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The Effects of Causal Attribution, Religiosity and Shared Beliefs On the Management of Type 2 Diabetes

Lucretia Smith
Loma Linda University

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LOMA LINDA UNIVERSITY
School of Science and Technology
In conjunction with the
Faculty of Graduate Studies

The Effects of Causal Attribution, Religiosity and Shared Beliefs
On the Management of Type 2 Diabetes

by

Lucretia Smith

A Dissertation submitted in partial satisfaction of
the requirements for the degree of
Doctor of Philosophy in Family Studies

June 2011

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Each person whose signature appears below certifies that this dissertation in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

_____, Chairperson
Curtis Fox, Professor of Counseling and Family Science, Family Studies Coordinator

_____, co-Chairperson
Colwick Wilson, Professor of Counseling and Family Science, Program Director

Barbara Couden Hernandez, Associate Professor of Counseling and Family Science

Patricia T. Pothier, Associate Professor of Nursing, School of Nursing

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ABBREVIATIONS

ADA	American Diabetes Association
BG	Blood Glucose
SES	Socio-Economic Status
R-COPE	Brief Religious Coping Scale
DCP	Diabetes Care Profile
ADS	Appraisal of Diabetes Scale
SEM	Structural Equation Modeling

ABSTRACT OF THE DISSERTATION

The Effects of Causal Attribution, Religiosity and Shared Beliefs
On the Management of Type 2 Diabetes

by

Lucretia Smith

Doctor of Philosophy, Family Studies
Loma Linda University, June 2011
Dr. Curtis Fox & Dr. Colwick Wilson, Chairpersons

This dissertation was a secondary analysis of data gathered from 114 couples who had one spouse with type 2 diabetes. Diabetes management was the outcome variable. The predictor variables in this analysis included the couples' causal attribution, religiosity, and congruence regarding the aforementioned. The major theories framing this study were the Family Systems theory and the family stress models. Support was found also in the middle ranged Family Resilience Framework. From a systems approach, families affect, and are affected by, the management of a chronic disease such as type 2 diabetes. The Family Resilience Framework suggests that the family's belief system, which includes the causes attributed to the disease, the religious coping and practices of the family, and the sharing of those beliefs, contributes to disease management. Structural Equation Modeling was used to test the relationships and pathways between causal attribution, religiosity, and shared beliefs and diabetes management. These models controlled for age, socio-economic status, gender and race/ethnicity for each of the spouses. This study found significant impact on type 2 diabetes management by both the causal attribution of the person with diabetes and the amount of causal attribution that was shared by the couple. Other findings included moderate pathway strength between

the amount of shared religiosity and management, in addition to a moderate path between the SES of the couple and management. Implications for theory, research and practice were noted from this study.

CHAPTER ONE

INTRODUCTION

One important missing piece of the allopathic management of type 2 diabetes mellitus may be the family system of the person with diabetes. This study used a level of manageable complexity to represent family systems and, using concepts demonstrated in the literature, tested the effects of family variables on the outcomes of diabetes management.

From a systems point of view, a chronic disease that affects one person also affects each system of which that person is a part. In addition, those systems affect the course of the disease in that person. The family is, perhaps, the system most affected by the chronic disease of one of its members and the system which has the most influence on the disease management in that member (ASHA, 2003; White & Klein, 2008).

A chronic disease is one for which there is no cure and the treatment for a chronicity is aimed at controlling symptoms and preventing disease progression (Paterson, Thorne, & Russell, 2002). The impact of chronic diseases on American society included a cost of about \$1.7 trillion in 2009 and they affected 45% of the population (PFCD, 2010). The impact of a chronic disease on families has been measured in various ways and included many more effects than monetary impact, such as higher rates of depression, caregiver burnout, system wide relationship strains and dissolution of the system (Brannan & Heflinger, 2001; Gerhardt et al., 2004; Gordon & Perrone, 2004). The opposite relationship, the effect of the family on the disease, has also been documented (Allison et al., 2003). Studies related to this effect of families on chronic diseases in children are becoming more frequent. However, studies about the effect of family wide

systems on an adult's chronic illness are sparse, although there are some studies about specific family relationships' effects on disease outcomes (Buckloh et al., 2008; Martire & Schulz, 2007; Patterson, McCubbin, & Warwick, 1990).

Type 2 diabetes mellitus is a common chronic disease in adults and is dependent on lifestyle for both its cause and its treatment. Since lifestyle is usually a characteristic of a whole family, it is probable that there are measurable effects of family characteristics on the management of diabetes (Bradley et al., 1984; Mamhidir & Lundman, 2004). For the purposes of this study, the effects of three of those characteristics, casual attribution, religiosity and shared beliefs, were assessed. The first, causal attribution, is based in evidence that the choices made by a family, in reference to its lifestyle, spring from how it believes a situation, or a disease, is caused (Shields, Brawley, & Lindover, 2006). The impact of the second characteristic, religiosity, or the spiritual and religious choices of a family, has been demonstrated in the family's decision making and problem solving process (Bayat, 2007; Cigrang, Hryshko-Mullen, & Peterson, 2003). Third, the degree to which a family shared beliefs tended to affect how the family system handled stressors such as chronic disease (Antonovsky & Sourani, 1988; Yoshimoto et al., 2006).

It has been noted in the literature regarding families and type 2 diabetes, that family wide characteristics are often explored as the outcome variable with type 2 diabetes (and its management) as the predictor variable. There are also frequent studies in which the characteristics of an entire family are measured in terms of a single informant (Carr & Springer, 2010). Another characteristic of the literature regarding family variables is the difficulty settling on a statistical method that may accurately and

precisely analyze the inherently non-independent data from several family members, especially when exploring a single family goal.

This dissertation is an attempt to address a few of the questions that have not been specifically addressed in the literature. This dissertation in particular focuses on the following research questions: Does the couple's causal attribution affect the management of the disease? Does the couple's religiosity affect the management of diabetes? Does the congruence between the spouses' answers about causal attribution and religiosity affect diabetes management? How does the combination of the aforementioned variables affect diabetes management?

The conceptual frameworks used to explore the research questions identified in the study are, Family Systems (White & Klein, 2008), Double ABC-X (McCubbin & Patterson, 1983), and the Family Resilience Framework (Walsh, 2006).

This study focused on three family characteristics, causal attribution, religiosity, and shared beliefs. Causal attribution was defined as, what the couple believed was the cause of the person's diabetes. It was measured by using both spouses' responses to the Brief Religious Coping Scale. Religiosity was defined as a combination of religious coping and religious activity. It was measured by using both spouses' responses to the causal scale and questions about the frequency of religious activity. Shared beliefs were defined, for this study, as the congruence between the spouses' responses to the measures of causal attribution and religiosity. This variable was measured as the absolute value of the differences of those responses. The outcome variable was diabetes management, and was defined as the choice to adhere to diet, exercise and blood glucose monitoring recommendations of the ADA (2010). It was measured using the responses of the spouse

with diabetes to questions regarding frequency of meal plan adherence, frequency of exercise, frequency of blood glucose testing, and a personal appraisal of disease management. Data from the Diabetes Couples Study (Lister, 2011), which was a two informant study of family level variables, were used to explore the variables described above. Two conceptual models were proposed and were tested using Structural Equation Modeling (SEM).

This study could be considered foundational work for further examination of chronic illness, the increasingly complex inclusion of a greater number of family members as informants and the statistical methods to adequately explore their responses. The multiple factors included in family resilience may also be examined quantitatively in light of this work.

Contributions of this study to family literature include the exploration of adult chronicities as they relate to family and the use of the middle range theories which are designed to bridge the gap between practice and research. The use of statistical measures in family studies may be enhanced by adding research using dyadic data in answer to the frequent criticism of family studies that family level data are often collected from only one family member. In addition, the use of SEM and congruence measures highlights the need for analytic methods for non independent samples which are common in family studies. The literature in healthcare may be enhanced by adding a voice to the increasingly frequent need to include the characteristics of the family in type 2 diabetes management and in the study of adult chronicities. Policy, both public and professional, could be affected by this and other studies that demonstrate the importance of family in the management of adult chronicities.

Using family systems theory, family stress theory and a resilience framework, this study used multiple informants and SEM to explore the affects of causal attribution, religiosity and shared beliefs on the management of type 2 diabetes.

CHAPTER TWO

THEORETICAL FRAMEWORK

Two levels of theory were used as the foundation for this study. At the highest level of abstraction was family systems theory, which addressed the focus of a study based in the idea that type 2 diabetes, and the person with diabetes, affect, and are affected by, multiple systems in and around a family. While only one system, the couple, is specifically identified, the use of systems theory informed the study by viewing the data in such a way that the research did not ignore the fact of other systems and factors than are presented here. The second, or middle range theory, included family stress/crisis models which are dependent on systems theory with specific ramifications for a family system when an ongoing stressor like diabetes enters the family. The third theory, also middle range, was the Family Resilience Framework which is dependent on the stress/crisis theories and looks specifically at which factors, or strengths, contribute to the families' ability to bounce back when stressor like diabetes becomes a part of family life.

Contribution from Systems Theory

This study tested models in which disease processes could be affected by the collective beliefs of a family, making a family systems approach the appropriate theory as it could frame a study which looked at the complex effects family on a complex, multisystem disease process. Family systems theory is based in General Systems Theory which is arguably a multidisciplinary theory, uniting both the physical and social sciences (Whitchurch et al., 1993). The specific principles of the this theory that influenced family scientists in the 1960s and early 1970s included the idea that no part of the system

could be correctly analyzed in isolation, and the concept that systems with feedback are self monitoring and human feedback systems are self reflexive. Self reflexivity, or the ability of the system to examine itself, seemed to be an obvious characteristic of human families and these principles formed the basis for Family Systems Theory (Whitchurch et al., 1993).

Broderick and Smith (1979) used general systems theory to build a systems approach to studying families highlighting the principles of non-isolation and self examination (Day, 1995). Day notes also that although the family literature was punctuated with systems theory, there has been no systematic interpretation or theory building beyond that noted in 1979. The major exceptions to this have been Bowen's use of systems specific to therapy (Kerr & Bowen, 1988), the systematic integration of systems theory and family life cycles (Carter & McGoldrick, 1989) and the feminist introduction of the concept of power (Knudson-Martin, 1994). Functionalism and the family variant, structural-functionalism, became a lens through which the theory came to be used in some research and clinical settings (Janosik & Green, 1992; White & Klein, 2008). However, more recently the constructivist foundations of the family systems approach have been emphasized and the researchers who use it are increasingly more likely to think about the theory in ways that will highlight the complexity, strengths, and changes in a family system (White & Klein).

Family Systems Theory was an appropriate meta-theory for this study for two reasons. First, type 2 diabetes is a disease that has been shown to affect multiple systems of a person's body, the family system surrounding the person with type 2 diabetes and the social/economic systems surrounding the family. Second, a major focus of this study was

to demonstrate that the management of a chronic disease is not isolated from a family's collective thinking and acting.

Contributions from Family Stress Theories

From the systems paradigm came several theories focused on how families cope and function in and through times of stress, as would be present in the diagnosis of type 2 diabetes. One of the earliest approaches was the ABC-X model (Hill, 1958) which described the processes of a family facing a stressor (A), families' resources (B) and interaction with the stressor (C), and the resulting crisis or lack of it (X). The diagnosis of a chronic disease can stress family resources and family interactions, as well as providing significant opportunity for poor interaction with the stressor itself.

In an effort to extend crisis understanding to include stressors that occur over time, such as a chronic disease and its management, the Double ABC-X model was proposed (McCubbin & Patterson, 1983). This model begins in a pre-crisis stage and adds time to Hill's original conceptualization (see diagram 1). A stressor is introduced which has the potential to demand change. This stressor interacts with both the way the family perceives it and the resources it has to cope with it. When it becomes obvious that change is demanded, the family moves into crisis or change (ABC-X). As change takes place, demands on the system pile-up (aA). Pile-up is the part of the Double ABC-X model which denotes increasing demands or changes, especially after a major stressor such as the diagnosis of diabetes. The demands or changes may come from family members, the family system or the community and include sequelae of the initial stressor, normative transitions, prior strains, the consequences of coping and the ambiguity

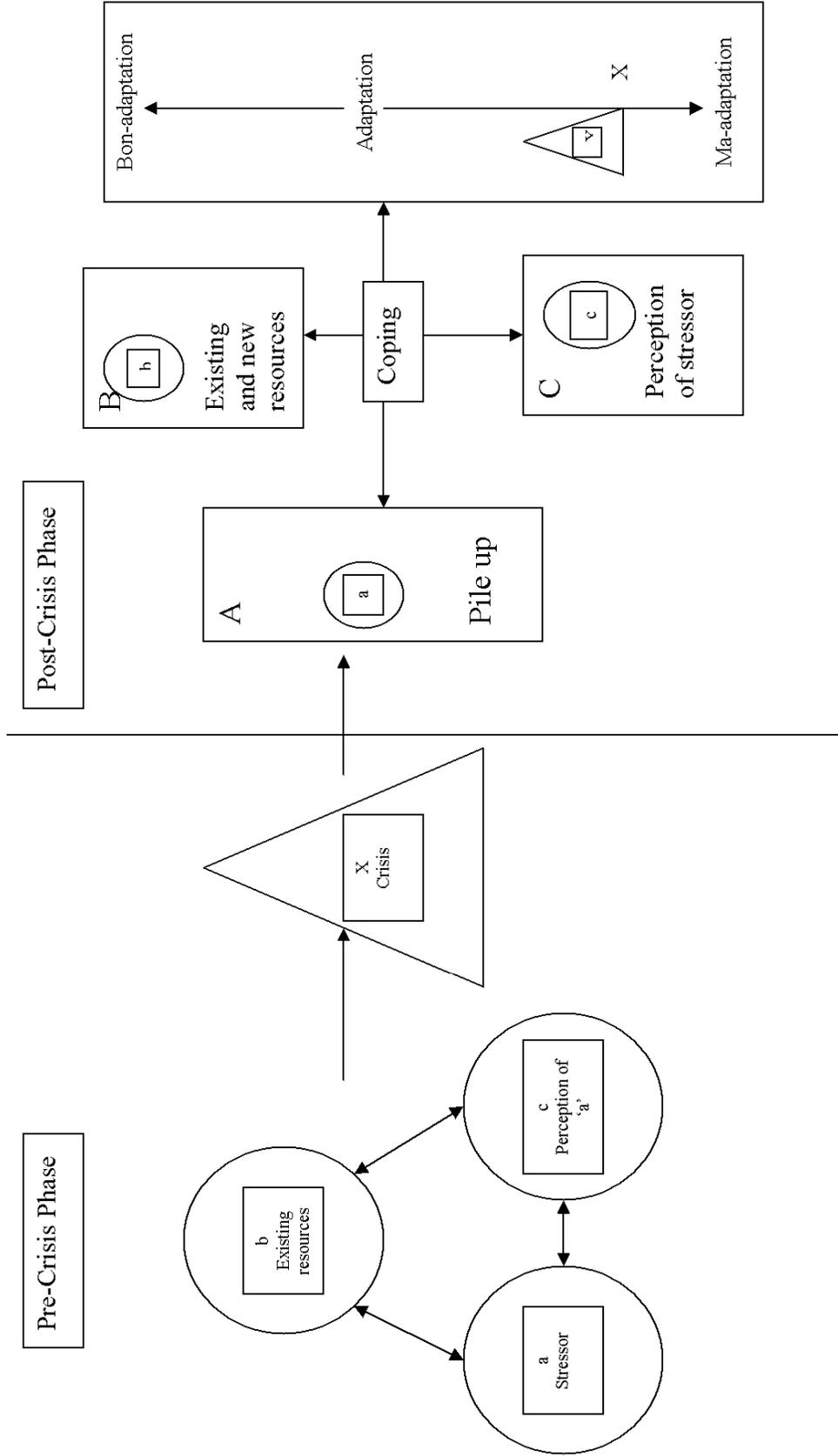


Figure 1. McCubbin & Patterson (1983) Double ABC-X Model of Family Adaptation

surrounding the changes involved in coping. The family uses both its new/existing resources (bB) and its perception of both the stressor pile-up and resources (cC) to cope. This coping, in a cyclical fashion as one considers the element of time, can result in bon-adaptation or mal-adaptation. In the case of type 2 diabetes, for example, the family may cope with the diagnosis by using insurance and having a conversation with the children about some diet changes that can be expected in the household. All may seem well until adolescence, which is a normative transition in which self will becomes prominent, begins in a child and the idea of not having the accustomed snack foods in the house becomes unacceptable to the child. While this seems a minor stressor, the fact that the person with diabetes does not like the changes either, and everyone in the house is angry that the money planned for a vacation has been used to pay medical co-payments and join a gym which no one wants to use can lead the family repeatedly to a point that it must change/cope or end in mal-adaptation. Subsequent testing of the Double ABC-X model has shown multiple possibilities of order and interaction in each of its components (Kahl, 2005; Lavee, McCubbin, & Olson, 1987; Lavee, McCubbin, & Patterson, 1985; Olson & Dreman, 1997).

This testing demonstrated, especially, that time played an even more important role in the bon-adaptation of families to crisis than the model allowed. In addition to family change, the stressors themselves changed over time in both expected and unexpected ways as did the contexts surrounding the family (Glick, 1990; Klever, 2005; Ungar, 2004). These details were then included in the Family Adjustment and Adaptation Response (FAAR) model (McCubbin & Patterson, 1983). In this re-conceptualization, special note is taken of time, patterns across time, and the contexts of

the family (such as culture, situation, and development). In the case of type 2 diabetes, and other chronicities, there is substantial progression of the disease and its attendant stressors, both within the normative transitions such as aging, and the non-normative stress of managing the disease. For example, it is possible that the positive meaning which was attributed to a disease may seem pointless when the disease progresses, despite the “good things” that it was thought to have brought to the family, as aging increases the severity of the disease.

With the progression of the family stress models, the focus has moved gradually from pathologizing a family or its components to finding and building on the strengths that exist in any part of the system, such as adherence to a faith tradition or the ability to find meaning in difficult circumstances (Allison et al., 2003; Lietz, 2006). Resilience is the concept that is often used to refer to the strength associated with healthy coping. Using family stress theories as a context, resilience may be studied as the regenerative power of a family which overcomes significant risk to good outcomes (Patterson, 2002).

Contributions from the Family Resilience Framework

If, as the previous theories suggest, it is a systems assumption that entire families, both the members and the interactions, affect the management of diabetes, then a framework that attempts to define the specific characteristics of that system which affect chronic conditions would be a helpful adjunct. The Resilience Framework provides a structure whose concepts supply a cohesive way to view how stress affects the family and, possibly, how the family and its responses affect the stress.

The idea of resilience came from studies of individuals who, despite situations of significant risk, had good outcomes. Family resilience grew from observing the same phenomenon in the families of critically or chronically ill children where families thrived, or arrived at bon-adaptation, rather than succumbed to mal-adaptation. Since the use of this idea was proposed, many studies of the phenomenon have been undertaken (Bayat, 2007; Chesla, McCubbin, Thompson, Thompson, & Futrell, 1999; Frain, Berven, Fong, & Tschopp, 2008; Greeff & van der Merwe, 2004; Lietz, 2006, 2007; Mednick et al., 2007; Riley et al., 2008; Sossou, Craig, Ogren, & Schnak, 2008; Vandsburger & Biggerstaff, 2004). The majority, while tied to family stress theories, have not followed any common definition or model of family resilience. The result has been a lack of clarity about, or common definitions of, resilience and its attendant features such as risk. For example resilience may refer to the traits that protect or rescue a family from dissolution, or it can mean a specific set of outcomes that measure family success under difficult circumstances (Coleman & Ganong, 2002; Greeff & van der Merwe, 2004; Lietz, 2007; Patterson, 2002). Much of the research and theory building in family studies suffer from this lack of clarity and seems to have rendered the systematic/organized use of family theory in a practice setting unlikely, distancing science from its practical application (Daly, 2003).

In an effort to bring some consistency to the idea of resilience, and to offer a clear, research-based model for use by practitioners, the family resilience framework was proposed (Walsh, 2006). This model sees resilience as an outcome which can be supported by transactional processes over time. Resilience itself is defined as the “capacity to rebound from adversity strengthened and more resourceful. It is an active

process of endurance, self-righting, and growth in response to crisis and challenge” (Walsh, 2006 p. 4). It is not invulnerability or self sufficiency; rather it includes healing to live a full and loving life. Underlying this framework are three assumptions: The first is that while individuals affect family resilience, the whole family and the processes that are maintained in the family, can create resilience (Simon, Murphy, & Smith, 2005). The second assumption is that each family may take different successful paths toward resilience (Israel, Roderick, & Ivanova, 2002). Third, there is a milieu in which the family faces its stressors that is very much a part of the way the family may find resilience: neither individuals nor families stand alone (Black & Lobo, 2008). In this study, the attempt was made to quantitatively test the complexity and relational aspects of family, as suggested by these assumptions, on the management of a chronic disease.

The Family Resilience Framework proposes three ‘keys’ to family resilience; family belief systems, organizational patterns, and communication processes. Each of these keys is divided into three characteristics which are further divided into defining concepts of those characteristics (Table 1). The first key, Belief Systems, is salient to this present study as it proposes two characteristics which might be considered strengths with which to help manage type 2 diabetes. It also reinforces the idea of family cohesion, or sharing of beliefs noted in the underlying assumptions.

The first characteristic of the Belief Systems key is, ‘making meaning of adversity.’ In the Family Resilience Framework, making meaning of adversity is relationally based and expressed through family transactions. It is the opposite of rugged individualism and includes viewing the ability of a family to bounce back as a part of relationship (Bellah & Madsen, 1991; Carter & McGoldrick, 1989). If families normalize

Table 1

Key Processes in Family Resilience

Belief Systems

- Making meaning of adversity
 - Viewing resilience as relationally based—versus “rugged individual”
 - Normalizing, contextualizing adversity and distress
 - Sense of coherence: viewing crisis as a challenge: meaningful, comprehensible, manageable
 - Explanatory attributions: How could this happen? What can be done?
- Positive outlook
 - Hope, optimistic bias; confidence in overcoming odds
 - Courage and en-courage-ment; affirming strengths and building on potential
 - Seizing opportunities: active initiative and perseverance (can-do spirit)
 - Mastering the possible; accepting what can’t be changed
- Transcendence and spirituality
 - Larger values, purpose
 - Spirituality: faith, healing rituals, congregational support
 - Inspiration: envisioning new possibilities; creative expression; social action
 - Transformation: learning, change, and growth from adversity

Organizational Patterns

- Flexibility
 - Rebounding, reorganizing, adapting to fit new challenges
 - Stability through disruption: continuity, dependability, rituals, routines
 - Strong authoritative leadership: nurturance protection, guidance
 - Varied family forms: cooperative parenting/caregiving teams
 - Couple/co-parent relationship: equal partners
- Connectedness
 - Mutual support, collaboration and commitment
 - Respect for individual needs, differences and boundaries
 - Seeking reconnection, reconciliation of wounded relationships
- Social and economic resources
 - Mobilizing kin, social, and community networks; models and mentors
 - Building financial security; balancing work-family strains
 - Institutional supports

Communication Processes

- Clarity
 - Clear, consistent messages (words and actions)
 - Clarity about ambiguous information; truth seeking/truth speaking
- Open emotional expression
 - Sharing range of feelings (joy and pain; hopes and fears:
 - Taking responsibility for own feelings, behavior; avoiding blaming
 - Pleasurable interactions; respite, humor
- Collaborative problem solving
 - Creative brainstorming; resourcefulness
 - Shared decision making; conflict resolution: negotiation, fairness, reciprocity
 - Focusing on goals; concrete steps; building on success; learning from failure
 - Proactive stance: preventing problems; averting crises; preparing for future challenges

-- Adapted from Walsh (2006)

and contextualize experiences, enlarging their perspective to include both what can be expected over time and how other families/people have handled similar situations there seems to be a greater likelihood that the family can bounce back from stressors (Carter & McGoldrick, 1989; Walsh, 2003). A sense of coherence, which is a family wide belief that life can be comprehended, managed, and have meaning also contributes to resilience (Antonovsky & Sourani, 1988). If a family can appraise the crisis of a member's diabetes diagnosis in a manner that opens it to the use of resources for recovery, and finds positive reasons to manage the ongoing stressor of management, there is a greater possibility of bouncing back even stronger (Falicov, 2007; Pickett, Vraniak, Cook, & Cohler, 1993).

In the Resilience Framework, the Belief Systems key also includes 'transcendence and spirituality.' Within this characteristic is the concept of connection. It speaks to the connection with people outside the family and the valuing of things larger than themselves (Walsh, 2006). Spirituality, the overall concept which includes faith and faith communities, is made up of a connection with the universal whole (Griffith & Griffith, 2002; Mansager et al., 2002), inspiration, innovation, and creativity and the ability to be transformed by adversity. This concept takes into consideration the openness to learning and changing even when, or especially when, there are challenging circumstances in the life of a family. It also stresses the idea of acting positively on those things learned (Walsh, 2006). The Resilience Framework places religion, as a code of behaviors for living out core values, inside the overarching concept of spirituality which is a connection between a person and "all there is" (Walsh, 2006, p. 73).

The other two keys of the Resilience Framework, "Structural/Organizational Patterns" and "Communication Processes" are ways in which the "Belief Systems" key

seems to be expressed both within the family system and the family's functioning within larger systems.

The use of the Family Resilience Framework in this study is twofold. First, this framework gives clear operational definitions to the family beliefs that could affect the way a stressor such as type 2 diabetes is managed. For example, the ability of a person to adhere to a low carbohydrate diet may depend on the family believing that the diet is healthy for the whole family and so change is welcomed as a "wake up call" for a hereditary problem that could be prevented. Or, the family could consider cutting carbohydrates a burden and only of benefit for the person with diabetes, making management of the disease a problem rather than a welcome change. Secondly, because this is a practice framework, research built around it may easily be translated into direct assistance to families where type 2 diabetes or other chronic diseases are family stressors.

The theories Family Systems, Family Stress and Resilience Framework were appropriate to this study regarding families and diabetes. First, because this study focused on an individual who, having been diagnosed with diabetes, is the sum of multiple systems, nearly all of which can be affected by, and affect, the diabetes. Secondly families in this study were a system which was affected by the diabetes of the individual. Those families experienced interdependence both with the subsystem of couple within it and the systems surrounding it, such as culture and resources, by which the beliefs in this study were defined within the family. Third, studies in the stress models have demonstrated that diabetes is a stressor on the family, and the way the family copes with such a stressor affects the way the individual manages their disease, that effect was a major focus of this study. Lastly, in order to cope successfully, it has been demonstrated

that some family characteristics may be correlated with successful coping. The Resilience Framework suggested that making meaning of an adversity such as diabetes includes the concept of causal attribution, and that religiosity is part of the transcendence that could underlie the way that families, such as those in this study, might affect how a person chose to manage their diabetes. This study used these characteristics, with the systems understanding that neither the family characteristics nor the diabetes management stand alone, to observe the affect of family characteristics in response to the stressor of diabetes, on the management of type 2 diabetes.

CHAPTER THREE

REVIEW OF LITERATURE

Chronic Disease

Chronic disease, simply defined, is a disease for which there is no cure and treatment is dedicated to symptom control and to preventing progression (Thorne, Harris, Mahoney, Con, & McGuinness, 2004). The core of caring for chronicity generally depends on continual self-care by persons with the disease and often includes care by others. The psychological and social implications of a chronic disease include; an erosion of self, unending work and continual threat of harm or loss (Paterson et al., 2002). These implications affect not only the person with the illness, but the contexts that surround them (Anderson, Loughlin, Goldberg, & Laffel, 2001; Bischoff, 2002; Woods, Haberman, & Packard, 1993). Attention, then, should not only be given to the person who is diagnosed with a chronic disease but also to those individuals and processes with whom they are connected, especially family.

Management and Health

Chronic diseases typically require attention, and often intervention, as a regular part of daily life. In addition, the direct effects of the disease (e.g. lack of adequate insulin) affect the daily life of the person with the disease. Both the disease and its daily care affect a person's life in an unremitting fashion and continue from diagnosis until death, bringing into focus the effects on developmental issues and each part of the person's physical, social and psychological life (Cardillo, 2005; "Psychological challenges of diabetes explained," 1996). While these effects have long been recognized,

the effects on persons and systems around the person with a chronic disease are more recently coming into focus as are the reciprocal effects of context on both the disease and its care (Almakhzoomy, 2005; Wallace, 1959; Woods et al., 1993).

Systems and Persons with Chronic Illness

The effects of a chronic illness on the systems in which the person with a chronicity is embedded are wide and varied. In a large system, the USA and its divisions, about 45% of Americans have a chronic disease. The costs of those diseases are borne by taxpayers, employers, insurers and the affected persons/families. When considered as an aggregate, the cost of chronic illness was about \$1.7 trillion in 2009, in addition to its affect on the growth of the GDP (PFCD, 2010). The effects of a person's lower productivity and their use of community services, such as free clinics, are costly to the smaller systems of immediate community (ASHA, 2003; Yinusa-Nyahkoon et al., 2007).

The effects of chronic illness on the family, perhaps the smallest system of a person with a chronic disease are multiple and complex. In the extended family the productivity means more than an economic number. The lack of assistance for, and use of resources by, a person with a chronic disease strikes directly at how a family can function. The effects are felt in the extended family (where, for example, grandparents cannot help in child care due to their chronic disease) as well as in the nuclear family where resources for basic living expenses could be encroached upon by the care of a person with a chronicity (Brubaker & Roberto, 1993; Hank & Buber, 2009).

Interestingly, most of the chronic diseases in the US are found in adults, but most of the research which includes the family systems surrounding the chronically ill has

been done in families where a child has a chronic illness. Children are developmentally dependent on others for care; even the healthiest of children require time and other resources from those around them. When a child is ill, those around them increase the resources invested in that child's health. When the disease is chronic, the resource investment is also chronic (Anderson, 1981; Shapiro, 2002; Wilson et al., 2005). The chronicity of both the resource use and the consequences of giving those resources have wide effects on the family system whether the person is a child or an adult (Anderson et al., 2001; Berge & Patterson, 2004).

The effects of a child's chronic illness have been well documented for each member of the immediate family. Parents have been described as; losing identity, losing control, overwhelmed and feeling unable to protect their child (Young, Dixon-Woods, & Heney, 2002). Studies of siblings have shown; stress of responsibility, loneliness and resentment, fear, jealousy, guilt, sadness, embarrassment, and confusion. In addition, siblings show resilience lessons learned, independence, and altruism (Fleitas, 2000). The child with the disease, functioning as a member of the family, often responds as a reflection of those around them, especially their primary care-giver (Berge & Patterson, 2004). When the person with a chronic disease is an adult, the toll on the person's caregiver has been given attention, as have the effects on the significant other, but no studies were found which address the system wide effects on the family (Bischoff, 2002; Brannan & Heflinger, 2001; Cohler et al., 1989; Dentinger & Clarkberg, 2002).

The family wide effects of a chronic disease may include not only the family members, but the interactions that make individuals a unit (Anderson et al., 2001). When children are involved, the effects of the chronicity on the interaction called parenting is

important, and not only for the child with the chronic disease. The time and quality of parenting given to the ill child may decrease the time that can be given to other interactions (Crain, Sussman, & Weil Jr, 1966; Hayes & Knox, 1984; Patistea, 2005). Healthy interactions within families dealing with chronicities can be affected by the objective quality of the interactions in addition to the beliefs that the family members hold about those interactions (Anderson, 1981).

The family of a person with chronic disease has been shown also to affect the larger systems in which the family is embedded. For example, the family affects economic stability and productivity in its larger context (Alesina, Giuliano, & National Bureau of Economic Research., 2007) and may also influence how trusted the social institutions of the society surrounding it may be (e.g. the medical and educational community) (Barnett, 2008).

It is well documented that chronic disease affects the systems that surround it. It has also been shown that the family can affect the care of chronicity. The direct effects of the family on the care of a chronic illness were demonstrated by McClain (2004) where the measures of wellbeing in older people recovering from a coronary artery bypass graft procedure, were positively correlated with the family's adaptation (McLain, 2004). Other direct effects were noted in evidence that something as simple as a family ritual can have positive impact on a person's health (Newell, 1999) and in families' effects on a child's response to medical procedures (Peterson, Mori, & Carter, 1985). The burden of care and lack of support within and outside the family has been shown to decrease the quality of chronic illness care (Shields, Pratt, & Hunter, 2006) and, in the case of mental health, it

has been shown that families can and do affect the outcomes of therapy for an individual (Allison et al., 2003; Barrabee, 1957; Campbell & Patterson, 1995).

In the larger milieu, how a family interacts with the community around it can have either positive or negative effects on how the management of the chronic disease is both carried out (as in the case of the medical community) or how the person and their disease is perceived by their contexts (Baker, Miers, Sulla, & Vines, 2007). For example, the largest source of a fathers' stress was shown to be the reactions of people to his impaired child (Saloviita, Itlinna, & Leinonen, 2003). A family both needs the support of the larger context and that context needs that family, in order to manage a chronic disease (McIntosh, Lyon, Carlson, Everette, & Loera, 2008).

Studies about families and chronic illness have had an noticeable impact on practice and theoretically family is becoming an important part of caring for people, especially children, with chronic disease. However, there seems to be increasing role ambiguity on the part of professionals and families about the interface between them and the roles of each in the care of the person with a chronicity (Johnson, 1990). Berge and Patterson (2004) in a review of literature suggested that studies, such as the proposed project, look at the factors of family which may predict health outcomes. Such studies could clarify the positions of the families and professionals when caring for chronicities like diabetes.

Diabetes Mellitus

Diabetes mellitus is one of the most common chronic conditions in the US. In general, diabetes mellitus can be described as an endocrine disorder which results in a

lack of sufficient insulin to regulate the transfer of glucose from the blood stream into body cells. This can be either a nearly complete lack of insulin, as in Type 1 diabetes mellitus, or a relative lack of insulin, as in Type 2 diabetes mellitus (NIDDK, 2008).

While the physical effects of increased blood glucose and decreased cellular glucose can be the same in both types of diabetes, the biological causes, progression, demography and psychological components are different. The present study will focus on type 2 diabetes.

In type 2 diabetes the relative lack of insulin is usually due to a resistance to insulin on the part of the body's cells. The combination of high blood glucose, low cellular glucose and insufficient insulin results in multi-system dysfunction in the body. The most often noted complications include peripheral nerve/vessel damage (especially in the feet), renal damage and kidney failure, retinal damage that often leads to blindness, and central nerve/vessel disease that leads to blood pressure and heart problems (often without the usual warning signs). Type 2 diabetes is usually a combination of genetic propensity and lifestyle choices resulting in a higher likelihood that people with a family history, who are inactive and overweight, will develop the disease (Otto-Buczowska, Jarosz-Chobot, & Machnica, 2008).

Management and Health

According to the ADA (2010), controlling the blood glucose level is essential to avoid these complications and properly executed daily management activities are the only way to control the level (Group, 1993). Appropriate management extends its influence into every part of a person's life and can spill into most of the contextual systems which the person participates. Early in the disease process, management of type 2 diabetes is

generally lifestyle based. Initially, changes in diet and exercise can delay or eliminate disease progression (ADA, 2010). Even when there is progression, diet and exercise remain the cornerstone of treatment. Beyond this, monitoring the blood glucose has become a regular part of management. This is usually recommended at least twice per week, and may increase to 3-5 times per day depending on the medical regimen that is prescribed (Ko et al., 2007). The regimen often becomes progressively more complex, beginning with medications which decrease blood glucose, but do not increase insulin production (and so do not risk too much insulin which may cause symptoms of low blood glucose). If blood glucose control deteriorates, other oral medications may then be added which increase the body's production of insulin in an effort to overcome insulin resistance. These medications require a structured meal plan and timing to avoid either hyper- or hypo-glycemia. At this point a person may be taking medications for those things which are part of the progression of type 2 diabetes, such as blood pressure medications, and they may adversely affect the action of the diabetes medications. Often the production of insulin by the body, even with the aid of medications, is not sufficient for euglycemia. In this case, injections of exogenous insulin become necessary. The use of injectable insulin generally carries with it the necessity of rigid diet, exercise and monitoring regimes (ADA, 2010).

Systems and Persons with Type 2 Diabetes Mellitus

As with all personal stressors, type 2 diabetes happens in context of family and community. Given the complexity of treatment, and progression of the disease, the systems of country and community bear a heavy economic burden for type 2 diabetes.

According to the CDC (2008) in the USA, the cost of direct diabetes care in 2007 was \$116 billion, with \$58 billion spent on indirect costs which were disability, work loss and premature mortality (NIDDK, 2008). Unfortunately, these costs appear to be climbing. There are some studies that point to the paradigms of individual (rather than family and contextual) education and intervention as one of the main reasons that these costs to the larger society remain high (Jacobson, 2009; Ko et al., 2007; Lawton, Peel, Douglas, & Parry, 2004; Polonsky, Zee, Yee, Crosson, & Jackson, 2005). In addition to the costs of diabetes itself, are the costs of the co-morbidities such as depression and cardio-vascular disease which could be prevented if type 2 diabetes was properly managed (Lee et al., 2009).

When considering the families and relationships of people with type 2 diabetes, it has been noted that the partners of people with type 2 diabetes may show depression levels as high as the partner with diabetes. While the rate of depression in the significant other is higher in females, the person with diabetes seems to have less depression when the person without has more (Fisher, Chesla, Skaff, Mullan, & Kanter, 2002). The interference of the disease with family interactions has been tied to anger, shame, and guilt related to the fact that that lifestyle changes had not been, or were not being, made.

The effects of type 2 diabetes on the person with diabetes have been frequently documented. It has been shown that co morbidities impact quality of life more than such variables as exercise, SES, stress, etc. (Maddigan, Feeny, Majumdar, Farris, & Johnson, 2006). When co morbidities like cardiovascular disease, neuropathy, and depression are prevented, the costs, both monetary and non monetary, to the patient and their contexts decrease (Riu, Vert, Martan, Gonzolez, & Sala, 2003).

As in all chronic disease, the effects of diabetes on the person are greater than the pathophysiology of the disease. Often the perceptions of the diseases' severity and the difficulty of the management have more to do with the likelihood that control will be maintained than do the objective facts about the disease or its management (Peel, Douglas, & Lawton, 2007). One frequently studied effects of type 2 diabetes is general emotional distress (Delahanty et al., 2007; "Psychological challenges of diabetes explained," 1996). In New York City, People with type 2 diabetes were found to be twice as likely as the general population to have serious psychological distress (McVeigh, Mostashari, & Thorpe, 2005), be more prone to depression (Adriannse et al., 2008; Egede, 2004; Hanninen, Takala, & Keinanen-Kiukaanniemi, 1999), anxiety (Boyle, Allan, & Millar, 2004), and self reported distress and depression were significant when associated with diabetes of all kinds (Karlsen, Bru, & Hanestad, 2002). The reverse effect, that is not just how diabetes effects persons and systems, but how persons and systems affect diabetes, was demonstrated when several psychological interventions were shown to improve diabetes management (Ismail, Winkley, & Rabe-Hesketh, 2004).

Although little research has been done on the subject, there is some thinking that, at the family level, the effects can be said to be interactive, that is type 2 diabetes affects family members and family processes, but those persons and processes also affect type 2 diabetes and its management (Mooy, De Vries, Grootenhuis, Bouter, & Heine, 2000). It has also been shown that increases of positive interaction, both within the family and outside it, are correlated with an increase in the quality of diabetes management (Barrett, Plotnikoff, Courneya, & Raine, 2007).

Family Level Variables

With systems thinking guiding the study of families where a member has type 2 diabetes, it is important to include not only more than one informant (Carr & Springer, 2010), but to consider the complexity of family factors that might affect the management of the disease (D'Onofrio & Lahey, 2010). Three of these factors or characteristics, suggested by the Family Resilience Framework and accessible in the current data, are causal attribution, religiosity and a shared beliefs.

Causal Attribution

A part of making meaning, according to Walsh (2006) is the ability to appraise both the cause and the potential consequences of a stressor to arrive at a meaning that will either facilitate or stymie the bounce-back of that family. There is evidence that what people believe to be the cause of a situation affects both the family (Coleman & Ganong, 2002) and the situation, such as disease or poverty, itself (Apastolo, Viveiros, Nunes, & Domingues, 2007). Causal attribution affects how the person experiences symptoms of a disease, what help they choose to seek, and, often, the prognosis of the disease process (Cho, Bhugra, & Wessely, 2008). For example when cultures or families attribute the cause of disease to a higher power, rather than chance or science, patients are less likely to seek medical help or advice and more likely to experience the disease as more severe, but less chronic (Aikins, 2006; Cho et al., 2008; Mishra, Awasthi, & Singh, 2004). In Chronic Fatigue Syndrome, causal attribution was correlated with the psychological adjustment to the disease (White, Lehman, Hemphill, Mandel, & Lehman, 2006). In many cases, patients have measurable knowledge about the risk factors and medically

known causes but may act on a cause that is either partially or completely untrue. It seems that the 'cause' upon which they act alleviates blame and/or gives them a sense of control (French, Maissi, & Marteau, 2005). Despite these needs for explanation, adults with type 1 diabetes demonstrate poorer management of their disease when their explanations for glucose events are not consistent with known physiological causes (Wearden, Davies, Tarriner, Hynd, & Smith, 2006).

Studies about causal attribution specific to type 2 diabetes have shown a relationship between propensity to adhere to a management plan and beliefs about causation (Apostolo et al., 2007). The direct affect of attribution on diabetes control was demonstrated (Latham & Calvillo, 2009), and the perception of severity and longevity of diabetes was associated with beliefs about the cause of diabetes (Mishra et al., 2004). Causal attribution has demonstrated an effect on both chronic disease in general and type 2 diabetes specifically.

Religiosity

The Resilience Framework suggests that a significant portion of families' belief systems are related to Transcendence and Spirituality. According to the this framework, spirituality is the overarching concept which includes faith expression through organized religion (Walsh, 2006) and resilience is best served when a family or person experiences congruence between spirituality and religion. Over a broad spectrum of stressors, this component has been cited as a coping mechanism and as a resource for both patients and their families (Cigrang et al., 2003; Kaye & Raghavan, 2002). As might be expected, spirituality was the main source of support for both clergy and spouse, using ABC-X

model (Darling, Hill, & McWey, 2004). However the religious/spiritual orientation of the family also seemed to play an important role in the prevention of violent behaviors for even families in not involved in clergy roles (Windham, Hooper, & Hudson, 2005).

The data available to this study focus on the religious aspect of transcendence and spirituality. Arccury and his associates (2007) found a positive relationship between participating in religious behaviors and good physical health. Positive Religious Coping in a post-traumatic incident population was associated with positive physical health when the Brief RCOPE was tested (Pargament et al., 2007) and all types of religious coping were associated with better problem solving skills in couples dealing with prostate cancer (Yoshimoto et al., 2006).

The functions of religion were reviewed in a meta-analysis of stress studies in which the researchers found that religion was a part of making meaning or organizing the family and self (Siegel, Anderman, & Schrimshaw, 2001). Religion also seemed to enhance coping resources and facilitate access to social support/integration. It appeared that chronically ill patients coped using experiences of connectedness with God and use spiritual questions to create meaning and purpose (Narayanasamy, 2004). In a study of religion and health, nearly all the participants in the study used religion as a coping resource for medical illness (Reyes-Ortiz, 2006). The connections between religion, spirituality and health were particularly strong in people with chronic illness and these connections seemed to influence medical decisions. For example, women coping with chronicity reported high use of spiritual resources and a higher percent of those who showed positive adaptation also reported spiritual resources (Gordon et al., 2002).

There is a popular perception that suffering, healing and disability are “earned” by an individual in religious traditions. However, one study shows that the people who found help in coping with disease, in both Buddhist and Christian traditions, found an assurance that transcends health or illness. Over a variety of chronic conditions, there was an overall sense that healing is not something one works for, but grateful thoughts and compassionate actions brought a kind of satisfying healing of their own (Schumm & Stoltzfus, 2007).

Although church going is a common way to express religion in America, research had demonstrated that different activities may also satisfy the need for religious activity. For example, older people with chronic disease withdrew from religious attendance and social activity, but continued with religious media and other private religious practices (Arcury et al., 2007; Benjamins, Musick, Gold, & George, 2003) Religious activities in general were associated with decreased perceived stress and a decrease in measures of depression for low income people with diabetes (Kilbourne, Cummings, & Levine, 2009).

In a study of women with type 2 diabetes, the core spiritual beliefs were the lens through which they gathered, processed, and understood disease and treatment information as well as the tool by which they interpreted their life scheme and came to believe that they could positively affect both their health and subjective well being (Daaleman, Cobb, & Frey, 2001). Also in type 2 diabetes, qualitative work has shown that in couples spirituality was an integral part of communication and problem solving patterns (Cattich & Knudson-Martin, 2009). A direct effect of church attendance was its

negative correlation with C reactive protein (a marker of cardiovascular problems) in people with diabetes (King, Mainous, & Pearson, 2002).

It seems prudent to note that although religious activity and coping seems to have a positive effect on people with chronic disease; one caveat should be highlighted when measuring family level religiosity. In the study by Yoshimoto et al. (2006) of couples dealing with prostate cancer, there seemed to be a decrease in the family's ability to solve problems when only one member of the couple was using religion as part of the problem solving process. This gives rise to the question, "How much sharing of beliefs increases the likelihood that resilience will be facilitated?"

Shared Beliefs

It is suggested by the Family Resilience Framework that the way a family shares beliefs, such as causal attribution and religiosity around the fact of a chronic disease may be a predictor of how well the family manages a crisis (Walsh, 2006). The pattern of belief sharing may also affect how a family manages ongoing stressors such as a disease process (Anderson, 1993) and, in turn, how well the person may manage their disease process (Giarelli, Bernhardt, & Pyeritz, 2008). When a chronic disease process complicated the relationship of a couple, Fox (2001) demonstrated that the agreement between spouses regarding the representations, or meanings, including causal attribution, were associated with positive treatment adherence choices by a spouse with congestive heart failure. In the instance of type 2 diabetes, the agreement between spouses about representations of disease was a mediator between the patient's disease representations and their inclination to adhere to management behaviors (Searle, Norman, Thompson, &

Vedhara, 2007). Not each person in a family will share each of the others' views and beliefs, for example the difference in age or gender will result in differing opinions. In the case of Chronic Fatigue Syndrome, the causal attributions of a 'close other' were significantly correlated with the actions of the person having the disease (White et al., 2006). However, it is important to note that the belief systems which best organize family life and deal with adversity are those which are shared (Falicov, 2007; Walsh, 2003).

Demographic Considerations

Because type 2 diabetes is widespread, is more common in some racial groups and occurs in all socio-economic, ethnic, age, and gender groups, it is important to note the effects socio-demographics and economic characteristics might have on a study of people with this disease and their spouses. In the USA, 11.2% of men and 10.2% of women have diabetes; of non-Hispanic whites 6% have diabetes as do 7.5% of Asian Americans, 11.8% of non-Hispanic blacks and 10.4% of Hispanics. Economically, the average medical expenditures for people diagnosed with diabetes were 2.3 times as high as those people without diabetes (NIDDK, 2008).

Gender

There is more in common than different about the way chronic disease affects men and women. However, some differences have been observed in the empirical literature. For example, as has been noted the treatment of diabetes requires lifestyle investment, and when there is a sense that one can control their own lifestyle, the disease management is better. This sense of control is decreased in women with type 2 diabetes

as compared to men and results in decreased level of disease management (Brooks & Roxburgh, 1999; Canja, 2001). In addition, the decreased power allotted to females in a couple may result in both a diminished sense of control and an increased objective workload, whether the diabetes is their own or their spouses' (Knudson-Martin, 2009). Interestingly, married people of both genders have the less morbidity from chronic disease than do unmarried people (Bischoff, 2002; Florian & Dangoor, 1994).

Race/Ethnicity

As the studies of the past decade were reviewed, it was noted that chronicity and family research needed to examine the cultural appropriateness of their methods and tools, and needed to report what is both unique and common among ethnic groups (Chesla & Rungreangkulkij, 2001; Skaff, Chesla, de los Santos Mycue, & Fisher, 2002). In the case of diabetes, not only are factors like SES and health care access an issue among racial and ethnic groups, but the disease tends to affect dark skinned peoples at a higher rate than lighter skinned (Caballero & Tenzer, 2007). Aside from the physical issues, the culture surrounding ethnicity may profoundly affect the way diabetes, or any chronic disease, is managed (Carbone, Rosal, Torres, Goins, & Bermudez, 2007; Friedman, 1997). The direct effect of ethnicity and race on the causal attributions of a person with diabetes was demonstrated by Noel (2010). However, it has been noted that consideration of the how the individual interprets their culture or other context, must be the main point when understanding their management of diabetes (Hunt, Arar, & Akana, 2000). For example, a change in cultural context increases the risk of families for poor outcomes (Roer-Strier, 2001). When a patient is considered non compliant, the health

care system and its relevance to cultural beliefs and practices should be explored (Anderton, Elfert, & La, 1989). The following are some marks of culture that should be considered in the treatment of and research on type 2 diabetes.

In Iranian culture, for example, the doctor is a holy man and diabetes should be accepted as God's will. The care of the body is necessary because it is a gift from God, and support in doing so is expected from the family, especially daughters (Abdoli, Ashktorab, Ahmadi, Parvizi, & Dunning, 2008).

When considering Chinese culture, it should be remembered that health and disease are thought to be a part of the balance of life and the meaning of food is ceremonial and often prescribed. Traditional Chinese medicine differs considerably from western medicine and the extent to which the patient believes in either traditional or western medicine must be assessed. Family dynamics are especially important in this society. It is collectivist and the effects and meanings of both the disease and its treatment on, and to, the family of the patient will be carefully considered before management is begun (Chun & Chesla, 2004). Taiwanese culture is very much like Chinese and they often sought alternative (traditional Chinese) therapy for hope as well as for disease management. There remained a social stigma with the disease, although people in Taiwan counted on support from family, some of their best support came from others with diabetes (Lin, Anderson, Hagerty, & Lee, 2008).

Samoa is divided between Samoa and American Samoa. American Samoa seems to have the most issues with type 2 diabetes. In that society, the disease causes considerable stress and the decrease in blood glucose control is associated with an

increase in family level stress. Despite this association, family is considered the primary support and network of care giving (Elstad, Tusiofo, Rosen, & McGarvey, 2008).

A large proportion of Filipino Americans have developed type 2 diabetes. The primary challenges in disease management for this population included the centrality of the family and prioritizing their needs, the social network, and the work of diabetes, this was especially true as diabetes seemed to carry a stigma. The diet was sometimes difficult to maintain because of the symbolic and social meanings of food. The medical aspect of the disease and treatment were often difficult to reconcile with the traditional spiritual meanings and stigmas associated with diabetes (Finucane & McMullen, 2008).

In Thai culture, there are varied beliefs about diabetes, some aligned with western medicine, some traditional, but most a mixture of the two. The Buddhist influence, which values moderation, is very helpful in the management of diabetes. However rice and other dietary components have important social value which hampers disease management (Sowattanagoon, Kotchabhakdi, & Petrie, 2009).

The use of spirituality, prayer or religious rituals when coping with type 2 diabetes are common in several cultures and among different racial and ethnic groups, notably, Nigerian and other African cultures (Greeff & van der Merwe, 2004; Melvin, Lanre, & Ayotunde, 2008), African American (Franklin et al., 2007; Polzer, 2007) and Hispanic (Bergland, Heuer, & Lausch, 2007).

African Americans dealing with diabetes tend to be dealing with higher family stress, often caused by lower SES (Blumberg, 1999; Johnson, Terrell, Sargent, & Kaufman, 2007) African Americans also, perhaps due to prejudice by the health care system, and differing health, nutritional, and religious beliefs tend to disconnect from the

medical system in the US (Liburd, 2003; Lii, 2007). In general, they tend to have psychological resources such as optimism and ego resilience which seem to come from the idea of a "nested self" (Hobfoll, 2001), in which a person with diabetes is supported by social resources created by family adaptability and cohesion. It seems that race-related stress was a significantly more powerful risk factor than stressful life events for psychological distress (Utsey, Giesbrecht, Hook, & Stanard, 2008). When considering diabetes management, African Americans were more similar to than different from Caucasians in that their propensity to act upon treatment advice from medical professionals depended more on the modality of treatment (insulin or pills) than on their ethnicity (Fitzgerald et al., 2000).

Age

In America, the number of children with type 2 diabetes is growing, and adults are being diagnosed at younger ages (NIDDK, 2008). The developmental and social issues must be considered in these cases as people diagnosed at younger ages have a greater chance of being obese, making poor diet choices and being extremely inactive (IHS, 2010). Despite this increase, the majority of type 2 diabetes happens in later adulthood. In older ages, physical limits and slowing cognition may interact with outdated medical knowledge and beliefs making both research with current tools, and education for appropriate management problematic (Magwood, 2006). In addition it should be remembered that older persons are more likely to use religious coping and prayer when dealing with chronic disease (Melvin et al., 2008).

Socio-economic Status

As previously noted, the pressure of a low SES level can cause family wide strain without the addition of a stressor such as chronic disease (Almakhzoomy, 2005). In the case of diabetes, appropriate management increases the cost of living by the medical treatment, a possible increase in food costs for more healthy varieties, a place to safely exercise, and the transportation for health services. In the case of the aging, this is often a time of decreasing income as well (Heymann, 2000).

Summary of Literature

Much of the literature surrounding families and chronic illness was focused on families who had children with chronicities (Anderson et al., 2001; Anderson, 1981; Knafl & Gilliss, 2002). It contained both qualitative and quantitative studies; however there was generally just one informant, which was not usually the person with the chronic disease. The family resilience literature, as previously mentioned, did not uniformly define the concept of resilience (Black & Lobo, 2008; Ganong & Coleman, 2002). Most of the research tended to look at a single characteristic and called it resilience (or resiliency) and test for some intervention that might create or strengthen that characteristic (Chartier, 1999; Chesla et al., 1999). This was often a way to test a specific program for a specific stressor which the researcher is assessing (Grigg-Saito, Och, Liang, Toof, & Silka, 2008; Iwasaki, MacTavish, & MacKay, 2005).

In the literature specifically regarding diabetes, there was a plethora of quantitative work about the physical aspects of controlling both the disease and the complications it engendered. For example the Diabetes Control and Complications trial

was a landmark study demonstrating significant decreases in micro-vascular sequelae of diabetes, such as blindness and kidney failure, when the blood glucose was controlled more tightly than standard practice had recommended up to that time (Group, 1993). The majority of work outside medical disease process and allopathic treatment seemed to be divided into two areas; the first was usually quantitative and focused on how best to either motivate the person with diabetes to follow their medical protocol (Jacobson, 2009) or what treatments outside the traditional medical model might decrease the blood glucose and its sequelae (Barrett et al., 2007; Ismail et al., 2004). The second area of non-allopathic diabetes research concerned the less physical effects of diabetes on the person, family or other contexts (Kerson & Kerson, 1985; McVeigh et al., 2005). This is most often qualitative or mixed methods research. The research about type 2 diabetes in this area seemed to be population specific (Aikins, 2003; Alcozer, 2000). With the rise of this type of diabetes in children, there has been an increase in the literature regarding how families and other contexts are affected by, or affect, the disease process. However, the families of adults among whom the disease is most common, were not well studied; nor was the affect of their families on the management of their disease (Hough, Lewis, & Woods, 1991).

This research, then, was aimed at filling several of the gaps noted in the type 2 diabetes and family literature. First, this study was based in the Family Resilience Framework which has shown validity in practice and defines both the resiliency characteristics and the resulting resilience (Coleman & Ganong, 2002). Second, this research was a step towards the use of multiple informants, both by surveying multiple informants, and by handling the statistics in such a way that multiple family informants

may be represented as a whole unit (Kenny, Kashy, & Cook, 2006). The third contribution of this study was to explore how a couple's resiliency characteristic can affect the management of an adult's disease, and to pave the way for looking at the whole framework of family resilience and the context of whole families.

A reading of the literature suggested that the expected results for this study might have included some evidence that increased religious coping and practices may result in a greater adherence to diabetes management practices. It is also probable that this research could have supported a model in which attributing diabetes causes to biophysical factors may also increase the level of diabetes management. The level of shared belief that may have resulted in the best type 2 diabetes management may have been an 'optimal' level rather than complete agreement or disagreement. It was also conjectured for this study that the interaction of these factors would have had a greater effect than the sum of each one of them alone.

CHAPTER FOUR

METHODOLOGY

Research Design

This secondary analysis was designed to understand couple's experience with the challenges and demands often associated with chronic illness in the family. This dissertation in particular focuses on the following research questions: Does the couple's causal attribution affect the management of the disease? Does the couple's religiosity affect the management of diabetes? Does the congruence between the spouses' answers about causal attribution and religiosity affect diabetes management? How does the combination of the aforementioned variables affect diabetes management?

Systems theory, especially as it relates to families, purports three salient constructs: nothing happens in isolation, self assessment is part of a human system, and correction is part of a human system. The management of diabetes often happens in the context of family and, in this study specifically the couple system within the family. Given that the disease process is known to respond to assessment and correction of blood glucose, and it stands to reason that the family may also assess and correct its influence on disease management. According to Family Stress Theory, the stress of having to manage diabetes not only affects the family, but also how the family copes with that stress or will, from a systems perspective, affect the management of the disease. If the system of family is conjectured to have an affect on the management of type 2 diabetes, then some characteristics of the family may be noted to increase or decrease the propensity of a family member to adhere behaviors which are implicated in diabetes management. Three of these characteristics which have been suggested by the Resilience

Framework, were used in this study to begin an analysis on how characteristics of a family system may affect the management of type 2 diabetes.

The family characteristics were causal attribution and religiosity, in addition to an analysis on the extent to which these beliefs are shared between the partners in predicting the management of type 2 diabetes in one member of couple dyad. A conceptual model was proposed to study these concepts using data from the Diabetes Couples Study and secondary analysis was conducted to test the research questions identified in this study. For the purposes of this study, causal attribution was defined as what a person considers to have been the cause of diabetes despite what doctors or family have said is the cause. It was operationalized using self report indices included in the causal attribution scale in the Revised Illness Perception Questionnaire-Diabetes (Moss-Morris et al., 2002). Religiosity was defined as the use of traditional Christian beliefs in response to the diagnosis of diabetes. It was operationalized using brief RCOPE (Pargament et al., 2007) and specific religious practices questions. Shared beliefs were defined as the congruence between the spouse with diabetes and the spouse without diabetes about causal attribution and religiosity. It was operationalized by using the absolute value of the differences in spouses' responses on each of the scales. Diabetes management was defined as appropriate diet, exercise, blood glucose monitoring and diabetic appraisal of management. It was operationalized using self report measures of adherence to diet, exercise, and blood glucose monitoring contained in the Diabetes Care Profile (Fitzgerald & Davis, 1996) and responses to the Appraisal of Diabetes Scale (Carey et al., 1991).

Participants

The participants of the Diabetes Couple Study were 113 married couples living in Southern California between the ages of 25-85 with a mean age of 54.9 for spouse having Type 2 diabetes and 54.7 for spouses without diabetes. Among the couples, about 59.6% of the diabetic spouses were female. The length of time diagnosed with diabetes ranged from under one year to 45 years with a mean average of 9.09 years. Couples were married for an average of 26 years and 81.7% of spouses did not have diabetes before they were married. The race/ethnic backgrounds of participants were 52% White, 24% Hispanic, 14% Black, 7% Asian and 3% other. Eleven percent of individuals did not complete high school, 19.3% completed high school, 39.1% had some college, and 30.1% complete college level education. The median income for couples was \$50,000-\$59,000. All participants were English speaking. Exclusion criteria for this study included individuals who were taking steroid medication, who had major physical co-morbidity (amputations, chronic renal failure, recent myocardial infarct, cerebrovascular accident), or were diagnosed with major mental illness (schizophrenia, bipolar disorder, eating disorders, substance abuse). Participants were screened during the consent process through questions on the consent form. All data were collected from the paper and pencil survey.

This study was approved by the Institutional Review Board (IRB) in the School of Science and Technology at Loma Linda University.

Diabetes Management Measures

The Outcome measure for this study was diabetes management, and diet and exercise are the cornerstones of diabetes management. With the advent of equipment which can be used by non-medical people to measure the effectiveness of their management, blood glucose monitoring has become a routine part of managing type 2 diabetes. The self reported frequency of exercise, meal planning, blood glucose monitoring, and diabetes appraisal will act as the manifest measures of diabetes management in this study. The tools that were used to ascertain these frequencies in the Diabetes Couples Study were the Diabetes Care Profile (DCP) and the Appraisal of Diabetes Scale (ADS).

Diabetes Care Profile

One tool used to measure diabetes management was the Diabetes Care Profile (Fitzgerald & Davis, 1996). The DCP was validated among African American Type 2 diabetics and has excellent internal reliability (Cronbach's alpha .60 to .95) and validity on profile scales, as well as psychosocial scales in two studies (Fitzgerald & Davis, 1996; Fitzgerald et al., 2000). The DCP is a self-administered questionnaire that assesses the social and psychological factors related to diabetes and its treatment. There are a total of sixteen scales in the DCP and those that assess diet adherence, exercise adherence and blood glucose testing frequency will be used in this study. Questions included such frequencies as, "how often do you follow a meal plan?" Responses ranged, on a one to five scale, from never to always (Appendix A). The DCP was also used to collect other

information such as of age, SES (income and education), race (white/nonwhite), gender (male/female), and duration of diabetes (number of years).

Appraisal of Diabetes Scale (ADS)

The ADS is a seven item self-report questionnaire designed to assess an individual's appraisal of his or her ability to manage diabetes (Carey et al., 1991). The internal reliability for this scale as measured by Cronbach's alpha was 0.73. The ADS was also shown to remain stable after both the 1-hour and 1-week retests, as reported through Pearson's correlation, $r(95) = .89$ and $r(77) = .85$. As measures of validity, correlation analyses of the ADS to other questionnaires indicate modest to strong relationships. Regarding the correlation between the ADS and HbA1c, moderate correlations were found between the ADS and HbA1c, as well as with psychological adjustment and current stress (Carey et al., 1991). An example of an item on this tool was, "I keep my weight under control" with responses on a scale of 1-5, from never to always (Appendix A).

Measures of Family Level Variables

The predictor variables in this study were those characteristics of the family, suggested by the Family Resilience Model, which may affect the management of type 2 diabetes. Those available in the Diabetes Couple data set were religiosity, which were measures of religious coping and religious behaviors, causal attribution, and congruence between couple members about religiosity and causal attribution. Religiosity was measured using the "Brief Religious Coping Scale" and three questions regarding the

frequency of religious behaviors. Causal attribution was measured using the attribution scale in the “Revised Illness Perception Questionnaire-Diabetes.” The congruence between the spouses’ responses on these measures was analyzed and transformed into the third and fourth predictor variables.

Revised Illness Perception Questionnaire- Diabetes

The Revised Illness Perception Questionnaire-Diabetes contains 5 scales that assess the cognitive representations of illness (Moss-Morris et al., 2002). The 5 scales assess identity, cause, time-line, consequences and cure control of the illnesses. In this study only the cause scale was used to illicit patient’s attributions about their diabetes developed. The attribution scale is broken into 4 different attributional areas (psychological, risk factor, immunity, and chance). The general question asked was, “We are interested in what you consider may have been the cause of your diabetes.” Examples of potential responses include stress or worry, diet or eating habits, my own behavior, and family problems or worries (Appendix C). Results show good levels of internal consistency and test-retest reliability, and concurrent, discriminative and predictive validity (Moss-Morris et al., 2002).

Religious Coping Scale

The brief RCOPE was developed in 1999, in order to identify positive and negative religious coping patterns which could have important implications for a person’s health. Positive coping included a belief that there is meaning to be found in life and a sense of spiritual connectedness with others while negative religious coping is an

expression of a less secure relationship with God and a tenuous ominous view of the world. The stem statement of the scale is, “Because I (or my spouse) has diabetes I have...” followed by statements such as, “felt God had abandoned me” with the scale of zero to four, from not at all to a great deal. The scale when tested in several diverse samples demonstrated a Cronbach’s alpha of 0.9 for positive scales and 0.81 for negative scales, with significant, but low, correlation between the scales (Pargament et al., 2007) (Appendix B).

The responses to these scales were described, screened and appropriately transformed or cases eliminated in preparation for the analyses.

Analysis

This dissertation in particular focuses on the following research questions: Does the couple’s causal attribution affect the management of the disease? Does the couple’s religiosity affect the management of diabetes? Does the agreement between the spouses’ answers about causal attribution and religiosity affect diabetes management? How does the combination of the aforementioned variables affect diabetes management?

Data were first screened for missing data, with replacement or deletion performed as appropriate, and descriptive statistics were reviewed. Additional analyses were conducted to examine the distribution and shape of these data. Following the descriptive statistics, a series of inferential statistics were performed which tested for the assumptions of regression analyses, factor analysis and path analysis. Transformations of data were made as necessary and appropriate. As a result of the screening of these data,

104 couples, with sufficient data, and the remaining nine cases were eliminated due to significant missing data problems.

Two separate conceptual models were proposed. The differences between them were the two latent variables, causal attribution and religiosity, and the sociodemographic (or control) variables. In the first series of analyses, the responses of the spouse with diabetes were examined (figure 2), and the responses of the spouse without diabetes were examined in the second (figure 3). The congruence between spouses causal attribution, the congruence between spouses' religiosity and the diabetes management of the spouse with diabetes did not differ between models. Each set of analyses controlled for age, socio-economic status, gender and ethnicity (in the spouse whose predictor variables were used), in addition to calculating error terms (Kenny et al., 2006; Schumacker & Lomax, 2004).

The first latent predictor variable, or causal attribution, consisted of the factors, psychological causation, risk factor causation, immunity causation and chance causation. The second latent predictor variable, or religiosity, included negative religious coping, positive religious coping and religious behaviors. The spouses' responses to these factors were then compared for congruence by obtaining the absolute value of the difference between them to make up the latent predictor variables, shared attribution and shared religiosity. The latent outcome variable, diabetes management includes the factors diet, exercise, blood glucose monitoring and personal appraisal (figures 2 and 3).

Structural equation modeling (SEM), having been used increasingly in the social sciences to analyze increasingly complex models, was chosen as the primary method of analysis for this study. This is a comprehensive statistical approach that provides analysts

with the opportunity to explore hypotheses about relationships among observed and latent variables in ways that were not available a few decades ago (Schumacker & Lomax, 2004). It flexibly and cohesively encompasses and extends procedures of factor analysis, path analysis, regression, measurement theory and estimation theory (Kline, 2011). SEM is available in many user-friendly software versions that enhance its accessibility and its utility in exploring research questions with specificity and complexity, which makes it highly adaptable and useful to researcher in the behavioral and social sciences (Hoyle, 1995; Schumacker & Lomax, 2004). The models in this study were built using EQS 6 software for Windows. Other analysis included univariate descriptions and bivariate correlations. These analyses and other statistics were done in IBM SPSS Statistics 19 for Windows.

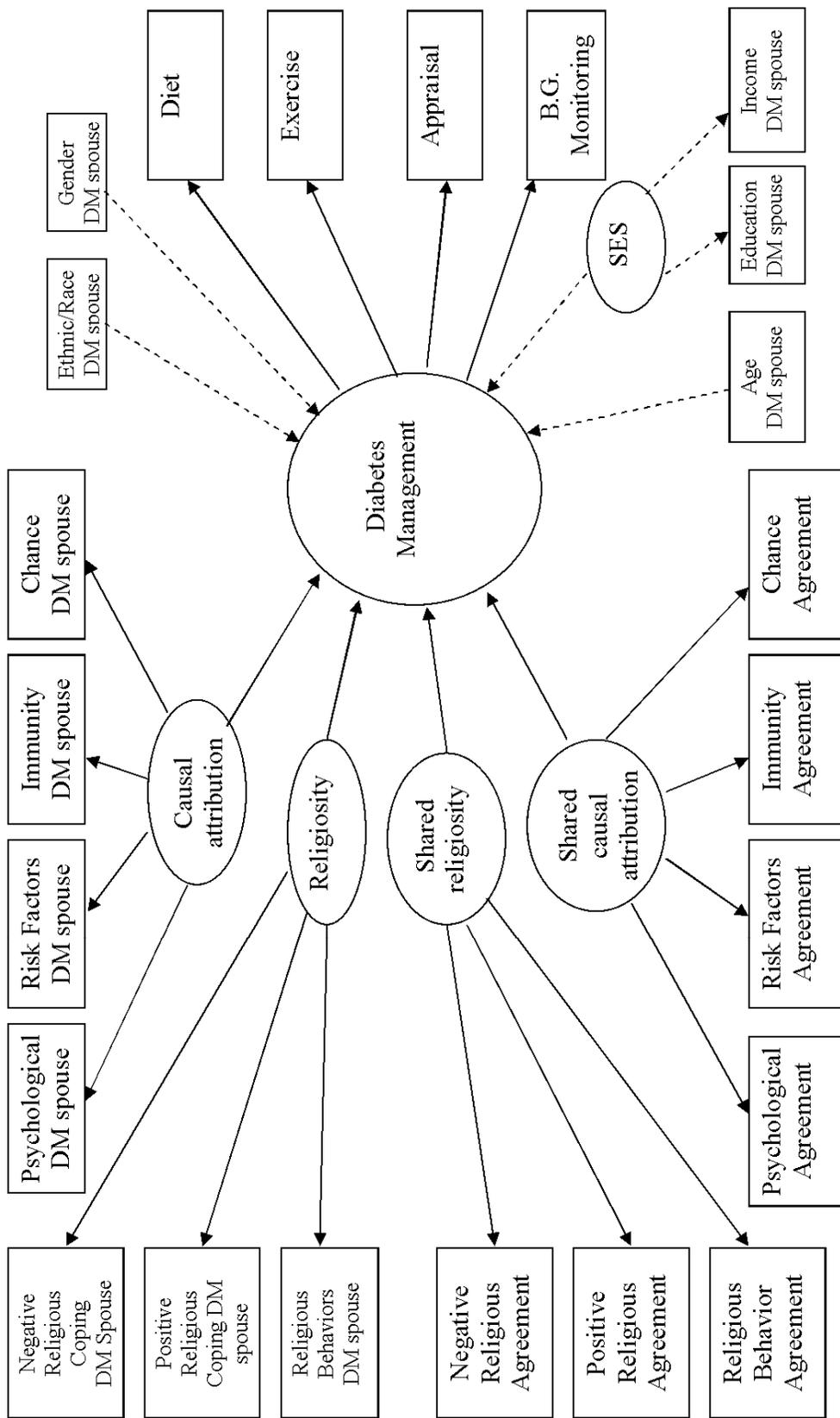


Figure 2. Conceptual model with diabetic spouse variables

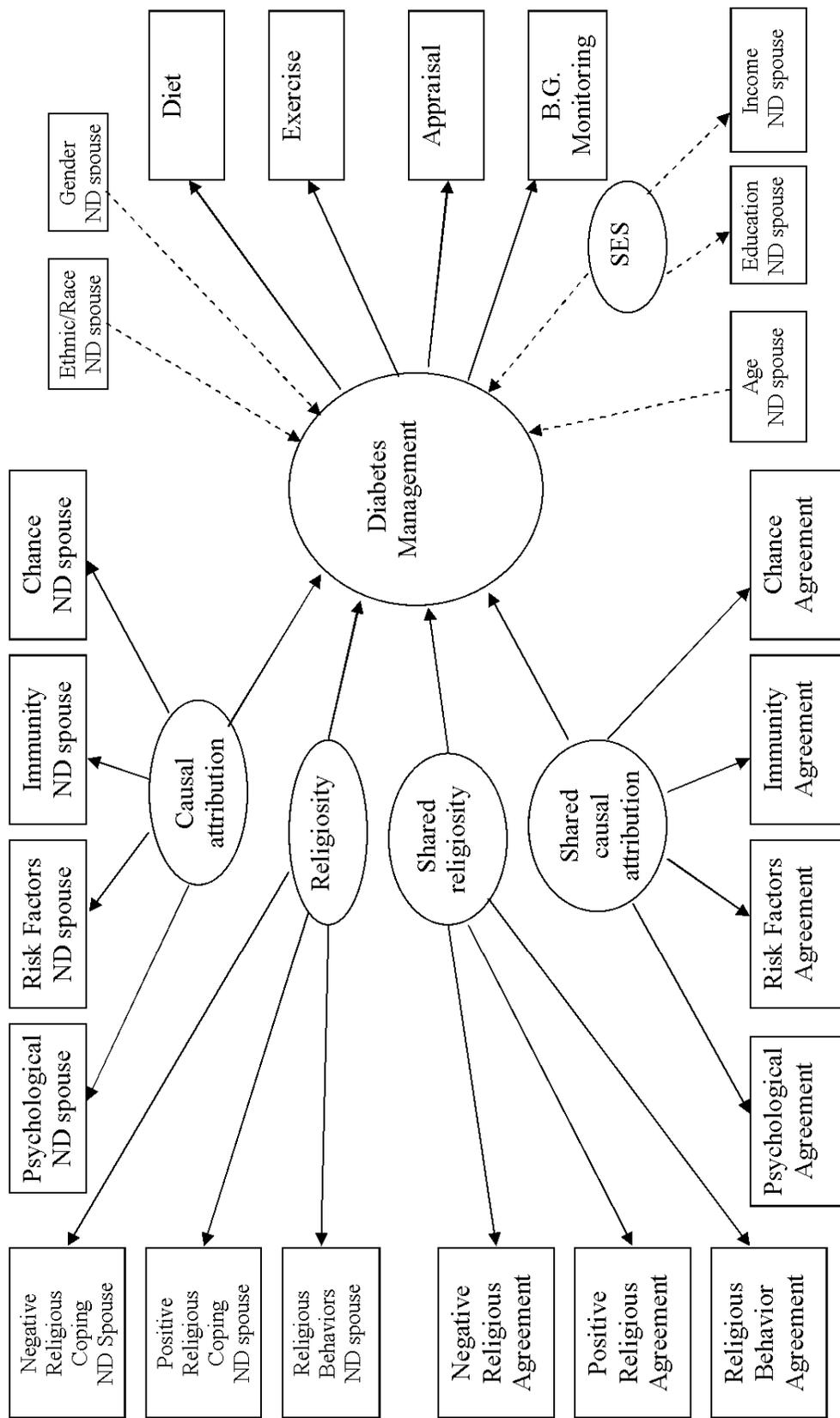


Figure 3. Conceptual model non-diabetic spouse

CHAPTER FIVE

RESULTS

This study was designed to answer the following questions: Does the couple's causal attribution affect the management of the disease? Does the couple's religiosity affect the management of diabetes? Does the congruence between the spouses' answers about causal attribution and religiosity affect diabetes management? How does the combination of these variables affect diabetes management? Two structural equation models were calculated in an effort to capture the effects of both spouses on the management of diabetes. The fit indices are as follows.

Data Description

Bivariate correlations using the data for the spouse with diabetes revealed the following trends (Appendix D). Gender was negatively correlated with a positive perception of diabetes management ($-.200, p < .05$) where 1=male and 2=female. The race/ethnicity of the spouse with diabetes (where nonwhite=0 and white=1) was positively correlated with immunity as the cause for diabetes ($.211, p < .05$), negatively correlated with both positive and negative religious coping ($-.246, -.221, p < .05$). The age of the spouse with diabetes was positively associated with immunity causes ($.200, p < .05$) and religious behaviors ($.201, p < .05$).

The variable household income was negatively correlated with both psychological causes and chance causes of diabetes ($-.199, -.208, p < .05$). It was also negatively correlated with both positive and negative religious coping ($-.219, -.223, p < .05$).

The differences in spouse beliefs were positively correlated with gender in the areas of psychological causes (.221, $p < .05$), risk factor causes (.344, $p < .01$), and religious behavior (.217, $p < .05$). The difference in positive religious coping was positively correlated with race/ethnicity (.195, $p < .05$). Household income was negatively related to the differences in psychological causes (-.324, $p < .01$), chance causes (-.266, $p < .01$), and religious behavior (-.241, $p < .05$). Education was negatively related to the spouses' differences in psychological causes (-.218, $p < .05$) and positively related to differences in positive religious coping.

The correlation between the differences of belief variables were significant and positive between positive religious coping and risk causes (.214, $p < .05$), negative religious coping and chance causes (.259, $p < .01$), and religious behaviors and risk causes (.352, $p < .01$).

The correlation of the diabetes management indicators showed a negative, but non significant correlation between exercise frequency and BG testing (-.130). The perception of management was positively correlated with exercise frequency (.313, $p < .01$) and propensity to follow the prescribed diet (.224, $p < .05$). There was no significant correlation between exercise and diet (.171), nor was there a significant association of BG testing with any other indicator of management.

The SEM fit indices, in answer to the research questions are as follows.

Model 1: Spouse with Diabetes

The constructs of causal attribution, shared attribution, religiosity, and shared religiosity were examined to determine if they impacted diabetes management,

controlling for the age, gender, SES, and race/ethnicity of the spouse with diabetes. The normalized estimate (Z score) was 9.468 indicating the need for robust fit tests (Satorra, 1994). The fit indices for this model were, $\chi^2=319.819$ ($p<0.001$), χ^2/df ratio=1,397, CFI=0.658 RMSEA=0.063 (90% CI=0.045, 0.078). There is co-linearity between causal attribution and shared causal attribution, as a result only one of these pathways could be entered in the model. The significant pathway to diabetes management was a large path from shared attribution (-.633). The pathways from shared religiosity (.261) and SES (.196) were moderate but not significant.

Model 2: Spouse Without Diabetes

The constructs of causal attribution, shared attribution, religiosity, and shared religiosity were examined to determine if they impacted diabetes management. This model controlled for the age, gender, SES, and race/ethnicity of the spouse with diabetes. The distribution of standardized residuals was normal, there were no problems during optimization, and the parameter estimates were in order. The normalized estimate (Z score) was 7.037 indicating the need for robust fit tests (Satorra, 1994). The fit indices for this model were, $\chi^2=299.353$ ($p<0.001$), χ^2/df ratio=1.319, GFI=0.728, CFI=0.784 RMSEA=0.056 (90% CI=0.037, 0.072). This model also could not analyze causal attribution due to its co-linearity with shared causal attribution. In the structural model a large but not statistically significant path from shared attribution to diabetes management was observed (-.423). The next largest, of small to moderate effect, was gender (.189)

Research Questions 1 & 2

Does the couple's causal attribution affect the management of the disease? Does the couple's religiosity affect the management of diabetes? Due to co-linearity, the path from causal attribution was not evaluated. There were not, in this sample, any paths that suggested a significant effect of religiosity on diabetes management. This was true for both the analyses of the spouse with diabetes and the non-diabetic spouse.

Research Question 3

Does the congruence between the spouses' answers about causal attribution and religiosity affect diabetes management? Shared attribution and shared religiosity were created by calculating differences between the responses of the spouses. Those paths were, therefore, expected to be negative. The shared causal attribution pathway was large in both sets of analyses and significant in the diabetic spouse analysis. A moderate, though not statistically significant, pathway was found between shared religiosity and diabetes management in the analysis of the spouse with diabetes. While the relationship between shared causal attribution was negative as expected (-.633), the relationship between shared religiosity and diabetes management was positive (.261).

Research Question 4

How does the combination of the aforementioned characteristics impact diabetes management. These models found one significant path, shared causal attribution to diabetes management (-.633) in the analysis of the spouse with diabetes. The pathways that show moderate effects, though not significant, are shared religiosity (.261) and SES

(.196). Gender also showed a nearly moderate effect size in the analysis of the non diabetic spouse (.189). Religiosity of neither spouse showed a statistical impact on diabetes management.

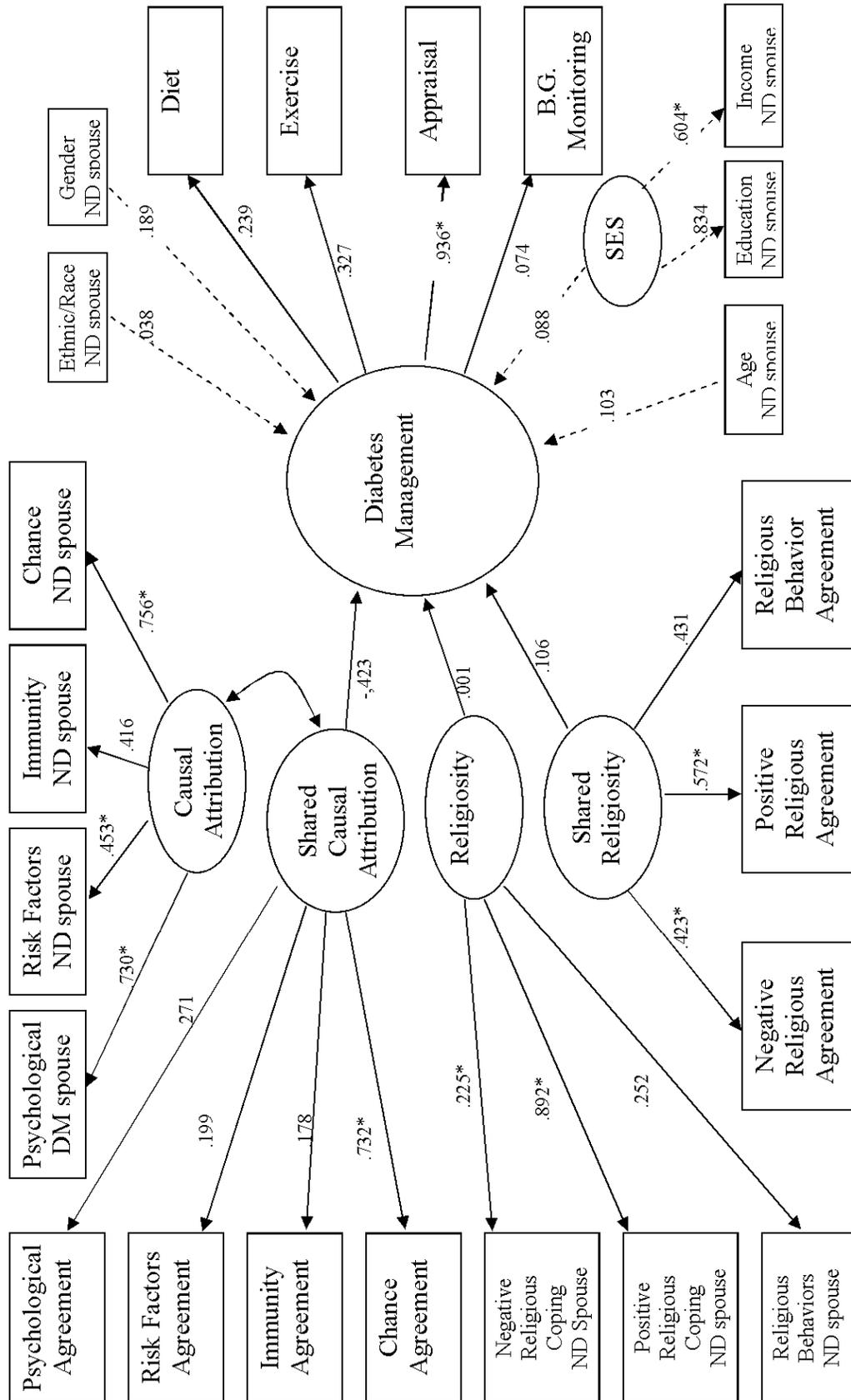


Figure 5. Path model of non-diabetic spouse

CHAPTER SIX

DISCUSSION

The results of these analyses suggested large and significant impact of shared causal attribution and individual causal attribution on the management of type 2 diabetes in the calculations of the spouse with diabetes. In those same calculations, moderate paths were found from both shared religiosity and SES to diabetes management. In the spouse without diabetes the same two causal attributions to diabetes management paths were large, but not quite statistically significant. It should be noted that, with the exception of race/ethnicity, all the shared predictor variables showed moderate to large affect on type 2 diabetes management. In neither model did any of the control variables, beside SES, show a notable effect size. Although an interesting finding was a nearly notable path from gender, in addition to the correlations between gender and management perception, which might be interpreted to mean that when the non diabetic was female there was a better chance that the male with diabetes would be more likely to adhere to a management plan. This finding is noteworthy in light of the finding by Knudson-Martin (2009) that women do more work in a relationship where diabetes is involved whether it is their diabetes or not. It was also found that the path between religiosity and management had a negligible effect size. One interesting finding was the lack of correlation between diet and exercise especially in the face of the fact that these are considered cornerstone treatments for type 2 diabetes (ADA, 2010).

The importance of this research lies in two areas. First, these finding suggest that there is some evidence that shared variables impact chronic disease, especially those that measure congruence between member's beliefs. Second, these analyses are important on

account of the fact that this study attempted to measure congruence using the methods available to control non-independence of couple members when a single outcome variable prohibits the use of dyadic analysis (Kenny et al., 2006). Despite the difficulties encountered in creating variables that would reflect multiple informant responses, sufficient evidence of the impact by those variables was suggested, using moderately appropriate methods, to merit further study of both the components of the variables and the method by which they can be more accurately analyzed.

A review of the literature revealed that chronic illness had, in previous research, been impacted by causal beliefs (Wearden et al., 2006; White et al., 2006) as has diabetes (Mishra et al., 2004). Although the specific attribution styles used in this study were not among those noted in the diabetes literature, it was expected that what the family believed about the cause of type 2 diabetes would affect the management of the disease. In a sense the selected attribution variables used in this study may provide some insights about whether this is a potentially fruitful line of investigation to pursue. These results indicate that both shared and individual attributions are salient in the management of type 2 diabetes in the context of couple relationships. That is, these data supported this expectation both by the co-linearity of causal attribution and shared causal attribution and, especially, by the large and statistically significant path from these to diabetes management.

Shared causal attribution was, as expected, a large and significant path. Research has not only demonstrated the connection between causal attribution as noted above, and management of chronicities, but there is some evidence that the congruence of disease representation (including the causal attribution) between spouses affects how a chronic

disease is managed (Fox, 2000). In the analyses of the non diabetic spouse, this path was large, but not statistically significant, although it was approaching significance and its lack could have been a function of the sample size (Schumacker & Lomax, 2004). However the results currently presented may indicate that impact is greater for the diabetic spouse as compared to the non-diabetic spouse. Perhaps, this could be expected as it is the person with diabetes who is ultimately responsible to manage that diabetes.

In previous studies, positive religious coping (Hills, Paice, Cameron, & Shott, 2005) and religious behaviors (Park, Moehl, Fenster, Suresh, & Bliss, 2008) have been associated with improved physical health in persons with chronic disease. In diabetes religiosity's affect on depression and collateral morbidities has been noted (Kilbourne et al., 2009; King et al., 2002). Again, the specific religious coping categories in the Brief R-Cope were not found in the literature relating to type 2 diabetes, nor were any specific studies found which demonstrated religious activities' impact on type 2 diabetes. Nevertheless, given the impact of religiosity on chronic disease, including those associated with diabetes, and given the use of religion to cope with type 2 diabetes (Bergland et al., 2007), there was an expectation that notable impact on the management of type 2 diabetes would be found. Although shared religiosity was found to have a moderate effect, the religiosity of neither the spouse with diabetes nor the spouse without was found to have a notable effect. In Walsh's (2006) conception of spirituality and transcendence, religiosity was a subcategory. The use of religiosity only may have decreased the impact of the larger concept of spirituality. In addition, the tool for religiosity was framed in a Christian tradition which may have been less appropriate than hypothesized for the sample in this study.

Shared religiosity has shown some correlation with problem solving (Yoshimoto et al., 2006) in chronic disease and as a part of coping with type 2 diabetes (Cattich & Knudson-Martin, 2009). In this study shared religiosity had a moderate, though not statistically significant pathway in the analyses of the spouse with diabetes. Interestingly, the path coefficient was positive which may be interpreted that the greater the disagreement between the spouses about religious coping, the better the diabetes management. This may be a function of a possible curvilinear relationship between the two since it is expected that complete agreement is neither expected nor desirable in a family relationship, nor is complete disagreement (Walsh, 2002). However the non-significance of the path suggests that this observation be held strictly within the context of a theoretical discussion. Future studies may explore whether there is a threshold effect or a curvilinear relationship with shared religious beliefs and diabetes management. It might also be interesting to examine the specifics of shared religious beliefs that may be implicated in effective management of chronic disease in general or type 2 diabetes in particular.

Implications for Theory, Research, and Practice

Theory

The systems framework suggests that multiple variables will be involved in, or affect, the management of type 2 diabetes. The Double ABC-X model implies that families are an integral part of coping with an ongoing stressor such as diabetes and this study supports that implication. However, the Double ABC-X may be more appropriate for a study that might explore the impact of time on both the predictor and the outcome

variables studied here. The Family Resilience Framework offers specific characteristics of family which may be involved in managing the disease such as meaning, transcendence, and shared beliefs. It was hypothesized for this study that the constructs chosen for meaning, transcendence and shared beliefs (causal attribution, religiosity, and the between the spouses regarding the former two constructs) would measurably impact the management of one spouses' type 2 diabetes.

The importance of a shared belief system is foundational to the concept of meaning in the Family Resilience Model. Congruence between spouses about religiosity was found to be necessary by Yoshimoto (2006) for successful problem solving. Congruence in representations of illness, including causal attribution, between spouses were significantly associated with adherence to congestive heart failure treatment (Fox, 2000). When a person with diabetes and their spouse shared those representations in the presence of type 2 diabetes, there was evidence that the management behaviors were more likely (Searle et al., 2007). The causal attribution of close others was demonstrated by White and her colleagues (2006), who divided causal attribution in to internal and external causes, finding the attribution of the spouse to internal factors created unhelpful support measures, decreasing the likelihood of effective Chronic Fatigue Syndrome management.

This study supported the importance of a shared belief system, with large and significant paths from shared causal attribution to diabetes management and moderate paths from shared religiosity and SES to diabetes management.

Family Literature

A summary of the family literature suggests that work remains to be done in the area of families and health. Specifically, the interaction of physical or genetic influences and social or environmental influences should be investigated (D'Onofrio & Lahey, 2010). In addition, the problem of using individual data to assess family level variables remains alive and well in the past decade (Carr & Springer, 2010). This study could enrich the family literature by; investigating family influences on physical health, and the use of multiple informants for family level variables, and by the use of a statistical model that calculated couple level variables. The finding that shared variables were the most important in this sample could alert family life educators to more closely assess the variance of beliefs among family members especially when educating in regard to families who are dealing with a chronic illness. Differences or similarities or some combination of both may be important areas of consideration for family educators.

Diabetes Literature

Despite the advances in diabetes medicine, the morbidity and mortality that result from diabetes and its complications remain expensive and devastating even though they are medically preventable (Lauritzen, Borch-Johnsen, & Sandboek, 2007). It has been suggested that the social determinants of health, such as the systems of family and its culture, have been ignored or undervalued in the treatment of type 2 diabetes (Daiski, 2008). There are sparse data on the family interactions of adults with type 2 diabetes, and this study will begin to fill the gaps that exist between the medical and the social health determinants in the management of this disease. The findings of this study underline the

importance of helping the family of persons with diabetes understand the causes (and probably the treatment) of diabetes. It also highlights the fact that family involvement is not only desired but necessary when assessing the obstacles to diabetes management. The unexpected fact that there was poor correlation between diet and exercise, that is it seems that either diet or exercise is chosen as a method for diabetes treatment, is an area of research that could prove fruitful for both educators and clinicians. The importance and use patterns of blood glucose management might also be an area of interest given its negative correlation with exercise in this study.

Practice and Policy

As previously noted, the professional practice of treating diabetes needs to be informed by family level health determinants (Daiski, 2008), and the practice of family level prevention/intervention needs to be informed by the physical causes and outcomes of the health and illness of the family members (D'Onofrio & Lahey, 2010). This study will speak to these issues by the use of both a practice level family framework and well accepted health outcomes to test the complex interaction of family and disease management.

The possibility of affecting policy using the results of this study would include support for extending government policy (and the resulting funding) to include spouses in the diabetes education process in addition to the use of family therapy for the purpose of increasing the effectiveness of disease management. It may also have implications in the diabetes professional policies that may encourage including whole families in the treatment plan of the disease and specific curricular inclusion of family science for health

professionals who may touch the lives of those with chronic disease. In addition, the policies of family professionals could be affected by offering evidence based guidelines in the matter of helping families toward resilience in cases where chronic disease is a factor. However across all of the implication sections above, it is important to note that these results are cross-sectional and while they point to some promising areas of inquiry, additional studies should be conducted to clarify these ideas, especially when applied to different settings.

Limitations and Proposed Continuing Research

The use of secondary data when exploring a complex framework like the Family Resilience Framework can limit the number of factors that could be used and miss some that may better represent the constructs of the framework than those available in this study. In addition the Resilience Framework suggests a synergy that cannot be reflected when using small parts of its complexity. Further study aimed at specifically testing the framework would be useful.

One planned research project is creating a quantitative tool with which to test this practice model. Such a project could serve families by refining both the model and the ways it could be used. Also, increasing the size of the interactive unit from a dyad to full family analysis (a social relations design or even a social network analysis framework) would focus on the family as the unit of analysis rather than using assumptive data from one or two persons of the family when assessing for the factors of resilience in a family.

In the same way, diabetes, and its management, are complex and involve multiple systems. This study is limited in that outcomes of management will be limited to self-

report for a disease in which both objective and subjective data would be relevant to measuring the efficacy of self management. Further study, then, should include not only complex family level variables, but objective variables such as the Hemoglobin A1c. Diabetes research in this area and may also profit from the evaluation of psychological and physical complications of diabetes as both a measure of and predictor for diabetes management in the context of family.

Another limitation to this study was some instability in the measurement model. That instability could have been a function of the sample size (Schumacker & Lomax, 2004) or possible mis-specification of the model, for example the loading of blood glucose monitoring was not optimal on the variable diabetes management. Also, although shared variables were an important finding in this study, race/ethnicity showed only a negligible effect size and it could be argued that race/ethnicity is a shared characteristic. In addition there is evidence that race/ethnicity affects the causal attribution of a person with diabetes (Noel, 2010). Because of the sample size this variable was collapsed into 'white/nonwhite' in this study it may have affected its importance to diabetes management. Additional studies should be conducted that include a sufficient number of couples with different racial/ethnic backgrounds to elucidate the variance. However, it has been observed that although race/ethnicity may be complicated by SES, when the effects of both variables are weighed on a variety of outcomes, SES accounts for the majority of the variation in the outcome. This is consistent with the findings of the current study, but additional studies may focus on ways in which not only shared beliefs may affect diabetes management, but also the potential role of shared economic resources. Also, in the case of diabetes it appears that other factors, such as treatment

modality, may be more important to regime adherence than ethnicity (Fitzgerald et al., 2000).

The design of the original Diabetes Couples study may limit the generalizability of the current study. The limitation of cross-sectional data in which conclusions are drawn based on one time observation is especially problematic when themes such as resilience and diabetes, which are known to change over time, are the subject of study. Further study, then should attempt to replicate the findings of this study at different points in time, in addition to creating longitudinal study designs which follow both the normative and non normative evolution of these families. Another limitation is the convenience sampling strategy which may not have resulted in an accurate representation of the population of families dealing with type 2 diabetes.

Summary

This research suggests that the congruence between the spouses' beliefs affect the management of diabetes. It also points to the need for statistical methods that will measure family data, controlling for non independence, when the outcome is found in a single member of the family. Such information may enrich the conversation around theoretical models that explain the family facing chronic disease. Both practice and policy could be affected by one more voice joining the literature that underscores the importance of family in the treatment of chronic disease. Further research regarding both the methodology and the part that family plays in both the theory and practice of helping people with chronicities could flow from this work.

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APPENDIX A

DIABETES OUTCOME & DEMOGRAPHIC MEASURES

Demographics

Q. Sex: ₁ Male ₂ Female

Q. Do you test your blood sugar? (check one box)

₁ No ₂ Yes → Q4a. How many days a week do you test your blood sugar?

_____ (days / week)

Q. Age: ___ ___ years old

Q. Birth date: ___ ___ / ___ ___ / ___ ___
(Month / Day / Year)

Q. What is your race/ethnic origin? (check one box)

- ₁ White
- ₂ Black
- ₃ Hispanic
- ₄ Native American
- ₅ Asian or Pacific Islander
- ₆ Arabic
- ₇ Other _____

Q. How much schooling have you had? (Years of formal schooling completed) (check one box)

- ₁ 8 grades or less
- ₂ Some high school

- _3 High school graduate or GED
- _4 Some college or technical school
- _5 College graduate (bachelor's degree)
- _6 Graduate degree

Q. Which of the categories best describes your total annual combined household income from all sources? (check one box)

- _02 \$10,000 or less
- _03 \$10,001 to \$14,999
- _04 \$15,000 to \$19,999
- _05 \$20,000 to \$29,999
- _06 \$30,000 to \$39,999
- _07 \$40,000 to \$49,999
- _08 \$50,000 to \$59,999
- _09 \$60,000 to \$69,999
- _10 \$70,000 to \$79,999
- _10 \$80,000 to \$89,999
- _10 \$90,000 and over

Diabetes Care Profile

	Never		Sometimes		Always
How often do you follow a meal plan or diet?	1	2	3	4	5

	Never		Sometimes		Always
How often do you follow the schedule for your meals and snacks?	1	2	3	4	5
How often do you weigh or measure your food?	1	2	3	4	5
How often do you (or the person who cooks your food) use the exchange lists or food group lists to plan your meals?	1	2	3	4	5

How often do you exercise or do activities that cause:	Never	Once a week	2-3 times	4-5 times	Almost daily
a) a light sweat (i.e. light work around the house)?	1	2	3	4	5
b) a moderate sweat (i.e. walk outside your home or yard such as for fun or exercise, walking the dog) ?	1	2	3	4	5
c) a heavy sweat (i.e. recreational activities such as dancing, bicycling or exercise bike, swimming, skating, or stair climbing)?	1	2	3	4	5

Appraisal of Diabetes Scale

I am able to: (circle <u>one</u> answer for each line)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) keep my blood sugar in good control.	1	2	3	4	5
b) keep my weight under control.	1	2	3	4	5
c) do the things I need to do for my diabetes (diet, medicine, exercise, etc.).	1	2	3	4	5
d) handle my feelings (fear, worry, anger) about my diabetes.	1	2	3	4	5

I think it is important for me to:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) keep my blood sugar in good control.	1	2	3	4	5
b) keep my weight under control.	1	2	3	4	5
c) do the things I need to do for my diabetes (diet, medicine, exercise, etc.).	1	2	3	4	5
d) handle my feelings (fear, worry, anger) about my diabetes.	1	2	3	4	5

I keep my blood sugar in good control.	1	2	3	4	5	Don't Know
----------------------------------------	---	---	---	---	---	------------

	Never	Rarely	Some times	Often	Always
I keep my weight under control.	1	2	3	4	5
I do the things I need to do for my diabetes (diet, medicine, exercise, etc.).	1	2	3	4	5
I feel dissatisfied with life because of my diabetes.	1	2	3	4	5
I handle the feelings (fear, worry, anger) about my diabetes fairly well.	1	2	3	4	5

APPENDIX B

RELIGIOSITY MEASURES

SECTION XI – Religious Coping

Complete the following statement with each of the responses below.

(Circle one answer for each line)

Since I was diagnosed with diabetes I have....

		Not At All	Very Little	Some-what	A Great Deal
a)	Looked for a stronger connection with God	0	1	2	3
b)	Sought God’s love and care	0	1	2	3
c)	Sought help from God in letting go of my anger	0	1	2	3
d)	Tried to put my plans into action together with God	0	1	2	3
e)	Tried to see how God might be trying to strengthen me in this situation	0	1	2	3
f)	Asked forgiveness for my sins	0	1	2	3
g)	Focused on religion to stop worrying about my problems	0	1	2	3
h)	Wondered whether God had abandoned me	0	1	2	3

i)	Felt punished by God for my lack of devotion	0	1	2	3
j)	Wondered what I did for God to punish me	0	1	2	3
k)	Questioned God's love for me		1	2	3
l)	Wondered whether my church had abandoned me	0	1	2	3
m)	Decided the Devil made this happen	0	1	2	3
n)	Questioned the power of God	0	1	2	3

This section contains statements about religious beliefs and practices. Please respond according to how each item describes you. (circle one answer for each line)

How often do you attend services at church?	Less than once a month	Once a month	Two to three times a month	At least once a week	More than once a week
	1	2	3	4	5
How much time do you spend in meditation or prayer?	Less than once a week	Once a week	Two to three times a week	At least once a day	More than once a day
	1	2	3	4	5
How much time do you spend in Bible study	Less than once a week	Once a week	Two to three times a week	At least once a day	More than once a day
	1	2	3	4	5

APPENDIX C

CAUSAL ATTRIBUTION MEASURES

We are interested in what you consider may have been the cause of your diabetes. As people are very different, there is no correct answer for this question. We are most interested in your own views about the factors that caused your diabetes rather than what others including doctors or family may have suggested to you. Below is a list of possible causes for your diabetes. Please indicate how much you agree or disagree that they were causes for you by circling the appropriate box. (circle only one response per line)

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
a).	Stress or Worry	1	2	3	4	5
b).	Hereditary - it runs in my family.	1	2	3	4	5
c).	A Germ or virus	1	2	3	4	5
d).	Diet or eating habits	1	2	3	4	5
e).	Chance or bad luck	1	2	3	4	5
f).	Poor medical care in my past	1	2	3	4	5
g).	Pollution in the environment	1	2	3	4	5
h).	My own behavior	1	2	3	4	5

i).	My mental attitude e.g. thinking about life negatively	1	2	3	4	5
j).	Family problems or worries	1	2	3	4	5
k).	Overwork	1	2	3	4	5
l).	My emotional state e.g. feeling down, lonely, anxious, empty	1	2	3	4	5
m).	Ageing	1	2	3	4	5
n).	Alcohol	1	2	3	4	5
o).	Smoking	1	2	3	4	5
p).	Accident or injury	1	2	3	4	5
q).	My personality	1	2	3	4	5
r).	Altered immunity	1	2	3	4	5

In the space below, please list in rank-order the three most important factors that you now believe caused YOUR diabetes. You may use any of the items from the box above, or you may have additional ideas of your own.

The most important causes for me:

1. _____
2. _____
3. _____

APPENDIX D

BIVARIATE CORRELATIONS

Table 2

Diabetic Spouse: Correlation of control variables and causal attribution

	psychological causes	immunity causes	risk factor causes	chance causes
Gender	.171	-.072	.046	-.036
Race/ ethnicity	.166	.211*	.004	-.045
Age	-.101	.200*	-.110	.012
household income	-.199*	-.134	-.107	-.208*
education	-.058	-.065	-.111	-.186

*p.<.05 **p < .01

Table 3

Diabetic Spouse: Correlation of control variables and religiosity

	positive religious coping	negative religious coping	religious behaviors
Gender	.111	.142	-.008
Race/ ethnicity	-.246*	-.221*	-.192
Age	.101	-.006	.201*
household income	-.219*	-.223*	.025
education	-.023	.015	.108

*p.<.05 **p < .01

Table 4

Diabetic Spouse Correlation of Control Variables and Diabetes Management

	BG Testing Frequency	Exercise Frequency	Perception of Management	Diet Frequency
Gender	.043	-.034	-.211*	-.135
Race/ ethnicity	.038	-.139	-.031	.082
Age	.085	-.021	.162	.064
household income	-.145	.027	.160	.043
education	-.081	-.016	.181	.140

*p.<.05 **p < .01

Table 5

Diabetic Spouse: Correlation of Control Variables and Belief Congruence

	Diff Psych Causes	Diff Immune Causes	Dif Risk Causes	Diff Chance Causes	Diff Positive Religious Coping	Diff Negative Religious Coping	Diff Religious Behavior
Gender	.221*	-.028	.344**	.039	.062	.114	.217*
Race/ ethnicity	-.141	.138	.088	.088	.195*	-.048	-.016
Age	-.160	.167	-.111	-.126	-.030	-.016	-.081
household income	-.342**	-.135	-.167	-.266**	.087	-.150	-.241*
education	-.218*	-.039	.061	.026	.219*	-.032	.024

*p.<.05 **p < .01

Table 6

Non Diabetic Spouse: Correlation of Control Variables and Causal Attribution

	psychological cause	Immunity cause	risk factor cause	chance cause
Gender	-.171	-.053	.024	-.149
Race/ ethnicity	-.065	.034	-.019	-.078
Age	.061	.058	-.072	-.028
Education	-.182	-.033	.005	-.100
Household Income	-.102	-.023	.180	-.023

*p.<.05 **p < .01

Table 7

Non Diabetic Spouse Correlation of Control Variables and Religiosity

	positive religious coping	negative religious coping	Religious behaviors
Gender	.064	-.078	.188
Race/Ethnicity	-.397**	-.173	-.215*
Age	.243*	.033	.129
Education	-.329**	-.166	-.046
Household Income	-.226*	-.242*	.043

*p.<.05 **p < .01

Table 8

Non Diabetic Spouse: Correlation of Control Variables and Diabetes Management

	BG Testing Frequency	Exercise Frequency	Perception of Management	Diet Frequency
Gender	-.039	.047	.200*	.136
Race/Ethnicity	.040	-.046	.042	.022
Age	.066	-.085	.079	.062
Education	-.095	.079	.089	.047
Household Income	-.077	-.018	.191	.034

*p.<.05 **p < .01

Table 9

Non Diabetic Spouse Correlation of Control Variables and Belief Congruence

	Diff Psych Causes	Diff Immune Causes	Dif Risk Causes	Diff Chance Causes	Diff Positive Religious Coping	Diff Negative Religious Coping	Diff Religious Behavior
Gender	-.221*	.030	-.337**	-.031	-.063	-.040	-.226*
Race/ Ethnicity	.002	.082	.172	.040	.362**	.054	-.051
Age	-.075	.147	.017	-.046	.033	.074	.077
Education	-.124	-.078	-.094	-.053	.084	-.078	.040
Household Income	-.302**	-.147	-.090	-.266**	.008	-.076	-.098

*p.<.05 **p < .01

Table 10

Correlation of Outcome Variables

	BG Testing Frequency	Exercise Frequency	Perception of Management
Exercise Frequency	-.130		
Perception of management	.080	.313**	
Diet Frequency	.058	.171	.224*

*p.<.05 **p < .01

Table 11

Correlation of Belief Congruence Measures

	Diff Psych Causes	Diff Immune Causes	Dif Risk Causes	Diff Chance Causes	Diff Positive Religious Coping	Diff Negative Religious Coping
Difference immune causes	.084					
Difference risk causes	.310**	.026				
Difference chance causes	.335**	.137	.144			
Difference positive religious coping	-.001	-.033	.214*	.052		
Difference negative religious coping	.151	-.025	.040	.259**	.266**	
Difference religious behaviors	.046	.027	.352**	.100	.252**	.168

*p.<.05 **p < .01