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Self-Management of Type 2 Diabetes in Appalachina Women.

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Self-Management of Type 2 Diabetes in Appalachian Women

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ABSTRACT

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Gender, minority, and regional-related disparities have been documented in diabetes management. Self-efficacy, the belief in one's ability to carry out the actions mandated by a task, has been identified as a key predictor in glycemic control; however, it has not been investigated in rural, female populations. This cross-sectional, correlation investigation examined the relationships among self-efficacy, depression, and diabetes self-care management in women living in Appalachia with type 2 diabetes. Using Bandura's Social Cognitive Theory, 85 women ages ≥ 21 with type 2 diabetes for a minimum of 6 months who were residents in Appalachia completed the 1) Diabetes Self-Efficacy Scale, 2) Beck Depression Inventory-II, 3)Summary of Diabetes Self-Care Activities, and a 4) Diabetes Health-Related Demographics tool. Descriptive statistics detailed the sample characteristics. ANOVA, chi-square, and independent t-tests were computed for between group differences as they related to depression, various physiologic states, presence of self-efficacy sources, and glycosylated hemoglobin. Pearson correlation coefficients were used to describe the relationships between self-efficacy, depression, and self-care management.

Multiple linear regression analyses examined prediction models for glucose control while controlling for potential confounders.

Eighty-four Caucasian and one African-American enrolled in the study with a mean age of 61. The mean time since diabetes diagnosis was 7 years with a mean glycosylated hemoglobin value of 6.9% (SD=1.3). Higher self-efficacy scores were associated with a lower glycosylated hemoglobin (r-.30, p=.005) and ability to choose foods best to maintain a healthy eating plan(r-.415, p=.001). The sources of self-efficacy associated with enhanced self-care management were mastery experience and vicarious experience. There were no significant relationships between self-efficacy and depression or depression and glycosylated hemoglobin. The diabetes self-care management regression model resulted in self-efficacy and education accounting for 7.5% of the variance in glycosylated hemoglobin.

Study findings support the social cognitive theory and the utility of self-efficacy as a predictor of glycemic control. Depression was not found to be a significant obstacle in this Appalachian population. Comprehending the significant relationship between self-efficacy and diabetes self-care management allows providers to modify their interventions when caring for women type 2 diabetes in the region.

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CONTENTS

CHAPTER 1

INTRODUCTION

Diabetes

The Centers for Disease Control and Prevention (CDC) report that the total prevalence of diabetes mellitus (DM) in the United States (US) for all ages is 20.8 million, or 7.0% of the total population (CDC, 2005). In addition to the 20.8 million, it is estimated that 41 million individuals have pre-diabetes, a condition of impaired glucose tolerance or impaired fasting glucose that generally leads to a diagnosis of type 2 diabetes within a period of 10 years (American Diabetes Association, 2006a). Of the two major types of diabetes, type 2 accounts for 90%-95% of all diagnosed cases in the US. Women comprise 9.7 million of those with the illness; 8.8% of all women 20 years or older have DM (CDC, 2005).

The American Diabetes Association (ADA)(2006b)categorizes diabetes into four clinical classes. Type I diabetes is a disorder that results from the destruction of pancreatic beta-cells, usually leading to absolute insulin deficiency. Type 2 diabetes occurs from a progressive pancreatic insulin secretory defect with a component of tissue insulin resistance. Clinical class three, gestational diabetes, is an imbalance of glucose and insulin during pregnancy. Class four outlines other specific types of diabetes due to various causes such as genetic defects in beta-cell function, genetic defects affecting insulin action, diseases of the exocrine pancreas, and drug or chemically induced diabetes.

Epidemiologic studies have shown that persons with diabetes have higher mortality rates than those without the disease (CDC, 2005; Cu, Cowie, & Harris, 1998). Although diabetes is listed as the sixth leading cause of death in the general population (Marks, 2002), data derived from death certificates most likely underestimate the actual contribution of diabetes to mortality as diabetes is not recorded on 35% to 60% of the death certificates of decedents with diabetes (Bild & Stevenson, 1992; CDC, 2005). Cu et al. found that women with diabetes aged 25-44 years had an overall mortality rate 3 times greater than women without diabetes.

Diabetes disproportionately affects racial and ethnic minority populations as well as the elderly (Marks, 2002). The prevalence of diabetes is approximately 2 to 4 times higher among black, Hispanic, American Indian, and Asian-Pacific Islander women than among white women (CDC, 2005; Harris, 1995). In 2003, the total prevalence of diabetes among people aged 65-74 was 14 times that of people less than 45 years of age (CDC, 2005). Regardless of racial and ethnic origin, the prevalence of diabetes doubles as women exit the reproductive years into middle age (Beckles & Thompson-Reid, 2001).

In addition to mortality, diabetes leads to biochemical imbalances, increased susceptibility to illnesses, and poorer prognosis with illnesses (United States Department of Health and Human Services, 2003). Independent of being a significant medical and social problem, DM is a large economic burden on individuals and society (Rubin, Altman, & Mendelson, 1992). The

ADA(2003), using a cost-of-disease methodology to determine health care expenses due to diabetes, approximates the associated costs of the disease in the United States as $132 billion (direct and indirect). The total comprises $92 billion (direct costs) and $40 billion (indirect related to disability, work loss, and premature mortality). Increased health care costs are directly related to glycosylated hemoglobin levels, a measure of glucose control. For every one percent increase above the recommended glycosylated hemoglobin level of seven percent, there is an associated seven percent increase in health care costs (Gilmer, O'Connor, Manning, & Rush, 1997).

The management of DM presents a major challenge to health care providers as the number of diagnosed persons is expected to rise in congruence with population growth and maturation (Boyle, 2001). The primary goal for the health care providers of clients with DM is maintaining normal glucose levels. Facilitating those behaviors that promote stringent glycemic control ultimately reduces the risk of developing complications from DM (ADA, 2006b). Although health care providers play an integral role in diabetes education and disease support, ultimately, glucose control rests on the patient as 95% of disease management is dependent upon self-care (Anderson et al., 1995).

Disparities and Diabetes

Unfortunately, disparities in health care access, equity, and outcomes exist on the basis of gender, ethnicity, and age. In a study investigating clinical and economic outcomes of

patients with type 2 DM, minorities and women received a lower quality of health care in comparison to their white male counter-parts (Dowell et al., 2004). Despite initiatives established by President Clinton in 1998 to eliminate racial and ethnic disparities in health care with programs focused on cancer, diabetes, HIV/AIDS, infant mortality, immunizations, and stroke, residents in Appalachia continue to experience life-expectancies similar to some poor, developing countries (Murray, Kulkarni, & Ezzati, 2005). Murray et al. posit the excess mortality that Appalachians experience can be attributed to chronic disease in the young and middle-aged adult. Although the Department of Health and Human Services recognizes that eliminating racial and ethnic disparities requires new knowledge about disease determinants and effective interventions for prevention and management, many opportunities for investigation remain unexplored.

Appalachian Health-Beliefs

Rossuwurm and colleagues (1996) explored the influences of the Appalachian culture and rural living on illness experiences. From the sample of 257 randomly selected patients hospitalized in Southern Appalachia, there were no significant differences in the demographic and socioeconomic characteristics of the native born Appalachians and the Appalachian in-migrants. The predominant Appalachian cultural health-beliefs included: the inability to prevent illness and only cope with its consequences; a heavy influence of religious faith in illness recovery; the woman's role as nurturer and homemaker; and the

importance of extended family. The findings suggested the need for culturally sensitive care and innovative education to reduce health risks when caring for Appalachian patients.

Women who reside in Appalachian have not been a specific focus in the research of diabetes maintenance and prevention. Those factors that impact diabetes self-care management must be investigated in the community of native and in-migrant Appalachian women to better comprehend adherence and metabolic control.

Problem Statement

The impact of self-efficacy on self-care management has not been investigated for significance in Appalachian women with type 2 diabetes. The purpose of this study is to evaluate the role of self-efficacy in the self-care behaviors of women with type 2 diabetes residing in Appalachia. Bandura's (1986) Social Cognitive Theory (SCT) will be the guiding framework for the investigation. According to Bandura, self-efficacy is defined as the belief in one's ability to perform a specific task. Self-efficacy is influenced by four main sources of information: mastery experience, vicarious experience, verbal persuasion, and physiological information (Bandura, 1977, 1986, 1995, 1997). The regimen of care demanded of an individual with diabetes and his or her ability to perform the tasks required is known as self-care. Self-care management is the actual performance of self-care activities aimed at the achievement of acceptable glycemic control (Sousa, Zauszniewski, Musil, Lea, & Davis, 2005). Self-efficacy is hypothesized to significantly impact

self-care management behaviors of Appalachian women with type 2 diabetes.

Significance

The role of self-efficacy in diabetes self-care management has not been a focus of study in the women of Appalachia. Discovering those factors that affect self-care management is essential to health care providers in that understanding the relationship of the variables in the Social Cognitive Theory and diabetes self-care can impact the manner that practitioners plan and provide care. Furthermore, intervening on these variables leads to improved self-care regimens (Johnston-Brooks, Lewis, & Garg, 2002) that ultimately decrease the morbidity and mortality associated with diabetes (ADA, 2006b).

Research Questions

1. What is the relationship between self-efficacy and diabetes self-care management in Appalachian women with type 2 DM?
2. What is the relationship between self-efficacy and depression in Appalachian women with type 2 DM?
3. What are the relationships among mastery experience, vicarious experience, verbal persuasion, physiological states, self-efficacy, depression, and self-care management in Appalachian women with type 2 DM?

Definition of Terms

Self-Efficacy

Conceptual. A key predictor variable in diabetes research is self-efficacy. In the SCT, the concept of self-efficacy is defined as the belief in one's ability to carry out the actions mandated by a specific task (Bandura, 1977; 1982; 1986).

Operational. The score obtained on a 20-item Diabetes Management Self-Efficacy Scale (DMSES)that assesses an individual's confidence in his or her ability to manage his or her blood glucose level, foot care, medication, diet, and level of physical activity (van der Bijl & Shortridge-Baggett, 2001; van der Bijl, van Poelgeest-Eeltink, & Shortridge-Baggett, 1999).

Self-care

Conceptual. The actions necessary for the individual with diabetes to perform in order to maintain optimal glucose control (Toobert & Glasgow, 1994). Self-care management is the actual performance of self-care activities (Sousa et al., 2005)

Operational. The score on the Summary of Diabetes Self-Care Activities (SDSCA). The SDSCA is an 11-item self-report questionnaire related to diabetes self-care management that includes items assessing the following aspects of the diabetes regimen: general diet, specific diet, exercise, blood glucose testing, foot care, and smoking (Toobert & Glasgow, 1994; Toobert, Hampson, & Glasgow, 2000).

Depression

Conceptual. Depression is the experience of a dysphoric mood, withdrawal of interest in life activities, loss of vital energy, and feelings of hopelessness and futility (Derogatis & Melisaratos, 1983).

Operational. A Beck Depression Inventory-II (BDI-II) score of 0-13 correlates with minimal depression, 14-19 mild depression, 20-28 moderate depression, and 29-63 severe depression (Beck, Steer, & Brown, 1996). The BDI-II is a 21 question multiple choice self-report questionnaire developed as an indicator of the presence and degree of depressive symptoms consistent with the fourth version of the Diagnostic and Statistical Manual of Mental Disorders.

Mastery Experience

Conceptual. Experiences of success. Feelings of mastery enhance self-efficacy; conversely, failure decreases self-efficacy (Bandura, 1977, 1986, 1995, 1997).

Operational. The Diabetes Health-Related Questionnaire (Appendices A, B)inquires whether the participant has experienced success in diabetes self-care. Response is in a yes or no format. A response of yes represents past experiences of success and is associated with enhanced self-efficacy.

Verbal Persuasion

Conceptual. Verbal attempts to convince an individual that he or she can succeed in a difficult task (Bandura 1977, 1986, 1995, 1997).

Operational. The Diabetes Health-Related Questionnaire inquires whether the participant has a person in her life who offers suggestions, advice, or instructions to manage diabetes. Response is in a yes or no format. A response of yes indicates the existence of verbal encouragement and is associated with higher self-efficacy.

Vicarious Experience

Conceptual. Visualization of others performing a behavior successfully (Bandura 1977, 1986, 1995, 1997).

Operational. The Diabetes Health-Related Questionnaire inquires whether the participant knows an individual who successfully manages his or her diabetes and serves as a role-model. Response is in a yes or no format. A response of yes indicates a diabetes management exemplar exists. Vicarious experience is associated with higher self-efficacy.

Physiological States

Conceptual. Somatic sources of information that affect judgment of capabilities (Bandura, 1997).

Operational. The Diabetes Health-Related Questionnaire inquires whether the participant has experienced disease processes frequently associated with diabetes including cardiovascular disease, nephropathy, neuropathy, and retinopathy. Response was a subjective recall of diagnoses.

Appalachia

Conceptual. A 200,000 square-mile area that follows the spine of the Appalachian Mountains from southern New York to northern Mississippi. West Virginia and sections of 12 other

states encompass Appalachia including: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia (Appalachian Regional Commission, 2005).

Operational. The Tri-Cities refers to the area surrounding Bristol, Johnson City, and Kingsport located in Northeastern corner of Tennessee. Although recruitment for participants will extend into Kentucky and Virginia, the Tri-Cities will be the primary Appalachian region of focus in this study. The US Census Bureau (2000) estimates the total population of this district to be approximately 480,000.

Theoretical Perspective

The SCT was developed by Bandura (1977; 1982; 1986). Over the last decade, this theory has gained widespread acceptance as an explanatory model of health-related behavior and a guide for the development of interventions focused on health-promotion (Badura 1998). The SCT indicates that behavior results from an individual's belief that he or she is able to perform a particular task (self-efficacy) combined with a belief that the action will lead to a desired outcome (outcomes expectancy). Outcome expectations are highly dependent on self-efficacy; therefore, self-efficacy is a better predictor of performance than expected outcomes (Bandura, 1986). The SCT predicts that people who are confident of their abilities are more likely to attempt difficult tasks, put in greater effort to master those tasks, and persist in the attempt despite difficulties.

Self-efficacy is not concerned with the skills that the individual has, rather the emphasis is on the judgment of what one can do with the skills he or she possesses (Bandura, 1986). Related concepts such as self-esteem, self-confidence, and locus of control are personal characteristics that exert a stable influence on a broad spectrum of behavioral domains (Maibach & Murphy, 1995). A global sense of self-efficacy is non-existent; hence, self-efficacy is not a personality trait but a temporary characteristic that is strictly situational and task-related (van der Bijl & Shortridge-Baggett, 2001).

The relationship between self-efficacy and personal factors such as self-confidence and self-esteem has been investigated with positive correlations established between self-esteem and self-efficacy (Blake & Rust, 2002; Coppel, 1980). Higher levels of self-efficacy have been documented in individuals with an internal locus of control (Schneewind, 1995). In a study examining self-efficacy and self-esteem as basic aspects of the self that influence self-care of diabetes, self-efficacy was found to be a better predictor than self-esteem in all aspects of self-care and glycosylated hemoglobin levels (Johnston-Brooks, Lewis, & Garg, 2002).

The SCT represents a triadic reciprocal causation model in which the behavior of a person, the characteristics of that person, and the environment within which the behavior is performed are constantly interacting (Bandura, 1977; 1986). A change in one aspect has implications for the others. Bandura (1986) suggests that aside from genetics, physical health is

primarily determined by life-style choices and environmental factors. Cognitive, social, and behavioral skills must be organized into integrated courses of action to execute control over the events that affect an individual's life (Bandura, 1986).

Four sources of information influence self-efficacy beliefs: mastery experience, vicarious experience, verbal persuasion, and physiological information (Bandura, 1977; 1986; 1995; 1997). Mastery experience, the most influential, relates to performance accomplishments acquired through practicing and earlier experiences. Vicarious experience is the observation of others that serves as an indicator by which one can measure his or her own capacities. Verbal persuasion, the most frequently used, is the instructions, advice, and suggestions from others to convince an individual that he or she can succeed in a difficult task. Lastly, physiological information refers to the self-evaluation of physiological and emotional states. A person's beliefs about his or her illness and how the symptoms are interpreted influence self-efficacy to cope with the illness; individuals rely heavily on their physical and emotional states to judge their abilities (Bandura, 1997).

Self-efficacy plays a pivotal role in the regulation of affective processes (Bandura, 1997). Personal beliefs in coping abilities affect how much stress and depression an individual will experience in threatening or difficult situations. Bandura suggests that self-efficacy is a significant regulator of

thinking patterns, the amount of stress experienced, and susceptibility to depression.

As applied to this study, the SCT holds that the independent variable self-efficacy and the moderating factors: mastery experience, vicarious experience, verbal persuasion, physiological states, and depression will influence the dependent variable diabetes self-care management in a sample of Appalachian women with type 2 diabetes.

CHAPTER 2

LITERATURE REVIEW

Evidence from the Diabetes Control and Complications Trial (DCCT) supports focusing on behavior, rather than metabolic control, as the key outcome of diabetes education and treatment (ADA, 1997). Over the last decade, there has been a shift from a didactic approach of diabetes self-management education to a skills based approach that focuses on informed self-management decision making (ADA, 2006). Individualized diabetes self-management education concomitant with enhanced self-care behaviors through frequent self-testing, regulation of dietary intake, exercise, and medication compliance can improve or maintain health in persons with diabetes (Glasgow et al., 1999).

A national survey (n = 2056) of adults with DM indicated that individuals with DM were least likely to make changes related to diet and physical activity; whereas adherence with other regimen-specific tasks of self-care such as blood glucose monitoring and medication administration were more reliable (Ruggiero et al., 1997). Some researchers have suggested that non-adherence is the norm for those with chronic illnesses such as DM who attempt to manage within their existing lifestyle according to their own values and beliefs about the illness (Rapley & Fruin, 1999).

Brown (1990, 1992) established that an improvement in a person's diabetes related knowledge level rarely, if ever, led to the behavior changes required to manage the illness. A meta-analysis of 17 studies revealed didactic or knowledge based

interventions were consistently associated with negative outcomes in diabetes care (Glazier, Bajcar, Kennie, & Willson, 2006). Emphasis is now on identification of factors that facilitate behavior changes leading to euglycemia. Furthermore, assuming that 95% of diabetes care is self-care, focusing on self-care variables rather than diabetes knowledge related outcomes is only rational (Krichbaum, Aarestad, & Buethe, 2003). As a result, self-efficacy has been a principal variable in diabetes research over the past 20 years (Glasgow & Osteen, 1992; Jenkins, 1995; Ludlow & Gein, 1995; O'Leary, 1985; Skelley, Marshall, Haughey, Davis, & Dunford, 1995; Sousa et al., 2005; Williams & Bond, 2002).

Self-Efficacy

One of the psychosocial barriers that most strongly and consistently relates to low levels of diabetes self-management is low-self efficacy (Glasgow, Toobert, & Gillette, 2001). Conversely, high levels of self-efficacy have been linked to enhanced adherence in diverse samples including adolescents with diabetes (Ott, Greening, Palardy, Holderby, & DeBell, 2000); European Americans(Skaff, Mullan, Fisher, & Chesla, 2003); Latinos (Sarkar, Fisher, & Schillinger, 2006); Canadians (Ludlow & Gein, 1995); and a sample of 309 participants that included 140 African Americans(Aljasem, Peyrot, Wissow, & Rubin, 2001).

Appalachia

The significance of diabetes-specific self-efficacy beliefs in rural populations has not been addressed by research. Rural populations such as those in Appalachia are some of the region's

most economically depressed. The residents have numerous social and health disparities contributing to increased rates of diabetes (ARC, 2005).

Appalachia is plagued with high rates of poverty, high levels of unemployment, low levels of education, and decreased access to care (ARC, 2005). Data compiled by the National Center for Health Statistics from 1990-1997 suggest that Appalachians die faster and have more chronic illnesses, higher rates of suicide, and fewer health care providers per 100,000 residents than the rest of the nation.

The literature imparts conflicting findings of research regarding health-related cultural perspectives in Appalachia. Rosswurm et al. (1996) found Appalachians perceived no control in illness prevention; their views were fatalistic with adaptive acceptance. This perspective is consistent with the finding that women of lower socioeconomic status believe more strongly in fate and chance than women of higher socioeconomic status (Raja, Williams, & McGee, 1994). Contrary to established research, Appalachian participants in a study by Smith and Tessaro (2005) linked diabetes to individual behaviors. Further, the participants recognized the ability to control some aspects of the disease through self-management.

In congruence with nationwide Hispanic population growth, Tennessee has experienced a 378% increase in the minority group since 1990 (United States Census Bureau, 2000). Persons of Hispanic or Latino origin account for 1.9% of the population in Johnson City, Tennessee (United States Census Bureau, 2004);

however, approximately 30-39% of Tennessee's immigrant population is undocumented (Capps, Passel, & Fix, 2004). The Hispanic-Latino immigrant is 1.7 times more likely to have diabetes and more prone to disease-related complications than his or her non-Hispanic white counterpart (CDC, 2005); yet, little is known about the cultural health-beliefs and applicability of self-efficacy as a predictor of glycemic control in the Appalachian in-migrant Hispanic-Latino population.

Depression

Presently, there is a greater understanding of the relationship among psychosocial factors such as mental health states and self-care behaviors as they relate to health outcomes (Rubin & Peyrot, 1998). For example, the presence of diabetes doubles the odds of co-morbid depression (Anderson, Freedland, Clouse, & Lustman, 2001). Glasgow et al. (1999) report depression to be three times more common among persons with DM than the general population; however, depression is frequently undiagnosed.

Identification of depression is significant in that there are mental health implications and negative impacts on self-management, glucose control, and diabetes-related complications (Glasgow et al., 1999); higher odds of functional disability (Egede, 2004); and a higher mortality rate (Katon et al., 2005). Diabetes with coexisting depression has been associated with higher nonadherence to three types of long-term pharmacotherapy: oral hypoglycemics, anti-hypertensives, and lipid lowering

agents (DiMatteo, Lepper, & Croghan, 2000). In recognition of depression's influence on diabetes care and outcomes, assessment of mood was added to the 2004 American Diabetes Association standards of medical care (ADA, 2004).

Egede et al.(2002) found the cost of health care in individuals with diabetes to be significantly impacted by the presence of comorbid depression. Depressed patients with diabetes have more ambulatory care visits and fill in excess of twice the amount of prescriptions than their non-depressed counterparts. Comorbid depression is associated with a fivefold increase in total annual health care expenditures that approximates $192 million (Egede, Zheng, & Simpson, 2002).

Women and Depression

In addition to cultural variables that impact chronic illness management and an increased risk for psychopathology, there are variations between genders. Women with type 2 diabetes are twice as likely to be depressed as men (Nichols & Brown, 2003). Peyrot and Rubin (1997) report similar findings in that women with diabetes are twice as likely to report higher levels of psychological disturbance in the form of depression and anxiety compared to men with the illness (Peyrot & Rubin). In addition to being a female with diabetes, Peyrot and Rubin found a higher likelihood of depression associated with less education, being unmarried, and aged 40-49.

On disease specific measures, women have expressed less mastery over their diabetes (Rubin & Peyrot, 1998) and more disruption in their everyday life secondary to the disorder

(Rubin & Peyrot; Wredling et al., 1995). Rubin and Peyrot's study investigating gender differences in psychosocial, behavioral, and physical aspects of diabetes found that women score higher on powerful-other health professional locus of control tool, meaning they view diabetes health-related outcomes as attributed largely to their health providers' efforts. Additionally, women had higher chance locus of control indicating that diabetes health-related outcomes were the result of fate or chance. Further, women scored lower than men on self-efficacy scales. Men had greater satisfaction with diabetes-related emotional support from their spouses, higher quality of life, greater overall treatment satisfaction, better glycosylated hemoglobin levels, and fewer hassles associated with meals and snacks (Peyrot, 1998). In a study examining gender and treatment differences in a Hispanic population, females with DM reported lower levels of perceived control and support for their diet than males (Brown et al., 2000). To date, no studies have addressed DM gender and treatment differences within the Hispanic-Latino in-migrant Appalachian population.

The prevalence of diabetes is well documented and research has clearly found a strong relationship between self-efficacy and diabetes related self-care behaviors. The last decade has focused on patient-centered perspectives and empowerment in diabetes management (Rayman & Ellison, 1998). Rayman and Ellison suggest an exemplar of diabetes self-management makes decisions about adherence that are congruent with personal values, beliefs, and circumstances. The exemplar is confident in her

decisions and is able to integrate diabetes management into daily living without rigidity. Similarly, as a woman's self-efficacy increases, higher levels of self-care with more flexibility can be attained. Flexible self-care allows for responsible management of diabetes resulting in adequate glucose control without extensive effects on daily life (Siguroardottir, 2005).

Although self-efficacy has been associated with enhanced diabetes self-care, the predominant Appalachian cultural health-beliefs are embedded in fatalism or passive acceptance of illness(Rosswurm, Dent, Armstrong-Persily, Woodbum, & Davis, 1996). One major opportunity for nursing research to embrace is the role of self-efficacy in the self-care management of type 2 diabetes in the women of Appalachia. Using Bandura's (1986) SCT as a guide, relationships among 1) self-efficacy and diabetes self-care management, 2) depression and self-efficacy, and 3) mastery experience, vicarious experience, verbal persuasion, physiological states, self-efficacy, and diabetes self-care management necessitate evaluation for significance in women with type 2 diabetes residing in Appalachia.

CHAPTER 3

METHODS

Design

This study was a descriptive, cross-sectional, correlation design. Cross-sectional designs attempt to capture attitudes or behaviors of participants at one point in time. The purpose of survey methodology is to measure variables by asking participants questions and then to examine the relationships among the variables (Field, 2000). This study examined the relationships among self-efficacy, depression, and diabetes self-care management in Appalachian women with type 2 diabetes. The specific research questions are:

1. What is the relationship between self-efficacy and diabetes self-care management in Appalachian women with type 2 DM?
2. What is the relationship between self-efficacy and depression in Appalachian women with type 2 DM?
3. What are the relationships among mastery experience, vicarious experience, verbal persuasion, physiological states, depression, self-efficacy, and diabetes self-care management in Appalachian women with type 2 DM?

Sample

Statistical power analysis assists in the estimation of the needed sample size to enable accurate and reliable statistical judgments. The sample size was confirmed using G power software (Erdfelder, Faul, & Buchner, 1996). In order to have a medium effect size and confidence interval of $p < .05$, the study sample required 85 subjects (Cohen, 1988). Participants were required to be age 21 or older and literate in English to complete the surveys. The diagnosis of type 2 diabetes must have been established for at least 6 months at the time of the survey to allow for psychological adjustment, diagnosis stabilization, and development of self-care skills. Adolescent females were excluded due to developmental (biological and psychological) related issues that may affect adherence as well as those persons with gestational diabetes.

Setting

The site of the study was an East Tennessee State University (ETSU) nurse-managed rural health clinic that serves residents of Appalachia. Participants were also recruited from Mountain States Health Alliance (MSHA) Health Resources diabetes education center as well as through ads in the community newspapers, television, and radio. Methods of recruitment included convenience sampling, assistance from clinic staff, diabetes educators at the Health Resources diabetes education center, fliers, and advertisements.

The risks associated with this study were related to emotional stress that may occur with the use of survey instruments investigating affective processes. The tool measuring depression was scored immediately upon completion. One question on the BDI-II inquires about suicidal thoughts or wishes. There were no participants who acknowledged suicidal ideations. BDI-II scores calculated above 20 indicate moderate depressive symptoms, those greater than 29 are indicative of severe depression. If depressive symptoms were identified by a score greater than or equal to 20, the participant was referred to the behavioral health provider at the clinic. If the participant was from Health Resources Center or from the general community, she was referred to her primary care provider for further psychological evaluation.

Measures

The four instruments used in this study were Diabetes Management Self-efficacy Scale (DMSES) (van der Bijl, Poelgeest-Eeltink, & Shortridge-Baggett, 1999), The Beck Depression Inventory-II (BDI-II) (Beck, Steer, & Brown, 1996), The Summary of Diabetes Self-Care Activities (SDSCA) (Toobert & Glasgow, 1994), and a demographics tool created by the principal investigator. The demographics record included information regarding age, marital status, education, and ethnicity. In addition, diabetes-related information was obtained from the participant's chart or by recall. Diabetes health-related information included the nature and duration of illness, presence of chronic illness co-morbidities, last glycosylated

hemoglobin, type of medication, formal education on illness, presence of diabetes self-management role model, and the existence of a source of encouragement. The participant's waist-to-hip ratio and body mass index were measured and calculated by the principal investigator. In consideration of the BDI-II's sensitive nature and complexity of the diabetes health-related demographics tools, these surveys were presented last in the data collection packets.

Diabetes Management Self-Efficacy Scale

Measuring self-efficacy in type 2 diabetes has been validated using the DMSES (van der Bijl et al., 1999; van der Bijl & Shortridge-Baggett, 2001). This tool measures the individual's ability to perform activities essential for the treatment of diabetes, self observation, and self-regulating activities required by the disease. Psychometrics of the English version of the instrument include an alpha coefficient of 0.81 and a test-retest reliability score of 0.79 ($P < 0.001$). The DMSES has been translated verbatim to Spanish (Appendix C); currently, there are no published psychometrics for the Spanish version of this instrument.

Beck Depression Inventory-II

Psychological states such as anxiety, stress, arousal, fatigue, and mood impact self-efficacy. In addition, self-efficacy impacts affective states (Bandura, 1997). The Beck Depression Inventory-Second Edition (BDI-II) was created for the assessment of symptoms corresponding to criteria for diagnosing depressive disorders listed in the American Psychiatric

Association's Diagnostic and Statistical Manual Fourth Edition (Beck, Steer, & Brown, 1996). The BDI is one of the most widely used tools for measuring the severity of depression in diagnosed patients and for identifying potential depression in normal populations age 13 and over (Piotrowski & Keller, 1992).

The BDI-II assesses symptoms of depression such as appetite changes, fatigue, hopelessness, irritability, cognitions of guilt, and feelings of punishment (Beck et al., 1996). The test-retest correlations for the BDI are reported as 0.93 ($p < .001$), with an internal consistency alpha coefficient of 0.91. The BDI-II can be used to determine the impact and significance of depression on self-efficacy and diabetes self-management.

Summary of Diabetes Self-Care Activities

There is a documented link between diabetes self-care and level of glucose control (Glasgow, 1991). Diabetes self-management can be measured by the Summary of Diabetes Self-Care Activities (SDSCA)(Toobert & Glasgow, 1994; Toobert, Hampson, & Glasgow, 2000). The SDSCA is a self-report measure of the frequency of completing the prescribed regimen related to diet, exercise, glucose testing, and foot care. Psychometrics report test-retest correlations as moderate (mean = 0.40) and high inter-item correlations (mean = 0.47) (Toobert et al., 2000). The SDSCA was selected as an outcomes measure in assessing self-efficacy and depression on diabetes self-care management. The SDSCA was translated verbatim to Spanish (Appendix D); currently, there are no published psychometrics for the Spanish version of this instrument.

Diabetes Health-Related Questionnaire

A diabetes health-related demographics questionnaire was created to focus on essential variables associated with diabetes self-care management. Obesity, specifically abdominal adiposity, is strongly linked to the development of type 2 diabetes (Fox et al., 2004)and a potent modifiable risk factor in the development of complications such as cardiovascular disease (Welborn, Dhaliwal, & Bennett, 2003); therefore, body mass index (BMI) and waist-to-hip ratio (WHR) were included in this investigation. The recommended BMI is 18.5 to 24.9 (CDC, 2007) and WHR measurement of 0.80 or less in women (National Institutes of Health, 1998). Additional items on the demographics tool included variables that influence self-efficacy such as: years since diagnosis, diabetes education, existence of a diabetes management exemplar, experiences of success in diabetes management, and co-morbid diseases.

Procedures

Informed Consent

Permission to complete research using human subjects was granted by The East Tennessee State University (ETSU) Institutional review Board (IRB). Upon initial contact with the participant, the nature and purpose of the study was fully detailed. In addition, participants were informed of their right to withdraw at anytime. Due to the inability to secure a bilingual research assistant, Spanish speaking participants were not recruited for the study. After all the participant's

questions were answered and informed consent had been provided, the women were entered into the study.

The risks associated with this study were related to emotional stress that may occur with the use of surveys investigating affective processes such as depression. As previously described, the Beck-Depression Inventory-II was scored immediately upon completion. None of the participants acknowledged the presence of suicidal ideations within the last 14 days. When a psychological process was identified by a score greater than or equal to 20, the participant was referred to the behavioral health provider at the clinic or her primary care provider if the participant was from the community.

Data Collection

The PI established contact with the clinic directors and diabetes educators at Health Resource Center. Inclusion and exclusion criteria were provided. The Principal Investigator was available at the ETSU nurse managed clinic 2 days per week for data collection with participants who met the criteria and were interested in the study. Recruitment and data collection were additionally conducted at the conclusion of select Health-Resources diabetes education sessions. Concurrently, responses to television, radio, and newspaper ads were answered and data collection scheduled. Data collection was conducted during the months of December 2006 through May of 2007.

Participants completed the surveys in a quiet, private room in the ETSU nurse-managed clinic office, the individual's home, or a secluded area in the Health Resources diabetes education

facility. Instructions regarding the instrumentation were provided in detail. The participants were then asked to complete the three surveys. Upon completion of the DMSES, SDSCA, and the BDI-II, the PI completed the diabetes health-related demographics that included measurement and calculation of the waist-hip-ratio. The PI remained present throughout the completion of surveys for any literacy related difficulties or visual deficits requiring assistance. A five dollar honorarium was provided to the participants immediately following completion of the surveys.

Data Analysis

Data were double entered into the Statistical Package for the Social Sciences (SPSS) version 14 to ensure accuracy. Before analysis, all variables were checked for entry accuracy and normality of distributions. Errors were corrected and variables transformed as necessary. Psychometric properties of all measures were evaluated to insure applicability of these tools with this population. All multiple comparisons used the Bonferroni correction.

Initial data analysis was purely descriptive in an attempt to detail the characteristics of the sample using frequency distributions. Primary data analysis focused on examination of the relationships among diabetes self-care management, self-efficacy, depression, mastery experience, vicarious experience, verbal persuasion, and physiological states in Appalachian women with type 2 diabetes. Additionally, Beck Depression Inventory-

II and SDSCA norms were compared to the study sample using one-sample t-tests.

The first research question, What is the relationship between self-efficacy and diabetes self-care management in Appalachian women with type 2 DM, was examined using Pearson's correlation coefficients to determine the existence of linear relationships between self-efficacy and the five scales of the SDSCA self-care management tool as well as self-efficacy and glycosylated hemoglobin. The second research question, What is the relationship between self-efficacy and depression in Appalachian women with type 2 DM, used one-way ANOVA between subjects design to evaluate self-efficacy in the presence of four categories of depressive symptoms. Independent t-tests and chi-square tests were used to investigate question three, What are the relationships among mastery experience, vicarious experience, verbal persuasion, physiological states, self-efficacy, depression, and self-care management in Appalachian women with type 2 DM. Self-efficacy and SDSCA score means were compared for those with or without mastery experience, vicarious experience, verbal persuasion, and various physiological states. The physiological variables were tested against the categorical glycosylated hemoglobin (<7% and >7%) using chi-square analysis. Multiple 2x2 chi-square tests were run for the four category BDI-II and the two category glycosylated hemoglobin. Multiple regression analysis was used to examine prediction models for glycemic control.

CHAPTER 4

RESULTS

For this cross-sectional correlation study, a sample of women with type 2 diabetes residing in Appalachia were surveyed to ascertain the relationship among self-efficacy, depression, and self-care management of diabetes. The primary focus of this investigation was to determine whether individuals with higher levels of self-efficacy had better glycosylated hemoglobin values, hence, were more likely to engage in self-care activities. The results of the data analysis are reported in this chapter.

Eighty-seven English speaking women were consented and surveyed in the course of this study. Two participants were excluded from analysis, one for a diagnosis of pre-diabetes and the second for diagnosis time less than 6 months. This resulted in 85 participants geographically representing East Tennessee, Southwest Virginia, and Eastern Kentucky.

Demographics

Due to the inability to secure bilingual research assistants, there were no Hispanic-Latino participants. Eighty-four Caucasian women and one African-American woman comprised the sample. The lack of diversity was expected and is reflective of the demographics in the area where the data were collected and minorities represent less than 10% of the population (United States Census Bureau, 2000). Six women participated from the Johnson City Downtown Clinic (JCDC), the

additional 79 subjects responded to advertisements in the community newspapers, radio, and television.

The sample ranged in age from 30 to 85, with a mean age of 61 (*SD* 10.06). Participants had lived in Appalachia for a range of 2 to 85 years with a mean residency time of 43.18 years (*SD* 23.68). Slightly more than half of the participants were married (54.1%, n=46) with a mean education of 13.87 years (*SD* 2.55). Demographic characteristics are listed in Table 1.

Table 1

Demographic Characteristics

Demographic characteristics	n	%
Race		
Caucasian	84	99
African-American	1	1
TOTAL	85	100
Education		
Graduate school	10	11.8
4 year College Graduate	15	17.6
Attended College	23	27.1
HS Grad	29	34.1
Less than HS	7	8.2
Missing	1	1.2
TOTAL	85	100
Marital status		
Single, never married	3	3.5
Married	46	54.1
Divorced-Separated	24	28.2
Widow	12	14.1
TOTAL	85	100

Diabetes Health

Time diagnosed with diabetes ranged from 6 months to 35 years with a mean of 7.39 years (*SD* 6.08). Most participants had

attended formal diabetes education classes (76.5%, n=65) and reported glycosylated hemoglobin values of less than 7% (68.2%, n=58). The majority of participants were on oral hypoglycemics versus insulin or other regimens. The medications categorized as "other" were Symlin® (pramlintide acetate) an injected synthetic analog of human amylin and Byetta® (exanatide injection) an incretin mimetic. Table 2 describes the participants' medication regimens.

Table 2

Medication Regimen

Medications	Frequency	Percent
Diet	7	8.2
Insulin only	4	4.7
Oral only	59	69.4
Other only	1	1.2
Insulin and Oral	10	11.8
Insulin and Other	1	1.2
Oral and Other	1	1.2
Insulin and Oral and Other	2	2.4
Total	85	100

Despite satisfactory glycemic control, the participants were obese as indicated by a waist-to-hip ratio of 0.857 (SD .079) and a mean BMI of 33.0 (*SD* 6.88) compared to the national average BMI of 32.4 (National Center for Health Statistics, 2003). Concurrent with their diagnosis of diabetes, 84.7% (n=72)

confirmed diagnosed cardiovascular complications; nephropathy (3.5%, n=3); neuropathy (9.4%, n=8); retinopathy (2.4%, n=2); and, or psychiatric diagnosis (17.6%, n=15).

Normative Comparisons

Participants' scores were compared to the SDCSA and BDI-II's representative sample results. Appalachian women scored significantly higher (t=4.39, p <.001) on the general diet dimension of the SDSCA with a mean of 70.58 (*SD*=25.17) compared to a mean of 58.6 (SD=28.7) in the norm group (n = 1,409). Conversely, the study sample was significantly lower (t=-3.05, p=.003) with a mean time of 59.3 (*SD*=24.6) consuming their specified diet compared to a mean of 67.5 (*SD*=16.9) in the norm group (n=973). Appalachian women scored higher on foot checks (t=2.93, p=.004) with a mean of 56.9 (SD= 31) compared to 47.1 (*SD*=21.4) in the comparison group (n=407). There was no significant difference between the "normal" comparative group's mean BDI-II scores (Beck et al., 1996) (n=120, *M* 12.56, *SD 9.93*) and Appalachian women (n=85, *M* 10.49, *SD* 7.87*).*

Self-Efficacy and Diabetes Self-Care Management

Question 1, What is the relationship between self-efficacy and diabetes self-care management, was examined using Pearson's correlation coefficients to determine the existence of linear relationships between self-efficacy and the five scales of the SDSCA as well as self-efficacy and glycosylated hemoglobin. When the glycosylated hemoglobin was analyzed as a continuous variable, a significant inverse relationship existed between total DMSES scores and last reported glycosylated hemoglobin (r-

.30, p=.005). Upon further analysis, there was a significant relationship between the glycosylated hemoglobin and DMSES question 4, the individual's confidence in her ability to choose foods best for her health, (r-.345, p = .001) and DMSES question 5, the ability to choose different foods to maintain a healthy eating plan, (r-.418, p =.001). There were no significant relationships between self-efficacy as measured by the DMSES and the five scales of the SDSCA: general diet, specific diet, exercise, blood glucose monitoring, or foot care.

Self-Efficacy and Depression

For question 2, one-way ANOVA between-subjects analysis evaluated the mean difference of the DMSES scores of self-efficacy in the four BDI-II depressive symptoms categories (minimal, mild, moderate, and severe). Fifteen participants acknowledged psychiatric diagnoses; the BDI-II category and reported history of psychiatric diagnoses is described in Table 3.

Table 3

Psychiatric History and BDI Category

Psychiatric History	BDI-II Category			
	Minimal	Mild	Moderate	Severe
Yes	7	3	4	1
No	53	9	6	2
TOTAL	60	12	10	3

The majority of participants fell into the minimal depressive symptoms category Mean DMSES scores for each of the BDI-II

depressive categories were distributed as follows: minimal depression (n=60, *M*=166.2, *SD* 27.96), mild depression (n=12, *M*=146.97, *SD* 25.60), moderate depression (n=10, *M*=160.20, *SD* 24.18) and severe depression (n=3, *M*=137, *SD* 47.46). There was no statistically significant effect of depression on self-efficacy F(3,81)= 2.570,p=.06).

Self-Efficacy Sources and Diabetes Self-Care Management

Question 3, What is the relationship among mastery experience, vicarious experience, verbal persuasion, phsysiological states, self-efficacy, depression, and physiological states, used independent t-tests and chi-square analyses to examine self-efficacy as measured by the DMSES, glycosylated hemoglobin, and SDSCA score means in the presence of mastery experience, vicarious experience, verbal persuasion, and various physiologic states. The mean difference in the presence of mastery experience was significant in the specific SDSCA dimensions of general diet (t=-3.975, df=27.96, p= <.001, two-tailed), specific diet (t=-3.04, df=82, p=.003, two-tailed), and exercise score (t=-4.016, df=81, p < .001, two-tailed). The mean difference in vicarious experience was significant in the SDSCA dimension of specific diet (t=2.873, df=83, p=.005, two-tailed). Verbal persuasion was not associated with DMSES scores, glycosylated hemoglobin, or with any SDSCA dimensions of diabetes self-care management.

Physiological variables (neuropathy, nephropathy, cardiovascular disease, and psychiatric history) were tested

against the categorical glycosylated hemoglobin (<7% and >7%) using chi-square analyses (Table 4).

Table 4

Physiologic State and Glycosylated Hemoglobin

Physiologic State	N	X^2	df	Asymp Sig (2 sided)
Retinopathy	85	0.95	1	.329
Neuropathy	85	0.19	1	.666
Cardiovascular	85	1.47	1	.226
Nephropathy	85	1.44	1	.229
Psychiatric	85	0.02	1	.886

Independent t-tests investigated DMSES and SDSCA scores in the presence of various physiologic states. Results indicated no relationship in glucose control in the presence of neuropathy, nephropathy, cardiovascular disease, and psychiatric history. Additionally, there is no significant mean difference in DMSES or SDSCA scores in the presence of neuropathy, cardiovascular pathology, nephropathy, or history of psychiatric diagnoses.

To determine the relationship among the independent variables and diabetes self-care management, all predictor variables were regressed on the glycosylated hemoglobin. The backward method ran 24 models and only kept self-efficacy that accounted for 6.5% of the variance in glycosylated hemoglobin as

shown in model one, Table 5. Due to the high number of educated subjects, a second linear regression tested the prediction of glycosylated hemoglobin by self-efficacy controlling for education. In model two, education and self-efficacy accounted for 7.5% of the variance in glycemic control.

Table 5

Model 1

Model	R	R Square	Adjusted R Square	Standard Error of Estimate
1	.277[a]	.077	.065	1.23640

a. Predictors: (Constant), DMSES Score out of possible 200
Dependent Variable: Last glycosylated hemoglobin

Model 2

Model	R	R Square	Adjusted R Square	Standard Error of Estimate
1	.311[a]	.097	.075	1.27700

a. Predictors (Constant), Highest grade completed in school, DMSES Score out of possible 200
b. Dependent Variable: Last glycosylated hemoglobin

Summary of Results

In summary, univariate and multivariate regression analyses were used to investigate variables that affected diabetes self-care management. The results indicate there is a statistically significant inverse relationship between self-efficacy and glycemic control. Additionally, mastery experience and vicarious experience were significantly associated with dimensions of diabetes self-care management. Verbal persuasion, depression, and various physiological states were not associated with diabetes self-care management in Appalachian women with type 2 diabetes.

Study Limitations

The major limitation of this study is the inability to generalize findings related to the distinct population of interest. The sample was limited to primarily Caucasian women who were literate, English speaking, had completed high school, and had the ability to self-report. The risk of bias was increased through the use of convenience sampling and recruitment of those with access to television, newspaper, and radio broadcasting. Physiological data such as the glycosylated hemoglobin and participants' height and weight measurements were based on subjective report and not verified by the researcher, thus potentially affecting study validity.

CHAPTER 5

DISCUSSION

Self-Efficacy and Self-Care Management

As the focal point of diabetes management has moved from disease-focused education to endorsing an evolved form of independent self-care, research has established the important link between self-efficacy and diabetes self-management. Self-efficacy permits individuals to optimize their self-care skills (Aljasem, Peyrot, Wissow, & Rubin, 2001). With each success, self-efficacy increases and individuals move higher on the management trajectory assuming a more active role in their healthcare (Ellison & Rayman, 1998).

The purpose of this investigation was to evaluate the relationship among self-efficacy, sources of self-efficacy, depression, physiological states, and diabetes self-care management in Appalachian women with type 2 diabetes. The participants were primarily middle-aged Caucasian women and the majority had a high-school education or beyond. Although the mean glycosylated hemoglobin of women in the United States from 1994 to 2000 was 7.9% (National Center for Health Statistics, 2003), more than half of the participants had a glycosylated hemoglobin less than 7% and were controlled by oral medication regimens.

Diabetes self-efficacy was measured by the DMSES and self-care management was measured by subjective reporting of last glycosylated hemoglobin in addition to the SDSCA. On average, self-efficacy scores were moderate to high and glycemic control

was ideal. Higher self-efficacy scores were associated with better glycosylated hemoglobin values. Additionally, higher self-efficacy scores were associated with lower glycosylated hemoglobin values in the areas of the individual's ability to choose healthy foods, maintain a healthy eating plan, and correct high blood glucose readings.

Self-Efficacy and Depression

Bandura (1986) suggests that individuals who are depressed tend to misperceive their performance accomplishments and negatively judge capabilities. Further, low self-efficacy can lead to depression (Bandura, 1995). In this study, self-efficacy and depression were not significantly related.

The study participants' mean depression score was actually lower than the normative comparison group and total self-efficacy scores were skewed toward higher values. The SCT (1986) posits non-depressed individuals remember successes, recall fewer failures, and have an enhanced view of the degree of control they have over positive outcomes. Although depression and self-efficacy were related in this investigation, the study findings are congruent with the SCT in that the participants' diabetes management accomplishments in the form of mastery experience and higher perceived self-efficacy occur in a non-depressed state.

Sources of Self-Efficacy, Depression, and Self-Care Management

Mastery experience is the most potent source of self-efficacy (Bandura, 1986). Participants who relayed success with past performance of diabetes management scored better on all

dimensions of the SDSCA, higher on self-efficacy, and had a mean glycosylated hemoglobin of 6.5%. More the three fourths of the participants had attended formal diabetes education courses since their diagnosis compared to the state and national average of <50% (Valentine, 2000). Approximately 60% of the women indicated they had mastered diabetes which closely correlates to the 68.2% of participants with glycosylated hemoglobin values less than 7%. Women who indicated they had mastered diabetes scored higher on the general diet, specific diet, and exercise dimensions of the diabetes self-care activities tool. Women who had a diabetes management role model reportedly followed their specific diet more closely. Receiving verbal encouragement for successful disease management from various sources did not appear to influence glycosylated hemoglobin or dimensions of the self-care management tool.

Depression and Self-Care Management

Depressive disorders assume a vital role in the course and outcomes of chronic illnesses such as diabetes. Specifically, depressive symptoms are associated with poor glycemic control, increased disease-related complications (Glasgow et al., 1999) and increased mortality (Katon et al., 2005). Current literature cites depression to be twice as prevalent in those with diabetes compared to those without the disease (Anderson et al., 2001). Residing in a socially-disadvantaged region such as Appalachia intensifies the risk for co-morbid depression. In recent epidemiologic studies investigating variables associated with depression in individuals with and without type 2 diabetes,

factors correlated with depression included: multiple comorbid chronic somatic diseases, low levels of education, and physical impairment (Engum, Mykletun, Midthjell, Holen, & Dahl, 2005). Depression among Appalachian subjects with type 2 diabetes has been correlated with younger age, unemployment, numerous medications, higher BMI, and lack of home ownership (de Groot et al., 2007).

Women with type 2 diabetes residing in Appalachia did not report higher rates of depression compared to the normative group and glycemic control was ideal. Further, depression was not associated with any dimension of diabetes self-care activities. Contrary to the traditional socioeconomic and demographic descriptors of Appalachian residents (ARC, 2005), the participants of this study were unique in their level of education, limited number of prescribed medications, low number of comorbidities, optimal glycemic control, disease mastery, and high level of functioning thus, accounting for the low depression scores and favorable glucose control.

Physiologic States and Self-Care Management

Diabetes is associated with serious complications; the major cause of morbidity and mortality is cardiovascular disease. The CDC (2007) reports approximately 5.2 million persons have co-morbid cardiovascular conditions. Additionally, 43,000 persons have renal disease, and 3.2 million are visually impaired. As expected, 84% of the participants reported cardiovascular disease, 3.5% renal disease, 2.4% retinopathy, and 9.4% neuropathy. There were no associations among the various

physiologic states, glycemic control, and dimensions of self-care activities.

Study Conclusions

This study investigated the relationships among variables associated with diabetes self-care management in a population that had not been previously studied. Among the variables, self-efficacy, mastery experience, and vicarious experience were found to be associated with enhanced diabetes self-care management. These findings support the social cognitive theory and demonstrate the important role of self-efficacy in Appalachian women with type 2 diabetes. Although diabetes is a complex chronic illness that is associated with serious complications, the women in this study maintain ideal glucose control. Surprisingly, depressive symptoms were not of significance in this population.

Nursing Implications

Diabetes and obesity are among the top public health issues in the United States. There is a strong correlation between obesity and the development of diabetes. Ideally, type 2 diabetes could be largely prevented by lifestyle; however, parallel to obesity, diabetes prevalence is expected to increase. In response to the 20.8 million already diagnosed with diabetes and the anticipated future prevalence, it is essential for nursing science to investigate and address diabetes care.

Although there are new national initiatives on quality of diabetes care, nurses are in a unique position to focus on

effective interventions and preventive measures, particularly in regions that are disadvantaged. This study focused on self-efficacy as a factor in glycemic control. Results suggest that higher self-efficacy was associated with better glycemic control; furthermore, the findings support prior experience of diabetes success and presence of a role model enhancing to some dimensions of self-care.

Acknowledging the role of self-efficacy in an individual's view of self and in behaviors, diabetes self-efficacy programs need to be implemented to improve confidence in the ability to follow self-care management regimens. The focus of the interventions should 1) improve the individual's knowledge of the diabetes disease process, hence affecting mastery experience; 2) improve regimen specific efficacy beliefs; 3) identify a diabetes exemplar to serve as a role model; and 4) increase behavior outcome expectations. Participants in a previous community-based diabetes self-management program focused on enhanced self-efficacy resulted in improved health behaviors (Lorig & Gonzalez, 2000).

Continued Study

Additional research is needed to achieve further progress in the self-care management of diabetes, particularly in underserved populations. There were several questions that developed from this investigation including: do self-efficacy enhancing interventions improve self-care, what is the role of spirituality in diabetes self-care, does social support impact self-care, and what is the role of self-efficacy in self-care

management of diabetes in the Latino population. The questionnaires have been translated to Spanish and can be used in future study with a Hispanic population.

Although this study focused on self-care management with an emphasis on the glycosylated hemoglobin, there are numerous variables that are associated with diabetes-related complications. Studies need to investigate cholesterol levels, vaccination status, blood pressure control, renal function, eye exams, foot evaluations, and oral care in the Appalachian population for compliance with published guidelines.

In conclusion, this quantitative investigation examined the role of self-efficacy in diabetes self-care management through the use of validated psychometric instruments. Appalachian women with higher self-efficacy scores had better glycosylated hemoglobin values, hence, supporting the propositions of the social cognitive theory. Further research is warranted in diabetes prevention and maintenance across gender, age, and ethnic spectrums.

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APPENDICES

Appendix A

Diabetes Health-Related Questionnaire

Age _____ Marital Status_____ Ethnicity _____

Country of Origin _____How long lived in East Tennessee_____

Site of data Collection _____How long diagnosed with diabetes_____

Highest grade completed in school _____

BMI _____ Waist-to-hip-ratio_____ Last A1C _____%

Diabetes Medications_____

_____

Co-Morbidities_____

_____

Attended Formal Diabetes Education Classes? Yes or No

Do you feel that you have experienced success in the self-care of your diabetes (mastery)? Yes or No

Do you know a person who successfully manages their diabetes and serves as a role model to you (vicarious experience)? Yes or No

Do you know a person who offers suggestions, advice, or instructions to encourage successful management of your diabetes verbal persuasion)? Yes or No

05/01/2006 Rev. 08/25/2006

Appendix B

Spanish Diabetes Health-Related Questionnaire
Cuestionario sobre la salud y la diabetes

Edad _____ Estado Civil_____ Etnicidad _____

País de Origen _____ ¿Cuánto tiempo en Tennessee?_____

Sitio de la colección de los datos_____

¿Hace cuánto que le diagnosticaron con la diabetes _____

Grado más alto completado en la escuela _____

Indice de masa corporal (BMI) _____ Comparasión entre la cintura y las caderas_____ La última medida de A1C _____%

Medicamentos de la diabetes _____

_____

CoMorbididades _____

_____

¿Asistió a lasclases formales educativas sobre la diabetes? Sí o No

¿Se siente como tiene éxito del autocuidado su diabetes? Sí o No

¿Conoce a una persona quien maneja su diabetes con éxito que puede server como un modelo/ejemplo para Ud.(experiencia por alguién más)? Sí o No

¿Conoce a una persona quien ofrece sugerencias, consejos, o instrucciones para animarle a cuidar bien /manejar su diabetes? (consejo verbal)? Sí o No

05/01/2006 Rev. 08/25/2006.10/30/2006

Appendix C

Spanish Diabetes Management Self-Efficacy Scale

Escala de Auto-Eficiencia sobre manejar la Diabetes (Versión Española)

Abajo, hay una lista de actividades que usted puede tener que hacer para manejar su diabetes. Por favor de leer cada una y hacer un círculo alrededor del número que mejor describe la <u>confianza</u> que usted tiene sobre su habilidad de hacer dicha actividad. <u>Por ejemplo</u>, si usted está seguro/a que puede hacerse chequeo del azucar en su sangre cuando sea necesario, haga un círculo sobre el número 10. Si usted cree que la mayoría del tiempo no lo podría hacer, haga un círculo sobre el número 1 o 2.

Haga un círculo alrededor de un número en cada línea

Estoy seguro/a que:	**No lo puedo hacer**			**Quizás sí Quizás no**						**Puedo hacerlo**
1. Puedo hacerme chequeo del azucar si sea necesario	0	1	2	3	4	5	6	7	8	9	10
2. Puedo corregir el azucar en mi sangre cuando el nivel está muy alto (por ejemplo: comer comida diferente)	0	1	2	3	4	5	6	7	8	9	10
3. Puedo corregir el azucar en mi sangre cuando el nivel está muy bajo (por ejemplo: comer comida diferente)	0	1	2	3	4	5	6	7	8	9	10
4. Puedo escoger las comidas que son mejores para mi salud	0	1	2	3	4	5	6	7	8	9	10
5. Puedo escoger comidas diferentes y mantener un plan de comer saludable	0	1	2	3	4	5	6	7	8	9	10
6. Puedo controlar mi peso	0	1	2	3	4	5	6	7	8	9	10
7. Puedo examinarme los pies (buscar cortas y ampollas)	0	1	2	3	4	5	6	7	8	9	10

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Escala de Auto-Eficiencia sobre manejar la Diabetes (Versión Española)

8. Puedo hacer sufficient actividad física (por ejemplo: caminar al perro; hacer yoga, trabajar en la huerta; estirarme)	0	1	2	3	4	5	6	7	8	9	10
9. Puedo mantener mi plan de comer aún cuando estoy efermo/a	0	1	2	3	4	5	6	7	8	9	10
10. Puedo seguir un plan de comer saludable la mayoría del tiempo	0	1	2	3	4	5	6	7	8	9	10

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Appendix D

Spanish Summary of Diabetes Self-Care Activities

SDSCA (Versión Española)

Toobert, Hampson, & Glasgow (2000)

El Resumen de las Actividades de Auto-Cuidado de la Diabetes

Las preguntas abajo le preguntarán sobre las actividades de auto-cuidado de su diabetes durante los últimos 7 días. Si estuvo enfermo/a durante los últimos 7 días, por favor de pensar sobre los últimos 7 días que no estuvo enfermo/a.

Dieta

¿Cuántos de los últimos SIETE DIAS usted ha seguido un plan saludable de comer?

0 1 2 3 4 5 6 7

¿Por remedio, sobre el último mes, cuántos DIAS POR SEMANA ha seguido su plan de comer?

0 1 2 3 4 5 6 7

¿Cuántos de los últimos SIETE DIAS usted comió cinco o más porciones de frutas y vegetales?

0 1 2 3 4 5 6 7

¿Cuántos de los últimos SIETE DIAS comió comida alta en grasa como carne rojo o productos lácteos de alta grasa?

0 1 2 3 4 5 6 7

Ejercicio

¿Cuántos de los últimos SIETE DIAS participó en al menos 30 minutos de actividad física? (Minutos seguidos de actividad continua, incluyendo caminar).

0 1 2 3 4 5 6 7

¿Cuántos de los últimos SIETE DIAS participó en una session específica (como nadar, caminar, montar bicicleta) aparte del trabajo diario que hace en la casa o el trabajo?

0 1 2 3 4 5 6 7

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SDSCA (Versión Española)

Hacerse Exámenes del Azucar en la Sangre
¿ Cuántos de los últimos SIETE DIAS se hizo la prueba nivel del nivel de azucar en la sangre?

0 1 2 3 4 5 6 7

¿Cuántos de los últimos SIETE DIAS se hizo la prueba del nivel de azucar en la sangre según el número de veces recomendado por su proveedor medico?

0 1 2 3 4 5 6 7

Cuidado de los pies
¿Cuántos de los últimos SIETE DIAS se hizo chequeo de los pies?

0 1 2 3 4 5 6 7

¿Cuántos de los últimos SIETE DIAS revisó la parte adentro de sus zapatos?

0 1 2 3 4 5 6 7

Fumar
¿Ha fumado un cigarrillo--- aún una chupada---durante los últimos SIETE DIAS?

0. NO

Sí. Si la respuesta es ***Sí,*** ¿Cuántos cigarrillos fumó en un día normal? El número de cigarrillos:

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