community lay coaches have a unique connection to the community and often live within the community they serve (Ali et al., 2012).

Training of all coaches must be provided by master-DPP trainers. The training for the Macomb County coaches was funded through the Michigan Department of Community Health grant monies (from Greater Detroit Area Health Council and HFMH-FCND). For organizations who are seeking National DPP Recognition status through the CDC, the programs they offer must have coaches trained by Master Trainers using the CDC-approved curriculum. HFMH is seeking the National DPP Recognition status.

The coach training is a two-day, in-person training which involves small group, hands-on practice about how to implement the DPP course (CDC, 2016e). The training also provides the

most up-to-date information about the DPP and the Recognition Program. Nurses and other health care professions may receive continuing education credits for attending (Emory University, 2016). Computer training for the coaches to learn how to enter the grant-required data into the Faith Community Network Department (FCND) and Health Ministries documentation database was provided by HFMH-FCND database support specialist (M.H.) and the director of the FCND (A.B.) prior to beginning the first DPP class.

Spirituality/religiosity variables. Assessment of S/R was determined by the score on the Duke University Religion Index. Approval to use the scale was not required by Dr. Koenig who created the scale, but an email was sent informing him of the use of the scale for this study at Harold.Koenig@duke.edu. The five-question scale contains three subscales that measure the following constructs: (a) organizational religious activities such as going to church or worship services or attending meetings (OR); (b) non-organizational religious activity such as prayer, meditation, and reading scriptures (NOR); and (c) intrinsic religiosity, such as how a person lives one's life based on religious beliefs (IR; Boyle et al., 2014).

Dependent (Outcome) Variables

The dependent variables for this study include weight change (including change in BMI pre- to post-core program), weekly physical activity (self-reported weekly during the last four classes attended, average of minutes), and A1C (either self-reported or received from medical record request). The National DPP Recognition Program (see Chapter II, Review of the Literature) requires organizations to report weight change and minutes of physical activity to qualify for the DPP Recognition Program with the goal of 5% to 7% weight loss and 150 minutes of moderate physical activity per week (Albright & Gregg, 2013; CDC, 2015).

Glycosylated hemoglobin (A1C). The A1C is a blood test reported as a partial determination of diabetes control status. This study measured the difference from session one of the program to post core (weeks 1– 26). In a person diagnosed with diabetes, the A1C level is ≥ 6.5% (48 mmol/mol). The A1C range for pre-diabetes is from 5.7 to 6.4% (39 mmol/mol to 46 mmol/mol) (Handelsman, 2015; Heianza et al., 2012). Per the program guidelines, these can be self-reported by the participants to the coaches who record them. A1C levels should be checked every 3 to 4 months. There is no blood testing done at the DPP courses.

Body mass index (BMI). BMI is calculated as weight (kg)/height (m^2). This figure was automatically calculated once the height and weight were entered into the FCND and Health Ministry documentation system. Overweight and obese measures are defined as a BMI over 25 kg/m^2. Participants with a BMI >24.9 kg/m^2 were included in this study (Mahan & Escott-Stump, 2008). BMI was analyzed for change from pre- and post-core (weeks 1–26).

Weight. DPP participants were weighed by the coaches in a private area at the beginning of each class. The coaches then documented this in the FCND and Health Ministry documentation database. Each site has its own scale. The participants were encouraged to take off their shoes and any heavy outer clothing prior to getting on the scale. The figure to be analyzed was the percent of change from the first class to the completion of the core program (weeks 1–26). The goal for the DPP is 5% to 7% weight loss over the 6-month period (CDC, 2016b).

Physical activity. Each participant kept a weekly log of their minutes of physical activity. This weekly activity was reported to their coach to be recorded in the FCND and Health Ministries documentation database by the coach. The goal for the program is to have participants exercising at least 150 minutes weekly (CDC, 2016a). In the American Diabetic Association

Guidelines (ADA, 2016a), physical activity should be of moderate intensity (i.e., brisk walking to achieve 50–70% of maximum heart rate). Session five and session six in the DPP program discuss the goal and plan for participants to get active. They should start with 60 minutes the first week (broken in to manageable time frames, 10 to 15 minutes per day) and plan to gradually increase to 150 minutes per week (Diabetes Training and Technical Assistance Center [DTTAC], 2012). The average minutes of physical activity during the last four weeks of attendance was used to determine if the participant met the goal of 150 minutes per week. This was statistically reported as achieving the goal—Met or Not Met (dichotomous).

Co-Variables

Session attendance. Participants were invited to participate in this study if they attended at least four sessions during the core program. Measuring session attendance is based on the recommendations of the National DPP. There are a total of 24 sessions for the entire 12-month program. The core part (weeks 1–26) provides 16 sessions, and the maintenance part (weeks 27–52) provides six monthly sessions (see Table 1 topic list for core program sessions located in Chapter 1). The literature supports that there is a "dose effect," meaning the more classes participants attend, the more successful they are in achieving goals (i.e., weight loss, reducing A1C, and increasing physical activity) (Albright & Gregg, 2013; Ali et al., 2012). The National DPP program counts attending four out the 16 core sessions as an active participant in the program (CDC, 2015).

Demographic variables. The demographic variables listed above were also factored into the analytical model to determine any relationship on the dependent variable.

Research Questions and Hypotheses

The *overarching question* for this study asked: Is spirituality/religiosity (S/R) correlated with improved health outcomes for individuals diagnosed with pre-diabetes and T2DM who attend faith-based DPPs? Five *defining research questions* were developed to further explore the overarching question which included:

1. In a group of both faith-based and community-based DPP coaches, what was their perceived measure of S/R, if any at all?
2. In a group of adults attending a faith-based DPP, what was the correlation with S/R, if any at all, on the participant outcomes for the following variables: weight loss, A1C, BMI, and degree of physical activity?
3. In a group of adults attending a community-based DPP, what was the correlation with S/R, if any at all, on the participant outcomes for the following variables: weight loss, A1C, BMI, and degree of physical activity?
4. What does a comparative analysis of S/R between the participant outcomes for faith-based and community-based DPPs indicate across the following variables: weight loss, A1C, BMI, and degree of physical activity?
5. What does the application of the Delphi Survey Technique reveal in terms of establishing the relative importance of spiritual interventions upon participants attending a faith-based DPP course?

Hypotheses

The hypothesis being tested for the overarching question and questions 2, 3, and 4 is: Participants who attend a faith-based DPP course will show a greater improvement in reducing

hemoglobin A1C, weight, BMI, and increased physical activity than participants who attend the community-based DPP program.

The hypothesis to test *question 1* is: Faith-based coaches will report greater S/R as compared to community-based coaches.

There is no hypothesis for *question 5* as it is not predicting a relationship or change but is a description for the qualitative data collected on spiritual interventions.

Setting and Sample

This research is a mixed-methods design that included a cross-sectional method to survey DPP participants and coaches about the variables of S/R. This also included a survey of the faith-based DPP coaches who agreed to complete the Delphi Survey about spiritual interventions used while leading a DPP course. The Delphi Survey is considered a qualitative tool.

Setting and Recruitment

To obtain a sample for this cross-sectional method, all DPP coaches and participants who were participating in courses coordinated by Henry Ford Macomb Faith-Community Nursing Department (FCND) were invited to participate. The first DPP classes began in September of 2015. The coach names and locations of the DPP course were obtained from the FCND and were coordinated with the web services specialist (M.H.) within the department. The participants and coaches were surveyed either by email (via a Survey Monkey platform) or in person at the DPP class if a participant did not have access to email.

Inclusion criteria. Inclusion criteria for the coaches and participants included being at least 18 years old and having completed the core program (weeks 1–26) of the DPP. To be invited into the study, participants needed to have attended at least four of the 16 core sessions.

Participant recruitment. Participant recruitment for the courses was coordinated by HFMH-FCND. The FCND collaborated with several insurance companies, like Health Alliance Plan (HAP), for referrals to programs in Macomb County. Henry Ford Macomb Hospital also used their current clinic and physician office network for referrals. Sites where courses were being offered at the time of the survey included four faith-based sites, two work sites, seven community sites, two medical clinics, and one university site. Additional sites continued to be added. The goal for the program project manager is to qualify 20 to 25 persons to join each course. Participants were not compensated for their participation and the course is offered with no cost or fees. Participants self-selected which DPP course they wanted to attend after being informed of locations and times of the course offerings.

Macomb County residents learned about the DPP courses from their primary care provider, their insurance company, advertisements or by a friend or relative. The focus of the program is to identify and work with persons who are at risk for developing diabetes, but people with T2DM can also attend (CDC, 2016a). To be enrolled in the program, attendees were screened for pre-diabetes or have Type-2 diabetes with a BMI over 25. At the first class, all participants completed a pre-diabetes screening questionnaire (see Appendix A) developed by the CDC. A score of 9 or more indicates that the person is at risk for pre-DM which qualifies the person to join the course. The score for the screening is based on the CDC recommendations to screen for pre-diabetes (CDC, 2016a).

Participants who attend a DPP course sign a “good-faith” agreement which specifies that they will work cooperatively with the coaches and fellow group members. This agreement encouraged them to honestly participate in the DPP program, such as doing the required self-recording, about diet and exercise, and providing information required for the grant reporting and

outcome measures (i.e., weight, BMI, A1C, and minutes of activity per week). Other behaviors included staying in contact with their coach, for example, if they cannot attend a class. The forms that the participants filled out at the first DPP session ask for contact information, such as an email address and phone number as well as baseline demographic data.

Coach recruitment. The second part of the mixed-method design included using a two-round Delphi Survey Technique with the faith-based coaches to determine spiritual interventions that may have been used in the DPP course (see Instrumentation section below). The faith-based coaches were invited to participate in the study after the course they are leading had completed the core part of the program (weeks 1–26).

The student investigator (SI) was invited by the DPP project manager, who works for the Faith Community Nursing Department, to give a brief overview of the research concept in-person to the DPP coaches group at the quarterly coaches meeting in September 2016. However, the SI was unable to attend due to work obligations. So the project manager suggested the SI prepare a brief overview of the study via an audio PowerPoint. No individual contact was made with any of the coaches by the SI. The SI feels very fortunate that the Faith Community Nursing Department is embracing this research project.

Recruitment of coaches was coordinated by HFMH-FCND. The coaches received training to lead a DPP course as required by the National DPP program (CDC, 2016e). The fee for the training was paid for by grant monies. The training is a 16-hour in-person small group education session. In addition, the coaches attended a 2-hour training led by the director of the FCND to learn how to enter participant information into the FCND and Health Ministries documentation database.

Sample Size

The anticipated sample size for the DPP participants was estimated to be 40 in the intervention (faith-based) group and 40 in the control (community-based) group. At the time of the study, there were about 10 DPP courses in progress at various stages throughout Macomb County at various locations, both faith-based and community-based.

The anticipated sample size for the coaches was estimated to be 20 coaches. However, as courses are being added, more coaches may be available to complete the survey. It is estimated that half of the coaches (n = 10) will designate themselves as faith-based coaches. The coaches were eligible to participate in the study after their class completed the core part of the DPP (weeks 1–26) which was determined by the DPP project manager who monitors course progress.

Data Collection

Procedures

After IRB approval from Western Michigan University and Henry Ford Health Systems, a list of coaches and participants with emails was requested from FCND. The student investigator, S.L., worked with the FCND web-services specialist (M.H.) and the DPP project manager (M.G.). Using the email addresses, the coaches who had completed the core part of the DPP (weeks 1–26) and participants who attended at least four out of 16 sessions in the core part of the DPP were invited to participate using the SurveyMonkey format.

An affiliation letter from Henry Ford Macomb Hospital to participate with the primary and student investigator from WMU in this research can be seen in Appendix J. Because of this agreement, the DPP participants and coaches who have completed the core part of the DPP (weeks 1–26) received an email from the Faith Community Nursing Department to invite them to participate in this research (see Appendix I).

DPP participants. DPP participants who had attended at least four of the 16 sessions in the core part of the DPP (weeks 1–26) were sent an invitation email to participate in the study from the Faith-Community Nursing Department (Appendix I). Attendance information was determined by the FCND web services specialist using the FCND Documentation and Health Ministries database. The email included a "link" which the invitees would "click" which electronically moved them to the SurveyMonkey platform. By clicking the link, the participant indicated interest in finding out more about the study (see Appendix C).

The consent to participate was on the first page within the SurveyMonkey platform. After reading the consent, if they chose to participate, the DPP participant who clicked "Yes" to the statement "I agree to participate in the study" moved forward to page two containing the questionnaires. If they clicked "No" to participating in the study, this provided an exit out of the survey and thanked them for their time.

Page two of the survey contained the demographic questionnaire. The study participants completed the demographic section (see Appendix C) and the Duke University Religion Index (DUREL; see Appendix F) survey. This took approximately 10 to 15 minutes to complete.

There was a need to send email reminders to the DPP participants who did not respond to the first invitation email. The participants were given 7 days to respond. A repeat email and consent were sent after 7 days from the original email, then 14 days and 21 days. If there was no response after 21 days, the participant was dropped as part of the survey pool and no additional email notifications were sent.

If 80% of the participants in a particular DPP course had an email contact, the researcher did not contact the other 20%. However, if more than 20% had no email contact, the researcher worked with the DPP project manager and coach for that particular course to arrange a good time

to visit the class. The script for this face-to-face interaction is in Appendix C. The estimated time for the SI to address the class in-person was 5 minutes. If they were interested in participating, the consent and questionnaire/survey was provided in a manila envelope to ensure participant confidentiality and given to the coach to pass out. The SI researcher stepped out of the room while participants read the consent and completed (or did not complete) the questionnaire. The time to complete the participant questionnaires was about 10 minutes. The participants placed the completed consent and questionnaire back in the manila envelope, sealed it, and returned it to the coach who gave it to the researcher.

The consent obtained from the DPP participants specified the outcome data (weight, BMI, AIC, and minutes of physical activity) pre- and post-core (weeks 1–26) to be obtained, as well as the number of sessions attended. The SI worked with the FCND web-services specialist from the FCND Documentation and Health Ministries database at the FCND offices in Clinton Township, Michigan. The data provided to the SI was in an Excel spreadsheet format and saved to the One-Drive, an encrypted-cloud memory space provided by HFMH, which can be uploaded into an SPSS file for analysis. The biological data were used to determine if there was a change in values from the start to the end of the core part of the DPP.

Participants were sorted by the DPP course they attended, which was classified as having a faith-based coach (intervention group) or community-based coach (control group). The SI was given the participant case number assigned in the database by the coach in order to locate the participant's outcome data in the database. To maintain HIPPA standards, the demographic survey and outcome data were assigned a code number by the SI to analyze the data. The code numbers were stored via a password-protected computer and the One-Drive encrypted cloud

space kept in the possession of the SI in a locked cabinet in her home (also see HIPAA paragraph under Protection of Human Rights section below).

DPP coaches. The DPP coaches received an email invitation to participate in this research from the FCND (Appendix I). Within the email there was a "link" which the invitees "clicked" which transferred them to the SurveyMonkey platform to participate in the study. The first page contained the consent form. After the coach read the consent (Appendix B), if they chose to participate, the DPP coach who clicked "Yes" to the statement "I agree to participate in the study" moved forward to page two containing the questionnaires. If they clicked "No" to participating in the study, this exited them out of the survey and thanked them for their time.

Coaches who agreed to participate completed the demographic survey (Appendix D) and the DUREL survey of S/R (Appendix F). Following the DUREL survey, the coach clicked "NEXT" to move them to the screening question. This question allowed the coaches to self-identify as faith-based coaches, who then continue to the Delphi Survey. The screening question is as follows: "Have you been trained as a Faith Community Nurse or, are you part of a congregational (church/religious) health team participating as a coach for a Diabetes Prevention Program for your congregation or a local congregation in your area?" A "Yes" response to the question moved them to the next page to complete the Delphi Survey (see Appendix G). If they answered "No" to the question, this response moved them to an exit page where they were "thanked" for participating in the research and then released to exit the survey. Total time to complete the demographic survey, the DUREL, and the screening question was 10–15 minutes.

The faith-based (FB) coaches who answered "Yes" to the screening question participated in two additional data collection points for this study. The community-based coaches who

answered “No” to the screening question did not complete the Delphi Survey and thus were excluded from completing the Delphi Survey.

A description of the two-round Delphi Survey was provided on the next page of the SurveyMonkey which included a description of the purpose and gave instructions for completion of the survey. In the first round, the Delphi Survey included a list of 10 spiritual interventions (see Appendix G). The FB coach indicated if they had used any of the interventions with an individual, with the group, or both by “clicking” a box next to each item. There is an open comment area after the list of 10 spiritual interventions for the coach to identify any other spiritual interventions which they may have used while conducting the DPP course. They may also use the comment area to expand on any of the interventions listed. Completion time for the first round of the Delphi Survey was approximately 10 minutes.

There was a need to send email reminders to the FB coaches to complete the first round of the Delphi Survey. Coaches were given 7 days to complete the first round. A repeat email and consent was sent after 7 days from the original email, again at 14 days and 21 days. If there was no response, the coach was dropped as part of the survey pool and no additional email notifications were sent.

The second round was emailed via the SurveyMonkey platform after the researcher collected, collated answers, and analyzed the data from the first round (see Appendix G). It was estimated that there may be a 3- to 4-week period to receive feedback on round one from the coaches. The researcher completed the analysis and then developed the follow-up round. Those interventions which are marked by 50% of the coaches were placed in the second round along with other interventions identified (written by the coaches) on the first-round survey.

The second round of the Delphi Survey invites the coach to rate, based on a Likert-type scale, the importance of using spiritual interventions in a group setting. It was estimated that 10 FB coaches would need to be surveyed as "experts" to develop a list of the type and frequency of spiritual interventions used. Completion time for the second round of the Delphi Survey was approximately 10 minutes.

There was a need to send email reminders to the FB coaches to complete the second round of the Delphi. Coaches were given 7 days to complete the first round. A repeat email and consent was sent after 7 days from the original email, again after 14 days and 21 days. If there was no response after three attempts, the coach was dropped as part of the survey pool.

The demographic and survey data were assigned a code number to connect survey responses to each coach. The code numbers were stored in a password protected database and One-Drive encrypted cloud storage accessed via the SI computer and kept in the possession of the SI in a locked cabinet in her home.

Duration of the study. The duration of the study was 4 to 5 months based on the number of DPP courses which had completed the core portion of the program and the response rate of the coaches and participants to three requests for survey completion.

Instrumentation – Survey Tools

Duke University Religion Index (DUREL)

Both coaches and participants were surveyed about their spirituality/religiosity using the *Duke University Religion Index*. This is a five-question quantitative survey that contains three subscales:

Q1. Organizational religious activity (OR) – one question about frequency of attendance at religious services or meetings;

Q2. Non-organizational religious activity (NOR) – one question about frequency of private practices, such as prayer or meditation; and

Q3, 4, and 5. Intrinsic religiosity (IR) – three questions about the importance of spiritual beliefs in daily living.

Response options for questions 1 and 2 are on a 6-point Likert scale from 1—rarely or never, to 6—more than once daily. Response options for questions 3 to 5 are on a 5-point Likert scale from 1—definitely not true of me, to 5—definitely true of me. This brief scale includes three distinct measures of S/R, or subscales, making it easy to administer. Cronbach's alpha coefficient, an indicator of reliability of the questionnaire, is 0.85 (Koenig & Bussing, 2010; Koenig et al., 1997; Piderman, Schneekloth, Pankratz, Stevens, & Altchuler, 2008).

Delphi Survey Technique

The second instrument used is the *Delphi Survey Technique*. A two-round Delphi Survey design was used to obtain consensus about spiritual interventions used in the DPP classes by FB coaches. The Delphi Survey is a multistage, self-completed questionnaire with individual feedback. This research used a group, or panel, of at least 10 coaches, who are considered to be a "panel of informed individuals," to develop consensus (Hasson et al., 2000; Procter & Hunt, 1994).

The two rounds of questionnaires were provided via electronic format (SurveyMonkey). The number of rounds is dependent on the level of dissention expected on the topic and can be modified depending on the results from the prior round. In most studies, two rounds are used to decrease panel attrition (Estby et al., 1994; McMillan et al., 2016; Ogden et al., 2016; U.S. Department of Health and Human Services, 2016). For this study, two rounds were used.

First round. This round included a list of 10 spiritual interventions developed from faith-based resources, the FCND and Health Ministries documentation system and nursing literature (Cavendish et al., 2003; Newlin, Dyess, Allard, Chase, & Melkus, 2012; Sanders, 2016; Yeary et al., 2015). The coaches identified (checked-off) which interventions they may have used in their DPP classes either in a group format or with an individual participant or both. They, also, were asked for comments about the listed interventions and suggestions of other interventions they may have used. This round was analyzed by totaling the most frequently used interventions by the majority of the coaches either as a group or with individuals. Also, any new interventions listed from round one were listed in round two.

Second round. The second-round questionnaire was developed by taking the most frequently indicated interventions (top 50%), plus any that were mentioned in the comment portion. For this round, the coaches indicated how important using each intervention is to support participant success while leading a DPP class. The scale is 4—very important, 3—important, 2—somewhat important, and 1—not important. An area for comments about the interventions or use of other interventions was provided.

The results from the second round were analyzed and compared with current literature to identify differences and similarities. The results may be further analyzed to see if any patterns occur based on types of interventions and the success of participant outcomes. The results will be shared with the Henry Ford Macomb FCND in support of their ongoing programing and services to the community as well as publication in an appropriate professional journal.

Data Analysis

Descriptive statistics were used to describe the characteristics of the participants and the coaches. Baseline demographic data were compared between the two groups using chi-squared

test and Fisher's Exact test for categorical variables and two-sample *t* tests for continuous variables. A dependent *t* test was used to calculate the change from pre- to post-measures of the A1C, BMI, weight change. A two-sided $p < .05$ was considered statistically significant. A .05 significance level with a 95% confidence interval was used. Independent factorial ANOVA with multiple regression was used to assess comparison of outcomes based on type of coach when entered into the model. Demographic variables were entered in the model(s) to determine their impact on study outcomes. The effect size (*r*) is reported, where appropriate, with ranges from small 0.0 to .20, to medium .20 to .50, to large >.50. SPSS version 22.0 was used for all statistical analysis.

DUREL survey. The five-question DUREL measures three areas of spirituality/religiosity (S/R) and is designed as three "subscales" (Koenig & Bussing, 2010). It is recommended that the scores for the scale not be summed together to get a total, overall religiosity score. Instead, questions 1 and 2 should be examined individually and questions 3, 4, and 5 should be examined as a group. "Combining all three subscales in a single analysis could result in subscale scores canceling out the effect of each other." (Koenig & Bussing, 2010, p. 83). Scores on the three subscales of the DUREL have been shown to predict multiple health outcomes in both cross-sectional and longitudinal studies (Boyle et al., 2014).

Effect size. Data from control and intervention groups with 20 to 25 participants is appropriate to generate a medium effect (r =.50, two-sided α = .50, β.20, 23 participants were required) (Hulley, Cummings, Browner, Grady, & Newman, 2007).

Delphi Survey Technique analysis. Analysis of the Delphi Survey was completed as the rounds were completed. Round one helped to develop round two. The goal was to develop a

picture of what FB coaches are contributing to the DDP which may influence participant outcomes.

Protection of Human Rights

Informed consent. The researcher has taken care to fulfill all the requirements of Western Michigan University's Human Subject Institutional Review Board (HSIRB) and Henry Ford Health System Institutional Review Boards (IRB). Two consent forms were developed which included one for the coaches and one for the DPP participants (see Appendices B and C). Participants and coaches received an email from the Faith Community Nursing Department to invite them to participate in this research. Within the email was contact information for the SI if there were any questions about the study. The invitation email from the FCND contained a "link" which the invitees clicked to participate in the study (see Appendix I) which moved them electronically to the SurveyMonkey platform. Next, the consent form was displayed. After they read the consent, if they chose to participate, the DPP coach or participant who clicked "Yes" to the question "I agree to participate in the study" moved forward electronically to page two containing the questionnaires. If they clicked "No" to participating in the study, this exited them out of the survey and thanked them for their time.

Confidentiality of data. After the DPP participant agreed to join the study and completed the on-line questionnaires, the student investigator (SI) worked with the FCND web services specialist to obtain outcome data (weight, BMI, A1C, physical activity, and number of sessions attended) for those consenting participants. To maintain HIPPA standards, consent was obtained from the participants and any personal data was assigned a code number to connect survey responses to each coach or participant. The code numbers were stored in a password-protected database and One-Drive encrypted cloud memory space to be accessed only on the

computer of the SI. To make sure that participants and coaches were protected, the researcher adhered to this protocol of informed consent.

The Health Insurance Portability and Accountability Act (HIPAA) Security Rule requires specific protections to safeguard electronic health information. Measures used while conducting this study included the following: (1) obtaining IRB approval from WMU and Henry Ford Health System organizations prior to conducting the study, (2) providing access control by working with the FCND web-services specialist to limit access to personal health information (PHI), (3) using a password-protected computer which is secured in the possession of the SI, (4) using the One-Drive encrypted cloud storage for stored information provided by HFHS, and (5) ensuring proper destruction of all data and code books 3 years after the completion of data collection or the closure of the IRBs (U.S. Department of Health and Human Services, 2016).

It was hoped that 80–90% of the data would be collected in an on-line format. However, it was necessary for the SI to visit a couple DPP classes to invite those DPP participants who did not have email access to participate in the study. Permission was obtained by working with FCND project manager who contacted the DPP coach to arrange a visit to the class. The script for this face-to-face interaction to address the class participants is in Appendix C. If they agreed to participate, the consent and questionnaire/survey were provided in a manila envelope to ensure participant confidentiality. Time to complete the participant questionnaire was about 10 minutes. The participant placed the completed questionnaire with consent (or uncompleted if they chose not to participate) back in the manila envelope to return to the researcher.

SurveyMonkey. The data collected from the coaches and participants were collected primarily using SurveyMonkey, an on-line survey platform. SurveyMonkey, Inc., participates in and has certified its compliance with the EU-U.S. Privacy Shield Framework which is listed with

the U.S. Department of Commerce's Privacy Shield List. SurveyMonkey receives personal information under the Privacy Shield and then transfers it to a third-party service provider acting as an agent on SurveyMonkey's behalf. SurveyMonkey is subject to the investigatory and enforcement powers of the U.S. Federal Trade Commission. In certain situations, SurveyMonkey may be required to disclose personal data in response to lawful requests by public authorities, including meeting national security or law enforcement requirements (SurveyMonkey, 2016).

The information collected on SurveyMonkey was private information. The survey data and email address are owned by the researchers, with SurveyMonkey acting as a mere custodian of that data. They do not sell or use the email addresses. See Appendix H for SurveyMonkey Security Statement.

Conclusion

This chapter has described the research design, research questions, and hypotheses for the research study. The setting, sample, and data collection instruments and procedures have been described. Data analysis has been described but input was pending for final statistical analysis. Finally, protection of human rights was described. Chapter IV will describe the results of the study.

CHAPTER IV

RESEARCH FINDINGS – RESULTS

The purpose of this chapter is to present the methodology, data analysis and results for the study. A review of the purpose of the study and research questions will be presented first. Next, descriptive findings of the participants who attended the Diabetes Prevention Program (DPP) will be presented along with data analysis to answer the research questions. The descriptive findings for the DPP coaches will be presented next along with analysis to answer the research question. The chapter will end with the presentation of the results of the Delphi Survey Technique describing spiritual interventions used by the DPP coaches.

Purpose of the Study and Research Questions

The purpose of this study was to determine if there was a relationship between a modified educational intervention (the DPP) for individuals with pre-diabetes (pre-DM) or type-2 diabetes (T2DM) with variables of spirituality and religiosity (S/R) related to participant outcomes of weight, BMI, A1C, and physical activity. Furthermore, self-designated faith-based coaches also completed a two-round Delphi Survey Technique to determine if any spiritual interventions were used while leading a DPP course.

This chapter will provide an answer to an overarching research question and five defining research questions. The *overarching question* is as follows: Is spirituality/religiosity (S/R) correlated with improved health outcomes for individuals diagnosed with pre-diabetes and T2DM who attend faith-based DPPs? Five *defining research questions* have been developed to further explore the overarching question. These include:

1. In a group of both faith-based and community-based DPP coaches, what is their perceived measure of S/R, if any at all?
2. In a group of adults attending a faith-based DPP, what is the correlation with S/R, if any at all, with the participant outcomes for the following variables: weight loss, A1C, BMI, and degree of physical activity?
3. In a group of adults attending a community-based DPP, what is the correlation with S/R, if any at all, with the participant outcomes for the following variables: weight loss; A1C, BMI, and degree of physical activity?
4. What does a comparative analysis of S/R between the participant outcomes for faith-based and community-based DPPs indicate across the following variables: weight loss, A1C, BMI, and degree of physical activity?
5. What does the application of the Delphi Survey Technique reveal in terms of establishing the relative importance of spiritual interventions upon participants attending a faith-based DPP course?

Descriptive Findings of Study Sample – DPP Participants

This section of Chapter IV will describe the data collection and demographics of the DPP participants in this study. Data analysis of the independent, dependent and covariate variables will be described and displayed in table format. Finally, statistical interactions will be described and displayed in table format which will lead to the next section of Chapter IV to answer the research questions.

A convenience sample was obtained by email, postal mail, and by the researcher visiting DPP classes that were in session. Classes were offered in Macomb County, Michigan, in a variety of venues: churches, medical office buildings, recreational centers, and one university.

The sample for this study included 34 participants who attended the core part the DPP (weeks 1–26) and 11 DDP coaches. Each group will be described separately below.

Demographics

Data were collected by email (n = 75), postal mail (n = 4), and by the researcher visiting DPP classes (two classes, n = 15) that were in the post-core session (weeks 27–52). There was no contact information for an additional 22 participants that were on the original participant list obtained from the project manager of the DPP program at Henry Ford Macomb Hospital, Faith Community Nursing Department (FCND). The email survey platform used was SurveyMonkey. Two participants opted-out of the survey while another four surveys were partially complete and not included in the analysis. Total response included 34 participants (34/94 = 36% response rate).

Seventeen DPP courses were offered in a total of 12 different sites beginning September, 2015 to the time of the data collection (May/June 2017). Three of the sites offered the DPP twice starting at different times. Five DPP courses were in the post-core sessions (weeks 27–52) at the time of data collection. Ten DPP courses had finished the year-long program. Data were analyzed for weeks 1 to 26 for all participants whether the course was completed or in post-core sessions.

Demographic data are presented in Table 3. Several of the demographic areas were condensed into two or three groupings to improve the cell counts for analysis. Those areas included age, education, employment, religious denomination, and number of classes attended. For this sample, the majority were female (82.4%), white (79.4%), and retired (50%), with 82.4% having education past high school. All the participants in this sample had health insurance. The participants in this sample reported that most were diagnosed with pre-diabetes (55.9%) and had never attended a diabetes education program prior to the DPP (79.4%). Fifty-

eight percent reported that they are Other Christian with 35.3% of those being Roman Catholic. Over half (52.9%) of the participants reported they are active in their congregation.

Table 3

Categorical Participant Demographic Summary and Overall Difference in Coach Type

	Total *n* = 34 (%)	Faith-Based Coach *n* = 19 (%)	Community-Based Coach *n* = 15 (%)	Sig. $p < .05$
Gender				1.00[a]
Male	6 (17.6)	3 (50.0)	3 (50.0)	
Female	28 (82.4)	16 (57.1)	12 (42.9)	
Age				.20[a]
50 years or less	7 (20.6)	2 (28.5)	5 (71.4)	
51 years and above	27 (79.4)	17 (63.0)	10 (37.0)	
Education				.15[a]
High school or less	6 (17.6)	5 (83.3)	1 (16.7)	
Vocational/Associate degree	14 (41.2	5 (35.7)	9 (64.3)	
Bachelor/Graduate degree	14 (41.2)	9 (64.3)	5 (35.7)	
Ethnicity/Race				.67[a]
White (non-Hispanic)	27 (79.4)	16 (84.2)	11 (73.3)	
Black (non-Hispanic	7 (20.6)	3 (15.8)	4 (26.7)	
Employment status				.023[a]
Full-time	11 (32.4)	5 (26.3)	6 (40.0)	
Retired	17 (50.0)	13 (68.4)	4 (26.7)	
PT/Unemployed/Other	6 (17.6)	1 (5.3)	5 (33.3)	
Type of Diabetes				1.00[a]
At-Risk for DM	11 (32.4)	6 (31.6)	5 (33.3)	
Pre-DM	19 (55.9)	11 (57.9)	8 (53.3)	
Type-2 DM	4 (11.8)	2 (10.5)	2 (1.8)	
Attended prior DM class				1.00[a]
Yes	7 (20.6)	4 (21.1)	3 (20.0)	
No	27 (79.4)	15 (78.9)	12 (80.0)	
Religious Affiliation				.17[a]
Roman Catholic	12 (35.3)	6 (31.6)	6 (40.0)	
Other Christian	20 (58.9)	13 (68.4)	7 (46.7)	
None/atheist	2 (5.9)	0 (00.0)	2 (13.3)	

Table 3—Continued

Demographic	Total *n* = 34 (%)	Faith-Based Coach *n* = 19 (%)	Community-Based Coach *n* = 15 (%)	Sig. *p* < .05
Practicing member of a church				.04[b]
Yes	18 (52.9)	13 (68.4)	5 (33.3)	
No	16 (47.1)	6 (31.6)	10 (66.7)	
Course location/site				.001[a]
Faith-based	16 (47.1)	16 (84.2)	0 (0.00)	
Community-based	18 (52.9)	3 (15.8)	15 (100)	
Number of classes attended				.48[b]
12 or fewer classes	11 (32.4)	5 (26.3)	6 (60.0)	
13 or more	23 (67.6)	14 (73.7)	9 (40.0)	
DUREL[c]				
OR (mean + ½ *SD*)				.002[a]
Less public S/R	19 (55.9)	4 (31.6)	13 (68.4)	
More public S/R	15 (44.1)	13 (86.7)	2 (13.3)	
NOR (mean + ½ *SD*)				.48[a]
Less private S/R activities	22 (64.7)	11 (50.0)	11 (50.0)	
More private S/R activities	12 (35.3)	8 (66.7)	4 (33.3)	
IR (mean + ½ *SD*)				.03[b]
Less spiritual living	18 (52.9)	7 (38.9)	12 (75.0)	
More spiritual living	16 (47.1)	11 (73.3)	4 (25.0)	

Note. S/R = spirituality/religiosity; DUREL = Duke University Religious Index; OR = organized religious activity; NOR = non-organized religious activity; IR = intrinsic religiosity.
[a]Fisher's Exact test. [b]Chi-square. [c]DUREL as categorical data.

The type of site where the participants reported they attended the DPP course were fairly even with 47.1% held in faith-based settings and 52.9% held in community-based settings. There was good attendance at the classes with 67.6% of participants attending 13 or more classes. The majority of the participants in this study were still actively attending DPP classes (70.6%).

More participants who attended a DPP course led by a faith-based coach reported being active members of a church (CV, co-variable, 68.4%) while more of the participants with a

community-based coach reported not being active in a church/congregation (66.7%). Likewise, more participants who attended a DPP course at a faith-based site reported having the class led by a faith-based coach (84.2%). All of the participants who attended a community-based DPP course reported having a coach that was community-based (100%).

Data Analysis – Participants

Data analysis was conducted in three phases. First, all data were analyzed descriptively (see prior section). Second, the relationship between the dependent variables and the predictor variables (which include the independent variables and co-variables) were examined using bivariate analysis. Third, predictor variables associated with the dependent variables at a statistically significant level ($p < .05$) were analyzed to answer the research questions.

Data were cleaned and checked for errors and missing data prior to any analysis procedures. SPSS Windows (SPSS version 22, SPSS Inc, Chicago, IL, USA) was used for data analysis. Data that were transferred from Faith Community and Health Ministries Database were securely transferred and stored for protection of source and subjects' rights. Data analysis was directed to specifically answer research questions and hypotheses.

Dependent variables. The dependent variables (DV) for this study are the percent of weight loss, change in BMI, and the amount of physical activity measured in minutes per week. Measuring a change in A1C has been eliminated as an outcome variable as this information was not recorded in the database by many of the DPP coaches. There may be two reasons for this. First, reporting A1C is not a required measurement goal for the DPP National Recognition Program (CDC, 2015). Second, many of the participants were screened on paper at the orientation class to determine their risk for DM and may not have had an A1C drawn by their

medical provider. Twenty-eight of the 34 participants self-reported one A1C to the coaches during the core program (weeks 1–26).

Change in weight loss was measured by the goal of 7% weight loss from weeks 1 to 26 and reported as having met/not met the goal (dichotomous data). The 7% weight loss and the physical activity goal of 150 minutes of moderate physical activity weekly is part of the DPP Recognition Program goals (Albright & Gregg, 2013; CDC, 2015). Physical activity minutes were self-reported for the last four classes attended which were then averaged. This was reported as having met/not met the goal (dichotomous data). Finally, BMI was recorded as the percent change from weeks 1 to 26 as continuous data.

Independent variables. The independent variables for this study include whether the coach leading a DPP course was faith-based or community-based. This was reported by the coach, who was also surveyed, and assigned to a DPP site. The participant indicated the coach name or site of the DPP class, which was cross checked with the list of sites given to the researcher by the DPP project manager. Again, the variable is the coach, not the site, as some faith-based coaches were leading classes at community locations (see Table 3). The second independent variable is the DUREL which has three independent subscales, which is described below.

Co-variables. The co-variables include age, gender, race, education, employment, type of DM reported, religious denomination, practicing member of a congregation and number of classes attended. The above variables have two or three categories listed (see Table 3).

Duke University Religion Index (DUREL). The five-question DUREL measures three areas of S/R and is designed as three "subscales" (Koenig & Bussing, 2010). Question 1, measuring organizational religiosity (OR), and question 2, measuring non-organizational

religiosity (NOR), are answered with a 6-point Likert-scale and each question is considered a subscale. Questions 3, 4, and 5 are considered the third subscale for the DUREL. This subscale focuses on intrinsic religiosity (IR) which involves subjective or cognitive aspects for religious motivation within each subject (Boyle et al., 2014). The responses for this subscale are answered with a 5-point Likert-scale. These three questions are summed to report intrinsic religiosity (IR) dimension of spirituality. The range of scores can be from 3 to 15.

The data for the DUREL subscales (IV) will be presented in two formats to analyze this data. It will be analyzed as continuous data based on the Likert scale (Tables 4 and 5). Second, as seen in Table 3, the DUREL variables were re-coded into dichotomous variables using a cut-off score. A cutoff score is a score that is selected to represent the boundary between a typical and significant level of a survey outcome using a study measurement tool (Bannon, 2013). A cutoff score has not been identified for the DUREL as it has been designed for use with large sample sizes (Boyle et al., 2014).

A common method to create a cutoff score is to use the mean plus one-half a standard deviation for the group being surveyed to identify high levels of the construct (Bannon, 2013). Thus, the cutoff score for OR is 4.69 (*M*3.88 + ½ *SD* (1.61/2 = .81)) and NOR is 4.22 (*M*3.29 + ½ *SD* (1.85/2 = .92)). The percentages seen in Table 3 show the breakdown of the participants who scored higher (more) on each of the OR and NOR constructs. For this sample of participants, a greater number of the total participant sample reported less activity with public religious activities (i.e., going to church) and less private spiritual activities (i.e., prayer, scripture reading) in both OR (55.9%) and NOR (64.7%) subscales.

Table 4

Analysis of Collinearity Between 3-Level Co-Variables (CV, Categorical) and the DUREL 3 Subscales (IV, Continuous)

ANOVA	Categories	OR				NOR				IR			
		M (*SD*)	*F* (*df*)	Sig. *p*<.05*	Eff. Size[a]	*M* (*SD*)	*F* (*df*)	Sig *p*<.05*	Eff. Size[a]	*M* (*SD*)	*F* (*df*)	Sig *p*<.05*	Eff. .Size[a]
Education	HS or less (*n* = 6)	4.33 (1.63)	0.973 (2,31)	.39	0.24	3.50 (1.52	0.047 (2,31)	.95	0.05	13.00 (2.53)	0.138 (2,31)	.87	0.09
	Voc/Assoc (*n* = 14)	3.43 (1.60)				3.29 (2.13)				12.43 (2.65)			
	Bachelor/Grad (*n* = 14)	4.14 (1.61)				3.21 (1.80)				12.21 (3.60)			
Employment	Full-time (*n* = 11)	4.00 (1.73)	1.65 (2,31)	.21	0.31	3.55 (1.97)	1.87 (2,31)	.17	0.33	12.09 (3.86)	1.60 (2,31)	.22	0.31
	Retired (*n* = 17)	4.18 (1.33)				3.59 (1.73)				13.24 (2.19)			
	PT/Unempl/Other (*n* = 6)	2.83 (1.94)				2.00 (1.67)				10.83 (2.86)			
Type of DM	At Risk for DM (*n* = 11)	3.36 (1.63)	2.18 (2,31)	.13	0.35	2.73 (1.42	2.12 (2,31)	.14	0.35	11.73 (3.61)	2.85 (2,31)	.07	0.58
	Pre-DM (*n* = 19)	4.39 (1.38)				3.84 (1.95)				13.37 (2.14)			
	T2DM (*n* = 4)	3.00 (2.16				2.25 (1.89)				10.00 (3.46)			
Religious Affiliation	Roman Catholic (*n* = 12)	4.00 (1.38)	4.05 (2,31)	.03	0.46	3.25 (1.87)	1.81 (2,31)	.18	0.32	11.83 (2.29)	14.01 (2,31)	.001	0.69
	Other Christian (*n* = 20)	4.10 (1.59)				3.55 (1.82)				13.55 (2.16)			
	Atheist/None (*n* = 2)	1.00 (.000)				1.00 (.000)				5.00 (2.82)			

Note. DUREL = Duke University Religious Index; OR = organized religious activity; NOR = non-organized religious activity; IR = intrinsic religiosity.

[a]Effect size uses eta squared - $\dot{\eta}^2$, effect size 0.0 to .20 small, .20 to .50 medium, >.50 large effect.

*Significance level is .05 (2-tailed).

Table 5

Relationship Between Weight Loss (DV, Categorical) and Physical Activity (DV, Categorical) and Predictor Variables (IV and Co-Variables)

	Dependent Variables									
	Weight Loss =/>7%					Physical Activity 150 min/week				
Independent and Co-Variables	% Met	% Not Met	χ^2 Value[a]	Sig.*	Effect Size[b]	% Met	% Not Met	χ^2 Value[a]	Sig.*	Effect Size[b]
Gender										
Male (*n* =6)	33.3	66.7	0.18	1.00[c]	0.07	83.3	16.7	6.28	.02[c]	0.43
Female (*n* =28)	57.1	42.9				28.6	71.4			
Age										
50 years or less (*n* =7)	28.6	71.4	0.58	.67	0.13	57.1	42.9	1.33	.39[c]	0.20
51years and above (*n* =27)	55.6	44.4				33.3	66.7			
Race										
White (*n* =27)	48.1	51.9	2.32	.20[c]	0.28	40.7	59.3	0.35	.68[c]	0.10
Black (*n* =7)	14.3	85.7				28.6	71.4			
Education										
High school or less (*n* =6)	50.0	50.0	0.38	.90[c]	0.11	33.3	66.7	3.86	.17[c]	0.34
Vocational/Assoc. (*n* =14)	35.7	64.3	(*df*2)			57.1	42.9			
Bachelors/Grad. (*n* =14)	42.9	57.1				21.4	78.6			
Employment										
Full-time (*n* =11)	27.3	72.7	2.49	.31[c]	0.27	27.3	72.7	0.97	.72[c]	0.17
Retired (*n* =17)	41.2	58.5	(*df*2)			41.2	58.8			
Part-time/Unempl/Other (*n* =6)	66.7	33.3				50.0	50.0			
DM health status										
At risk for DM (*n* =11)	63.6	36.4	3.45	.22[c]	.32	27.3	72.7	1.53	.52[c]	0.21
Pre-DM (*n* =19)	31.6	68.4				47.4	52.6			
Type-2 DM (*n* =4)	25.0	75.0				25.0	75.0			

Table 5—Continued

Independent and Co-Variables	Dependent Variables: Weight Loss =/>7% % Met	% Not Met	χ^2 Value[a]	Sig.*	Effect Size[b]	Physical Activity 150 min/week % Met	% Not Met	χ^2 Value[a]	Sig.*	Effect Size[b]
Attended prior DM education										
Yes (*n* =7)	28.6	71.4	0.58	.67[c]	0.13	42.9	57.1	0.08	1.00[c]	0.05
No (*n* =27)	44.4	55.6				37.0	63.0			
Practicing member of church										
Yes (*n* =18)	33.3	66.7	0.97	.49[c]	0.17	38.5	61.9	1.77	.18	0.23
No (*n* =16)	50.0	50.0				61.5	38.1			
Religious affiliation										
Roman Catholic (*n* =12)	41.7	58.3	3.17	.29[c]	0.31	41.7	58.3	3.86	.22[c]	0.34
Other Christian (*n* =20)	35.0	65.0	(*df*2)			30.0	70.0			
None/atheist (*n* =2)	100.0	0.0				100.0	0.0			
Coach type (IV)										
Faith-based (*n* =19)	36.8	63.2	0.33	.56	0.10	31.6	68.4	0.81	.40	0.15
Community-based (*n* =15)	46.7	53.3				46.7	53.3			
Site type (IV)										
Faith-based (*n* =16)	31.3	68.8	1.23	.27	0.19	37.5	62.5	0.01	.93	0.01
Community-based (*n* =18)	50.0	50.0				38.9	61.1			
Classes										
12 or less (*n* =11)	27.3	72.7	1.30	.30[c]	0.20	15.4	42.9	2.77	.14[c]	0.86
13 or more (*n* =23)	47.8	52.2				84.6	57.1			

Questions 3, 4, and 5 represent the IR subscale of the DUREL. The cutoff score for the tally of these questions is 13.93 (*M*12.44 + ½ *SD* (2.98/2 = .149) to re-code the variable. Table 3 shows the breakdown of participants that report increased IR as compared to less IR. For this sample, there was not a large difference in the total sample of participants with 52.9% reporting less IR living as compared to 47.1% of those who live their spiritual/religious beliefs.

Checks of data integrity. The data analysis plan includes checks of data integrity. The test assumptions for categorical data include multicollinearity. The Pearson's *r* indicated that two independent variables, coach type and site type, were highly correlated (*r* = .838). Therefore, only the coach type variable was used as an independent variable along with the three subscales of the DUREL. The test assumption for chi-square and cross-tabulation analysis requires expected cell counts to be above 5. If the expected cell count was below 5, the Fisher's Exact test was used (Fields, 2009). The effect sizes for means and standard deviations were calculated using effect size calculator from University of Colorado, Colorado Springs (Becker, 2000) for Independent-*t* test calculations and Cramer's V for chi-square calculations provided within SPSS analysis software.

From the original data set, the continuous outcome variables (weight loss and BMI) are not normally distributed based on skewness and kurtosis values. Because weight loss was not normally distributed as a continuous variable, for the final analysis of outcomes, weight loss data was converted to met/not met dichotomous variable based on meeting the 7% weight loss goal of the DPP programs. This weight loss goal provides a natural cut-off score to create a dichotomous variable.

Data for the three DUREL subscales (IV) as continuous data were analyzed for normal distribution. All three continuous scales, the OR, NOR, and IR, appear to be normally distributed

based on skewness and kurtosis analysis. The effect size for categorical variables with three levels which were analyzed with the BMI (continuous) was calculated using eta-squared ($\dot{\eta}^2$, see Table 4).

Independent Variable and Co-Variable Interactions

The independent variables for this study are the type of coach and the three subscales of the DUREL survey. Chi square and crosstabulation were used with categorical variables to determine if there was a significant relationship between IV and CV. Table 3 highlights the significant relationships with the type of coach. All of the CV and IV are listed as categorical.

Statistically significant differences were noted between the type of coach (IV) and three variables, which include employment status (CV, co-variable), being an active member of a congregation/church (CV), and if the DPP class was held in faith-based versus community-based site (IV, which is highly correlated as stated above).

Examining the employment status results, there was a significant association between reported employment and the coach type χ^2 (2) = 6.91, $p < 0.023$. The strength of the relationship shows a medium effect size that is significant (Cramer's *V* scale is 0 to 1; Cramer's *V* 0.46, $p < .02$). More participants in the courses with a faith-based coach (68.4%) reported being retired as compared to participants who attended a DPP course led by a community-based coach (26.7%).

The participants attending a DPP course at a community-based site reported either being employed full-time or reported other/part-time work or unemployed. For this study, the sites were self-selected by the participants based on personal preferences such as location and time of day the classes were held. Furthermore, more participants who attended a DPP class at a faith-based site reported being retired (75%) as compared to the participants at a community-based site

who were 27.8% retired, 38.9% working full-time, and 33.3% working part-time, unemployed, or other. The differences between the type of site and type of coach were statistically significantly different at $\chi^2(2) = 9.58$, $p < .007$ with a large effect size (Cramer's V 0.53, $p < .006$). Having very similar results between the type of coach and the type of site with reported employment categories again supports the strong correlation between the type of coach and type of site variables ($r = .838$, see above).

An association was noted between the type of coach and whether the participant reported being a practicing member of a church or congregation. More participants who had a faith-based coach reported being a practicing member of a church (68.4%) as compared to participants who attended a DPP course with a community-based coach and were not practicing members of a congregation (66.7%). There is a statistically significant difference between the two groups, $\chi^2(1) = 4.142$, $p < .04$, with a medium effect size (Cramer's V 0.35, $p = .04$).

There was a significant association between the type of coach and two of the DUREL subscales reported as categorical data: the OR and IR. Participants attending a DPP course with a faith-based coach reported more public religiosity (e.g., going to church services or meetings; 86.7%) as compared to 68.4% of participants attending a DPP with a community-based coach reporting less public religious activities. Participants who reported more organizational religiosity was statistically significant with attending a DPP course led by a faith-based coach as compared to those reporting less OR and having a community-based coach $\chi^2(1) = 10.32$, $p < .001$. The strength of the relationship measured by the Cramer's V is 0.55 (on a scale of 0–1, $p < .001$), which shows a large effect size that is significant.

Second, there was a significant association between the type of coach and reported IR, intrinsic religiosity, $\chi^2(1) = 4.48$, $p < .03$. The strength of the relationship shows a medium effect

size that is significant (Cramer's V 0.36, $p < .03$). More participants attending a DPP course with a faith-based coach reported more (higher) intrinsic religiosity (63.2%) as compared to those reporting less IR and attending a course led by a community-based coach (73.3%). The results of this finding may be the result of how the courses were advertised at the different locations or if the site had a congregational health team, making the church/congregation more receptive to hosting and advertising the DPP course. There was not a statistically significant difference between the NOR (non-organizational activities) subscale and type of coach.

The three DUREL subscale scores were also analyzed as continuous variables with co-variables using the Independent-*t* with two categories and the one-way ANOVA with three categories (see Tables 4 and 6). Using the DUREL as continuous variables appears to be more sensitive, showing statistical significance with all three subscales and type of coach, type of site and practicing member and two of the subscales (OR and IR) for religious affiliation (see Table 6). Because of this, the DUREL subscales were used as continuous variables to analyze the dependent variables. (See discussion above for significance between DUREL and coach type and practicing member.)

Looking at the data for the DUREL as a continuous variable, the NOR subscale showed statistical significance with coach type ($p = .03$) and practicing member ($p = .001$) (see Table 6). Additionally, statistical significance was noted with religious denominations for the OR and IR subscale reported as continuous data (see Table 4). The data from the religious denominations showed 97% of the participants reported being Christian (32/34) with Roman Catholic being reported as 35.2% ($n = 12$) of the total sample. The Other Christian denominations reported were Methodist, Lutheran, Episcopalian, non-denominational and Jehovah Witness (58.9%, $n = 20$). This grouping of Other Christian denominations was blended to achieve cell counts to do

Table 6

Analysis of Collinearity Between 2-Level Co-Variables (Categorical) and the DUREL 3 Subscales (IV, Continuous)

		DUREL											
		OR				NOR				IR			
	Categories	*M* (*SD*)	Sig *p*<.05*	*t* (*df*)	Eff. Size[a]	*M* (*SD*)	Sig *p*<.05*	*t* (*df*)	Eff. Size[a]	*M* (*SD*)	Sig *p*<.05*	*t* (*df*)	Eff. Size[a]
Gender	Male (*n* = 6)	3.00 (2.10)	.41	–1.51 (32)	–.28	2.00 (3.57)	.06	–1.97 (32)	–0.39	10.50 (4.46)	.26	–1.25 (5.68)	0.31
	Female (*n* = 28)	4.07 (1.46)				3.57 (1.73)				12.86 (2.49)			
Age	Less than 51 years (*n* = 7)	3.43 (2.07)	.41	–.83 (32)	–.016	2.43 (1.81)	.71	–1.41 (32)	–0.29	10.71 (2.50)	.08	–1.77 (32)	–.37
	51 years and above (*n* = 27)	4.00 (1.49)				3.53 (1.83)				12.89 (2.98)			
Race	White (*n* = 27)	3.81 (1.54)	.64	–.48	–0.09	3.15 (1.84)	.38	–0.90 (32)	–0.19	12.19 (3.53)	.33	–0.98 (32)	–0.22
	Black (*n* = 7)	4.14 (1.95)				3.86 (1.86)				13.43 (2.15)			
Attended DM Education Classes	No (*n* = 27	3.73 (1.56	.32	–1.01 (32)	–0.20	3.22 (1.81	.66	–0.44 (32)	–0.09	12.33 (2.94	.69	–0.41 (32)	–0.08
	Yes (*n* = 7)	4.43 (1.81)				3.57 (2.15)				12.86 (3.39)			
Practicing Member	No (*n* = 16)	2.63 (1.20)	.001	–6.28 (32)	–0.74	2.13 (1.41)	.001	0.747 (32)	–0.59	10.50 (3.20)	.001	–4.49 (32)	0.62
	Yes (*n* = 18)	5.00 (.970)				4.33 (1.57)				14.17 (1.25)			

Table 6—Continued

		DUREL											
		OR				NOR				IR			
	Categories	*M* (*SD*)	Sig *p*<.05*	*t* (*df*)	Eff. Size[a]	*M* (*SD*)	Sig *p*<.05*	*t* (*df*)	Eff. Size[a]	*M* (*SD*)	Sig *p*<.05*	*t* (*df*)	Eff. Size[a]
Coach Type	Faith-Based (*n* = 19)	4.74 (1.24)	.001	4.313 (32)	0.59	3.89 (1.70)	.03	2.253 (32)	0.37	13.53 (2.17)	.001	2.58 (32)	0.41
	Comm-Based (*n* = 15)	2.80 (1.37)				2.53 (1.81)				11.07 (3.37)			
Site Type	Faith-Based (*n* = 16)	4.49 (1.00)	.001	4.55 (32)	0.62	4.25 (1.57)	.003	3.21 (32)	0.49	14.13 (1.58)	.001	3.75 (25.6)	0.59
	Comm-Based (*n* = 18)	2.94 (1.47)				2.33 (1.68)				10.94 (3.17)			
Number of Classes	12 or less (*n* = 11)	4.00 (1.61)	.77	0.29 (32)	0.52	3.82 (1.60)	.26	1.15 (32)	0.21	13.55 (2.02)	.14	1.52 (32)	0.29
	13 or more (*n* = 23)	3.83 (1.64)				3.04 (1.94)				11.91 (3.26)			

Note. Independent-*t*; DUREL = Duke University Religious Index; OR = organized religious activity; NOR = non-organized religious activity; IR = intrinsic religiosity.
[a]Effect size 0.0 to .20 small, .20 to .50 medium, >.50 large effect.
*Significance level is .05 (2-tailed).

chi-square analysis. Two participants reported none or atheist (5.9%). It was decided to keep the participants reporting as practicing in the Roman Catholic faith as a separate category.

Looking at the data for the DUREL as a continuous variable, the NOR subscale showed statistical significance with coach type (p = .03) and practicing member (p = .001) (see Table 6). Additionally, statistical significance was noted with religious denominations for the OR and IR subscale reported as continuous data (see Table 4). The data from the religious denominations showed 97% of the participants reported being Christian (32/34) with Roman Catholic being reported as 35.2% (n = 12) of the total sample. The Other Christian denominations reported were Methodist, Lutheran, Episcopalian, non-denominational and Jehovah Witness (58.9%, n = 20). This grouping of Other Christian denominations was blended to achieve cell counts to do chi-square analysis. Two participants reported none or atheist (5.9%). It was decided to keep the participants reporting as practicing in the Roman Catholic faith as a separate category.

Looking at the OR subscale and religious denominations, there was a statistically significant difference between the three groups ($F(2, 32) = 4.05$, $p = .03$, $\dot{\eta}^2 = 0.46$) and a significant interaction effect between responses from participants who are Roman Catholic and Other Christian compared to none/atheist participants ($F(1,33) = 7.05$, $p = .01$, $\dot{\eta}^2 = 0\ .42$). The strength of the interaction was medium effect for both within and between groups (see Table 4).

There was a statistically significant difference between the three religious affiliation types and the IR subscale ($F(2,32) = 14.01$, $p = .000$, $\dot{\eta}^2 = 0.69$). The between-group interaction revealed no interaction between the Roman Catholic and Other Christian groups but significant interactions between the Roman Catholic and Other Christian as compared to the none/atheist group ($F(1,33) = 16.05$, $p = .000$, $\dot{\eta}^2 = 0.27$). The strength of the interaction was large for the between groups and medium for the within groups. The results of this testing for this sample

shows that participants who actively participate in a religious denomination report more intrinsic spirituality/religiosity (see Table 4).

Finally, there was a statistically significant difference between race and the number of classes attended. The class attendance variable was dichotomized to 12 or less classes attended and 13 or more classes attended. White/Caucasian participants attended 13 or more classes as compared to black/AA participants $\chi^2(1) = 11.47$, $p < .002$. The strength of the relationship measured by the Cramer's V is 0.58 (on a scale of 0–1, $p < .001$) which shows a large effect size that is significant.

Answering the Research Questions – Participants

Non-parametric testing was used to determine if significant relationships existed between the outcome variables (DV) and the IVs and CVs. Bivariate analysis includes the use of independent samples *t* test for variables with two categories (weight loss and physical activity) and continuous variable (DUREL; see Table 7). Chi square and Fisher's Exact test were used to explore relationships between categorical co-variables and the independent variables (weight loss and physical activity; see Table 5). Correlation was used with two continuous variables (BMI and subscales of the DUREL; see Table 8).

The *overarching question* is as follows: Is spirituality/religiosity (S/R) correlated with improved health outcomes for individuals diagnosed with pre-diabetes and T2DM who attend faith-based DPPs? Questions 2, 3, and 4 of the *defining research questions* will be analyzed in this section to assist in answering the overarching question. Questions 1 and 5 will be analyzed under the coach section. These questions include:

Table 7

Relationship Between Weight Loss (DV, Categorical) and Physical Activity (DV, Categorical) and DUREL 3 Subscales (IV, Continuous)

		DUREL											
		OR				NOR				IR			
Dependent Variables	Categories	*M* (*SD*)	*t* (*df*)	Sig *p*<.05	Eff. Size[a]	*M* (*SD*)	*t* (*df*)	Sig *p*<.05	Eff. Size[a]	*M* (*SD*)	*t* (*df*)	Sig *p*<.05	Eff. Size[a]
Weight Loss =/> 7%	Met	3.71 (1.62)	.50 (32)	.62	0.18	2.93 (1.77)	–1.21 (32)	.34	0.34	11.57 (3.52)	1.44 (32)	.16	0.49
	Not Met	4.00 (1.62)				3.55 (1.91)				13.05 (2.46)			
Physical Activity 150 minutes/ week	Met	3.46 (1.94)	–1.21 (32)	.24	–0.41	2.69 (2.06)	–1.52 (32)	.14	–.53	11.31 (3.59)	–1.80 (32)	.08	–0.60
	Not Met	4.14 (1.35)				3.67 (1.65)				13.14 (2.37)			

Note. Independent-*t*; DUREL = Duke University Religious Index; OR = organized religious activity; NOR = non-organized religious activity; IR = intrinsic religiosity.
[a]Cohen's *d*.

Table 8

Relationship Between BMI (Continuous, DV) and DUREL 3 Subscales (Continuous, IV)

DUREL	OR		NOR		IR	
Dependent Variable	*r*	Sig. $p < .05$	*r*	Sig. $p < .05$	*r*	Sig. $p < .05$
BMI	–.07	.68	–.37	.84	–.17	.34

Note. Pearson's *r*; DV = dependent variable; DUREL = Duke University Religious Index; IV = independent variable; OR = organized religious activity; NOR = non-organized religious activity; IR = intrinsic religiosity.

2. In a group of adults attending a faith-based DPP, what is the correlation with S/R, if any at all, on the participant outcomes for the following variables: weight loss, BMI, and degree of physical activity?
3. In a group of adults attending a community-based DPP, what is the correlation with S/R, if any at all, on the participant outcomes for the following variables: weight loss, BMI, and degree of physical activity?
4. What does a comparative analysis of S/R between the participant outcomes for faith-based and community-based DPPs indicate across the following variables: weight loss, BMI, and degree of physical activity?

Research Questions 2 and 3 – DPP Outcomes Based on Type of Coach

Frequency data were run on the percent of participants from each group that met the goals of weight loss and physical activity. Meeting the 7% weight loss goal included 36.8% of the participants from courses led by faith-based coaches (9/19) while 63.2% of the participants did not meet the goal (12/19). Of the participants who had a community-based coach, 46.7% (7/15) met the weight loss goal, while 53.3% (8/15) did not meet the weight loss goal. Thus, the participants attending a DPP course with a community-based coach tended to lose more weight.

Meeting the physical activity goal of 150 minutes/week was compared between the type of coach variable. Participants who had a faith-based coach had a 31.6% (6/19) success rate as compared to 46.7% (7/15) from the community-based coach led courses. Again, more participants attending the community-based coach led courses tended to be more successful achieving the physical activity goal.

To evaluate the frequencies for the BMI, it was noted that 23.5% (8/24) participants had no change in their BMI for weeks 1 to 26. A cut-off score was determined based on the mean of

the group of 9.20 (rounded to 9) to convert BMI to a categorical variable. Three BMI categories were created as follows: a group achieving no change (23.5%), a group achieving less than 10-point reduction (52.95), and a group reporting achieving a 10- or more-point reduction (23.5%) in BMI. In total, 76.4% of the group showed some weight loss.

Looking at the BMI categorical frequency based on coach type, 79% of participants with a faith-based coach achieved some reduction in BMI (15.8% more than 10 points) as compared to the 73.3% of participants attending a DPP course led by a community-based coach (33.3% achieving more than 10 points or more reduction). Thus, both groups were fairly equal in achieving some weight loss, but the community-based group had a higher percentage of participants achieve a greater reduction their BMI overall.

Research Question 4 – Comparative Analysis Between DPP Outcomes and Type of Coach

Statistical analysis between coach type and the DV was completed (see Table 5). First, analyzing the relationship between attaining the 7% weight loss goal (DV) and coach type (IV), there was no significant association between participants who attended a DPP course with a community-based coach as compared to a faith-based coach and meeting the goal of 7% weight loss during the core program $\chi^2(2) = 0.33$, $p = .56$. There was a small effect size calculated using the Cramer's V of 0.10 (see Table 5). Second, analyzing the relationship between meeting the physical activity goal of 150 minutes/week related to the type of DPP coach, there was no significant relationship between meeting the goal and type of coach $\chi^2(2) = 0.81$, $p = .40$ with a small effect size measured by the Cramer's V of 0.15 (see Table 5). Third, the BMI is not a specific goal of the DPP program but is a measure of success with weight loss as all the participants in the program needed to be overweight or obese to participate. Analyzing the continuous variable, BMI, to determine if there is a relationship between coach type showed no

statistical difference between faith-based versus community-based coach led courses $t(32) = 0.50$, $p = .62$, with a small effect size of 0.18 calculated by the Cohen's *d* (see Table 9).

Table 9

Relationship Between BMI (DV, Continuous) and 2-Category IV and Co-Variables

Dependent Variable	BMI – % Decrease (continuous)			
IV and Co-Variables	*M*(*SD*)	*t* (*df*)	Sig. $p < .05$	Effect Size[a]
Gender				
Male ($n = 6$)	4.83 (4.40)	–.68(32)	.50	–0.34
Female ($n = 28$)	6.68 (6.29)			
Age				
50 years or less ($n = 7$)	5.71 (6.47)	–.31(32)	.76	–.13
51years and above ($n = 27$)	6.52 (5.97)			
Race				
White ($n = 27$)	7.19 (6.36)	1.63(32)	.11	.08
Black ($n = 7$)	3.14 (2.91)			
Attended prior DM education				
Yes ($n = 7$)	6.00 (6.22)	.17(32)	.86	0.07
No ($n = 27$)	6.44 (6.04)			
Practicing member of church				
Yes ($n = 18$)	5.39 (4.69)	.99(32)	.33	0.33
No ($n = 16$)	7.44 (7.17)			
Coach type (IV)				
Faith-based ($n = 19$)	6.16 (5.86)	–.21(32)	.83	–0.07
Community-based ($n = 15$)	6.60 (6.33)			
Site type (IV)				
Faith-based ($n = 16$)	6.38 (6.20)	.02(32)	.98	0.01
Community-based ($n = 18$)	6.33 (5.97)			
Classes				
12 or less ($n = 11$)	3.91 (4.66)	–1.69(32)	.10	–0.65
13 or more($n = 23$)	7.52 (6.28)			

Note. Independent-*t*; DV = dependent variable; IV = independent variable.
[a]Cohen's *d*.

Research Questions 2 and 3 – DPP Outcomes and Measures of Spirituality

The three subscales of the DUREL (IV) were used as a measure of S/R to determine if there was an association with the three DVs (weight loss, physical activity, and BMI). Tables 7 and 8 show the data revealing the outcomes. There was no statistically significant difference between OR subscale and achieving the 7% weight loss goal (p = .62), achieving the 150 minute/week physical activity goal (p = .24) nor achieving a BMI score (p = .68). There was no statistically significant difference between the NOR subscale and achieving the weight loss goal (p = .34) and physical activity goal (p = .14) nor reducing the BMI (p = .84). Finally, there was no statistically significant difference between the IR subscale and achieving the weight loss goal (p = .16), a nearly significant difference with achieving the physical activity goal (p = .08), nor a reduction in BMI (p = .34). Therefore, according to these findings with this small sample, S/R did not have an impact on achievement of the goals for the DPP program nor reduction of BMI.

Research Question 4 – Comparative Analysis Between DPP Outcomes and Measures of Spirituality

The results of this research did not produce statistically significant findings between the independent variables and the outcomes. To check if the type of coach and results of the three subscales of the DUREL may have had a relationship with the DV goal of weight loss, a multivariate analysis was run. This analysis revealed no statistically significant findings (F (4, 34) = 0.54, p = .71). The effect of the relationship is measured by the partial eta squared (PES) of 0.07 which is a medium effect for this measure. Again, the results of type of coach and three subscales of the DUREL showed no statistically significant findings to predict achieving the physical activity goal (F (4,34) = .25, p = .91, PES = 0.03). A multilinear regression cannot be run on continuous outcome variable BMI because of the small sample size.

Co-variables and outcome variable interactions. Tables 5, 9, and 10 show the statistical analysis for the co-variables and the outcome variables. Only one statistically significant finding is noted. More male participants achieved the physical activity goal of 150 minutes/week (83.3%) as compared to the female participants (28.6%) which was a statistically significant difference ($\chi^2(1) = 6.28$, $p = .02$) with a medium effect between the relationship (Cramer's $V = 0.43$). Male participants made up only 18% of the total participant sample but achieved greater success with achieving the physical activity goals.

Table 10

Relationship Between BMI (DV, Continuous) and 3-Category Co-Variables

	BMI		
One-Way ANOVA	*F*(*df*)	Sig. $p < .05$*	Effect Size[a]
Education HS or less ($n = 6$) Vocation/Associates($n = 14$) Bachelors/Graduate ($n = 14$)	.08 (2,31)	.92	0.07
Employment Full Time ($n = 11$) Retired ($n = 17$) PT/Unemp/Other ($n = 6$)	1.52 (2,31)	.23	0.30
Health status At risk for DM($n = 11$) Pre-DM ($n = 19$) Type-2 DM ($n = 4$)	.49 (2,31)	.62	0.17
Religious affiliation Roman Catholic ($n = 12$) Other Christian ($n = 20$) None/Atheist ($n = 2$)	2.25 (2,31)	.12	0.36

Note. One-way ANOVA.
[a]Effect size uses eta squared - $\dot{\eta}^2$, effect size 0.0 to .20 small, .20 to .50 medium, >.50 large effect.
*Significance level is .05 (2-tailed).

In summary, answering research questions 2, 3, and 4 revealed that the three dependent variables (BMI, weight loss, and physical activity) did not have a relationship with the independent predictor variables of coach type or the three subscales of the DUREL. Gender was the only co-variable predictor of meeting the physical activity outcome, with the men being more successful than the women. In the next sections, research questions 1 and 5 will be discussed.

Descriptive Findings of Study Sample – DPP Coaches

In this section of Chapter IV, data collection methods to survey the DPP coach sample will be described. The demographics of this sample will be described and presented in table format. Finally, the Delphi Survey Technique used with the coach will be described and the results presented to answer research questions 1 and 5.

Demographics

Fifteen DPP coaches were invited by email to participate in this study. Eleven completed the demographic and DUREL survey. Six self-identified themselves as faith-based coaches designated in two categories, either a faith-community nurse (FCN, $n = 3$) or a member of a congregational health team ($n = 3$). The five remaining coaches identified themselves as community-based nurses ($n = 4$) and one dietician. All of the coaches were female. The majority of the coaches (73%) were aged 51 to 65 and the majority indicated their race as white (64%) as compared to 36% African American. Most of coaches were employed either full time (46%) or part time (27%) and all were well educated with college degrees (see Table 11). Most of the DPP classes were held in community settings (82%) as compared to faith-based settings (18%). All of the coaches indicated they are active members of their church or religious organization with 82% being Christian (36% Roman Catholic; 46% Other Christian) and 18% reported non-denominational.

To determine if there was a significant difference between the faith-based coaches and community-based coaches based on the demographic information, chi-square crosstabs was computed. The Fisher's Exact test was used for statistical analysis due to the small sample size (Fields, 2009). There were no statistically significant differences noted between the two groups of coaches based on age, education, race, employment, compensation for coaching, religious denomination, or site of the DPP course (see Table 11).

Table 11

Categorical DPP Coach Demographic Summary and Overall Difference in Coach Type

Demographic	Total *n* (%)	Faith-Based Coaches *n* (%)	Community-Based Coaches *n* (%)	Sig. <.05
Age				
50 years or less	2 (18.2)	1 (16.7)	1 (20.0)	1.00
51 years and above	9 (81.8)	5 (83.3)	4 (80.0)	
Education				
Bachelor Degree	6 (54.5)	4 (66.7)	2 (40.0)	.57
Graduate Degree	5 (45.5)	2 (33.3)	3 (60.0)	
Ethnicity/Race				
White (non-Hispanic)	7 (65.6)	2 (33.3)	5 (100)	.06
Black (non-Hispanic	4 (36.4)	4 (66.7)	0	
Employment status				
FT/PT work	8 (72.7)	4 (66.7)	4 (80.0)	1.00
Retired/Other	3 (27.3)	2 (33.3)	1 (40.0)	
Received Compensation				
Yes	8 (72.7)	5 (83.3)	3 (60.0)	.55
Volunteer	3 (27.3)	1 (16.7)	2 (40.0)	
Religious affiliation				
Roman Catholic	4 (36.4)	1 (16.7)	3 (60.0)	.44
Other Christian	5 (45.5)	3 (50.0)	2 (40.0)	
None	2 (18.1)	2 (33.3)	0	
Site Type				
Faith-based	2 (18.2)	2 (33.3)	0	.56
Community-based	9 (81.8)	4 (66.7)	5 (100)	

Note. Chi-square cross tabs; Fisher's Exact test.

All of the coaches (n = 11) completed the DUREL survey (see Table 12). The data provided are percentages to compare three areas of spirituality. The format and scoring of the DUREL survey has been described in the participant section above. Question 1 focuses on the organizational religious (OR) activities in a public or community setting. Question 2 focuses on non-organizational religious (NOR) activities which may occur in a private or personal setting. For question 1, only three of the six Likert responses were selected by the coaches as answers. For question 2, only four of the six Likert responses were selected by the coaches (see Table 12). Questions 3, 4, and 5 are considered the third subscale for the DUREL. This subscale focuses on intrinsic religiosity (IR) for each subject. These three questions can be summed to report intrinsic religiosity dimension of spirituality. The range of scores can be from 3 to 15.

Table 12

DUREL Survey Response Description and Overall Difference in Coach Type

DUREL	Total *n* (%)	Faith-Based Coaches 6 (54.5%)	Community-Based Coaches 5 (45.5%)	Sig. <.05
OR				.06[a]
A few times a month (4)	3 (27.3)	0	50%	
Once a week (5)	4 (36.4)	40%	20%	
More than once/week (6)	4 (36.4)	60%	10%	
NOR				.66[a]
Few times/month (2)	2 (18.2)	20%	10%	
Two or more/week (4)	2 (18.2)	20%	20%	
Daily (5)	4 (36.4)	40%	20%	
More than once/day (6)	3 (27.3)	40%	10%	
IR – (range 3-15)				.18
Living religious/spiritual beliefs				
Definitely *not* to be true (1-3)				
Tends *not* to be true (4-6)				
Unsure (7-9)				
Tends to be true 10-12)				
Definitely true of me (13-15)	11 (100%)	6 (100%)	5 (100%)	

Note. DUREL = Duke University Religious Index; IV = independent variable; OR = organized religious activity; NOR = non-organized religious activity; IR = intrinsic religiosity.
[a]Chi-square or Fishers Exact test.

Descriptive data from the DUREL completed by the DPP coaches is presented in Table 12. Overall, 50% of the community-based coaches reported being active in their religious organizations a few times a month and the other 50% are more active on a weekly basis in their churches. All of the faith-based coaches reported being active at least weekly or more in their churches (OR subscale). Comparing the personal spiritual time (NOR subscale) spent between the two groups of coaches, 80% of the faith-based coaches report daily or more than once-a-day personal spiritual activities as compared to 30% of the community-based coaches.

Delphi Survey Technique Results

Six faith-based (FB) coaches completed a two-round Delphi Survey about spiritual interventions used while leading a DPP course. In the first round, the Delphi Survey included a list of 10 spiritual interventions. The FB coach indicated which spiritual interventions, if any, were used with an individual, with the group, or both. Additional comments were also collected to describe how interventions were used or to write-in others that may not have been on the list (see Table 13). The results showed that eight out of the 10 interventions were used by all of the faith-based coaches. Two of the interventions, meditation facilitation and presence, were not used by all the coaches. Reasons for this may be the class style format for the DPP courses, which provides more of a learning and discussion forum about nutrition and lifestyle. Another reason may be the time constraints for the classes. Because these two activities were not used by all of the coaches, they were eliminated from being used in round two of the Delphi Survey.

Two different coaches made comments in round one of the Delphi Survey which included: “Sometimes have used prayer along with encouragement for participants” and

> We always start a session with prayer. Regarding “Hope Inspiration,” I frequently point out how Jesus never criticized anyone who came to Him for help. I point out how He always encourages us to start over when we mess up. I mention this throughout the program, but especially in Session 11.

These coaches are describing the use of spiritual interventions to provide support for DPP participants.

Table 13

Delphi Survey, Round One, Spiritual Intervention Frequency (n = 6 Coaches)

Spiritual Intervention	Individual *n* (%)	Group *n* (%)	Both *n* (%)	Total # Using S.I.
Active Listening		1 (16.7)	5 (83.3)	6 (100)
Emotional Support	2(33.3)		4 (66.7)	6 (100)
Forgiveness Facilitation	1 (16.7)	1 (16.7)	4 (66.7)	6 (100)
Touch/Hug			6 (100)	6 (100)
Hope/Inspiration	1 (16.7)	5 (83.3)	6 (100)	6 (100)
Humor			6 (100)	6 (100)
Meditation Facilitation	1 (16.7)	1 (16.7)	1 (16.7)	3 (50)
Spiritual/Sacramental	1 (16.7)	1 (16.7)	4 (66.7)	6 (100)
Prayer		1 (16.7)	5 (83.3)	6 (100)
Presence	1 (16.7)		2 (33.3)	3 (50)

Note. The six coaches indicated how they used each of the spiritual interventions (S.I.).

The second round of the Delphi Survey was emailed out about four weeks after the first round. The researcher collated and analyzed the answers and analyzed the data from the first round and removed two interventions, presence and meditation facilitation, which met the criteria of 50% use by the coaches. The second round invited the coaches to rate, based on a Likert-type scale, the importance of using spiritual interventions in a DPP group setting. The six faith-based coaches served as “experts” to develop a list of the type and frequency of spiritual interventions used in a group setting while leading a DPP course.

The Delphi Survey, round two, contained eight spiritual interventions which the faith-based coaches rated based on this statement, "Please indicate how important the intervention is to help a participant be successful in the DPP program" (see Table 14). The Likert scale ranged from 1—not important, to 4—very important. The responses from the coaches ranged from 2 to 4 for all six coaches, which indicates all of the spiritual interventions are at least somewhat important.

Table 14

Delphi Survey Round Two, Ranking of Spiritual Interventions by Faith-Based Coaches

	Somewhat Important *n* (%)	Important *n* (%)	Very Important *n* (%)
Active Listening			6 (100)
Emotional Support			6 (100)
Forgiveness Facilitation		3 (50.0)	3 (50.0)
Touch/Hug	1 (16.7)	2 (33.3)	3 (50.0)
Hope/Inspiration		1 (16.7)	5 (83.3)
Humor		1 (16.7)	5 (83.3)
Spiritual/Sacramental		5 (83.3)	1 (16.7)
Prayer			6 (100)

Five of the six coaches made a comment about spiritual interventions. One coach indicated she used Bible scriptures. Four of the coaches described using prayer to start the meeting, one closed the class with prayer and one encouraged one of the participants to lead the prayer. Results from this survey show that active listening, emotional support and prayer are the spiritual interventions that all of the DPP coaches reported as very important to support participants in the program. One coach wrote, "I use a prayer to start the meeting, and frequently

to end the meeting with prayer. I point out how similarly difficult it is to change our habits, whether our sinful habits or our eating/physical activity habits."

Another coach wrote, "The group shared personal successes and setbacks and we emailed and shared prayer requests. This helped keep the group connected."

Giving hope and use of humor (83.3% each) were rated very important for five of the six coaches (83.3%). One coach wrote, "I write a different inspirational/humorous quote on the white board at each meeting. I reinforce how important it is to stay positive and to encourage oneself and look for even the smallest changes of behavior." Another coach wrote, "I like to add humor to keep the participants relaxed and not up-tight. I find that being happy helps, also."

Use of spiritual/sacramental activities was rated important for 83% of the coaches. An interesting finding in the data regarding the "touch/hug" intervention showed it was rated as somewhat important (16.7%) and important (33.3%). The coaches seem to be respecting the need for personal space when using spiritual interventions in group settings.

Answering the Research Questions – Coaches

Research Question 1

In a group of both faith-based and community-based DPP coaches, what is their perceived measure of S/R, if any at all? To determine if there was a significant difference between the two groups of coaches in OR subscale and the NOR subscale, chi-square crosstabs was computed. The Fisher's Exact test was used for statistical analysis due to the small sample size (Fields, 2009). No statistical significance was found in the reported organizational religious activities (p = .06) or the non-organizational/private religious activities (p = .66). Because of the small sample size, statistical power was impacted related to low cell numbers.

The IR subscale consists of three questions with a range of 3 to 15 for a score. The average of the three questions is reported for each coach. The range of scores for the 11 coaches in this study is 13 to 15 which means they report spiritual living as "definitely true of me." Again, no statistical significance was noted in IR (p = .18) between the reported S/R of the faith-based or community-based coaches. In totality, these coaches report being highly spiritual in their beliefs and the way they live their lives.

Research Question 5

What does the application of the Delphi Survey Technique reveal in terms of establishing the relative importance of spiritual interventions upon participants attending a faith-based DPP course? The results of the Delphi Survey show that all the faith-based coaches reported using prayer, active listening, and emotional support in leading their DPP courses. Furthermore, giving hope, using humor, and using spiritual/sacramental activities were rated as important or very important by the majority of the coaches.

Answering the Overarching Research Question and Hypotheses

To conclude this chapter, the overarching research question and the hypothesis will be answered. The *overarching research question* is: Is spirituality/religiosity (S/R) correlated with improved health outcomes for individuals diagnosed with pre-diabetes and T2DM who attend faith-based DPPs? For this study, there was no statistically significant difference between the participants who attended a DPP led by a faith-based coach as compared to a community-based coach on the outcomes of weight loss, decreased BMI, or increased physical activity. One statistically significant finding related to physical activity showed that men were more successful at meeting the goal of 150 minutes per week than women.

Hypotheses

The hypothesis being tested for the *overarching question and questions 2, 3, and 4* is: Participants who attend a faith-based DPP course will show a greater improvement in reducing weight, BMI, and increased physical activity than participants who attend the community-based DPP program. This hypothesis was not supported based on this small sample size.

The hypothesis to test *question 1* is: Faith-based coaches will report greater S/R as compared to community-based coaches. This was not supported based on the results of the DUREL, especially the IR where all of the coaches reported high intrinsic religiosity related to living their faith.

There is no hypothesis for *question 5* as it is not predicting a relationship or change but is a description for the qualitative data collected on spiritual interventions.

Conclusion

In conclusion, this chapter has analyzed demographic data from both the DPP participants and the DPP coaches. Data were compared between those participants who attended a DPP course led by a faith-based coach versus a community-based coach as whether there was a relationship between spirituality and the outcomes of weight loss, decreased BMI, and increased physical activity. Finally, the faith-based coaches were surveyed about, and ranked the importance of, spiritual interventions used in a group setting such as the DPP. Chapter V will provide a discussion of the findings, the limitations, and future research needed in this area.

CHAPTER V

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS FOR PRACTICE AND FUTURE RESEARCH

This chapter begins with a review of the research problem and the purpose of the research. A summary of the study findings with interpretation based on the research questions and hypothesis will be presented next. The findings will be applied to the Biopsychosocial-Spiritual Model developed by Koenig. The chapter concludes with a description of limitations and recommendations for clinical practice and future research.

Statement of the Problem

There is a need, based on the literature, to identify spiritual interventions and measure the relationship between spiritual/religious S/R activities and practices in the support of diabetes self-care management. Research is needed that compares health outcomes in S/R atmospheres or environments (faith-based and faith-placed) as compared to an atmosphere or environment that does not (Koenig, 2011). The need for professional support for research and scholarship regarding the impact of faith community nursing (FCN) and other faith-based programs and treatments continues to mount and yet, empirical studies with solid research designs and evaluation lag in proportion (Ziebarth, 2014). This research will contribute to spiritual/religiosity health care literature related to spirituality of participants attending a Diabetes Prevention Program (DPP) and the coaches who lead the programs.

Purpose of the Study

The purpose of this study was to determine whether there was a relationship between a modified educational intervention (the DPP) for individuals with pre-diabetes (pre-DM) or type-2 diabetes (T2DM) with variables of spirituality and religiosity related to participant outcomes of weight, body mass index (BMI), and physical activity. All DPP participants and DPP coaches completed a spirituality survey (Duke University Religion Index or DUREL). Furthermore, self-identified faith-based coaches also completed a two-round Delphi Survey to determine what, if any, spiritual interventions may have been used while leading a DPP course.

Discussion of Findings

Summary and Discussion – DPP Participants

The first section of the summary and discussion will focus on the demographics of the DPP participants. The second part of this section will focus on answering the research questions related to S/R variables with a summary of the outcomes. A total of 34 participants were surveyed for this study and had complete outcome data.

Demographics of sample. The incidence of diabetes and pre-diabetes is at an epidemic level. The CDC estimates that as many as one in five could have the disease by 2025 and diabetes prevalence will increase to 33% by 2050 (Albright & Gregg, 2013; Boyle, Thompson, Gregg, Baker, & Williamson, 2010). The age of this sample was dichotomized for analysis purposes. The actual categorical data shows that 44.1% of the sample was 66 and older with 35.3% between age 51 and 65. Coupling this with the employment results, supports the evidence that most of the participants were retired. The concern from the literature is that people in the U.S. are living longer and the population above age 65 will be expanding greatly with the aging of the baby-boomers (Boyle et al., 2010). New data from the CDC show that the age group 45 to

64 led the younger and older age groups in both persons diagnosed with DM and those undiagnosed (CDC Division of Diabetes Translation, 2017).

The majority of this sample were female which is opposite of the reported demographics for pre-DM in the U.S. population. More men are diagnosed with DM than women (9.1% and 8.5%, respectively) including higher rates of undiagnosed DM (3.2% and 2.3%, respectively (CDC Division of DM Translation, 2017). The recruitment process for the DPP program in Macomb County was primarily through churches involved in the Faith Community Nurse (FCN) Network and announcements to the public and health care providers with literature (mailed and on-line) provided by the Henry Ford Health System (HFHS). The data for this study were collected during year two of the creation of the DPP in Macomb County. Currently, the DPP is now in year three and the FCN Department has now linked with the HFMH utilizing their electronic medical record system to identify persons with pre-diabetes or who are at risk for DM to generate a referral system to the DPP courses (A. Brown, personal communication, September 2017). This will increase the number and diversity of participants from across Macomb County and the surrounding areas.

The study sample consisted of white/Caucasian and black/African American (AA) participants. Missing are participants from the Hispanic and Asian racial groups. The minority populations of the U.S. are increasing, especially the Hispanic population which are at greater risk of developing diabetes than the white/Caucasian population (Boyle et al., 2010). The incidence of reported pre-diabetes from the CDC Division of DM Translation (2017) based on ethnicity in the U.S. population include black/AA at 36.3%, Asian at 35.7%, Hispanic at 31.7%, and white/Caucasian at 31.5%. The report also lists the percentage of ethnicities reporting awareness of pre-DM. The percentages show that white and black Americans have the greatest

awareness (11.3% and 10.5%, respectively), Asian American at 9.0%, and Hispanic at 7.5% awareness (CDC Division of Diabetes Translation, 2017).

Zhang, Wang, and Huang (2009) looked at racial/ethnic disparities of DM using the National Health and Nutrition Examination Survey (NHANES) in four time periods from 1971 to 2004. The prevalence of diagnosed and undiagnosed Type-2DM was estimated for three racial groups (white/Caucasian, black/AA, and Mexican American) and for four groups of BMI (normal weight, overweight, obese, and severely obese). Their results showed the greatest ethnic disparities in diabetes prevalence in the overweight group which increased 33% in whites compared to 60% in blacks and 227.3% in Mexican Americans. Disparities were not observed in obese and severely obese groups over time. Racial disparities declined in undiagnosed DM in all BMI groups (Zhang et al., 2009). Unfortunately, this sample did not have any Hispanic/Mexican American participants, but the need is prevalent in Macomb County as there is a large Mexican American migrant population which would benefit from bilingual coaches (E. Gomez, personal communication, November 2016). Screening for pre-DM is part of the purpose of the DPP. With early identification of at-risk persons, the DPP serves as a resource to health care providers and communities to educate people at risk to prevent DM.

The AA church is the focus of many health promotion programs including diabetes education, blood pressure management, and weight loss, to name a few (Lancaster et al., 2014; Sattin et al., 2016; Yeary et al., 2011). Sattin et al. (2016) describe faith-based lifestyle interventions with AA who have DM but are less likely to benefit from lifestyle interventions compared to other ethnic groups. They describe social and cultural barriers which can include body-image ideas, food attitudes, lack of role models, and lack of safe places to exercise in their communities (Sattin et al., 2016).

This study sample was well educated with the majority of participants having more than a high school education including earning associate degrees, having vocational training post-high school, and earning bachelor's or graduate degrees. Data from the CDC Diabetes Translation Report (2017) show that only 30.4% of the U.S. population with pre-DM have more than a high school education.

Since the original DPP study published in 2002, the DPP program has been modified by using group sessions (as compared to one-on-one meetings with nurse or dietician case managers) and to include both lay and various professionals as leaders of the sessions (Crespo, Hatfield, Hudson, & Justice, 2015; Knowler et al., 2002). The DPP courses being utilized for this research were set up in the group format. The persons leading the course are called "coaches" who may be health care professionals or a para-professionals who may not work in the health care field but who have an interest in health. The main reason for modification of the DPP has to do with the applicability or translation into communities at an affordable cost for the program (i.e., one-on-one counseling vs. group, professional vs. lay coaches) (Kahn & Davidson, 2014; Vitolins et al., 2017). Providing education during the "traditional" office visit is not practical because visits are so time limited. The increased focus on pre-DM and DM education has shifted to group-based DM education and prevention through self-management of lifestyle habits including diet and exercise (Hoerth & Udlis, 2014).

There have been questions about the effectiveness of group-based diabetes education as compared to education received during routine care and/or individual education. Eight articles were reviewed by Hoerth and Udlis (2014) to evaluate effectiveness of group education. Seven of the articles showed that group education was effective in increasing knowledge and improving A1C levels. Two of the seven articles reviewed showed that there were no significant differences

in BMI levels between the two delivery methods (Hoerth & Udlis, 2014). These findings confirmed a prior systematic review by Heinrich, Schaper, and De Vries (2010), who had the same results of increased knowledge, decreased A1C but no effect on BMI. A final point from the Hoerth and Udlis (2014) article was the amount of time and contact between the clients and the program. The evidence points to at least weekly contact and, at the very least, monthly contact, over at least a 4-month period of time to improve outcomes in diabetes education programs.

Attendance at programs has been implicated in the successful outcome of weight loss and diabetes management programs. Melanson and Lowndes (2010) created a 24-week single group trial to measure change in weight and indicators of glucose control (e.g., fasting blood sugars, insulin levels, and insulin resistance), waist circumference, and BMI. Their main hypothesis was that attendance would be directly related to risk reduction for type-2 DM. Results showed that normo-glycemic, overweight and obese individuals who attended at least 65% (16 of 24) of the weekly group meetings, showed reduced risk for type-2 DM evidenced by improvement in glucose control measures listed above and reductions in weight, BMI, and waist circumference (Melanson & Lowndes, 2010) . As stated above, over 60% of the participants in this study attended 13 or more DPP classes, but there was no statistically significant findings ($p > .05$) related to weight loss for the group.

Answering the Defining Research Questions – DPP Participants

To determine whether S/R variables had a relationship with the outcome variables, two perspectives were taken. First, was there a relationship based on the type of coach (faith or community), and second, was there a relationship based on the three subscales of the DUREL?

Defining research questions 2, 3, and 4. More participants who had a community-based

coach met the 7% weight loss goal as compared to the participants with a faith-based coach (46.7% and 36.8%, respectively). Also, more participants with a community-based coach met the 150 minutes per week physical activity goal as compared to the groups with faith-based coaches (46.7% and 31.6%, respectively). Looking at the change in BMI, there was barely a difference between the two groups with 79% of participants with a faith-based coach achieving slightly more of a reduction in BMI as compared to 73.3% of participants with a community-based coach. No statistically significant differences were noted for the weight loss goal (p = .56), physical activity goal (p = .40), and reduction in BMI (p = .62) based on the type of coach.

The three subscales of the DUREL were used as a measure of S/R to determine whether there was an association with meeting the weight loss goal, the physical activity goal and reducing the BMI. There was no statistically significant difference between participants' scores on the OR, NOR, or IR subscales to influence the outcomes of weight loss, increased physical activity, nor a reduction in BMI.

Discussion. A unique feature of this study is the actual surveying of participants about their spirituality/religiosity and using this measure as a variable. Most studies about church-based health promotion programs are just that—church based (Austin et al., 2013; Baruth & Wilcox, 2013; Cené et al., 2013; Gutierrez et al., 2014). The review of the literature assumes that just because the program is held in a church or sponsored by a religious institution, that is, being in the physical building, it will have an effect on the outcome of the program and the participants. An article by DeHaven and colleagues (2004) describes faith-based organizations as a "catch-all category referring to health programs designed, conducted or supported by groups affiliated-with or based-in a non-secular setting" (p. 1030). The authors describe these settings

could include a store-front church, the local YMCA, or a local chapter of Habitat for Humanity (DeHaven et al., 2004).

Campbell and colleagues (2007) identify why churches and religious organizations are great places to hold health promotion programs. Some of the reasons include the majority of Americans identify with a religion, positive effects of social networks, loyalty, familiarity with religious rituals and cultural food habits and, a main factor, that churches have resources including space to meet and a relationship with the community (Campbell et al., 2007). Furthermore, Anshell and Smith (2014) describe in their article the role religious leaders (i.e., pastors, priests, rabbis, etc.) can play in providing guidelines, counsel, motivation, and initiatives for the purposes of health promotion. Thus, health promotion activities in churches or places of worship can attract many people from the community who may not have a relationship with the church or the faith.

This research focused on the impact of spirituality/religiosity of the participants and the relationship with meeting the goals of the DPP program. Many of the articles found in the literature focus on African American churches, especially those in southeastern U.S. which is also known as the "Bible-belt" (Baruth & Wilcox, 2013; Polzer & Miles, 2007). An article by Rovner, Casten, and Harris (2013) evaluated cultural beliefs in 110-older African Americans (80% women) and adherence to diabetes self-management behaviors. They surveyed participants about present-time and future-time orientation and religiosity as well as exercise, reading food labels and checking blood sugars using a brief scale. The results showed that participants who engaged in all three self-management behaviors had higher future-time orientation scores (p = .004) and religiosity scores (p = .024). However, there was also a significant relationship between exercising consistently and religiosity (p = .014). This study did not measure the

implementation of a program or intervention, but the study surveyed the participants about their personal religiosity and following life-style management of diabetes.

Another cross-sectional study looked at religion and the degree that participants feel that God is in control of one's health. Karvinen and Carr (2014) recruited, by email, a group of adults (n = 549) from across the U.S. looking at God Locus of Health Control and health behaviors and beliefs. Included in this study was a question about the importance of religion as well as a scale investigating God Locus of Health Control (the perception of God's control over their health). The health behaviors looked at included smoking, alcohol consumption, physical activity, fruit and vegetable intake, perceived susceptibility of chronic disease (heart disease, diabetes, cancer, stroke), and perceived risks of poor health behaviors. The interesting finding the researchers pointed out was the statistically significant finding that the importance of religion, as compared to God Locus of Health Control, was correlated with physical activity. Future research will need to explore possible relationships between physical activity and religiosity.

The DUREL has been used to evaluate spirituality with alcohol treatment (Piderman et al., 2009), caregiver burden, mental health, and quality of life (de Oliveira et al., 2015), and cancer patients (Sherman et al., 2000). A study used the DUREL tool to sample 973 participants from five Alabama counties about religiosity, smoking, exercise, and obesity. The OR and NOR subscales were negatively related to lifetime cigarette smoking and OR was positively related to leisure-time physical activity. IR did not predict smoking or exercise (Roff et al., 2005). In the current study, OR and NOR was not significantly related with physical activity (p = –.41; p = .08, respectively). In searching the literature, no research was found using the DUREL specifically with patients with pre-DM or DM. The DUREL is a brief, easy tool to use and future research may include the use of the DUREL to measure S/R.

In summary, to answer *defining research questions 2 and 3*, there was no correlation between the variables of S/R nor the type of coach (faith-based or community-based) on the outcomes of weight loss, decreasing BMI, or increasing physical activities. To answer *defining research question 4*, the comparative analysis between the two groups of participants showed there was no significant difference between the variables of S/R of each group on the study outcomes.

Summary of Descriptive Findings – Coaches

In this section of Chapter V, a descriptive summary of the coaches' data will be presented. The discussion for this section will include answering the defining research question 1. The DUREL was used to measure spirituality/religiosity (S/R) of this coach group. The results of the DUREL were analyzed as a categorical variable to see if there were any specific differences in the three subscales in describing the S/R of the coach group.

This sample of coaches (n = 11) consisted of six self-identified faith-based coaches which were designated into two categories, either a faith-community nurse (FCN, n = 3) or a member of a congregational health team (n = 3). The five remaining coaches identified themselves as community-based nurses (n = 4) and one dietician. The faith-based coaches were also surveyed using a two-round Delphi Survey Technique about the types of spiritual interventions used, if any, while leading a DPP course.

Discussion and Answering Defining Research Question 1

The discussion for this part of Chapter V will include answering *defining research question 1*: "In a group of both faith-based and community-based DPP coaches, what is their perceived measure of S/R, if any at all?" Most of the references to diabetes classes and programs focus on the outcomes of the participants—see discussion above. However, this research is

unique as the coaches of the individual DPP courses are also part of the study to determine their spirituality as a variable.

For this group of coaches (healthcare professionals and para-professionals), their spiritual beliefs are very important in the work they are doing and how they live their lives. In reviewing the literature, there is great focus on the need to provide spiritual care to patients, about how healthcare providers should provide this dimension as part of their care to patients and how to educate nurses and medical staff and students to do spiritual care assessments and interventions (King, 2000; Pullen, McGuire, Farmer, & Dodd, 2015; Ross, 2010; Swinton & Pattison, 2010; Younas, 2017). However, there are few studies actually surveying nurses or healthcare providers about their spirituality and if these beliefs may, or may not, impact their professional practices.

A recent study was published by Coughlin et al. (2017) as the first of a two-part study to assess spirituality in maternal-child health staff. This study surveyed a total of 406 nurses (NICU and obstetric), physicians and residents (neonatology and OBGYN), advance practice nurses, physician assistants, respiratory therapists, social workers, and chaplains from three academic hospitals in the Philadelphia area. Subjects who reported they were a Christian denomination and African American or Asian had higher scores on the Spiritual Involvement and Beliefs Scale (SIBS) and the Spiritual Care Inventory (SCI) as compared to white, Latino and other ethnicities and other reported religious affiliations. More spiritual care practices were provided by subjects who reported being Christian and, specifically, African American and Christian. Finally, there was a positive correlation between those who are more spiritual and those who incorporate spiritual care and reflective practices into their work experience (Coughlin et al., 2017).

Another study surveyed nurses, medical students, and physicians from several hospitals in Tehran, Iran, about their spirituality, religious attitudes, and practices (Hafizi, Koenig, Arbabi,

Pakrah, & Saghazadeh, 2014). This study surveyed 720 Muslim physicians and nurses using four different tools, one of which was the DUREL. Female physicians and nurses who were married reported higher levels of spirituality. Females were not more religious than men. Training level was inversely related to spirituality with fewer years in practice or school reporting more spirituality. The article notes that this may be due to less emphasis on the role of spirituality in health as the program progresses or that the program is more focused on the technical aspects of care (Hafizi et al., 2014). The attitude of physicians and nurses toward religion could affect the relationship with their patients.

The findings of these two studies and the findings of the current study show that more spiritually oriented healthcare providers tend to engage in spiritual behaviors in their role as healthcare providers. On the flip-side, large numbers of patients have religious and spiritual needs which are not being met (Koenig, 2012a). With 78% of Americans reporting that they believe in God and an additional 15% believe in a higher power or universal spirit, linking the spirituality in providers with patients is an intervention that needs further exploration (Coughlin et al., 2017).

With the onset of a chronic illness (like diabetes) or with the new knowledge that a person is at risk for diabetes, the search for solutions is paramount. The DPP coaches in this research report being highly spiritual in their beliefs. However, the coaches were not randomly assigned to teach the DPP courses. As the coaches were trained and course sites became available, coaches were offered a site. Coaches that were trained as faith-community nurses had the option to lead a DPP program in a community-site or a faith-based site. Thus, approaching the aspect of S/R at a community-based site was up to the coach and the participants, as religious/spiritual references or interventions are considered a modification to the DPP program

without changing the curriculum. There were no statistically significant findings based on coach-type nor site-type on participant outcomes in this study. Continued research focusing on participant outcomes and enlisting faith-based coaches who are allowed to and interested in using spiritual interventions needs to continue. It cannot be assumed that all nurses, or all DPP coaches, are spiritual or religious. Research needs to continue to survey the coaches and the participants about their own spirituality.

Examination of Spiritual Interventions: The Delphi Survey

This section of Chapter V will briefly describe the methodology for the two-round Delphi Survey with a summary of results. The discussion will include answering defining research question 5.

The six faith-based coaches agreed to participate in a two-round Delphi Survey exploring possible spiritual interventions used while leading a DPP course. *Defining research question 5* asks: What does the application of the Delphi Survey Technique reveal in terms of establishing the relative importance of spiritual interventions upon participants attending a faith-based DPP course? The results of the Delphi Survey show that all the faith-based coaches reported using prayer, active listening, and emotional support in leading their DPP courses and ranked them as very important to support participants in the program. Five of the six coaches made a comment about using spiritual interventions. Four of the coaches described using prayer to start the meeting, one closed the class with prayer, and one encouraged participants to lead the prayer. Furthermore, giving hope, using humor, and using spiritual/sacramental activities where rated as important or very important by the majority of the coaches.

Discussion and Answering Defining Research Question 5

In this study, three of the six faith-based coaches were faith-community nurses (FCNs). FCNs, formerly known as parish nurses, which are registered nurses who work in a faith community and address health issues in that faith community and the community-at-large (Westberg Institute for Faith Community Nursing, n.d.). King (2011), in her research, identified the health care services FCNs delivered by interviewing 17 members of three churches who had a relationship with the FCN. The six service areas provided by the FCNs that were identified by the church members are as follows: health education, personal counseling, health screening, referral, spiritual support, and being a health advocate. In contrast, the FCNs in this study were working with groups of DPP participants who provided five of the six identified service areas. The activities the faith-based nurse DPP coaches (and non-nurse coaches) provided to the group included physical care (blood pressures and weight are screened at every DPP class), emotional care (through active listening, giving emotional support, providing hope, and use of humor), group discussion as opposed to personal counseling, health screening (the initial DPP screening form), spiritual care (praying with the class and using spiritual/sacramental activities), and being a health advocate. The FCNs provide spiritual care as a main component of nursing care, which is valued and expected in faith communities (King, 2011).

Much of the literature about faith-based diabetes prevention programs are really "faith-placed" meaning they are held in the church or religious organization. The programs are mostly provided by persons who are not members of the church/organization who are hosting the program (Austin et al., 2013; Baruth & Wilcox, 2013). It is a benefit to the church to host the health education and promotion programs because of the churches' commitment to healthy and holistic living. Christians are encouraged in the Scriptures to lead healthy, peaceful lives: "Dear

friend, I am praying that *all is well* with you and that *your body is as healthy* as I know your soul is" (3 John 1:2, The Living Bible). Furthermore, having church leadership (i.e., pastors and priests) endorse health programs increases the interest and acceptance of the church membership to participate (Summers et al., 2013).

For the current research, the DPP programs were coordinated and sponsored through the Faith-Community Nursing (FCN) Department from Henry Ford Macomb Hospital. The FCN Department has been involved in making Macomb County healthier for over 25 years by promoting health education through the training of nurses in their own churches to provide and promote health education, screening, counseling, and referral. The nurses from the community can enroll in a FCN training program offered through the FCND at Henry Ford Macomb Hospital to become commissioned as a FCN. Developing, receiving and implementing the grant from the Michigan Department of Community Health to develop the DPP has allowed the FCN Department to be a leader in Macomb County to serve the community with a new and structured program via a private/public partnership. The DPP courses, in this research, are both faith-based using FCNs and faith-placed when offered in a church. The faith-based coaches have a relationship with the church because of the FCN Department and network.

The non-nurse faith-based workers self-identified as members of their congregational health teams. The teams are also referred to as health ministry teams which work closely with the pastoral leaders of the church to offer support, healing, and care of people within the church and the community it serves (VanLoon, 2012). People who become involved in health ministry teams are usually lay people with special gifts in pastoral health and care who work alongside qualified and educated health professionals as a team. The FCN frequently is the leader of a health ministry team (VanLoon, 2012).

Three of the faith-based coaches in this study were members of their congregational health ministry team who attended DPP coach training and led a DPP course. In the diabetes literature there is more awareness of lay members of the community providing selected health services. The American Association of Diabetes Educators (2009) published a Position Statement about using community health workers (CHW) in diabetes management and prevention. Most community health workers are employed by health care systems or health departments because they share the culture, language, and life experience of the people they serve (Crespo et al., 2015).

CHW and congregational health team members can be client advocates, provide services (e.g., blood pressure checks and first aid), provide health education, be outreach and enrollment agents and community organizers (Crespo et al., 2015; VanLoon, 2012). A mixed-methods study was conducted by Collinsworth, Vulimiri, Schmidt, and Snead (2013) to evaluate the effectiveness of a CHW-led DM self-management education program and determine how CHW's and primary care providers worked together. CHWs were involved in providing five DM education classes over an 18-month period. Program outcomes included change in A1C, BMI, diastolic and systolic blood pressure. Furthermore, five CHW and seven primary care providers were interviewed about the role of the CHW, how they may have improved DM-related outcomes, and how they interacted with the primary care providers. The results showed that clients who participated in the programs provided by the CHWs had statistically significant reductions in A1C and blood pressure readings and were viewed as valuable assets to community education programs (Collinsworth et al., 2013). Thus, trained CHWs or lay coaches can be utilized in a variety of roles to help clients achieve healthier outcomes.

In conclusion, this research study helps to describe the actions of faith-based coaches in providing DPP courses both in community settings and in faith-based settings. The coaches are incorporating spiritual interventions as they feel appropriate to support the group to achieve individual goals. Spiritual interventions and using faith-based coaches become another intervention in providing health education to a community. Further study is need with a larger sample size to fully explore the true impact of faith-based interventions. The next section of Chapter V briefly applies the Biopsychosocial-Spiritual Model to this research study.

Framework: Biopsychosocial-Spiritual Model

The theoretical framework for this study is based on the work of Harold Koenig. The underlying premise of this framework is based on the Biopsychosocial (BPS) Model but with the added dimension of spirituality (BPS-S). His premise is the importance of spirituality/religion (S/R) as a coping mechanism to encourage researchers to investigate relationships between religious variables and health outcomes (Cohen & Koenig, 2003).

The Biopsychosocial Model, as applied to this research study, includes biological factors (e.g., change in weight and BMI), psychological factors (e.g., motivation to make life-style changes to include incorporating an exercise routine), and social factors (e.g., attending 16-DPP classes over a 6-month period). With the addition of the spiritual box on the top of the model (see Figure 1, Hatala, 2013, in Chapter II, page 43; Koenig, 2015), additional factors were added. There is overlap in the psychological and social dimensions with the spirituality/religiosity dimension, especially in the areas of social support and cultural experiences (Cohen & Koenig, 2003).

When a person is diagnosed with diabetes, or discovers that he/she is at-risk for diabetes, there is a need for both education about life-style changes and social support. The concept of

social support includes family, friends, places of work, schools, and places of worship. This new diagnosis of pre-DM or DM may even disrupt some of these same relationships (Koenig, 2013). Changing personal life-style behaviors to promote health and prevent illness are more than biological/physical manifestations. The impact includes psychological, behavioral and spiritual dimensions that embrace the whole person, their family and their support systems.

Learning about and changing health behaviors, which occurs by attending a DPP course, allows the person to process and reflect (e.g., meditation) about the needed changes over a 1-year period. These choices are presented in the DPP course to allow the participant to process the meaning and purpose of the behavior change. It allows them to experiment with food choices, exercise choices, and behavior changes in a supportive environment.

Conclusions: Overarching Research Question and Hypothesis

The *overarching research question* for this research study asks: Is spirituality/religiosity (S/R) correlated with improved health outcomes for individuals diagnosed with pre-DM and T2DM who attend faith-based DPPs? In this study, S/R was not correlated with improved health outcomes to lower weight and BMI and increase physical activity. Neither was there a correlation with improved outcomes based on the type of coach, faith-based or community-based, a person had while attending a DPP course.

Hypotheses

The hypothesis being tested for the *overarching question and defining questions 2, 3, and 4* is: Participants who attend a faith-based DPP course will show a greater improvement in reducing weight, BMI and increased physical activity than participants who attend a community-based DPP program. This hypothesis was not supported.

The hypothesis to test *defining research question 1* is: Faith-based coaches will report greater S/R as compared to community-based coaches. This was not supported based on the results of the DUREL, especially the IR where all of the coaches reported high intrinsic religiosity related to living their faith.

There is no hypothesis for *defining research question 5* as it is not predicting a relationship or change but is a description for the qualitative data collected on spiritual interventions.

Limitations

The experience of surveying two groups of people (participants and coaches) about their spirituality and the impact on DPP outcomes is an area where little research has been done. There has been more research on spiritual interventions, but not specifically used in a group setting. Based on the outcomes of answering the research questions, there are several limitations to the current study:

1. Regarding quantitative methodological limitations, interpretations of the results are limited by the fact of a small sample size, the inability to randomize which participants attend which sessions, the size of the classes, and the place the DPP courses are held.
2. The biologic measurements were not controlled as they are self-reported by DPP participants to the coaches (i.e., the number of minutes of physical exercise). Heights and weights were measured by a variety of persons and methods (coaches in the classes) and there were no standard measuring tools used (i.e., the scale and measuring height). However, the same scales were used consistently week after week by the same coaches at each site.

3. Because of the small sample size, there was a lack of cultural and religious diversity that can be found in the population of Macomb County.
4. Finally, recording the A1C level was not listed as an DPP outcome for participants. There was no equipment provision at the classes to do any pre- or post-session A1C testing. Because of this, including A1C as an outcome was dropped from the study because of the lack of data to compare.

Recommendations for Clinical Practice and Future Research

This final section of Chapter V will include a discussion about potential clinical practice applications of the results and findings of this study. This will be followed by recommendations for future research.

Recommendations for Clinical Practice

The discussion above related to group versus individual effectiveness of educational programs supports the continued use of group programs, especially in view of the overwhelming societal need of health education about obesity and diabetes prevention. However, more structured use of spiritual interventions should be incorporated in the programs that are hosted by religious/faith-based organizations. In research completed by Whitney et al. (2017), the research team tailored a clinic-based DM education program into a faith-based education curriculum. To do this, the research group worked with the pastor and health ministry team at a church in Chicago to modify presentation slides to include scriptures which supported the learning objective of each class. In total, 17 education documents were adapted for use in an African American church curriculum and scriptures were added to goal-setting worksheets (Whitney et al., 2017).

Kitzman et al. (2017) in her article highlights a faith-based curriculum for 16 weeks of the DPP program. The curriculum describes faith learning objectives, mini-sermon summary, a memory verse and a faith activity/homework for each of the weeks. The article describes a control group (n = 102) and a faith-enhanced DPP group involving six churches (n = 119). The prospective, randomized study is currently in progress. It will be interesting to monitor the outcome of the research by Kitzman et al. The development of documents for the DPP that are faith-based are currently being developed and incorporated into faith-placed DPP courses. The organization of the DPP with the Henry Ford Macomb Faith-Community Department could be an ideal program to further pilot the Kitzman curriculum.

Regular attendance and motivation to participate in community-based health education programs continues to be a focus. Location, convenience, affordability, and social networks are all important aspects to promote involvement in health programs. Many studies focusing on diabetes prevention and treatment have incorporated the community-based participatory research design to foster collaboration among health organizations, researchers, and community partners, such as religious institutions (Kitzman et al., 2017; Summers et al., 2013; Wallerstein & Duran, 2010). Henry Ford Macomb Hospital has been working at the community level to engage social networks and community organizations. The Faith-Community Nursing Network (FCNN) is engaged with many churches and community centers in Macomb County, which were involved in this research project. As the DPP, coordinated by FCND, grows in support from insurance companies and physician groups, the momentum focuses on sustainability and to show improvements in health outcomes.

Finally, there is a need to survey participants/patients about their spirituality and religious beliefs when dealing with a chronic disease like diabetes. There are conflicting findings when

examining S/R involvement and the involvement of health promotion and screening activities (Koenig, 2012b). As stated above and in Chapter I, just because the course is hosted by a church or religious organization, it cannot be assumed that spiritual beliefs and activities have a positive impact when choosing to make lifestyle changes.

Suggestions for Future Research

Several suggestions for future research are described in this final section of Chapter V. Although the coaches stated they were faith-based coaches, there was no curriculum or direction about how spirituality would be integrated into the DPP. It was totally up the FCN as to what type, if any, spiritual interventions they may use. Future research could incorporate a spiritual curriculum such as the one described in the article by Kitzman et al. (2017). Additionally, because of the lack of diversity in this study, expanding to other religions and cultures would provide broader data about the relationships between spiritual variables and DPP outcomes.

Findings from this study has community education implications for delivering the DPP courses with faith-based coaches and in faith-based sites. As a demonstration project between a private and public partnerships (Henry Ford Macomb Hospital, the support from the Michigan Department of Community Health, and all the community sites), further research should continue to develop and describe the partnerships to highlight the success of such DPP partnerships, including the correlation with spiritual activities.

This research evaluated outcomes based on 6 months' participation in the DPP course. The goal is to achieve 7% weight loss and then maintain or continue to lose in the second 6-month period (weeks 27—52). Results of the systematic review by Neamah et al. (2016) refer to the need of program planners to include maintenance components as they significantly reduce risk for acquiring type-2 DM. Future research with this sample of participants could include

investigating results at 12 months which is the completion of the program, and then continue to follow them for an additional 6 or 12 months. The current grant monies did not allow for monetary rewards to encourage participants to continue in the DPP program. Writing for grant money to support monetary research incentives could possibly encourage greater participation in the DPP program and the research study.

In summary, these findings present implications for future research, and contribute to a larger body of work suggesting the need to identify clinically significant relationships among persons participating in life-style interventions for persons at-risk for diabetes. More research is needed on how S/R influences lifestyle choices that individuals make that cumulatively influence their health. The focus of future research should be about what spirituality does as compared to what spirituality is (Swinton & Pattison, 2010).

Conclusion

This chapter began with the restatement of the purpose of the study and the statement of the problem. A summary of the finding for the participants was presented and applied to answer three defining research questions. Next, a summary of findings for the coaches was presented to answer one defining research question. The results of the Delphi Survey to identify spiritual interventions used while leading a DPP course was presented to answer the fifth defining research question. A brief description of the Biopsychosocial-Spiritual Model was provided and applied to the current study. The overarching research question was answered as well as the hypothesis for this study. The chapter concluded with limitations of the study and recommendations for future study in the area of measuring S/R as a modification for future DPP courses.

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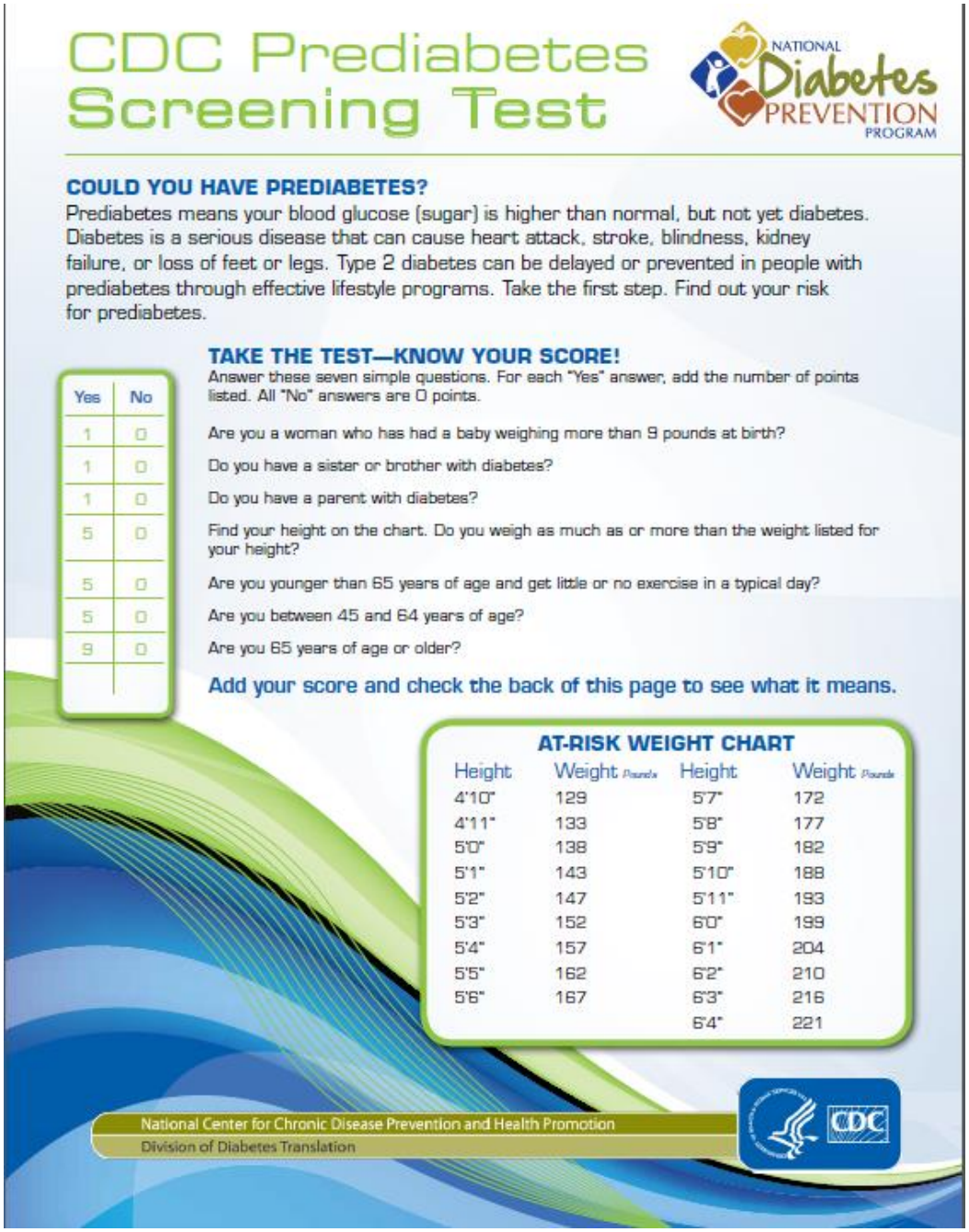
Appendix A

CDC Pre-Diabetes Screening Tool



CDC Prediabetes Screening Test

NATIONAL Diabetes PREVENTION PROGRAM

COULD YOU HAVE PREDIABETES?

Prediabetes means your blood glucose (sugar) is higher than normal, but not yet diabetes. Diabetes is a serious disease that can cause heart attack, stroke, blindness, kidney failure, or loss of feet or legs. Type 2 diabetes can be delayed or prevented in people with prediabetes through effective lifestyle programs. Take the first step. Find out your risk for prediabetes.

TAKE THE TEST—KNOW YOUR SCORE!

Answer these seven simple questions. For each "Yes" answer, add the number of points listed. All "No" answers are 0 points.

Yes	No	
1	0	Are you a woman who has had a baby weighing more than 9 pounds at birth?
1	0	Do you have a sister or brother with diabetes?
1	0	Do you have a parent with diabetes?
5	0	Find your height on the chart. Do you weigh as much as or more than the weight listed for your height?
5	0	Are you younger than 65 years of age and get little or no exercise in a typical day?
5	0	Are you between 45 and 64 years of age?
9	0	Are you 65 years of age or older?

Add your score and check the back of this page to see what it means.

AT-RISK WEIGHT CHART

Height	Weight Pounds	Height	Weight Pounds
4'10"	129	5'7"	172
4'11"	133	5'8"	177
5'0"	138	5'9"	182
5'1"	143	5'10"	188
5'2"	147	5'11"	193
5'3"	152	6'0"	199
5'4"	157	6'1"	204
5'5"	162	6'2"	210
5'6"	167	6'3"	216
		6'4"	221

National Center for Chronic Disease Prevention and Health Promotion
Division of Diabetes Translation

CDC

IF YOUR SCORE IS 3 TO 8 POINTS

This means your risk is probably low for having prediabetes now. Keep your risk low. If you're overweight, lose weight. Be active most days, and don't use tobacco. Eat low-fat meals with fruits, vegetables, and whole-grain foods. If you have high cholesterol or high blood pressure, talk to your health care provider about your risk for type 2 diabetes.

IF YOUR SCORE IS 9 OR MORE POINTS

This means your risk is high for having prediabetes now. Please make an appointment with your health care provider soon.

HOW CAN I GET TESTED FOR PREDIABETES?

Individual or group health insurance: See your health care provider. If you don't have a provider, ask your insurance company about providers who take your insurance. Deductibles and copays may apply.

Medicaid: See your health care provider. If you don't have a provider, contact a state Medicaid office or contact your local health department.

Medicare: See your health care provider. Medicare will pay the cost of testing if the provider has a reason for testing. If you don't have a provider, contact your local health department.

No insurance: Contact your local health department for more information about where you could be tested or call your local health clinic.

CS232302A

www.cdc.gov/diabetes

Appendix B

Consent for Coaches

Diabetes Prevention Program: Exploring Spirituality and Spiritual Interventions on Outcomes

Principal Investigator (PI):	Kieran Fogarty, PhD
Student Investigator (SI):	Sharon E. Long, RN, PhDc, FNP-BC
Program:	PhD in Interdisciplinary Health Sciences, Western Michigan University
In Collaboration With:	Henry Ford Macomb Hospital, Faith-Community Nursing Department

Please read this consent form carefully and completely before clicking the "YES" button at the end. If you have any questions or need clarification, you may contact Sharon Long at 586-255-4091 or sharon.e40.long@wmich.edu. This study is being conducted by Sharon Long, a Family Nurse Practitioner, as part of her doctoral dissertation.

What we are trying to find out in this study?

This aim of this study is to examine whether there is a relationship between spirituality/religiosity (S/R) and the use of spiritual interventions in adults who participate in a Diabetes Prevention Program (DPP) and changes in weight, glycosylated hemoglobin (A1C), body mass index (BMI) and physical activity.

Who can participate and what will you be asked to do if you choose to participate in this study?

Any DPP coach or participant who have completed the core part of the program (Weeks 1-26) can participate in the study. This study will be conducted on-line using a computer. As a coach, you will complete a 10-question demographic questionnaire and a 5-question survey about your spirituality and religiosity. This will take about 10 minutes to complete.

If you have been trained as a Faith Community Nurse (FCN) or are participating with the DPP because you are a member of a congregational health team (ministry), you will be invited to complete an additional 2-round survey, the Delphi Survey, about spiritual interventions possibly used during the DPP classes. This first round will take about 10-15 minutes to complete.

The information you share in the first round of the Delphi Survey will be analyzed from a group of faith-based coaches to develop a second survey. You will receive the second round in about 3- to 4-weeks with a new list of spiritual interventions collated from round one. This questionnaire will ask you to rate the importance of using each of the spiritual intervention in leading a DPP course. The second round of the Delphi Survey will take about 10-15 minutes to complete.

What information will be measured?

Information that will be measured for all DPP coaches and participants includes demographic information and a measure of their spirituality/religiosity. Additionally, those who self-identify as a faith-based coach will be surveyed about spiritual interventions used and the importance of the interventions.

What are the benefits and risks of participating in this study?
There is no direct benefit to you for participating in the study. There is no physical risk to participate in the study. There may be a risk of experiencing feelings of discomfort that may arise simply from recording your spirituality or religiosity as these may be sensitive and personal topics. This study hopes to shed light on the potential relationship of spirituality/religiosity and spiritual interventions to help individuals lower their risk of getting diabetes and help persons with self-management of type-2 diabetes.

Are there any costs or compensation associated with participating in this study?
There is the cost of time to fill out the questionnaires. There is no compensation for participating in this study. You may stop participating in the study at any time by exiting out of the questionnaire/survey by closing your computer file/browser. You may refuse to answer any question without prejudice, penalty, or risk of loss to continue with the DPP course.

Who will have access to the information collected during this study?
Your information will be given a unique code number for the purpose of reporting the data. All questionnaires, surveys and demographic forms will be stored on a password- secured computer as well as an encrypted-Iron Key storage device in the possession of the Student Investigator (S.L.). Aggregate (not individual) data may be discussed with the SI dissertation committee for analysis purpose. Data will not be transmitted to any public computers. Federal regulations require that data be maintained in a locked file in the Primary Investigator's office at Western Michigan University or in the University Archive for at least three years after the study closes.

Questions about the study?
If you have any questions prior to or problems during this study you can contact the following: Primary Investigator, Dr. Kieran Fogarty at kieran.fogarty@wmich.edu or 269-387-3342; or The Chair, Human Subjects Institutional Review Board at (269) 387-8293 or at hsirb@wmich.edu.

This study has been approved by the Human Subjects Institutional Review Board (HSIRB) at Western Michigan University on (date). Please do not participate in the study after (expiration date).

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study. If you wish to continue with the study, click the **YES** button. By submitting your responses indicates your consent to participate.

Appendix C

Consent for Participants

Diabetes Prevention Program: Exploring Spirituality and Spiritual Interventions on Outcomes

Principal Investigator (PI):	Kieran Fogarty, PhD
Student Investigator (SI):	Sharon E. Long, RN, PhDc, FNP-BC
Program:	PhD in Interdisciplinary Health Sciences, Western Michigan University
In Collaboration With:	Henry Ford Macomb Hospital, Faith-Community Nursing Department

Please read this consent form carefully and completely before clicking the "YES" button. If you have any questions or need clarification, you may contact Sharon Long at sharon.e40.long@wmich.edu or 586-255-3091. This study is being conducted by Sharon Long, a Family Nurse Practitioner, as part of her doctoral dissertation

What we are trying to find out in this study?

This aim of this study is to examine whether there is a relationship between spirituality/religiosity (S/R) and the use of spiritual interventions in adults who participate in a Diabetes Prevention Program (DPP) on changes in weight, glycosylated hemoglobin (A1C), body mass index (BMI) and physical activity.

Who can participate and what will you be asked to do if you choose to participate in this study?

Any DPP participant or coach who has completed the core part of the program (Weeks 1-26) may participate in the study. As a participant you need to have attended at least nine of the 16 core sessions offered. This is study involves answering surveys on-line using a computer. If filling out the survey in-person, it may occur in your DPP class.

To participate in this study, you will be asked to complete a 14-question demographic questionnaire and a 5-question survey about your spirituality and religiosity, either on-line or in-person. This will take about 10 minutes to complete.

What information will be measured?

In addition to the demographic and spirituality survey answers, we will be collecting information about how much you weight, your body mass index, A1C level, how much physical activity you are doing weekly and the number of DPP sessions you attended. This information will be obtained by working with the Henry Ford Macomb Hospital Faith-Community Nursing Department web services specialist using the FCND Documentation and Reporting System located in their offices in Clinton Township, Michigan.

What are the benefits and risks of participating in this study?

There is no direct benefit to you for participating in the study. There are no physical risks by participating in this study. There may be a risk of experiencing feelings of discomfort that may arise simply from recording your spirituality or religiosity as these may be sensitive and personal topics. This study hopes to shed light on the potential influence of spirituality/religiosity and

spiritual interventions to help individuals lower their risk of getting diabetes and help persons with self-management of type-2 diabetes

Are there any costs or compensation associated with participating in this study?
There is the cost of time to fill out the questionnaires, approximately 10 minutes. There is no compensation for participating in this study. You may stop participating in the study at any time by exiting out of the questionnaire/survey by closing your computer file/browser, or returning the questionnaire to the researcher in the envelope provided. You may refuse to answer any question without prejudice, penalty, or risk of loss to participate in the DPP course.

Who will have access to the information collected during this study?
Your information will be given a unique code number to connect your survey answers with your outcome data and for the purpose of reporting the data. All questionnaires, surveys and demographic forms will be stored on a password- secured computer with an encrypted Iron Key devise in the possession of the Student Investigator (S.L.). Aggregate (not individual) data may be discussed with the SI dissertation committee for analysis purpose. Data will not be transmitted to any public computers. Federal regulations require that data be maintained in a locked file in the Primary Investigator's office at Western Michigan University or in the University Archive for at least three years after the study closes.

Questions about the study?
If you have any questions prior to or problems during this study you can contact the following: Primary Investigator, Dr. Kieran Fogarty at kieran.fogarty@wmich.edu or 269-387-3342; or The Chair, Human Subjects Institutional Review Board at (269) 387-8293 or at hsirb@wmich.edu

This study has been approved by the Human Subjects Institutional Review Board (HSIRB) at Western Michigan University on (date). Please do not participate in the study after (expiration date). Participating in this survey online indicates your consent for use of the answers you supply.

If viewing this consent on-line, I agree that I have read this informed consent document. The risks and benefits have been explained to me. If you wish to continue with the study, click the **YES** button. By submitting your responses indicates your consent to participate.

Alternative ending for in-person (paper) consent. – remove this on original copy

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study. If you wish to continue with the study, sign and date below.

_____
Please Print Your Name

_____ _____
Please Sign your Name Date

Appendix D

Script of Participants In-Person Data Collection and Coaches Questionnaire

Hello my name is Sharon Long.

I am a doctoral student at Western Michigan University in the Interdisciplinary Health Sciences PhD program. I am a Family Nurse Practitioner who works part-time at Henry Ford Macomb Hospital and full-time teaching nursing at Davenport University in Warren. This research is part of my doctoral dissertation being supervised by Dr. Kieran Fogarty, my doctoral advisor. This study has been approved by WMU and Henry Ford Health System Institutional Review Boards.

The study I am conducting is examining spirituality and religiosity in Diabetes Prevention Program (DPP) participants and coaches on the outcomes of the DPP program. These outcomes include changes in the following: 1) your weight; 2) your glycosylated hemoglobin or A1C; 3) your body mass index which is a calculated measure of your weight and height; and 4) your physical activity. The DPP coaches are also being asked about spiritual interventions used while leading their DPP classes.

This study begins by reading the consent form which explains the purpose of this research project, describes the commitments and procedures of the study as well as the risks and benefits of participating in this research study. After you have read and signed the consent, you will complete a 14-question demographic survey and a 5-question spirituality questionnaire. Total time to complete the questionnaire is 10 minutes.

If you have already completed the survey on-line you may place the consent and questionnaires back in the envelope – Thank you for participating. If you choose not to participate, just put the consent and surveys back in the envelope, seal it, and hand it back to your coach. I will be stepping out of the room while you complete the questionnaires.

I hope you will consider participating in this research study. I thank you in advance.

Coaches Questionnaire

Demographic/Background Information

1. What is your gender?

_____ Male

_____ Female

2. What is your age?

_____ 20 to 35 years

_____ 36 to 50 years

_____ 51 to 65 years

_____ 66 years and older

3. What is your ethnicity or race? Select one

_____ White, non-Hispanic

_____ Black, non-Hispanic

_____ Hispanic

_____ Native American

_____ Asian

_____ Arabic

_____ Pacific Islander

4. How much schooling have you completed?

_____ < than high school

_____ High School Graduate

_____ Some college or vocational/technical school

_____ Associate Degree

_____ Bachelor's Degree

_____ Graduate Degree

5. What is your employment status?

_____ Employed full-time _____ Retired

_____ Employed part-time _____ Other _____

_____ Unemployed _____

6. What is your professional or para-professional role for the DPP class you taught or you are currently teaching? (Please check only one role)

_____ Faith Community Nurse (certified or attended the training sessions)

_____ A registered nurse from the community

_____ A member of a congregational health team at your own place of worship

_____ Other professional or para – professional

Please describe _____

7. Did you receive any compensation for being a DPP coach?

_____ Yes, I received a stipend

_____ No, it was part of my job.

_____ No, I volunteered to lead a course

8. What is your religious denomination? _____

_____

9. Are you a practicing member of a religious congregation or organization? <u>(circle one)</u>

Yes No

10. Where is your DPP course being held?

Organization/Facility: _____

City: _____

Appendix E

Participants Demographic Survey

Demographic/Background Information

1. What is your gender?

_____ Male _____ Female

2. What is your age?

_____ 20 to 35 years
_____ 36 to 50 years
_____ 51 to 65 years
_____ 66 years and older

3. What is your ethnicity or race? Select one

_____ White, non-Hispanic _____ Asian
_____ Black, non-Hispanic _____ Arabic
_____ Hispanic _____ Pacific Islander
_____ Native American

4. How much schooling have you completed?

_____ < than high school
_____ High School Graduate
_____ Some college or vocational/technical school
_____ Associate Degree
_____ Bachelor's Degree
_____ Graduate Degree

5. What is your employment status?

_____ Employed full-time
_____ Employed part-time
_____ Unemployed
_____ Retired
_____ Other _____

6. Do you have medical insurance? (circle one) Yes No

7. Which type of diabetes did your doctor say you have?

_____ Screened at the class and are at risk for pre-diabetes (you have not been diagnosed with pre-diabetes of diabetes)

_____ Pre-Diabetes, also known as "Borderline" or "Diet-controlled" diabetes

_____ Type II (2), non-insulin dependent diabetes or called adult onset diabetes (some people with non-insulin-dependent diabetes take insulin)

8. Prior to attending the Diabetes Prevention Program, have you ever attended a diabetes patient education program (a series of classes)? (<u>circle one</u>)

No Yes

9. What is your religious denomination, if any: _____

_____

10. Are you a practicing member of a religious congregation or organization? <u>(circle one)</u>

Yes No

11. Where did you attend your Diabetes Prevention Program?

Organization/Facility: _____

City: _____

12. Who is/was your coach or coaches: Name(s):

_____

_____

13. How many classes did you attend in the first 6 months (Weeks 1 to 26)?

_____ 1 to 8 classes

_____ 9-12 classes

_____ more than 12 classes

14. When will/did you finished the full year program? (Weeks 27 to 52)?

When will your program end? _____ (month/year)

Appendix F

Duke University Religion Index

Duke University Religion Index

INSTRUCTIONS: Reflect on each question and circle your best answer.

(1) How often do you attend church or other religious meetings? (ORA)

1 - Never

2 - Once a year or less

3 - A few times a year

4 - A few times a month

5 - Once a week

6 - More than once/week

(2) How often do you spend time in private religious activities, such as prayer, meditation or Bible study? (NORA)

1 - Rarely or never

2 - A few times a month

3 - Once a week

4 - Two or more times/week;

5 - Daily

6 - More than once a day

Continued . . . .

Duke Religious Index.continued

The following section contains 3 statements about religious belief or experience. Please mark the extent to which each statement is true or not true for you. **(IR)**

(3) In my life, I experience the presence of the Divine (*i.e.*, God, Allah, Jesus, etc.)

1 - Definitely *not* true

2 - Tends *not* to be true

3 - Unsure

4 - Tends to be true

5 - Definitely true of me

(4) My religious beliefs are what really lie behind my whole approach to life

1 - Definitely *not* true

2 - Tends *not* to be true

3 - Unsure

4 - Tends to be true

5 - Definitely true of me

(5) I try hard to carry my religion over into all other dealings in life

1 - Definitely *not* true

2 - Tends *not* to be true

3 - Unsure

4 - Tends to be true

5 - Definitely true of me

OR-organizational religious activity, NORA-non-organizational religious activity, IR – Intrinsic religiosity.
(Storch et al., 2004; Koenig & Bussing, 2010)

Appendix G

Delphi Survey Technique

Coach Screening Question

Screening for the Delphi Survey Technique

Have you been trained as a Faith-Community Nurse (FCN) or are you part of a congregational health team (church/religious) participating as a coach for a Diabetes Prevention Program for your congregation or a local congregation in your area? (Click one)

No -------→ Exit the survey –"Thank you for participating"

Yes ------→ This moves them to the next page which contains the Delphi Survey

Delphi Survey Round One

Delphi Survey Technique for Spiritual Interventions

Thank you again for participating in this study. There are two rounds to this survey. This is the **first round** which will take less than 10 minutes to complete. You will receive the second round after enough data has been collected and analyzed from other faith-based coaches. The **second round** may include items you marked or described in the first round but you will be asked to indicate how important it is for you to use those spiritual interventions while leading the DPP course. It may take up to three to four weeks to get the second round to you depending on the response rate.

Round One: Below is a list of spiritual interventions. Please CLICK the circle next to the "G" or "I" if you have used any of these activities during your DPP classes. Click the "B" if you have used it with both individual and the group. Also, in the space below, the list any other spiritual interventions you may have used while leading your DPP classes. Please describe the activity as specifically as possible. You may use the space below to describe any of the activities you have clicked on.

	Group	**Individual**	**Both**
_____ Active Listening	G	I	B
_____ Emotional Support	G	I	B
_____ Forgiveness Facilitation	G	I	B
_____ Touch/Hug	G	I	B
_____ Hope Inspiration	G	I	B
_____ Humor	G	I	B
_____ Meditation Facilitation	G	I	B
_____ Spiritual/Sacramental	G	I	B
_____ Prayer	G	I	B
_____ Presence	G	I	B

Reference: Henry Ford Health System, Faith Community Network. (2000). https://fcndocumentation.com

Please list other activities you may have used in your classes or with individual DPP students. **Be as descriptive as possible.**

Delphi Survey Round Two

Delphi Survey Technique for Spiritual Interventions

Thank you again for participating in the second round of the DPP spiritual intervention survey. This part should take you about 10 minutes to complete.

Round Two: Below are listed # __ spiritual interventions gathered from your participation and other faith-based coaches in Round One of the Delphi Survey. Based on your work as a DPP Coach, please circle how important the intervention is to help a participant be successful in the DPP program.

	Not Important	Somewhat Important	Important	Very Important
	1	2	3	4
	1	2	3	4
	1	2	3	4
	1	2	3	4
	1	2	3	4
	1	2	3	4
	1	2	3	4

Are there other interventions that need to be added to this list:

_____

_____

_____

_____

Appendix H

SurveyMonkey Policy Security Statement

Go to: https://www.surveymonkey.com/mp/policy/security/

Security Statement

Millions of users have entrusted SurveyMonkey with their survey data, and we make it a priority to take our users' security and privacy concerns seriously. We strive to ensure that user data is handled securely. SurveyMonkey uses some of the most advanced technology for Internet security that is commercially available today. This Security Statement is aimed at being transparent about our security infrastructure and practices, to help reassure you that your data is appropriately protected. Visit our privacy policy for more information on data handling.

User Security

- **Authentication:** User data on our database is logically segregated by account-based access rules. User accounts have unique usernames and passwords that must be entered each time a user logs on. SurveyMonkey issues a session cookie only to record encrypted authentication information for the duration of a specific session. The session cookie does not include the password of the user.
- **Passwords:** User application passwords have minimum complexity requirements. Passwords are individually salted and hashed.
- **Single Sign-On:** For our Team Collaboration accounts, SurveyMonkey supports SAML 2.0 integration, which allows you to control access to SurveyMonkey across your organization and define authentication policies for increased security. For more details, visit our SSO help page.
- **Data Encryption:** Certain sensitive user data, such as credit card details and account passwords, are stored in encrypted format.
- **Data Portability:** SurveyMonkey enables you to export your data from our system in a variety of formats so that you can back it up, or use it with other applications.
- **Privacy:** We have a comprehensive privacy policy that provides a very transparent view of how we handle your data, including how we use your data, who we share it with, and how long we retain it.
- **Data Residency:** All SurveyMonkey user data, to include Wufoo, TechValidate, SurveyMonkey Intelligence, is stored on servers located in the United States. For FluidSurveys and FluidReview, all data is stored in Canada.

Physical Security

All SurveyMonkey information systems and infrastructure are hosted in world-class data centers. These data centers include all the necessary physical security controls you would expect in a data center these days (e.g., 24×7 monitoring, cameras, visitor logs, entry requirements). SurveyMonkey has dedicated cages to separate our equipment from other tenants. In addition, these data centers are SOC 2 accredited. For more information, visit SuperNAP and InterNAP. If you are looking for FluidSurvey or FluidReview information, please contact us directly.

Availability

- **Connectivity:** Fully redundant IP network connections with multiple independent connections to a range of Tier 1 Internet access providers.
- **Power:** Servers have redundant internal and external power supplies. Data centers have backup power supplies, and are able to draw power from the multiple substations on the grid, several diesel generators, and backup batteries.
- **Uptime:** Continuous uptime monitoring, with immediate escalation to SurveyMonkey staff for any downtime.
- **Failover:** Our database is replicated in real-time and can failover in less than an hour.
- **Backup Frequency:** Backups occur daily at multiple geographically disparate sites.

Network Security

- **Testing:** System functionality and design changes are verified in an isolated test "sandbox" environment and subject to functional and security testing prior to deployment to active production systems.
- **Firewalls:** Firewalls restrict access to all ports except 80 (http) and 443 (https).
- **Access Control:** Secure VPN, 2FA (two-factor authentication), and role-based access is enforced for systems management by authorized engineering staff.
- **Logging and Auditing:** Central logging systems capture and archive all internal systems access including any failed authentication attempts.
- **Encryption in Transit:** By default, our survey collectors have Transport Layer Security (TLS) enabled to encrypt respondent traffic. All other communications with the surveymonkey.com website are sent over TLS connections, which protects communications by using both server authentication and data encryption. This ensures that user data in transit is safe, secure, and available only to intended recipients. Our application endpoints are TLS only and score an "A" rating on SSL Labs' tests. We also employ Forward Secrecy and only support strong ciphers for added privacy and security.

Vulnerability Management

- **Patching:** Latest security patches are applied to all operating systems, applications, and network infrastructure to mitigate exposure to vulnerabilities.
- **Third Party Scans:** Our environments are continuously scanned using best of breed security tools. These tools are configured to perform application and network vulnerability assessments, which test for patch status and basic misconfigurations of systems and sites.
- **Penetration Testing:** External organizations perform penetration tests at least annually.
- **Bug Bounty:** We take the security of our platforms very seriously! SurveyMonkey runs a private bug bounty program to ensure our applications are continuously reviewed for vulnerabilities.

Organizational & Administrative Security

- **Information Security Policies:** We maintain internal information security policies, including incident response plans, and regularly review and update them.
- **Employee Screening:** We perform background screening on all employees, to the extent possible within local laws.
- **Training:** We provide security and technology use training for employees.
- **Service Providers:** We screen our service providers and bind them under contract to appropriate confidentiality and security obligations if they deal with any user data.
- **Access:** Access controls to sensitive data in our databases, systems, and environments are set on a need-to-know / least privilege necessary basis.
- **Audit Logging:** We maintain and monitor audit logs on our services and systems.

Software Development Practices

- **Stack:** We code in Python and run on SQL Server, Windows, and Ubuntu.
- **Coding Practices:** Our engineers use best practices and industry-standard secure coding guidelines which align with the OWASP Top 10.
- **Deployment:** We deploy code dozens of times during the week, giving us the ability to react quickly in the event a bug or vulnerability is discovered within our code.

Compliance and Certifications

- **PCI:** SurveyMonkey is currently PCI 3.1 compliant.
- **HIPAA:** SurveyMonkey offers enhanced security features that support HIPAA requirements. For more details, visit our HIPAA-compliance page.

Handling of Security Breaches

Despite best efforts, no method of transmission over the Internet and no method of electronic storage is perfectly secure. We cannot guarantee absolute security. However, if SurveyMonkey learns of a security breach, we will notify affected users so that they can take appropriate protective steps. Our breach notification procedures are consistent with our obligations under various state and federal laws and regulation, as well as any industry rules or standards that we adhere to. Notification procedures include providing email notices or posting a notice on our website if a breach occurs.

Your Responsibilities

Keeping your data secure also depends on you ensuring that you maintain the security of your account by using sufficiently complicated passwords and storing them safely. You should also ensure that you have sufficient security on your own systems, to keep any survey data you download to your own computer away from prying eyes. We offer TLS to secure the transmission of survey responses, but it is your responsibility to ensure that your surveys are configured to use that feature where appropriate. For more information on securing your surveys, visit our Help Center.

Customer Requests

Due to the number of customers who use our service, specific security questions or custom security forms can only be addressed for customers purchasing a certain volume of user accounts within a SurveyMonkey subscription. If your company has a large number of potential or existing users and is interested in exploring such arrangements, please check out Team Collaboration.

Last updated: July 13, 2016.

Appendix I

Email Invitation from Henry Ford Faith Community Nursing

DPP Coaches

Dear DPP Coaches,

You are cordially invited to participate in a research study that is looking at the relationship of spirituality and spiritual interventions on the outcomes of clients participating in the Diabetes Prevention Program (DPP). The DPP courses are coordinated by Henry Ford Macomb Faith Community Nursing (FCN) Department who is working with Sharon Long, RN, PhDc, FNP-BC, a doctoral student at Western Michigan University, to complete her dissertation. Sharon is an Assistant Professor of Nursing at Davenport University and works part-time as a Nurse Practitioner at Henry Ford Macomb Hospital.

If you choose to participate in the study, you will answer a series of questions which includes background information and a 5-question survey that asks about your spirituality. This survey will take approximately 10 minutes to complete. If you are a faith-community nurse or a member of congregational health team from your church leading a DPP course, there is an additional survey link asking about your use of spiritual interventions while leading a DPP course which will take an additional 10 minutes to complete.

Participation in this study is completely voluntary. This will not impact your participation in the DPP course. Clicking on the link below will take you to the consent form to further explain the study and give contact information if there are any concerns about the study.

Click HERE to view the IRB approvals. (to be inserted). If you have any questions about the study, Sharon's contact information is: cell 586-255-6091, email sharon.e40.long@wmich.edu.

The information from this study will be used to identify religion-health connections for persons struggling with self-management of pre-diabetes and type-2 diabetes and the use of spiritual interventions to support diabetes education.

We hope you will participate in this important research study.

Copy and paste the link below into any browser to see the consent and move on to the survey: https://www.surveymonkey.com/r/38YNZDQ

Thank you,

Ameldia Brown, RN, M.Div., Director, Henry Ford Macomb Hospital Faith Community Nursing
Marian Giacona, RN, BSN, DPP Project Manager, Henry Ford Faith Community Nursing

DPP Participants

Dear DPP Participants,

You are cordially invited to participate in a research study that is looking at the relationship of spirituality and spiritual interventions on the outcomes of participating in the Diabetes Prevention Program (DPP). The DPP courses are coordinated by Henry Ford Macomb Faith Community Nursing (FCN) Department who has been working with Sharon Long, RN, PhDc, FNP-BC, a doctoral student at Western Michigan University. Sharon is an Assistant Professor of Nursing at Davenport University and works part-time as a Nurse Practitioner at Henry Ford Macomb Hospital.

If you choose to participate in the study, you will answer a series of questions which includes background information and a 5-question survey that asks about your spirituality. This survey will take approximately 10 minutes to complete. As part of the study, you will allow the researcher to work with Henry Ford Macomb FCN Department to access the information you provided at your DPP course about your weight, body mass index, hemoglobin A1C, minutes of physical activity and the number of classes you attended.

Participation in this study is completely voluntary. This will not impact your participation in the DPP course. Clicking on the link below will take you to the consent form to further explain the study and give contact information if there are any concerns about the study.

Click HERE to view the IRB approvals. (to be inserted). If you have any questions about the study, Sharon's contact information is: cell 586-255-6091, email sharon.e40.long@wmich.edu.

The information from this study will be used to identify religion-health connections for persons struggling with self-management of pre-diabetes and type-2 diabetes and the use of spiritual interventions to support diabetes education.

We hope you will participate in this important research study.

Copy and paste the link below into your browser to see the consent and move on to the survey: https://www.surveymonkey.com/r/3MPJMWS

Thank you,

Ameldia Brown, RN, M.Div, Director, Henry Ford Macomb Hospital Faith Community Nursing
Marian Giacona, RN, BSN, DPP Project Manager, Henry Ford Faith Community Nursing

Appendix J

Affiliation Letter from Henry Ford Macomb Hospital

HENRY FORD MACOMB HOSPITALS

15855 Nineteen Mile Road
Clinton Township, Michigan 48038
(586) 263-2300

January 16, 2017

Western Michigan University
HSIRB Office
Western Michigan University
1903 W Michigan Ave
Kalamazoo MI 49008-5456 USA

RE: Research Study #16-12-04
Student Researcher: Sharon E. Long, RN, PhDc, FNP-BC
Title: Diabetes Prevention Program: A Study Exploring Spirituality and Spiritual Interventions on Outcomes

Henry Ford Macomb Hospital is pleased to support the research stated above that Sharon Long will be conducting with the Faith Community Nursing Department. She is also applying for approval from Henry Ford Health Systems IRB.

We look forward to the outcomes of this exciting research project. Feel free to contact me with any questions or concerns.

Sincerely,

Michelle Mahaffey Harmon, PhD, RN
Nursing Education Specialist
Nursing Development & Research
Mharmon2@hfhs.org
(586) 263-2272 – office
(586) 203-1057 – fax

809671

Appendix K

Western Michigan University, Human Subjects Institutional Review Board Approval Letter

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: February 7, 2017

To: Kieran Fogarty, Principal Investigator
Sharon Long, Student investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 16-12-04

This letter will serve as confirmation that your research project titled "Diabetes Prevention Program: Exploring Spirituality and Spiritual Interventions on Outcomes" has been **approved** under the **expedited** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study***)." Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: **February 6, 2018**

1903 W. Michigan Ave., Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276
CAMPUS SITE: 251 W. Walwood Hall