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A SAD MARRIAGE: MARITAL SUPPORT AND QUALITY OF LIFE IN OLDER ADULTS WITH TYPE 2 DIABETES

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ABSTRACT

The present study is focused on the widely supported relationship between social support and quality of life. We assessed whether depressive symptoms, exercise adherence, or demographic covariates mediated the relationship between marital support and quality of life in older patients with type 2 diabetes. The investigation utilized data from a pre-existing data set of 68 adults from Central Pennsylvania with type 2 diabetes between the ages of 50 and 82 years old. Stepwise regression analyses were conducted to identify mediating factors between marital support and diabetes-related quality of life, controlling for demographic variables. The most significant mediating factors were age and sex. Older men reported lower diabetes-related quality of life than did their younger female counterparts. Given the increasingly troublesome prevalence of type 2 diabetes across all ages but particularly in older adults, further research should focus on how health care practitioners can adjust treatment methods to meet the needs of older adults living with diabetes. Furthermore, preventing diabetes and its subsequent complications through better health education should remain a public health priority.

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CHAPTER 1: LITERATURE REVIEW

INTRODUCTION

Diabetes is a major health concern, particularly in industrialized nations such as the United States. In 2010, the estimated percentage of adults in the U.S. with diabetes was 3.7% among those aged 20–44 years, 13.7% among those aged 45-64 years, and 26.9% among those aged 65 years or older (CDC, 2011). Currently, diabetes affects 25.8 million people of all ages; nearly one in twelve (8.3%) of the U.S. population is affected. Diabetes is especially prevalent among the older population. Over one-quarter of U.S. residents ages 65 years and older (26.9% or 10.9 million people) had diabetes in 2010 (NIDDK, 2011). In the next twenty years, the percentage increase in people living with diabetes worldwide is estimated to be 114%; and the percentage increase in adults over 65 living with diabetes is expected to be 134% by 2030 (Wild et al., 2004). According to these estimates, the most striking demographic change in global terms of diabetes, will be the increase in the proportion of the population 65 years and older (Wild et al., 2004). Because of these dramatic predicted changes, it is imperative to study the effects of diabetes in this age group. Currently the lifetime risk for diabetes is 1 in 3 for men, 2 in 5 for women, and 1 in 2 for Hispanic females (Narayan et al., 2003). Diabetes currently costs individuals and society over $174 billion per year to treat - the equivalent of one in five U. S. health care dollars (CDC, 2011). Given the aging and increasing diversity of our society, the The purpose of the present review of the literature is to examine the impact of marital support, depressive symptoms and exercise adherence on quality of life in older adults living with type 2 diabetes. The review of the literature spanned a thirty year period, from 1976 to 2009. The search utilized two electronic databases, MEDLINE and PsychINFO. Both original research costs associated with diabetes are expected to rise in the future.

Diabetes is a complex disease, but biologically it is a simple cause-effect relationship. The body fails to secrete insulin (due to either an autoimmune disorder or complications resulting from obesity) which leads to increased blood glucose. This happens because insulin is necessary for the body to absorb glucose into cells; when glucose is not absorbed into cells, the glucose levels in the blood increase.

Diabetes is diagnosed with a fasting plasma glucose test; if a patient's blood glucose tests above 126mg/dL two times or more, then he or she is diagnosed with diabetes (NIDDK, 2011). There are three types of diabetes: gestational diabetes occurs during pregnancy and Type 1 diabetes (formerly called juvenile-onset) is an autoimmune destruction of insulin cells. Type 2 diabetes accounts for 90% of diabetes prevalence and is obesity-related insulin resistance (CDC, 2011). Type 2 diabetes is the main concern of this research due to its greater prevalence in older adults; more importantly, it is increasing at an alarming rate.

Diabetes is a major concern not only because 18.8 million Americans have already been diagnosed with diabetes (NIDDK, 2011) but also because at least 41 million Americans have pre-diabetes, a condition that is characterized by fasting glucose levels of 100-125mg/dL and leads to diabetes within 10 years in a majority of cases (CDC, 2011). Diabetes cannot be cured - once diagnosed, a patient is always considered "diabetic" - however, with proper blood glucose control and lifestyle changes, it can be well-managed. Type 2 diabetes—and its precursor pre-diabetes—can often be asymptomatic; nonetheless, both can lead to serious health complications and extended hospitalizations. The complications of diabetes include increased risk of stroke, blindness, heart attack, nerve damage, amputation, and premature mortality (CDC, 2011).

Many studies also consider the extent to which diabetes affects one's quality of life, a general measurement of a patient's well-being. There are a number of factors used throughout the literature to determine quality of life (QOL). For example, physical health, social support, emotional stability, attitudes, family relationships, and burden of illness have all been widely measured to assess QOL. Specific to type 2 diabetes, Misra and Lager (2008) have proposed the following predictors to assess DRQOL: social relationships, daily hassles, leisure time flexibility, dietary restrictions, physical complaints, and anxiety. Other research supports the use of measures such as ambulation, dexterity (Wexler et al., 2006) and role limitations (Rejeski et al., 2006).

Recent research has suggested that both psychological factors like depressive symptoms and physical factors, such as diet and exercise adherence, can affect the quality of life of people with type 2

diabetes (Sundaram et al., 2007; Misra & Lager, 2008). Additionally, it has been suggested that social support and marriage may affect diabetes management and health outcomes (Beverly, Wray & Miller, 2007; Fisher et al., 2000; Nagelkerk, Reick, & Meengs, 2006; Wen, Parchman, & Shepherd, 2004). This is particularly relevant to the elderly popuation, since 58.5% of all individuals 60 and older are married and an additional 37% were previously married (U.S. Census Bureau, 2000).

The purpose of the present review of the literature is to examine the factors which impact the quality of life of older adults living with type 2 diabetes. Such factors include: marital support, depressive symptoms, exercise adherence, and a myriad of socio-demographic characteristics. The review of the literature spanned a thirty-five year period, from 1976 to 2011. The search utilized two electronic databases, MEDLINE and PsychINFO. Both original research studies and meta-analyses were reviewed.

THEORETICAL FRAMEWORKS

Many theoretical frameworks were presented in the literature to better understand the relationships between diabetes, quality of life, and the factors that mediate this relationship. Diabetes has been associated with lower levels of HRQOL in older adults throughout the 21st century. However, the relationship is complex and convoluted; the mechanisms have yet to be fully understood (Brown et al., 2003). Although several conceptual models were presented throughout the research, two were most highly utilized: Social Cognitive Theory (SCT) and Symbolic Interaction Theory (SIT). SCT emphasizes the importance of the interrelationship between behavior, environmental factors, and personal factors in learning. Self-care in diabetes takes considerable time and effort from patients and their families; SCT further describes the importance of human agency in learning. Human agency can be direct (i.e., self-care), proxy (i.e., relying on others), or collective (i.e., group). In order to enhance agency and continue efforts, humans rely on themselves, others, and groups to stimulate behavior modification (Bandura, 2004; Beverly, Wray & Miller, 2007). Rather than types of relationships, SIT is based on the idea that a person's behavior is influenced by the meaning they attribute to the situation or social interaction. SIT conceives that that subjective experience of the environment and social exchange guides further behavior (Tang et al., 2008). For instance, if a person finds a relationship to be meaningful and a positive aspect of

their life, they are more likely to spend time and energy on said relationship. In terms of social support, the perception and interpretation of the support has greater impact than the objective availability and/or stipulation of said support (Tang et al., 2008).

Because diabetes has been long associated with lower HRQOL and literature has documented the importance of social support and diabetes-related health outcomes, such as quality of life, the purpose of the present study was to better understand the mechanisms that mediate the relationship between social support (specifically marital adjustment) and DRQOL. Many studies documented the association between emotional state (i.e., depressive symptoms) and DRQOL, and most found significant associations between the two. Furthermore, several studies examined how physical factors such as BMI, glucose levels, adherence to diet, and physical activity affect DRQOL. The present study is based on the strength of the relationship between marital support and DRQOL, and asks if depressive symptoms or exercise play a role in mediating this relationship.

METHODS UTILIZED TO BETTER UNDERSTAND SOCIAL SUPPORT

Designs of Studies Examining Social Support and Health

In the 1800s, sociologist David Émile Durkheim illustrated that "social integration and cohesion influence mortality" (Berkman et al., 2000, p. 844). Since that time, researchers have attempted to better understand the role social support plays in determining our health. In the late 1980s, John Bowlby published the Attachment Theory, wherein the attached figure, or dependent person (i.e., a young child) uses the attachment figure (i.e., their parent or guardian) as "a secure base from which [to] explore and venture forth" (Berkman et al., 2000, p.844). As people grow older, their attachment system changes from family members or friends to (for most people) a spouse. Regardless of who the figure is, the protective and comfort factors remain important for psychological health and security needs. Through the 1970s, most research regarding this relationship was either retrospective or cross-sectional; there were no clear tests of causality (House et al., 1994). In a review of diabetes and social relationships, the support of others was found to decrease fear and frustration, two feelings often associated with diabetes (Trief, 2005).

After Durkheim presented his theory on the role of social support in suicide, many researchers used retrospective and cross-sectional data (i.e., death certificates, interviews with the deceased's family and friends, and calculating the attendance at the deceased's funeral) to gauge the role of social support in mortality. A clear negative correlation between social support and mortality was found in many studies. In the latter part of the twentieth century, many studies provided evidence that social support can predict mortality for most causes of death (Berkman et al., 2000).

Over the past few decades, many researchers have focused on the correlation between social relationships and health disparities, and particularly socioeconomic disparities, that is, how education, income, and living situation can affect one's health. After this link was shown to exist and validated by a large number of studies, researchers moved forward to try and explain the mediating factors that may help elucidate the connection between social support and inequalities in health (Alwin & Wray, 2006). Lastly, research has moved in the direction of greater specificity, that is, studies that focus on individual disease conditions, assuming that different diseases may involve diverse relationships between social support and morbidity (Alwin & Wray, 2006).

Until the 21st century, the importance of marital support and, conversely, adverse effects of marital conflicts, were demonstrated for patients with chronic diseases in general, yet little attention was paid to the marital relationship for individuals with diabetes. The Changing Our Understanding of People Living Everyday with Diabetes (COUPLED**)** study changed this trend, by using the Spanier Dyadic Adjustment Scale and other existing scales to collect data specifically regarding the effects of marital satisfaction and conflict on diabetes management. Trief et al. (2001) illustrated that the marital relationship may be more powerful than general family support in terms of its impact on glycemic control; this finding is very important in terms of treatment for diabetic patients, suggesting that specific attention should be paid not only to patients, but also to their spouses. There are differences between supportive and non-supportive spouses. For example, a supportive spouse may offer to adhere by a patient's new exercise regimen, whereas a non-supportive spouse may instead insist on not engaging in physical activity or even sabotaging their spouse's own efforts to be active. In a subsequent study, Trief

found that (as expected), marital support can decrease health-related distress, while marital conflict can increase emotional distress (Trief et al., 2002).

In a review article of social support and chronic illness management, Gallant (2003) explains that while social support is cited as an important influence on self-management, its implications are not yet fully understood and that social interactions may be both beneficial and detrimental to one's well being. Apart from the biomedical model of disease treatment, studies have demonstrated the importance of coping and problem-solving skills in managing diabetes. Research has shown that such skills are perhaps, as important as adjustments and adherence to medication, healthy diets, and exercise (Beverly, Penrod & Wray, 2007).

Participants in Studies Examining Social Support and Diabetes

Although the population most at-risk for diabetes is Hispanic females (Narayan et al., 2003), a majority of study participants described in the literature are Caucasian males. Most of the research examined for the present study focused on people living with diabetes over the age of 60, because this is the population most relevant to the data set and the research questions. I read articles specific to both female and minority (i.e., Black, Hispanic, Asian) populations in order to learn more about the differences in quality of life and other important measures, however a majority of the study findings come from a substantially White male participant base.

Demographic characteristics measured in the literature are widespread and include variables such as age, race, sex, socioeconomic status, residence, and relationship status. Factors relating to diabetes in the literature include type of diabetes, age of diagnosis, physical complications, psychological complications, treatment methods, medications, and health care. Furthermore, there are a number of variables and covariates relating to each of the four measures of analytic interest that are outlined below.

Measures in Studies Examining Diabetes-Related Quality of Life

Four scales were often described in the literature to explain diabetes-related quality of life, as illustrated in the conceptual framework described in further detail in Chapter 2: (1) Center for Epidemiologic Studies Depression (CES-D) Scale; (2) Summary of Diabetes Self-Care Activities

(SDSCA); (3) Spanier Dyadic Adjustment Scale (DAS); (4) Problem Areas in Diabetes (PAID). These four scales were also included as part of the questionnaire administered to the couples in the diabetes management study on which the present thesis was based. The scales were chosen—in both existing literature as well as the diabetes management study—because of their strong reviews for both reliability and consistency. Each is described below, based on relevant studies in the existing literature.

First, the Center for Epidemiologic Studies Depression (CES-D) Scale is a short self-report scale designed to measure depressive symptomatology in the general population (Radloff, 1977). The items of the scale are symptoms associated with depression which have been used in previously validated longer scales. It was found to have very high internal consistency and adequate test retest repeatability. Validity was established by patterns of correlations with other self-report measures, by correlations with clinical ratings of depression, and by relationships with other variables which support its construct validity. Reliability, validity, and factor structure were similar across a wide variety of demographic characteristics in the general population samples tested. According to Radloff (1977), the CES-D scale is a useful tool for epidemiologic studies of depression because it has high internal consistency, acceptable test-retest stability, and excellent concurrent validity by clinical and self-report criteria, and substantial evidence of construct validity. These properties hold across the general population subgroups studied. The scale is a valuable tool to identify such high-risk groups and to study the relationships between depressive symptoms and many other variables (Radloff, 1977).

Second, the Summary of Diabetes Self-care Activities **(**SDSCA) measure is a brief self-report questionnaire of diabetes self-management developed by Toobert, Hampson, and Glasgow (2000) which includes items assessing the following aspects of the diabetes regimen: general diet, specific diet, exercise, blood-glucose testing, foot care, and smoking. Participants utilizing this scale were typically older patients, having type 2 diabetes for a number of years, with a slight predominance of women. The average inter-item correlations within scales were high (mean = 0.47), with the exception of specific diet; test-retest correlations were moderate (mean = 0.40). Correlations with other measures of diet and exercise generally supported the validity of the SDSCA subscales (mean = 0.23). There are numerous

benefits from standardization of measures across studies. The SDSCA questionnaire is useful both for research and practice. The inclusion of this measure in studies of diabetes self-management is recommended when appropriate (Toobert, Hampson & Glasgow, 2000). However, the psychosocial and behavioral measures were based on self-report, which may be less reliable indicators of self-management than are biological measures.

Third, the Spanier Dyadic Adjustment Scale (DAS) is a self-report measure of relationship adjustment. It is intended to determine the level of satisfaction that spouses are experiencing within their marriage. A higher score indicates better reported marital quality. Using this measure, people who feel they're receiving positive illness-related support from a spouse would score higher levels of satisfaction. The 28-item DAS has shown good reliability (Cronbach's $\alpha = 0.96$) and construct validity (Spanier, 1976; Trief et al., 2002).

Finally, the concept of Health Related Quality of Life (HRQOL) is a complex characteristic designed to measure the influence of diabetes on physical health, mental health, and quality of life. Several scales measure HRQOL, each of which includes unique factors, including but not limited to: emotional well-being, social function, role limitations due to emotional problems, energy/fatigue, pain, role limitation due to physical health problems, physical functioning, and general health perceptions (Hermann et al., 1996). Large cross-sectional studies have shown that older adults with type 2 diabetes have lower HRQOL than those without diabetes, independent of a multitude of socio-demographic characteristics, duration of diabetes, treatment, body mass index and cardiovascular disease (Brown et al., 2004). Some measures of HRQOL are related to general health and some are disease-specific. The Problem Areas In Diabetes (PAID) questionnaire was designed to identify negative emotional responses to several aspects of diabetes in particular (Hermanns et al., 2006), and so can be used to measure diabetes-related quality of life (DRQOL). The PAID questionnaire is a 20-item measure of diabetes-related emotional distress that assesses a broad range of feelings related to living with diabetes, including guilt, anger, frustration, depressed mood, worry, and fear. In a study of depression and diabetes, Trief et al. (2002) found that diabetes-related distress (PAID) could be predicted the marital quality measures in

the Spanier DAS. Furthermore, DAS scores significantly predicted scores on the PAID scale (ß = -0.4, $p \leq 0.05$); higher self-reported marital adjustment predicted less diabetes-related distress.

KEY PREDICTORS OF DIABETES-RELATED QUALITY OF LIFE

Depressive Symptoms

The majority of studies reviewed for the present study support the relationship between depression and DRQOL. According to research, depression affects between 9% and 27% of persons with diabetes (Paschalides et al., 2004). Additionally, co-morbid depression in diabetic patients is related to higher numbers of symptoms and more severe complications related to diabetes (Katon, 2008). Marital relationships have been shown to decrease depressive symptoms, most likely due to the emotional and instrumental support offered by a spouse (Ross & Mirowsky, 1989). Depression in these studies was measured largely by either a diagnosis of Major Depressive Disorder or by quantifying depressive symptoms, using scales such as the CES-D Scale and Beck Depression Inventory. The presence of depressive symptoms in patients with type 2 diabetes is associated with significantly poorer QOL and health status (Sundaram et al., 2006). Studies support a negative relationship between depression and HRQOL – that is, as symptoms of depression increase, HRQOL declines. Other psychological factors, such as anxiety (Thomas, 2003) and personal illness representations (Paschalides et al., 2004), were also found to be important determinants of DRQOL in people with type 2 diabetes; however, there is significantly less research available to support their relationship and importance to DRQOL.

Exercise Adherence

Diabetes self-management—including adherence to a strict diet, exercise plan, use of oral medications or insulin, foot care, and self-monitoring of blood glucose (Misra & Lager, 2008)—is an important component of treatment and DRQOL. Numerous studies have investigated the relationship between diet adherence and diabetes, but high quality studies establishing the importance of exercise for people with diabetes were lacking until recently. It is currently well-established that participation in regular physical activity has enormous health benefits for people with type 2 diabetes, including positively affecting QOL (Beverly & Wray, 2008, Misra & Lager, 2008). Although exercise has physical

and mental benefits, it is often cited as one of the most difficult self-management behaviors for people with type 2 diabetes (Beverly & Wray, 2008).

Marital Support

Existing studies largely found that marital support was associated with better DRQOL. Among the specific social relationships studied, marital relationships have the highest significance in terms of health (Umberson et al., 2006). Individuals who have the support of a spouse to encourage them to adhere to treatment plans and accompany them to the doctor's office faired better in terms of diabetes self care and QOL (Trief et al., 2001; Umberson et al., 2006). Better reported marital quality was associated with more diabetes related satisfaction, increased HRQOL, and lower levels of diabetes-related distress (Trief et al., 2002). Though marital quality and support have significant effects on health (Umberson et al., 2006; Beverly, Wray & Miller, 2008); they are not always positive. As explained by Trief et al. (2002; 2005) a supportive partner may join in a patient's diet plan, or promote exercise, while an unsupportive spouse may not. Furthermore, marital strain may lead to stress, which can both increase blood pressure and accelerate the decline in self-rated health and QOL for patients with diabetes (Umberson et al., 2006).

IMPLICATIONS

Twenty years ago, preliminary studies demonstrated that greater levels of social support were correlated with better diabetes self-management (Gallant, 2003). In 2007, Beverly and her colleagues examined qualitative data to illustrate that that the support of a spouse is a critical factor in consistent behavior adherence for diabetes management. Their study provided the health field with a better comprehension of the experience of illness beliefs and the psychological and social context of diabetes care (Beverly, Penrod & Wray, 2007).

At the start of the 21st century, researchers are evaluating social networks to operationally define the many levels and types of support, including factors such as range/size, density, boundedness, homogeneity, frequency of contact, multiplexity, duration, and reciprocity. Social support is typically divided into subtypes including emotional, instrumental, appraisal and informational support (Berkman et al., 2000). From these studies, Alwin and Wray concluded that several "risk factors –including

psychosocial factors such as social support, chronic and acute stressors, and self-efficacy– may account for more of the social differentials in health" than social inequalities in and of themselves (2005, p. 12; House et al., 1994).

The strongest findings to date regarding social support and diabetes come from Trief et al. (2001), in which she and her colleagues found that marital quality is associated with an individual's adaptation to diabetes. Specifically, they found that better marital satisfaction is related to higher levels of diabetes-related satisfaction and less impact, as well as less diabetes-related distress and better general quality of life. Later they demonstrated that PAID scores – which reflect diabetes-related distress – were strongly predicted by marital quality measures; spousal relationships can and do effect the QOL of patients with type 2 diabetes (Trief et al., 2002).

Discussions of self-management for people with diabetes cite the relative importance of social support without delving into the details or mechanisms which support said relationships. Some research has illustrated the importance of illness-specific support (i.e., a cancer support group versus a women's support group for female cancer patients) in predicting health outcomes (Gallant, 2003). Additionally, many studies have successfully shown the relationship between marital strain and health. For instance, marital conflict and stress can negatively impact one's immune system and furthermore, have a detrimental impact on their heart and blood glucose control (Trief, 2005).

Lastly, three main improvements in this area of research include: theoretical development, increases in the frequency and clarity of research designs and methods of analysis, and better attention to intervention strategies (Alwin and Wray, 2005). Future research should be aware of the existing evidence of the correlation between social support and self management. Although often modest, the association may have widespread implications for diabetes, along with many other diseases (Gallant, 2003). As diabetes continues to become more prevalent, nurses and health care providers should recognize and help strengthen supportive relationships in order to foster better self-management and to improve the quality and length of life which both partners experience. (Beverly, Penrod & Wray, 2007). Research regarding specific procedures addressing the treatment barriers to diabetes self-management will help to clarify the

question of whether or not interventions by a health care team can improve a patient's glycemic control. Most importantly, as diabetes continues on this epidemic trajectory, more efficient and successful tools are necessary to assist patients in adhering to their diabetes care treatments (Daly et al., 2009).

Future studies should focus on identifying diabetic patients with subclinical depression for the purpose of intervening to avoid the serious effects of depression on diabetes self-care (Hermanns et al., 2006). The measurement of diabetes specific emotional distress using the PAID questionnaire may better fit the expectations of diabetic patients and physicians than scales used in the past. Trief et al. (2001) emphasize the importance of couple-focused interventions for the treatment and care of diabetic patients.

PURPOSE

Trief et al. (2001) illustrated the importance of a supportive marital relationship in terms of its impact on glycemic control and the health of patients with diabetes. Biological factors (such as glycemic control) and medical complications from diabetes can substantially change one's quality of life (Testa, 2000; Coffrey et al., 2002). Thus, we hypothesized that the relationship between marital support and quality of life is present in older adults with type 2 diabetes, and seek to find whether the relationship is mediated by primarily biological mechanisms (i.e., exercise adherence) or psychological ones (i.e., depressive symptoms). The purpose of the present study is to examine the impact of depressive symptoms and exercise adherence on the relationship between marital support and quality of life in older adults living with type 2 diabetes.

CHAPTER 2: METHODS AND MODELS

For the past three decades, numerous studies have focused on the complex relationship between social support and health outcomes. It is now understood that social support has powerful effects by benefitting physical and mental health and lowering the risk of mortality (Berkman et al., 2000). Of all the connections studied, marital relationships hold the greatest significance for health (Umberson et al., 2006). Diabetes is a chronic illness in which treatment involves significant lifestyle changes through adherence to, and maintenance of, a complex health care regimen. Social support has been found to influence the adherence to the lifestyle changes and, in turn, diabetes-related quality of life (Trief et al., 2001). Studies have also shown that dietary restrictions and physical activity regimens can decrease diabetes-related quality of life (Misra & Lager, 2008). In addition, mental health has also been found to influence diabetes-related quality of life: In particular, higher levels of depression are strongly correlated with lower diabetes-related quality of life (Sundaram et al., 2006).

THE PRESENT STUDY

This study seeks to find if mental health and/or physical activity mediates the relationship between social support and diabetes-related quality of life. The research questions are as follows:

1. Does marital support increase diabetes-related quality of life?
2. Do depressive symptoms mediate the relationship between marital support and quality of life in older adults with type 2 diabetes?
3. Does exercise adherence mediate the relationship between marital support and quality of life in older adults with type 2 diabetes?
4. Do depressive symptoms exert a stronger mediating influence than does exercise adherence on the relationship between marital support and quality of life in older adults with type 2 diabetes?

As noted earlier, research has shown strong relationships between marital support and quality of life; other factors such as depressive symptoms and exercise adherence, also affect quality of life (Sundaram et al., 2006; Misra & Lager, 2008). The question is how these factors are related. The

conceptual framework, based on Social Cognitive Theory, which illustrates the hypothesized relationships is shown in Figure 1:

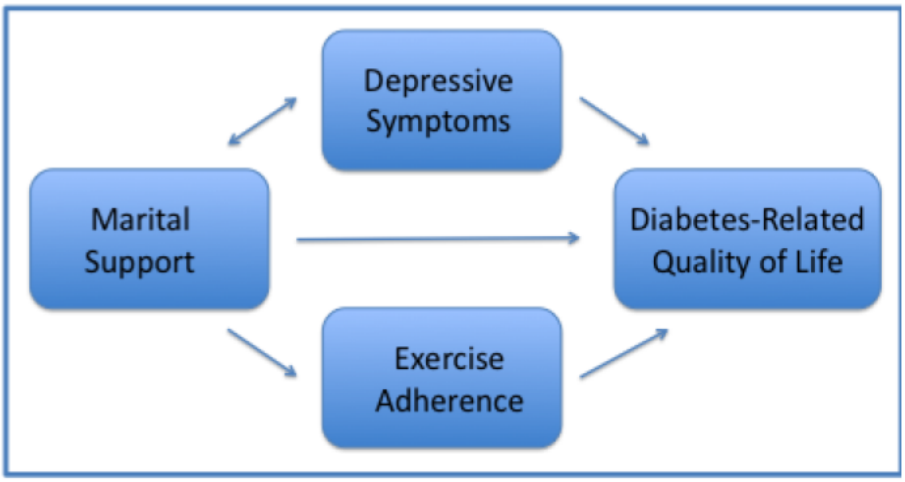

Figure 1: Conceptual model for the effects of marital support, depressive symptoms, and exercise adherence on diabetes-related quality of life in middle-aged and older adults living with type 2 diabetes.

Two of the most difficult diabetes self-care behaviors are adhering to and maintaining healthy diets and active lifestyles (Sarkar, Fisher, & Schillinger, 2006; Wen, Shepherd, & Parchman, 2004; Beverly & Wray, 2008). Greater social support predicts better adherence to diet and exercise (Gallant, 2003; Pham, Fortin & Thibadeau, 1996). The strongest supporting findings are from Trief et al. (2001), who found that marital quality is significantly associated with adaptation to diabetes. Adaptation to the disease and its consequences is an important source of distress (and can lessen quality of life) for people with diabetes. Specifically, Trief and her colleagues found that better marital satisfaction is related to higher levels of diabetes-related satisfaction and better general quality of life. Diabetes-related Quality of Life (DRQOL) is a complex measure that assesses emotional responses and attitudes towards health and illness. High scores from the Problem Areas in Diabetes scale, one measurement of DRQOL, are associated with greater emotional distress (Welch et al., 2003).

RESEARCH METHODS

Data Source

Data from the Penn State study "Changing Our Understanding of People Living Everyday with Diabetes" (COUPLED) was used for the present study. The COUPLED study aimed to explore the relationship between spousal support and diabetes management in older adults living in Central Pennsylvania. The Pennsylvania State University Institutional Review Board (IRB) approved the protocol prior to the start of the study.

Sample

The researchers asked a purposive sample of 81 married or partnered couples questions related to their mental and physical health, marital quality, and diabetes management using survey questionnaires and focus groups. Participants were required to be above the age of 50 and to have been diagnosed with type 2 diabetes at least one year prior to the study or married to a person with diabetes who had been diagnosed for at least one year. Participants were excluded if they had difficulties in everyday living tasks (like bathing or walking), or were diagnosed with serious conditions that could interfere with their ability to maintain a healthy diet or exercise regimen (such as stroke, cancer, or progressive mental disorder). The 102 participants (52 couples) who fully completed the survey questionnaires were split into two groups: persons-with-diabetes (PWD) or spouses of-person-with-diabetes (SPWD). Over one-half of those participants (n=68) reported they had been diagnosed with type 2 diabetes and had complete information on the study's key measures, making up the sample used in the present study. Two separate questionnaires were administered, one for the PWD and another for the SPWD. The PWD questionnaire included items to assess demographic information, general and diabetes-specific health, mental and physical functioning, knowledge pertaining to nutrition and diabetes, social support and views of living with diabetes. The SPWD questionnaire did not contain questions about views of living with diabetes,

since most spouses were not diagnosed with diabetes. The items were largely based on items included in the nationally representative and longitudinal Health and Retirement Study (funded by the NIH and administered be the University of Michigan Survey Research Center) and other existing questionnaires, such as the Dyadic Adjustment Scale (Spanier, 1976), Center for Epidemiologic Studies Depression Scale (Radloff, 1977), Summary of Diabetes Self-Care Activities measure (Toobert, Hampson & Glasgow, 2000), and the Problem Areas in Diabetes scale (Welch, Jacobson, & Polonsky, 1997). The questionnaires were used to understand how attitudes and symptoms affect behaviors in adults living with diabetes and their spouses.

Models and Covariates

A review of the literature illustrates a strong correlation between social (especially marital) support and DRQOL (Beverly, Wray & Miller, 2008; Trief, 2001; 2002; Umberson et al., 2006). Two broad categories of factors may mediate this relationship: mental health and physical health. Mental health, specifically depressive symptoms, contribute greatly to DRQOL (Sundaram et al., 2006). Physical health plays a similar role, in that the worse physical health a person has, the lower their self-reported DRQOL is (Daly et al., 2009; Rejeski et al., 2006). Diet and exercise adherence play a large role in physical health and, therefore, in DRQOL. As illustrated in the study's conceptual framework, the four key constructs of analytic interest in this study are marital support, depressive symptoms, exercise adherence, and diabetes-related quality of life. Each of these four constructs is described in detail in the following paragraphs.

Marital Support

In the COUPLED study, researchers examined spousal beliefs, perceived effects of spousal support, and daily management of the disease in a qualitative study of older married couples living with diabetes. Their research illustrated that that the support of a spouse is a critical factor in consistent behavior adherence for diabetes management (Beverly, Penrod, & Wray, 2007). Spousal support can be

either beneficial and/or detrimental to a person with type 2 diabetes (Trief, 2005). The Spanier Dyadic Adjustment Scale (DAS) is a self-report measure of relationship adjustment. It is intended to determine the level of satisfaction spouses are experiencing within their marriage. Using this measure, people who feel they're receiving positive illness-related support from a spouse would score lower levels of dissatisfaction. (Spanier, 1976). The 28-item DAS has shown good reliability (Cronbach's $\alpha = 0.96$). To generate DAS values, I summed the 28 responses, changed missing values to 0, and by multiplied the total sum by 28 to create a composite measure of perceived marital support. The scores ranged from 36.30 to 76.74 (mean = 59.18, standard deviation = 6.94). Higher scores indicate higher perceived marital support (Spanier, 1976; Trief et al., 2002).

Depressive Symptoms

The original Center for Epidemiologic Studies Depression (CES-D) scale is a 28-item self-report scale designed to measure depressive symptomatology in the general population. Shortened 11-item and 8-item versions were created and tested in the 1970s at the National Institute of Mental Health. The items in the shortened scales assess symptoms associated with depression that have been used in previously validated longer scales. Both short forms were found to have very high internal consistency and adequate test-retest reliability, compared with the original 28-tem scale (Radloff, 1977). To calculate the count of depressive symptoms in the 8-item scale used in the COUPLED study, I reverse coded three questions which were worded in a positive valence (e.g., asking about optimism and happiness, rather than sadness and lethargy) so that the new values for all items were measured in a negative valence. Then, I found the mean of the 8 items and multiplied by 10 for an average score of depressive symptomology. The scores ranged from 0 to 8 (mean = 1.73, standard deviation = 1.80). Higher scores indicate higher levels of depressive symptoms, thus poorer mental health.

Exercise Adherence

The Summary of Diabetes Self-Care Activities (SDSCA) measure is a brief set of self-report questions related to diabetes self-management, and includes items assessing general diet, specific diet,

exercise, blood-glucose testing, foot care, and smoking. In the revised scale, the metric "days per week" is asked instead of percentages (i.e., "On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity?"). Research has found the revised version of the SDSCA to be a reliable and valid measure of diabetes self-management (Toobert, Hampson & Glasgow, 2000). To calculate a value for exercise adherence, I concentrated solely on the nine exercise questions included in the SDSCA measure. I generated the means and multiplied by nine (the number of exercise questions) to calculate composite scores for exercise adherence. The scores ranged from 5 to 63 (mean = 39.62, standard deviation = 12.75). Higher scores indicate better adherence to a regular exercise regimen.

Dependent Variable

Diabetes-Related Quality of Life (DRQOL) is the dependent variable in the present study, measured by the 20-item Problem Areas in Diabetes (PAID) scale of diabetes-related emotional distress. PAID assesses a broad range of feelings related to living with diabetes, including guilt, anger, frustration, depressed mood, worry, and fear. The PAID scale has been found to have high internal reliability (α = 0.95). Test-retest correlations supported the temporal stability of the instrument (r = 0.83). The PAID scale has been used in the past to measure quality of life (Welch et al., 2003). The scores range from 0 to 100 (mean = 15.91, standard deviation = 12.01). Higher scores indicate a better DRQOL or an improved sense of overall health, in addition to enhanced physical, mental and social well-being (Polonsky, 2000).

Covariates

The following covariates were found to have important implications for patients with type 2 diabetes within the literature, and thus are included within the present study: age, sex, number of years married, level of education, and comorbid conditions. Each is described below.

Age: Diabetes is a progressive disorder. Regardless of treatment methods, diabetes status deteriorates over time (Kahn et al., 2006). Furthermore, humans are most susceptible to chronic disease (i.e., type 2 diabetes) between the ages of 45 to 75 years old, although the age of onset has been

decreasing in recent decades, making type 2 diabetes an increasingly troubling health problem (Maddigan et al., 2006). Despite poorer health status over time, chronological age is significantly and moderately correlated with higher DRQOL (Brown et al., 2003). This finding was replicated in the COUPLED sample; higher age was associated with lower scores on the PAID scale ($r=-.342$, $p<.01$), as shown in Table 2. Age is measured as a continuous variable; participants were asked to record their birthdays, and ages were calculated at the time of data collection from that information. Participants ranged from 51 to 81 years of age (mean = 66.16, standard deviation = 8.11).

Sex: Epidemiologic data indicate that diabetes is more prevalent in males than females (CDC, 2011). Conversely, the lifetime prevalence of major depression is twice as high in females as in males (Desai & Jann, 2000); studies indicate that women generally score lower than men on quality of life measures (Coelho, Amorim, & Prata, 2003). Sex is significantly correlated with exercise adherence in this study ($r=-.331$, $p<.01$), such that being male is associated with greater exercise adherence. Sex is measured as a qualitative value, coded from self-reports as 0 for female and 1 for male. The PWD sample was made up of 56% male participants.

Years Married: Most diabetes researchers use marital status as a demographic variable when studying PWD (Sundaram et al., 2006). Because every participant in the COUPLED sample was married, number of years married provided a better understanding of this demographic. Furthermore, similar studies have illustrated the importance of overall marital adjustment and intimacy in calculated DRQOL (Trief et al., 2002). The continuous measure of years married was significantly correlated with age ($r=.644$, $p<.01$). Years married is measured as a continuous variable; each participant was asked "in what month and year were you married to your current spouse/partner?" and the number of months and years was calculated at the time of data collection. The PWD number of years married ranged from 6 to 58 (mean = 36.06, standard deviation = 12.79). Years married was not found to be significantly associated with PAID scores, depressive symptoms, or exercise adherence.

Education: Individuals with lower education tend to score lower on various indices of HRQOL than do those who are highly educated and/or more economically advantaged (Rejeski et al., 2006). Education has been confirmed to be an important determinant of health status; researchers theorize this may be due to higher levels of education being associated with healthier lifestyles (i.e., not smoking, more physical activity, healthy foods). Education may also affect understanding of diabetes, communication with healthcare providers, and adherence to treatment, all factors shown to affect HRQOL (Maddigan et al., 2006). Studies have also shown that higher education is associated with lower levels of depression, especially in women (Ross & Mirowsky, 2006) and lower rates of diabetes (Alwin & Wray, 2005). Education is measured by the highest grade of school or year of college completed, as reported by the participant. The self-reported education levels ranged from 3, indicative of high school completion, to 6 indicative of further education after obtaining a college degree. The sample was highly educated (mean = 4.45, representing some college, standard deviation = 1.2).

Comorbid Conditions: Individuals with type 2 diabetes frequently have additional comorbidities and complications (Maddigan et al., 2006). Previous studies have shown that comorbid conditions are significantly and positively associated with depressive symptoms and DRQOL ($r=-0.16$, $p<.05$ and $r=-0.11$, $p<.05$**,** respectively). Though social and environmental factors play a very important role, Maddigan et al. (2006) found comorbidities to have the largest effect on HRQOL in people with type 2 diabetes. Comorbidity is a count of major health conditions common to middle-aged and older adults in the U.S.: arthritis, cancer, heart disease, hypertension, lung disease, and stroke. In the present study, comorbid conditions were not found to be significantly correlated with other factors of analytic interest or covariates. The PWD reported a range of 0 to 6 comorbid conditions, (mean = 2.37, standard deviation = 1.46).

Sample Characteristics

The sample characteristics of the COUPLED participants described in this thesis are summarized in Table 1. As noted previously, of the 162 individuals who responded to the survey, 68 had been

diagnosed with type 2 diabetes and had complete information for the study's key measures. This sample was, on average, 66.16 years old, male, married for 36.06 years and reported 2.37 conditions comorbid to type 2 diabetes. The highest level of education was coded categorically (i.e., 3=high school graduate, 6=college graduate); thus, the sample mean of 4.45 indicates "some college" education. Most of the study's participants were satisfied with their marital support and experienced less than 2 depressive symptoms. The SDSCA score of 39.62 means that in a given week, the PWDs participate in 62% of the physical activities listed or being active on some activity 3 out of every 7 days (Toobert, Hampson & Glasgow, 2000). (As described earlier, the scale lists 9 activities and the participants report how often, using a scale from 0 to 7 days, they complete it; 63 points are possible.) The mean diabetes-related quality of life was 15.91 (out of 100), which is a substantially low self-report of quality of life.

The significant associations among study variables, presented in the correlation matrix (Table 2), are marked with an asterisk. Significant associations included: exercise adherence and sex (r=-.331, p <.01), depressive symptoms and education (r=-.404, p <.01), age and quality of life (r=.342, p <.01), age and years married (r=.644, p <.01), exercise adherence and education (r=.270, p<.05), and depression and quality of life (r=.272, p <.05).

Table 1: Socio-demographic and Other Characteristics of Study Participants Living with Type 2 Diabetes

Sample Characteristics	Mean ± Standard Deviation	Range
Age (years)	66.16 ± 8.11	51 - 81
Sex (percent male)	.56 ± 0.5	0-1
Years Married	36.06 ± 12.792	6-58
Comorbid Condition(s)	2.37 ± 1.465	0-6
Level of Education	4.45 ± 1.205	3-6
Marital Support (DAS)	59.18 ± 6.946	36.3-76.74
Depressive Symptoms (CES-D)	1.73 ± 1.802	0-8
Exercise Adherence (SDSCA)	39.62 ± 12.754	5-63
Diabetes-Related Quality of Life (PAID)	15.91 ± 12.008	0-100

Table 2: Correlation Matrix of Factors of Analytic Interest and Socio-demographic Characteristics of Participants with Type 2 Diabetes (Using Spearman's rho)

		DAS	SDSCA	CES-D	PAID	Age	Sex	YrsMar	Education	Comorbid
Marital Support (DAS)	r	1.000	0.171	0.13	0.157	-0.001	-0.071	0.116	0.109	-0.024
	Sig	.	0.163	0.292	0.202	0.992	0.565	0.35	0.384	0.846
	N	68	68	68	68	67	68	67	66	68
Exercise Adherence (SDSCA)	r	0.171	1.000	-0.086	-0.041	0.086	-.331**	0.185	.270*	-0.047
	Sig	0.163	.	0.483	0.739	0.489	0.006	0.134	0.028	0.703
	N	68	68	68	68	67	68	67	66	68
Depressive symptoms (CES-D)	r	0.13	-0.086	1.000	.272*	-0.208	-0.124	0.016	-.404**	0.15
	Sig	0.292	0.483	.	0.025	0.091	0.316	0.899	0.001	0.221
	N	68	68	68	68	67	68	67	66	68
Diabetes-Related Quality of Life (PAID)	r	0.157	-0.041	.272*	1.000	.342**	-0.238	-0.089	-0.193	-0.04
	Sig	0.202	0.739	0.025	.	0.005	0.051	0.473	0.121	0.748
	N	68	68	68	68	67	68	67	66	68
Age	r	-0	0.086	-0.208	.342**	1.000	0.101	.644**	0.145	0.223
	Sig	0.992	0.489	0.091	0.005	.	0.416	0	0.246	0.069
	N	67	67	67	67	67	67	66	66	67
Sex	r	-0.07	-.331**	-0.124	-0.238	0.101	1.000	-0.058	0.128	-0.02
	Sig	0.565	0.006	0.316	0.051	0.416	.	0.643	0.307	0.871
	N	68	68	68	68	67	68	67	66	68
Years Married	r	0.116	0.185	0.016	-0.089	.644**	-0.058	1.000	0.189	0.187
	Sig	0.35	0.134	0.899	0.473	0	0.643	.	0.132	0.129
	N	67	67	67	67	66	67	67	65	67
Level of Education	r	0.109	.270*	.404**	-0.193	0.145	0.128	0.189	1.000	-0.081
	Sig	0.384	0.028	0.001	0.121	0.246	0.307	0.132	.	0.517
	N	66	66	66	66	66	66	65	66	66
Comorbid Conditions	r	-0.02	-0.047	0.15	-0.04	0.223	-0.02	0.187	-0.081	1.000
	Sig	0.846	0.703	0.221	0.748	0.069	0.871	0.129	0.517	.
	N	68	68	68	68	67	68	67	66	68

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Analyses

Using the questionnaire data, the researchers analyzed the couples' perceived marital support, depressive symptoms, exercise behaviors, and self-reported quality of life using SPSS 17.0. Composite test scores were computed for the four key constructs of analytic interest, using algorithms recommended by the authors of each respective scale. Univariate analyses were run to describe the study sample and to test for the skewness and kurtosis of all outcome measures. Bivariate analyses were run to to examine relationships among all of the study variables. Finally, multivariate analyses were conducted as appropriate, based on the form of dependent variable. Each of these analyses is described in greater detail below.

First, in addition to generating the univariate descriptive statistics presented in Table 1, I tested for skewness and kurtosis to make sure the continuous analytic variables (and particularly my dependent variable) had relatively normal distributions. This is an important step because normality is an assumption for the multivariate regression analyses that I conducted. Skewness is a measure of symmetry, or more precisely, the lack of symmetry (Park, 2008). The distribution of a variable's values is symmetric if it looks the same to the left and right of the center point. Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution (Park, 2008). That is, data with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data with low kurtosis tend to have a flat top near the mean rather than a sharp peak. A uniform distribution would be the extreme case. If the skewness or kurtosis of a variable is asymmetric, Ordinary Least Squares (OLS) regression should not be used. All four key analytic variables and five covariates of interest were tested for skewness and kurtosis, and all distributions were relatively normal, which allowed me to proceed using OLS. The determinants for each scale were as follows: if skewness value is more than zero, then the distribution is skewed to the right. If the kurtosis value is less than 3, than the distributions have a thick tail and a low peak. Consequently, if the kurtosis value (k) is more than 3, the distribution has a high peak and a thin tail

(Park, 2008).

Second, I generated a correlation matrix to estimate the strength, direction, and significance of the study's key constructs and covariates. Based on the preliminary correlation analyses, I noticed unexpected discrepancies across scales, which resulted in having to recode some individual scale items (e.g.,, reverse-coding) so that all items were in the same valence. In other examinations, I saw that certain scales and covariates were associated with each other as expected. Additional tests were run in order to finalize the list of model variables to be used in the regression analyses. For instance, the correlations identified instances of multicollinearity that guided our selection of one variable over another for inclusion in the final models. Multicollinearity is when two or more predictors in the model are correlated, and thus provide redundant information about the response. The consequences of multicollinearity are increased standard error of estimates of the standardized coefficients (leading to decreased reliability), and results that seem paradoxical or unclear (Motulsky, 2002). To avoid such circumstances, that data was revisited to reduce multicollinearity before we ran the test models.

Finally, the data analyses consisted of inferential statistics. OLS regression analyses tested the contribution of nine blocks of variables on the DRQOL, as measured by the PAID scale: (1) marital support (DAS); (2) depressive symptoms (CES-D) and exercise adherence (SDSCA); (3) marital support, depressive symptoms, and exercise adherence; (4) age and sex; (5) years married and education; (6) age, sex, years, married, and education; (7) comorbid conditions; (8) age, sex, years married, education, and comorbidity; and (9) age, sex, years married, education, comorbidity, marital support, depressive symptoms, and exercise adherence.

The analyses were run hierarchically in order to see if the variance explained, significance, or strength changed when testing different sets of covariates. This procedure makes it easier to tell if the strength of a correlation is due primarily to the measure of analytic interest or if it can be explained by a covariate.

In this chapter I have described the measures used in my analytical models, as well as the analyses used to test the hypothesis of the present study. Results of these analyses and their implications will be presented in Chapter 3.

CHAPTER 3: RESULTS AND DISCUSSION

The data analyses consisted of inferential statistics of the four analytic measures and the five covariates. OLS regression analyses tested the contribution of nine blocks of variables on Diabetes-Related Quality Of Life (DRQOL), as measured by the Problem Areas In Diabetes (PAID) scale: (1) marital support (Spanier Dyadic Adjustment Scale); (2) depressive symptoms (Center for Epidemiologic Studies Depression Scale) and exercise adherence (Summary of Diabetes Self-care Activities Measure); (3) marital support, depressive symptoms, and exercise adherence; (4) age and sex; (5) years married and education; (6) age, sex, years, married, and education; (7) comorbid conditions; (8) age, sex, years married, education, and comorbidity; and (9) age, sex, years married, education, comorbidity, marital support, depressive symptoms, and exercise adherence. The analyses were run hierarchically to see if the variance explained, significance, or strength of the relationship changed when testing different sets of covariates.

RESULTS

Table 3 presents the findings of multivariate analysis from Models 1 through 9 on DRQOL. The table coefficients are beta values. In Model 1, marital support was not found to be significantly associated with DRQOL. However, the association is positive, meaning that higher levels of marital support were likely associated with higher DRQOL. In Model 2, neither exercise adherence nor depressive symptoms were significantly associated with DRQOL. However, the relationships between levels of depressive symptoms, exercise adherence, and DRQOL were in the expected directions. In Model 3, marital support and depressive symptoms had less influence on DRQOL. Exercise adherence became negatively associated with DRQOL, meaning that more physical activity was associated with lower DRQOL; however, this finding was not statistically significant.

Model 4 illustrates that age (-0.479, $p<.10$) and sex (-5.616, $p<.05$) were both significantly and negatively associated with DRQOL. Specifically, older adults and males had significantly lower self-reported DRQOL than did younger adults or females with type 2 diabetes. As shown in Model 5, neither the number of years married nor level of education was significantly associated with DRQOL. Both relationships are negative, however, suggesting that fewer years married and less education may be associated with higher DRQOL. In Model 6, increasing age (-0.602, $p<.01$) and male sex (-5.586, $p<.10$) were even more strongly associated with DRQOL, controlling on education. The correlation remains negative, as in Model 5. In Model 7, comorbid conditions were not significantly associated with DRQOL. However, the relationship is in the direction that we expected (more comorbid conditions being associated with a lower DRQOL). In combining the variables of Models 6 and 7 (and shown in Model 8), age (-0.615, p<.01) and sex (-5.559, p<.10) continue to be the only significant associations with DRQOL. Although the associations remain negative (and in the expected direction), the level of significance for sex drops to the $p<0.10$ level.

Model 9 tests the influence of all of the demographic, marital, educational, health, and health behavior factors on DRQOL. Here we see that none of our measures of key analytic interest are significantly associated with DRQOL; the lone significant factors continue to be age and sex (-.0531, p<.05, -6.039, p<.10). Nevertheless, in the final model, years married, level of education, and depressive symptoms are positively related to DRQOL, meaning that longer marriages, higher education, and more depressive symptoms may be related to higher self-reported DRQOL, suggesting some expected and some surprising relationships.

Comorbid conditions, marital support, and exercise adherence are negatively associated with DRQOL; this means that more comorbidities, higher marital support, and more physical activity are associated with a lower self-reported DRQOL in older adults with type 2 diabetes, again illustrating some unexpected directions in these relationships. The relationship between age, sex and DRQOL remains negative, meaning that older males reported lower DRQOL throughout the nine models.

Although we did not find many significant associations that would support our study hypotheses, we did find the directions of some relationships that were expected and worthy of discussion. Further, our findings lead us to some conclusions about the study's strengths and limitations, implications for practice, and future research.

Table 3: The effects of selected demographic, health, and adherence characteristics on Diabetes-Related Quality of Life

Characteristics	Model 1 (b)	Model 2 (b)	Model 3 (b)	Model 4 (b)	Model 5 (b)	Model 6 (b)	Model 7 (b)	Model 8 (b)	Model 9 (b)
Marital Support	0.120								
Depressive Sym.		2.006							
Exercise Adh.		0.026							
Marital Support			0.026						
Depressive Sym.			1.985						
Exercise Adh.			-0.029						
Age				-0.479+					
Sex				-5.616*					
Years Married					-0.064				
Education					-1.235				
Age						-0.602**			
Sex						-5.586+			
Years Married						0.155			
Education						-0.762			
Comorbid Cond.							-0.145		
Age								-0.615**	
Sex								-5.559+	
Years Married								0.152	
Education								-0.705	
Comorbid Cond.								0.304	
Age									-0.531*
Sex									-6.039+
Years Married									0.124
Education									0.208
Comorbid Cond.									-0.102
Marital Support									-0.001
Depressive Sym.									1.218
Exercise Adh.									-0.109

Note: Depressive Sym = Depressive Symptomology (CES-D). Exercise Adh. = Exercise Adherence (SDSCA), and Comorbid Cond. = Comorbid Conditions.

Key:
+ $p<0.10$
* $p< 0.05$
** $p< 0.01$

DISCUSSION

Diabetes is a leading cause of blindness, amputation, end-stage renal disease, coronary heart disease and stroke (Harris, 1998). Management of type 2 diabetes requires complex, continual, and challenging self-care behaviors, including dietary control, exercise, and frequent medication (Hunt et al., 1998; Trief, 2005; Beverly, Penrod & Wray, 2007). Failure to follow treatment recommendations is reported as a serious and widespread problem in patients with type 2 diabetes, leading to pervasive health problems and decreased quality of life (Misra & Lager, 2008; Polonsky, 2000). This study sought to learn whether mental health and/or physical activity mediates the relationship between social support and diabetes-related quality of life (DRQOL). The research questions are as follows:

1. Does marital support increase diabetes-related quality of life in older adults with type 2 diabetes?
2. Do depressive symptoms mediate the relationship between marital support and quality of life in older adults with type 2 diabetes?
3. Does exercise adherence mediate the relationship between marital support and quality of life in older adults with type 2 diabetes?
4. Do depressive symptoms exert a stronger mediating influence than does exercise adherence on the relationship between marital support and quality of life in older adults with type 2 diabetes?

Surprisingly, we found that the relationship between marital support and quality of life was not statistically significant in this group of older adults living with diabetes in Central Pennsylvania. Though marital support has been named a critical factor in consistent behavioral adherence to diabetes management (Beverly, Penrod, & Wray, 2007; Trief, 2005), I was unable to replicate that finding in terms of DRQOL. Interestingly, although marital support was positively

related to DRQOL in Models 1 and 3 (as expected), in model 9 (which included all four factors of analytic interest and the 5 covariates), the relationship was a weak and negative association, meaning that more marital support was related to lower DRQOL. Whether that unexpected relationship would hold up in a larger sample of adults living with diabetes is unknown.

Similarly, depressive symptoms have been correlated with poorer health outcomes in patients with diabetes (Maddigan et al., 2006). For that reason, I hypothesized that this relationship may be due, in part, to the connection between marital support and quality of life. However, using OLS regression analyses, depressive symptoms were not found to mediate the relationship between marital support and quality of life in older adults with type 2 diabetes. It was unexpected that the direction of the association between depressive symptoms and DRQOL would remain positive throughout the regression analyses. This means that in the present study, a higher number of depressive symptoms was associated with higher DRQOL. Again, a larger sample of adults is needed to confirm or refute that relationship.

In addition to mental health factors, I hypothesized that adherence to an exercise program may mediate the relationship between marital support and quality of life. Research shows the importance of marital support in maintaining exercise adherence (Trief, 2005), but the data from this particular sample did not support this hypothesis. Although exercise adherence was positively related to DRQOL in Model 2 as expected (meaning more physical activity was correlated with better DRQOL), the association was negative in Models 3 and 9. This means that less exercise adherence was correlated with better DRQOL for part of the present study, again another unpredicted finding.

The final research question asked which of the following factors–depressive symptoms or exercise adherence–exerted a stronger mediating influence on the relationship between marital support and quality of life in older adults with type 2 diabetes. Because neither of the factors was

found to mediate the relationship between marital support and quality of life, this question was not answered by the research. Several factors trended towards significance, however; with a larger sample size, these findings may be significant. Even though most relationships were not statistically significant, many associations remained in the direction that we hypothesized. For example, in Model 9, number of years married, level of education, and comorbid conditions were related to DRQOL in the directions we expected.

The main finding of the present study was that in light of all other analytic factors and covariates reviewed, age and sex played the most significant roles in diabetes-related quality of life (DRQOL). Most studies reviewed in the literature were not based upon the age and/or the sex of participants, but we found both demographic variables to be important determinants of DRQOL. As age increases, quality of life (measured by self-reported PAID values) decreases. Older age has been significantly associated with both the presence of diabetes and lower HRQOL (Brown et al., 2003). Similarly, the sex of participants was coded using 0 and 1; therefore, the "negative" significance means that men reported lower levels of DRQOL. Studies indicate that women generally score lower than men on Quality of Life measures (Coelho, Amorim, & Prata, 2003).

STUDY STRENGTHS AND LIMITATIONS

There were several strengths of the present study. The conceptual and analytical models tested in this study were based in theory and grounded in the existing literature. Similarly, the four research questions were based on previous findings and theoretical expectations. The questionnaires from which the data were drawn came from the Health and Retirement Study, a very large, nationally representative sample of older adults above the age of 50, as well as other existing well-validated scales. Also, the data covered factors likely to be associated with DRQOL, as evidenced by the literature and similar studies of older persons with type 2 diabetes.

However, several characteristics of the sample utilized in the present study may have inhibited our findings and lead to our limited results. These include a small sample size, homogenous demographic characteristics, and unknown representativeness. With a larger sample size, the findings trending towards significance may have indeed become significant, and some of the surprising relationships either confirmed or discounted.

Additionally, the sample was relatively homogenous. A majority of our participants were in their first marriages, college-educated, and Caucasian. The average number of years married (36.0 6± 12.792) is atypical in a society where 1 in 2 marriages end in divorce. Also, the average Spanier Dyadic Adjustment Scale score of our sample (59.18 ± 6.949) is significantly lower than the reported mean of married couples by the scale's creator, 114.8 ± 17.8 (Spanier, 1976). The lack of variance within the sample (indicated by the low standard deviations) may limit the findings from our regression models. Perhaps the lower marital support reported by the spouses with diabetes is actually confounding our measure of quality of life. The average education level of 4.45 indicates some college education, which is more education than most Americans of similar age complete.

Furthermore, almost all participants were Caucasian, largely representative of older adults in Central Pennsylvania, but certainly not representative of older community-dwelling adults across the U.S. Although all of the scales have been utilized and construct validity has been established in Caucasian and minority populations, some findings may be (in part) a result of using a small, homogeneous sample of older, college-educated, Caucasian adults residing in Central Pennsylvania. Factors such as higher socioeconomic status, long-term marriage, and cultural norms may influence the strength and direction of the correlations in the present study.

IMPLICATIONS

Although the findings of the present study did not support the aforementioned hypotheses, the data do illustrate one important finding. Above many other demographic and health measures, the age and sex of an individual are strongly associated with their diabetes-related quality of life. This finding shows the potential importance of age and sex-specific treatment methods and evaluations for older adults with type 2 diabetes.

One finding of the study which replicated previous research is that older adults with type 2 diabetes suffer poorer quality of life than do their younger counterparts (Brown et al., 2003). Physicians should strive to provide high quality care to older adults and to find ways to better suit their specific health care needs. Furthermore, we found that older women with type 2 diabetes have lower DRQOL than did older men with the same condition. Doctors and health care providers should be aware of this difference and work to help both men and women with diabetes enjoy a better quality of life.

Though the present study was unable to replicate previous findings about the older population with type 2 diabetes, future research should be aware of the existing evidence of the relationships among social support, management, and quality of life for patients with diabetes. As diabetes continues to become more prevalent, nurses and health care providers should recognize and help strengthen supportive relationships in order to foster better self-management and to improve the quality and length of life which both partners experience. Public health education regarding the widespread need for healthier diets and increased physical activity may be the foundation of a successful health care campaign to prevent the spread of diabetes and the deteriorating quality of life of older adults with type 2 diabetes in America.

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VITA

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EDUCATION

The Pennsylvania State University – University Park, PA **Graduation: May 2011**
The Schreyer Honors College
B.S. Biobehavioral Health, College of Health and Human Development
Minors in Hearing and Deafness Studies and Psychology

- Honors Thesis: independent research regarding the physical and psychological factors affecting the quality of life in elder adults diagnosed with type 2 diabetes - Advisor: Professor Linda Wray

HONORS AND AWARDS

- Student Leadership Scholarship, Penn State Office of Student Activities
- Schreyer Honors College Academic Excellence Scholarship
- Joseph B. Longnecker Alumni Memorial Scholarship, Schreyer Honors College
- Francis A. and Ruth C. Wodock Scholarship, College of Health and Human Development
- Dean's List, Pennsylvania State University, Fall 2007 thru Spring 2011
- National Residence Hall Honorary, Nittany Chapter, Inducted Spring 2011

WORK EXPERIENCE

Teach for America, Baltimore, MD
2011 Corps Member

- Working to eliminate educational inequity by leading students in a low-income community to enhanced levels of scholastic achievement
- Leading students towards substantial academic progress by contributing experience in teaching and leadership skills to a Secondary Biology educational program in Baltimore

Jewish Studies and Hebrew Teacher, Congregation Brit Shalom
Fall 2008 – Spring 2011

- Teach elementary-age students recognize and write Hebrew letters, read and recite prayers, and understand Jewish holidays and values
- Engage students for 1-2 hours by creating and utilizing innovative lesson plans

Occupational and Physical Therapy Aide, Rehabilitation Services of Greater Washington
Summer 2009 and 2010

- Aided in the treatment of patients by demonstrating and assisting with exercises, setting up electrical stimulation machinery and work-simulation activities
- Built personal relationships with patients to foster comfortable and convenient care at the therapy clinic

LEADERSHIP EXPERIENCE

Penn State Dance Marathon, Family Relations Captain
Fall 2007 – Spring 2011

- Helped fundraise more than $9.56 million for the Four Diamonds Fund in THON 2011, benefitting the kids, families, researchers and staff in the fight against pediatric cancer
- Created workshops to facilitate outreach to and provide support for families of children in treatment at Hershey Medical Center
- Contact families battling childhood cancer and organize events to meet their needs
- Develop personal relationships with Four Diamonds families; plan and attend home visits

Resident Assistant, Penn State University Residence Life
Fall 2009 – Spring 2011

- Develop and strengthen the community of first-year and upperclassman residents
- Preserve a safe and comfortable living-learning environment by coordinating programs, educating students about policies, and enforcing the rules of on-campus living
- Serve as a mentor and role-model for the students living in the Honors residence halls

Schreyer Honors College Student Council, and Fall Orientation Leader
Fall 2007 – Spring 2011

- Participate in committee meetings and coordinate service and recruitment activities
- Present Penn State and Schreyer Honors College to prospective students and families
- Facilitated the transition of first-year students to college through various activities; provided information about different majors and extracurricular programs during the Honors College Orientation

Camp PALS Head Counselor, Cabrini College in Radnor, PA
June 2007 – June 2011

- Supervised a team of twenty-two people (ten campers, ten counselors, two support staff) at a week-long overnight camp for young adults with Down syndrome
- Helped arrange a field trip to the beach, a magic show, games, and Camp Olympics
- Ensured that the physical and emotional needs of campers and staff were met by providing support to each throughout the day and facilitating staff meetings each evening