

DEVELOPMENT AND PSYCHOMETRIC TESTING
OF HENSARLING'S DIABETES FAMILY
SUPPORT SCALE

A DISSERTATION

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BY

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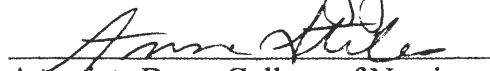
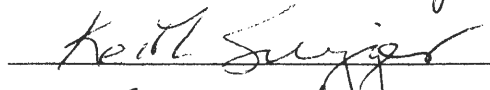
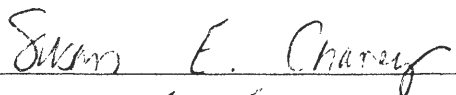
To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Janice Hensarling entitled "Development and Psychometric Testing of Hensarling's Diabetes Family Support Scale." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Nursing.



Gail C. Davis, Ed.D., Major Professor

We have read this dissertation and recommend its acceptance:



Associate Dean, College of Nursing

Accepted:



Dean of the Graduate School

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DEDICATION

This dissertation is dedicated to my mother Pat Bass, and in the loving memory of my father, Calvin Bass. They instilled in me the idea that I could do anything if I put my mind to it; and that they would love me no matter what. They always believed in me, and never even suggested that I would not be successful in life. With their love, support, trust, and guidance I have gone beyond even my own expectations.

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I thank God, my heavenly father, for opening many windows for me when doors seemed to slam in my face. He gave me direction, insight, determination, persistence, and support during my academic journey and dissertation process.

If I could name all those who have supported me physically, mentally, and spiritually throughout this educational journey, and in my life, thankfully, I could fill many pages. Most importantly, I thank my husband, Kenneth, who has cheered me on relentlessly. I thank my mother Pat Bass, who has said many, many, words of encouragement and has also lifted me up to my father in heaven on numerous occasions. My children, Bryan, Seth, and Natalie, my daughter-in-law Amy, and grandchildren Molly and Kaden have been blessings and anchors to what really matters. I had a whole cheering squad who encouraged me regularly: my brother-in-law Glenn, sisters Mary, and Diana, my brother Zerrial, my sister-in-law Glenese, Aunt Doris, and their families. Additionally, my good friends Joy and Warren Miller, and other physical, and spiritual family members blessed me with their support. Last, and certainly not least, I thank my good friend Carla Hairston who started (pushed) me on the road to my PhD and continued as a steady source of encouragement.

Finally, I want to express my appreciation to Dr. Gail Davis who has been an educator, mentor, editor, and prodder for me to complete the dissertation process. We have often laughed and said we hoped we both “lived to see my completion of this dissertation.” Well “we” did! I could not have completed it without her.

ABSTRACT

JANICE HENSARLING

DEVELOPMENT AND PSYCHOMETRIC TESTING OF HENSARLING'S DIABETES FAMILY SUPPORT SCALE

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The purpose of this study was to develop Hensarling's Diabetes Family Support Scale (HDFSS) as a valid and reliable instrument to specifically measure *perceived family support* of adults with type 2 diabetes. The sample included 158 participants with type 2 diabetes who responded to three instruments: General Information Form (GIF), HDFSS, and Social Support in Chronic Illness Inventory (SSCII).

Psychometric testing focused on estimating reliability (i.e., internal consistency) and several types of validity: content, criterion-related (concurrent and predictive), convergent, and construct validity. Testing also resulted in item reduction, from 29 to 24 items. The Content Validity Index (CVI) of the 24-item HDFSS was 1.00. The HDFSS demonstrated estimates supporting internal consistency with an item-item correlation mean of .52, item-total score correlations between .49 and .87, and Cronbach's alpha of .96. Concurrent validity was tested by examining the correlation of the total HDFSS score with a 1-item rating of "perceived overall family support" (on a scale of 0 to 10) using *Kendall's tau* (τ). The resulting correlation was moderate (.58, $p = .01$), as

predicted. Predictive validity was tested by examining the correlation of the total HDFSS score with the self-reported Hemoglobin A1c (HbA1c), resulting in a low ($\tau = -.048, p = .45$) correlation; though low, this correlation was in the predicted direction. Convergent validity examined the relationship between the scores on the HDFSS and a similar instrument, Social Support in Chronic Illness Inventory (SSCII), a measure of satisfaction with family support by persons with chronic illness. The resulting correlation was moderate ($\tau = .52$), slightly below the moderately high correlation ($\tau \geq .55$) predicted. The HDFSS demonstrated internal construct validity through the emergence of four theoretically clear dimensions: (a) empathetic support, (b) encouragement, (c) facilitative support and (d) participative support.

Results demonstrate that the HDFSS is a valid and reliable instrument when used with this sample. Further testing is needed with other samples to determine whether findings replicate. An alternate approach to assessing predictive validity is suggested. The HDFSS should serve as an efficient and psychometrically sound tool for both clinical and research applications.

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CHAPTER I

INTRODUCTION

Type 2 diabetes mellitus affects eight percent of the population, or approximately 23.6 million persons in the United States (American Diabetes Association [ADA], 2007b); it is the seventh deadliest disease in this country (Centers for Disease Control [CDC], 2007). Complications of this condition include heart attack, stroke, kidney disease, amputations, blindness, and altered life style. Diabetes research emphasizes the importance of both early detection and proper treatment regimens to prevent complications and prolonging quality of life (Carter-Edwards, Skelly, Cagle, & Appel, 2004; CDC, 2007; Glasgow, 2003; Wen, Shepherd, & Parchman, 2004).

In type 2 diabetes the body either does not manufacture enough insulin, or the cells resist the insulin that is produced, or both. This leads to high blood glucose levels and cells that are starved for energy. Over time this may cause serious, and life threatening damage to the major organs of the body. People with diabetes can lead long healthy lives, but only if the symptoms and complications are controlled.

The treatment regimen for type 2 diabetes requires the use of self-management that includes: (a) monitoring blood sugars regularly, (b) diabetes meal planning, (c) regular physical activity/exercise, (d) regular medical checkups, (e) taking medications if ordered, (e) regular dental checkups, (f) regular eye examinations, (g) stress management, and (h) proper care during times of sickness (ADA, 2006). Continued effective self-

management practices may be the most important key to health among patients with type 2 diabetes. The Diabetes Control and Complications Trial (DCCT) demonstrated that metabolic control rested on the adherence levels of self-management that was achieved and sustained (Fisher, Brownson, O'Toole, & Anwuri, 2007).

Family members represent one of the support sources for maintaining adherence levels that is most accessible to many patients with diabetes (Beverly, Wray, & Miller, 2008; Glasgow, Toobert, & Gillette, 2001; Lo, 1999). Family support is an important and essential element of diabetes management (Haas, 2006; Hutchison, 1999; Rubin, 2001). To help patients benefit optimally from diabetes education, nurses need to be aware of the influence that family support has on effectively adhering to a positive health care regimen and learning to live successfully with a chronic condition. Assessment of family support for those with diabetes, gained through the use of a valid and reliable assessment tool, would help the clinician to better understand what this support means to the patient and thus, work more effectively with patients and families to determine the most appropriate plan of care.

Problem of the Study

The adherence to positive health care practices and the ability to assess the impact of family support in promoting adherence to the plan of care is important to health care providers, patients with type 2 diabetes, and to their significant others (i.e., primarily their family members). Family support has been identified as a variable affecting an individual's participation in positive health care practices (Glasgow, Toobert, & Gillette,

2001; Marrero & Ackermann, 2007; Stys & Kulkarni, 2007). There have been several instruments developed to understand the type of events most stressful to family systems and the systemic changes that can happen when a family or family member faces a life crisis (Hilbert, 1990; Procidano & Heller, 1983; Rodriguez, 1991). However, no diabetes-specific instrument was found to measure the concept of perceived family support in adults with type 2 diabetes (Anderson, Funnell, Fitzgerald, & Marrero, 2000; Moos & Moos, 1994; Wen et al., 2004). To determine if family support does relate to how well patients control their diabetes, an instrument to measure family support specific to adults with type 2 diabetes is needed.

Purpose of the Study

The purpose of this study was to develop a valid and reliable instrument, *Hensarling's Diabetes Family Support Scale* (HDFSS), which specifically measures perceived family support of adults with type 2 diabetes. A small pilot study with 26 participants (18 useable responses) was done to initiate the development of the HDFSS. Even though the number was small, estimating internal consistency with coefficient alpha was of interest. The computed alpha for the 29 items was 0.956. Evaluation of the instrument's initial items led to its further development. The current study focused on the psychometric testing of the revised instrument. Study aims included estimation of the instrument's (a) internal consistency, (b) construct validity, (c) criterion-related validity (i.e., concurrent and predictive), and (d) convergent validity.

Internal consistency estimation, in conjunction with factor analysis for construct validity estimation, may result in a further reduction of items. Cronbach's alpha and factor analysis (i.e., principal components analysis [PCA]) were performed in a synchronous fashion with the goal of retaining those items that were internally consistent. Two approaches to estimating criterion-related validity were used: (a) correlating the HDFSS score with a one-item rating of perceived family support (i.e., concurrent validity) and (b) correlating the total score with the criterion of the most recent HbA1c lab value (i.e., predictive validity). To assess convergent validity, individuals' HDFSS scores were correlated with those on the *Social Support in Chronic Illness Inventory* (SSCII; Hilbert-McAllister, 2003).

The HDFSS may assist health care providers in gaining a clearer understanding of how patients with diabetes perceive the level of disease-specific support they receive from family members. Based on assessments using a valid and reliable instrument, the nurse will be able to assist the patient and family in gaining the knowledge and skills needed to improve adherence to treatment, to develop healthy lifestyle behaviors, to prevent complications, and to improve diabetes-related outcomes. Such outcomes could lead to improved health and quality of life. In addition to its clinical use, the HDFSS should be useful in research.

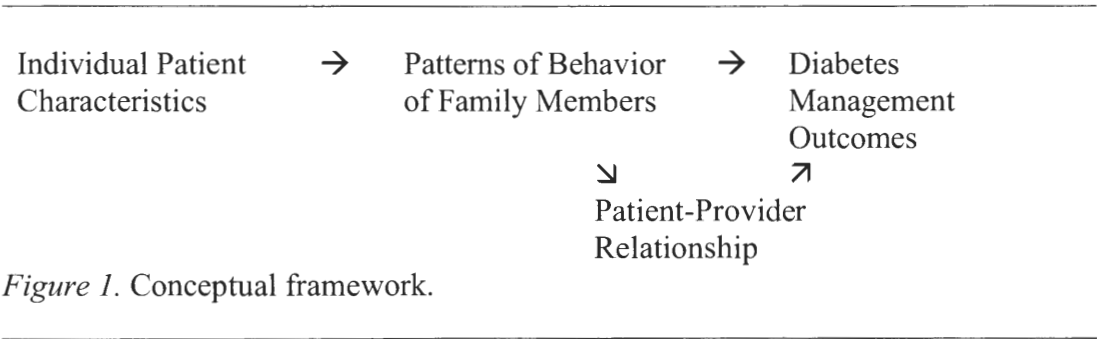
Conceptual Framework

The concept of diabetes family support (DFS) was defined for this study as "how patients with diabetes view their family's support." The conceptual framework guiding

the study combined this definition with the importance of each patient's view of family support. Family support is important in helping one follow a diabetes treatment plan of care (Epple, Wright, Joish, & Bauer, 2003; Gerstle, Varebbe, & Contento, 2002; Wen et al., 2004); thus how one views this support is significant to how well the disease is managed. According to *A Core Curriculum for Diabetes Education* by the American Association of Diabetes Educators (AADE, 2006; Franz, 2003), the major social influences on diabetes self-care of adults through the life span are spouses, other family members, friends, and coworkers. The authors of the *National Standards for Diabetes Self-Management Education* stated, "Each participant or significant other living with diabetes brings unique life experiences and preferences or an encounter that helps determine the intervention" (Mensing et al., 2002, p. 140).

Family relationships are unique, as are the individual views of family support. The understanding and assessment of support by the diabetes education team is important (Mensing et al., 2002), and this support has been identified as a variable affecting an individual's adherence to a health regimen (Glasgow, Toobert, & Gillette, 2001; Lo, 1999; Stys & Kulkarni, 2007). The conceptual framework guiding this study (see Figure 1) was based on Bowen's Family Systems Theory, integrating the importance of individual patient characteristics, patient-family relationships, and characteristics of the patient-healthcare provider relationship. While Bowen's theory does not use these exact terms, they are implied from his writings (Kerr & Bowen, 1988). Additionally, the underlying framework of this theory emphasizes these issues which have an effect on

disease outcomes from the perspective of a family context of care (Bowen, 1978; Fisher et al., 1998).



According to Haire-Joshu (1992), “The family is the most frequently mentioned social context in the psychosocial literature in diabetes” (p. 355). Family systems theory (FST) provides the basis of the conceptual framework that guided this study as it focuses on family interactions, knowledge, and influence on the patient’s ongoing diabetes management (Cox, 2003). When the family is viewed as a system, the behavior of one individual family member brings about almost predictable behaviors of another member according to their roles and relationship within the family.

Murray Bowen, a psychiatrist, developed Bowen’s Family Systems Theory which is founded on the beliefs that “physical, psychiatric and behavioral disorders are manifestations of emotional forces operating in a family” (Bowen, 1978; Kerr, 1992, p. 101). Bowen’s theory is based on the premise that family members profoundly affect each others’ thoughts, feelings, and actions (Kerr & Bowen, 1988; Titelman, 1998). His theory includes eight interlocking concepts: (a) triangles, (b) differentiation of self, (c)

nuclear family emotional system, (d) family projection process, (e) multigenerational transmission process, (f) emotional cutoff, (g) sibling position, and (e) societal emotional process.

Triangles

Bowen theorized that “the triangle is the basic molecule of an emotional system. It is the smallest stable relationship unit. A two-person system is unstable because it tolerates little tension before involving a third person” (Kerr & Bowen, 1988, p. 134). As the intensity in a relationship between two family members escalates, it triangulates a third family member to reduce anxiety and increase stability (Hurst & Sawatzky, 1996). Triangles involve repeating patterns in which people develop fixed roles with each other. The purpose of the triangle is to manage anxiety when the stability is vulnerable.

Differentiation of Self

The foundation of self is inborn and an individual’s family relationships determine how much “self” is developed during the formative years. According to Bowen’s theory, “a person with a well-differentiated ‘self’ recognizes his realistic dependence on others... and thoughtfully acquired principles help guide decision-making about important family and social issues” (Bowen Center, 2004, p. 1). An individual in a family, who is confident in his or her thinking, can support another’s view without being dogmatic, or decline other’s ideas without causing alienation. Both persons with diabetes and the family members who are trying to assist them in their care need to be accepting of each other and realize the overall goal for diabetes management is adherence to the

treatment regimen and prevention of complications (Bowen Center). Harrison (1999a, 2002a) postulated that most people believe physical disease and emotional responses are distinct things, but Bowen realized that physical disease and emotional responses are both the result of ordinary biological responses affected by the way individuals react and relate to each other.

Nuclear Family Emotional System

The four basic relationship patterns in the nuclear family emotional system which can cause problems are marital conflict, dysfunction in one spouse, impairment of one or more children, and emotional distance. These relationships cause family tensions and mean that some family members maintain their functioning while having an adverse affect on others in the family. Individuals with diabetes may cause added stress to the nuclear family emotional system. The extent of the damage on the family system depends on the stress a family encounters and how the family adapts to that stress (Bowen Center, 2004). The way individuals in a family relate to others can both support and constrain individuals physically, psychologically, and socially (Harrison, 1999b, 2002b).

Family Projection Process

The family projection process “describes the primary way parents transmit their emotional problems to a child” (Bowen Center, 2004). Children inherit weaknesses as well as strengths through their parental relationships. These relationships may magnify dependence on attention and approval, difficulty dealing with expectations, the inclination to blame oneself or others, feeling the accountability for contentment of others

or that others are responsible for one's own contentment, and impulsiveness rather than practicing delayed gratification. There are three steps to the family projection process:

- 1) the parent focuses on a child out of fear that something is wrong with the child;
- 2) the parent interprets the child's behavior as confirming the fear; and 3) the parent treats the child as if something is really wrong with the child. (Bowen Center, p. 4)

Multigenerational Transmission Process

The multigenerational transmission process “describes how small differences in the levels of differentiation between parents and their offspring lead over many generations to marked differences in differentiation among the members of a multigenerational family” (Bowen Center, 2004, p. 1). Relationships convey the knowledge regarding these differences from one generation to the next. One step in the multigenerational transmission process is that individuals choose partners with levels of differentiation of “self” that are equivalent to their own. This process may affect stability in relationships, educational advances, career choices, and even health care decisions (Bowen Center). The understanding of this process will assist family members in accepting how individuals under the added stress (physically and mentally) of diabetes, may maintain their functioning at the expense of other family members.

Emotional Cutoff

Emotional cutoff is “the fear of losing one's sense of self to another” (Kerr & Bowen, 1988, p. 365). Individuals who are emotionally cut off have a tendency to isolate

themselves from others and distance themselves from family members. This may be displayed as exaggerated independence (Peleg-Popko, 2002). “If one does not see himself as part of the system, his only options are either to get others to change or to withdraw. If one sees himself as part of the system, he has a new option: to stay in contact with others and change self” (Kerr & Bowen, p. 272).

Sibling Position

Bowen (1978) discovered that the research findings of Walter Toman, a psychologist, coincided so much with his, that he incorporated the impact of sibling position on a person’s development and behavior into Bowen’s Family Systems Theory. The fundamental idea is that individuals who grow up in the same sibling position predictably have significant common characteristics (Bowen Center, 2004). Assisting the individual to be aware of and transcend the confines of their own sibling position and role is an objective of Bowen’s Family System’s Theory (Brown, 1999).

Societal Emotional Process

Each concept in Bowen’s theory can be applied to nonfamily groups, such as work and social organizations. Bowen (1978) recognized that changes made in one societal institution, for example the legal system, were also occurring in other institutions such as schools and government entities. As societies go through phases of regression and progression during developmental periods the societal emotional process expresses how the emotional system directs behavior on a societal level.

The framework for this study focused on the second, third, and fifth concepts from Bowen's Theory for guidance related to the individual's disease management: (a) differentiation of self, (b) nuclear family emotional system, and (c) multigenerational transmission process. Differentiation of self is an important accomplishment if the individual with diabetes is to assume the role of self-manager of his or her health. Development of a treatment regimen that takes into account the understanding of the nuclear family emotional system can improve outcome measures. "If any family member can function with more differentiation in the family (it need not be the symptomatic person who make the first change), it can lead to a reduction in anxiety in the whole family" (Kerr, 1992, p. 102). The multigenerational transmission process not only programs the levels of "self" people develop, but also programs how people interact with others" (Bowen Center, 2004, p. 3).

The family, then, is viewed as an emotional unit or system that encompasses complex interactions (Kerr, 2003). Families can provide a meaning for a chronic illness in a way that maximizes competencies and fosters independence through active support within the family system (Gambert, 1990). Important treatment implications may, therefore, be partially dependent on the family members' support (Kerr, 1992), and the patient's perception of that support.

Definition of Terms

The major terms are defined as they are used in this paper.

Adult

Conceptual definition: Person aged 18 years or older.

Operational definition: Participant's self-reported age on the General Information Form (GIF).

Type 2 Diabetes

Conceptual definition: Type 2 diabetes is the most common form of diabetes, occurring either when the body does not produce enough insulin or the cells ignore the insulin (ADA, 2006).

Operational definition: Participant's self-reported diagnosis of Type 2 Diabetes (as answered on the GIF question, "Which type of Diabetes does your health care provider say you have?").

Perceived Family Support

Conceptual definition: How persons with Type 2 diabetes view their family's support.

Operational definition: Perceived family support will be measured by the total HDFSS score. A higher score on the instrument means that the perceived family support is greater.

Hemaglobin A1c (HbA1c)

Conceptual definition: An objective estimate of how well patients with Type 2 diabetes are managing their diabetes over time. The estimate averages the blood sugar level over a period of 3 months.

Operational definition: The laboratory test that measures the amount of glycosylated hemoglobin in the blood. The hemoglobin A1C assay has become the “gold standard” measurement of chronic glycemia (ADA, 2007a). The ADA recommends that patients maintain an HbA1C result of less than 7% (Resnick, Foster, Bardsley, & Ratner, 2006).

Family Member

Conceptual definition: Who the participant considers to be the family member(s) that support(s) them in caring for his or her diabetes?

Operational definition: The family member is a person who is considered to be a part of the participant’s family. Family, for the purpose of this research, is defined as “a group of intimates living together or in geographical proximity with strong emotional bonds (identification, attachment, loyalty, reciprocity, solidarity), and with a history and future” (Fisher et al., 1998, p. 602).

Limitations

The method of data collection may have presented a study limitation. Individual participants completed the forms in a variety of settings (e.g., home, clinic, or diabetic education meeting). While consistency of data collection was controlled as much as possible through the use of scripts and standardized instructions, there may have been

some variation within the data collection process. Even though participants were cautioned to answer questions individually when completing the study forms, there was a possibility that family members or others may have provided input.

History was recognized as a potential limitation. Recent changes or issues within the dynamics of the family interactions could have played a role in how the person responded at one point in time.

Selection of participants was also a possible limitation. The participants were individuals who had been seen by a health care provider or diabetes educator. The sample did not include those who had not had an affiliation with health care providers.

Delimitations

Generalization of the study results, or use of the HDFSS, was limited by the criteria set for study participation. For the purpose of this research, participation was limited to adults aged 18 years or older with type 2 diabetes who were able to read English and who were in contact with a health care professional. At this time, the HDFSS was only available in English. Patients with type 1 diabetes were excluded from this study. There was no limitation based on other demographic or socioeconomic factors.

Assumptions

Assumptions included the following:

1. Most individuals with type 2 diabetes want family support.

2. Individuals with family support perceived as higher, or more positive, will have better outcomes than those with family support perceived as less positive.
3. The level of family support is what the individual with type 2 diabetes perceives it to be.
4. The patient-provider relationship is important to diabetes management outcomes.
5. An understanding of the role played by family support in each individual's situation is important to diabetes management and outcomes.
6. Participants will honestly and individually complete the data collection instruments.

Research Hypotheses

The following research hypotheses were tested:

When tested with adults diagnosed as having type 2 diabetes, the HDFSS will demonstrate:

1. A content validity index (CVI) supporting content validity.
2. Estimates supporting internal consistency.
 - a. Item-item average correlation of .30 or greater.
 - b. Item-total score correlation of between .40 and .70.
 - c. Cronbach's alpha of .70 or greater
3. Estimates supporting criterion-related validity.

- a. Concurrent validity of .55 or greater.
 - b. Predictive validity of -.40 or greater.
- 4. An estimate supporting convergent validity of .55 or greater.
 - 5. Internal construct validity through emergent dimensions that are consistent with the concept of “Diabetes Family Support.”

Background and Significance

According to Grotevant and Carlson (1989), “As researchers study the family, careful attention should be paid to selecting and/or developing appropriate, psychometrically sound measures for the constructs under investigation” (p. 8). There have been several instruments developed to measure the type of events most stressful to family systems and the systemic changes that can happen when a family or family member faces a life crisis (Hilbert, 1990; Procidano & Heller, 1983; Rodriguez, 1991). However, no diabetes-specific instrument was found to measure the concept of family support in adults with type 2 diabetes (Anderson et al., 2000; McKelvey et al., 1993; Moos & Moos, 1994; Smilkstein et al., 1982; Wen et al., 2004).

The significance to nursing of this research study is its potential to enhance nursing practice, education, and research by providing a measure of family support in adult patients with type 2 diabetes. Through the increased understanding of family support gained by using a valid and reliable assessment tool, nurses may be better educated about what constitutes positive support and may be able to educate others affected by diabetes and to develop a more effective individualized plan of care. The

long-range goals for diabetes self-management are early detection of complications and proper treatment regimens for patients with diabetes, preventing complications, and prolonging quality of life (Carter-Edwards et al., 2004; Glasgow, 2003; Wen et al., 2004). Family support is an important and essential issue for patients with diabetes, as well as for their family members (Hutchison, 1999; Stewart, 1993). For the patient to have optimum benefit from educational attempts, nurses need to be aware of the influence that family support has on learning to live successfully with a chronic condition and to adhere effectively to a positive health care regimen.

Summary

This study focused on the development and psychometric testing of *Hensarling's Diabetes Family Support Scale* (HDFSS). A pilot of the HDFSS was completed, indicating that it showed promise as an instrument for measuring the perceptions of family support by the adult patient with type 2 diabetes. The current study was guided by the concept of family support and Bowen's Family Systems Theory. The participants were asked to identify the relationship of the person they consider to be the family member(s) who support(s) them in caring for their diabetes. They were asked to indicate, by their answers to the HDFSS items, how often (from *Never* to *All the time*) they felt each happened with their family member in relation to their diabetes care. It is the hope of the researcher that this study will be important in determining the influence that family support has on the outcomes and compliance practices, or lack thereof, of patients with type 2 diabetes. A valid and reliable tool is necessary for making this possible.

Type 2 diabetes and its complications are considered epidemic (Barrett, 2004). The development of a valid and reliable instrument may help in gaining a better understanding of how perceived family support helps, or does not help, the individual. The use of such a tool in practice may lead to better treatment planning, to specific patient and family education, and to planning individual care and group programs that will assist those affected by this disease process to attain a more positive outcome. The tool will also be useful as a measure of family support in intervention and outcome studies of persons with type 2 diabetes.

CHAPTER II

REVIEW OF LITERATURE

The review of published literature for the purpose of this research will focus on type 2 diabetes mellitus, widely accepted treatment regimens for type 2 diabetes, the concept of family support, the concept of social support, and measurement for family/social support in adults with type 2 diabetes. The concept of *diabetes family support* for this study was developed using the method of systematic analysis suggested by Walker and Avant (1988). The goal of the research is to refine and psychometrically test an instrument that can be used to specifically measure perceived family support in individuals with type 2 diabetes. A better understanding of one's perceived family support may affect the essential elements of diabetes management.

Definition of Type 2 Diabetes Mellitus

Type 2 diabetes mellitus, which accounts for approximately 90-95% of those with diabetes, was previously referred to as non-insulin dependent diabetes (NIDD) or adult-onset diabetes. This diagnosis includes individuals who have insulin resistance (a disorder in which the cells do not use insulin properly) and usually have relative (rather than absolute) insulin deficiency. As the need for insulin increases, the pancreas gradually loses its ability to manufacture insulin. There are probably many different etiologies for this change, although the specific causes may be unknown. Type 2 diabetes is associated with "older age, obesity, family history of diabetes, history of gestational

diabetes, impaired glucose metabolism, physical inactivity, and race/ethnicity” (National Diabetes Fact Sheet, 2005, p.1). Most patients with type 2 diabetes are obese but patients who are not obese, by traditional weight criteria, may have an increased percentage of body fat distributed predominately in the abdominal region. This form of diabetes often goes undiagnosed for years because the hyperglycemia develops slowly and may not be severe enough for patients to notice the classic symptoms of diabetes, such as polyuria, polydipsia, extreme hunger, unusual weight loss, increased fatigue, irritability, and blurry vision (American Diabetes Association [ADA], 2008b).

Type 2 diabetes is diagnosed in three ways and each must be confirmed on a subsequent day unless undeniable symptoms are present (see Table 1). The fasting plasma glucose (FPG) is the preferred test to diagnose diabetes in adults. Although the Hemoglobin A1C (HbA1c) lab test is done to evaluate the average blood glucose control for the past 2 to 3 months, it is not recommended as a test to diagnose diabetes (ADA, 2007a; Cagliero, Levina, & Nathan, 1999; Miller et al., 2003).

The Hemoglobin A1c is a term used to describe a series of stable minor hemoglobin components formed slowly and nonenzymatically from hemoglobin and glucose. The rate of formation of glycosolated hemoglobin (GHb) is directly proportional to the ambient glucose concentration. Since erythrocytes are freely permeable to glucose, the level of GHb in a blood sample provides a glycemic history of the previous 120 days, the average erythrocyte life span. GHb most accurately reflects the previous 2-3 months proficiency certification testing. Proper interpretation of HbA1c test results requires that

health care providers understand the relationship between test results and average blood glucose. Table 2 shows HbA1c and mean plasma glucose levels shown in mg/dl (Rohlfing et al., 2002).

Table 1

Criteria for the Diagnosis of Type 2 Diabetes

1	Fasting plasma glucose \geq 126 mg/dl (7.0 mmol/l). Fasting is defined as no calorie intake for at least 8 h.*
	OR
2	Symptoms of hyperglycemia and a casual plasma glucose \geq 200 mg/dl (11.1 mmol/l). Casual is defined as any time of day without regard to time since last meal. The classic symptoms of hyperglycemia include polyuria, polydipsia, and unexplained weight loss.
	OR
3	2-h plasma glucose \geq 200 mg/dl (11.1 mmol/l) during an OGTT (75-g oral glucose tolerance test). The test should be performed as described by the World Health Organization, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.*

Note. *In the absence of unequivocal hyperglycemia, these criteria should be confirmed by repeat testing on a different day (ADA, 2008a).

Table 2

HbA1c and Mean Glucose Levels Shown in mg/dl

HbA1c	6.0%	7.0%	8.0%	9.0%	10.0%	11.0%	12.0%	13.0%
mg/dl	135	170	205	240	275	310	345	380

“Lowering HbA1c to an average of ~ 7% has clearly been shown to reduce microvascular and neuropathic complications of diabetes and possibly microvascular disease. Therefore, the HbA1c goal in adults with type 2 diabetes is < 7%” (ADA, 2008b, p. S3). Epidemiologic studies have suggested that the HbA1c goal in selected individual patients is as close to normal (< 6%) as possible without significant hypoglycemia. The ADA recommendations are that the HbA1c test is performed at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control), performed quarterly in patients whose therapy has changed or who are not meeting glycemic goals, and use of point-of-care testing of HbA1c for timely decisions on therapy changes, when needed (ADA, 2007a; Cagliero et al., 1999; Miller et al., 2003; Sacks et al., 2002).

Treatment for Type 2 Diabetes

The goal of treatment for type 2 diabetes is to keep the blood sugar as close to normal as possible (i.e., glycemic control). In 2008, the ADA recommended the treatment measures that will have a positive influence on glycemic control; these include:

1. Medical nutrition therapy (MNT) including weight loss for overweight and obese insulin resistant individuals,
2. Self-monitoring of blood glucose,
3. Increase in physical activity,
4. Diabetes self-management education (DSME),
5. Psychological assessment and care,
6. Prevention and management of diabetes complications,
7. Hypertension/blood pressure control,
8. Dyslipidemia/lipid management,
9. Antiplatelet agents,
10. Smoking cessation,
11. Coronary heart disease screening and treatment,
12. Nephropathy screening and treatment,
13. Retinopathy screening and treatment, and
14. Neuropathy screening and treatment.

Each of these recommended treatment measures are presented and discussed.

Medical Nutrition Therapy (MNT)

Individuals with type 2 diabetes should receive individualized MNT, preferably by a registered dietitian familiar with the nutritional management of patients with type 2 diabetes, as needed to achieve treatment goals. In overweight and obese insulin resistant individuals, modest weight loss has been shown to reduce insulin resistance. Thus, weight loss, either with low-carbohydrate or low-fat calorie restricted diets, is recommended for individuals who have diabetes. Dietary fat intake should be less than 7% of total calories and trans fat should be minimized (Pastors, Franz, Warshaw, Daly, & Arnold, 2003; Pastors, Warshaw, Daly, Franz, & Kulkarni, 2002). “Monitoring carbohydrates, whether by carbohydrate counting, an exchange, or experienced-based estimation, remains a key strategy in achieving glycemic control” (ADA, 2008b, p. S6).

According to the ADA (2008c) the goals of MNT for individuals with type 2 diabetes are to:

- 1.) Achieve and maintain blood glucose levels in the normal range or as close to normal as is safely possible, a lipid and lipoprotein profile that reduces the risk for vascular disease, blood pressure levels in the normal range or as close to normal as is safely possible; 2.) Prevent, or at least slow, the rate of development of the chronic complications of diabetes by modifying nutrient intake and lifestyle; 3.) Address individual nutrition needs, taking into account personal and cultural preferences and willingness to change; and 4.) Maintain the pleasure of eating by only limiting food choices when indicated by scientific evidence. (p. S61)

To meet the MNT goals individuals with type 2 diabetes are encouraged to implement lifestyle modifications that reduce calorie intake, saturated and trans fatty acids, cholesterol, and sodium. Efforts should be made to increase physical activity to control blood sugars, blood pressure, and decrease abnormal lipid levels. Blood glucose monitoring can be effective in determining if MNT is stabilizing blood sugars or if diabetes medications or insulin needs to be added to the health care regimen (Klein et al., 2004; Salmeron et al., 2001; Wolf et al., 2004).

Self-Monitoring of Blood Glucose (SMBG)

Research studies about patients who use SMBG suggest that SMBG is a component of effective therapy in patients with type 2 diabetes. SMBG allows patients to evaluate their individual response to therapy and assess whether glycemic targets are being achieved. Results of SMBG can be useful in preventing hypoglycemia, and adjusting medication, MNT, and physical activity. The optimal frequency and timing of SMBG for patients with type 2 diabetes on non-insulin therapy is not known but should be sufficient to facilitate reaching glucose goals. A meta-analysis of SMBG in non-insulin-treated patients with type 2 diabetes concluded that some regimen of SMBG was associated with a reduction in HbA1c. However, many of the studies in this analysis also included patient education with diet and exercise counseling and, in some cases, pharmacologic intervention, making it difficult to assess the contribution of SMBG alone to improved control (Welschen et al., 2005).

Because the accuracy of SMBG is instrument-and-user-dependent (Sacks et al., 2002), it is important to evaluate each patient's monitoring technique, both initially and at regular intervals thereafter. In addition, optimal use of SMBG requires proper interpretation of the data. Patients should be taught how to use the data to adjust food intake, exercise, or pharmacological therapy, to achieve glycemic goals that have been determined with input from the interdisciplinary health care team along with the patient, and these skills should be evaluated periodically.

General recommendations for SMGB include the following: (a) SMBG should be carried out three or more times daily by patients using multiple insulin injections or insulin pump therapy; (b) Persons using less frequent insulin injections, non-insulin therapies, or MNT alone, should use SMBG one or more times a day as directed by the health care provider; and (c) To achieve postprandial (i.e., after meals) glucose targets, postprandial SMBG may be appropriate. If persons are self-monitoring, it is important that they receive initial instruction in and routine follow-up evaluation of SMGB technique and that they can use data to adjust therapy (ADA, 2008a).

Physical Activity

Recommendations for people with diabetes are to perform at least 150 minutes of moderate-intensity aerobic physical activity (50-75% of maximum heart rate) per week over at least 3 days, with no more than 2 consecutive days without physical activity. Resistance training is also effective in improving glycemia and, in the absence of contraindications, people with type 2 diabetes should be encouraged to perform resistance

exercise training three times a week (Boulé, Haddad, Kenny, Wells, & Sigal, 2001; Sigal, Kenny, Wasserman, & Castaneda-Sceppa, 2004).

Diabetes Self-Management Education (DSME)

According to the ADA National Standards, individuals with type 2 diabetes should receive DSME when they are diagnosed and as needed. Self-management behavior change is the key outcome of DSME and should be measured and monitored as part of care (ADA, 2007b). DSME is an essential element of diabetes care (Norris, Lau, Smith, Schmid, & Engelgau, 2002), and the National Standards for DSME are based on evidence for its benefits. Education helps people with diabetes initiate effective self-care when they are first diagnosed (Funnell et al., 2007) and ongoing education helps to maintain effective self-management as diabetes presents new challenges and as treatment advances become more available. DSME helps patients optimize metabolic control, prevent and manage complications, and maximize quality of life, in a cost-effective manner (Mulcahy et al., 2003).

Psychological Assessment and Care

According to Rubin and Peyrot (1992), assessment of psychological and social situation should be included as an ongoing part of the medical management of diabetes. DSME should address psychological issues, since emotional well-being is strongly associated with positive outcomes. Psychological screening and follow-up should include, but is not limited to: (a) attitudes about the illness, (b) expectations for medical management and outcomes, (c) affect/mood, general and diabetes-related quality of life,

(e) resources (financial, social, and emotional), and (f) psychiatric history. Health care providers should also screen for psychological problems such as depression, anxiety, eating disorders, and cognitive impairment on initial assessment and when adherence to the medical regimen is poor (Anderson et al., 2002; Delamater et al., 2001; Jacobson, 1993; Surwit, Schneider, & Feinglos, 1992).

Prevention and Management of Diabetes Complications

The medical management and self-management of patients with type 2 diabetes focuses on preventing the complications related to the disease processes of diabetes which may affect the vital organs and their functions. Cardiovascular disease is the major cause of morbidity and mortality for individuals with diabetes and is the largest contributor to the costs of diabetes. Other diseases that cause complications for patients with type 2 diabetes include kidney disease, amputations, blindness, neuropathy, and altered life styles (ADA, 2008b; Franz et al., 2002).

Hypertension/blood pressure control. Blood pressure (BP) should be measured at every routine diabetes care visit with the health care provider. Before a diagnosis of hypertension is confirmed, there should be a number of readings on different days that show systolic BP \geq 130 mmHg or diastolic BP \geq 80 mmHg. Goals for patients with diabetes should include treatment for a systolic BP $<$ 130 mmHg and to a diastolic BP $<$ 80 mmHg. Patients with systolic BP of 130-139 mmHg or diastolic BP of 80-89 may be given lifestyle changes alone for a maximum of 3 months, and then, if targets are not met, should be treated with anti-hypertensive medications. Angiotensin converting-enzyme

(ACE) inhibitors and/or an angiotensin receptor blockers (ARBs) and/or diuretics are medications recommended. Two or more medications are often required to achieve BP targets. Lab work is required to monitor kidney function and electrolytes with these anti-hypertensive medications (Arauz-Pacheco, Parrott, & Raskin, 2002; Bax et al., 2007; Chobanian et al., 2003; Psaty et al., 2003; UKPDS, 1998).

Dyslipidemia/lipid management. In most adults with type 2 diabetes a fasting lipid profile should be completed annually. If patients have low-risk lipid levels, LDL cholesterol < 100 mg/dl, HDL cholesterol > 50 mg/dl, and triglycerides < 150 mg/dl, lipids may be checked every 2 years. Lifestyle modifications focusing on the reduction of saturated fat, trans fat, and cholesterol intake; weight loss (if indicated); and increased physical activity should be recommended to improve lipid profile in patients with diabetes. Statin therapy should be added to lifestyle therapy, regardless of baseline lipid levels in patients with diabetes if they (a) have overt cardiovascular disease (CVD), (b) are without CVD and are over 40 and have one other CVD risk factor, (c) have LDL cholesterol levels > 100mg/dl, and (d) have multiple CVD risk factors (Baigent et al., 2005; Haffner, 1998).

Antiplatelet agents. It is recommended that patients with type 2 diabetes use aspirin therapy (75-162 mg/day) as a secondary prevention strategy if they have a history of CVD. Health care providers are recommended to prescribe aspirin (75-162 mg/day) as a primary prevention in patients with type 2 diabetes at increased cardiovascular risk, including those over age 40 or those who have additional risk factors (family history of

CVD, hypertension, smoking, dyslipidemia, or albuminuria). Aspirin is not recommended in patients under 30 due to lack of evidence of benefit and is contraindicated under age 21 because of the risk of Reye's syndrome. Aspirin may be combined with other antiplatelet medications based on the severity of CVD (Antithrombotic Trialists' Collaboration, 2002; Colwell, 2001).

Smoking cessation. All patients should be advised not to smoke and smoking cessation counseling and other forms of treatment should be a routine component of diabetes care. Patients with diabetes are already at risk for CVD and smoking will increase these risks with further complications (Haire-Joshu, Glasgow, & Tibbs, 1999; Ranney, Melvin, Lux, McClain, & Lohr, 2006).

Heart disease screening and treatment. In patients with known CVD, ACE inhibitor medication, aspirin, and statin therapy should be used to reduce the risk of cardiovascular complications. In patients with a prior myocardial infarction, Beta-blockers should be added to reduce mortality. In patients over 40 with another cardiovascular risk factor (hypertension, family history, dyslipidemia, microalbuminuria, cardiac autonomic neuropathy, or smoking), ACE inhibitor, aspirin, and statin therapy should be used to reduce the risk of cardiovascular events (Buse et al., 2007; ADA, 2008a).

Nephropathy screening and treatment. To reduce the risk or slow the progression of nephropathy, glucose and blood pressure should be in optimal control. An annual test should be performed to assess urine albumin starting at the diagnosis of type 2 diabetes.

Serum creatinine levels should be checked at least annually in all adults with diabetes regardless of the degree of urine albumin excretion. The serum creatinine should be used to estimate glomerular filtration rate (GFR) which is the best test to measure the level of kidney function and determine the level or stage of chronic kidney disease (CKD) if present.

In patients with type 2 diabetes, hypertension, microalbuminuria, and renal insufficiency (serum creatinine > 1.5 mg/dl), ARBs have been shown to delay the progression of nephropathy. Reduction of protein intake is recommended in individuals with diabetes and later stages of CKD, since this has been found to improve renal function. When ACE inhibitors, ARBs, or diuretics are used, providers of care should monitor serum creatinine and potassium levels for the assessment of the development of acute kidney disease and hypokalemia. Continued monitoring of urine albumin excretion to assess both the response to therapy and the progression of disease is recommended (Bakris et al., 2000; Gall, Hougaard, Borch-Johnsen, & Parving, 1997; Lewis, Hunsicker, Bain, & Rohde, 1993; Remuzzi, Macia, & Ruggenenti, 2006).

Retinopathy screening and treatment. Individuals with diabetes should have blood glucose and blood pressure levels within ADA recommended goals to decrease their probability of developing retinopathy. Patients with type 2 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist shortly after the diagnosis of diabetes and repeated annually. Patients with type 2 diabetes should be referred promptly, if they have any level of macular edema, severe nonproliferative

diabetes retinopathy (NPDR), or any proliferative diabetes retinopathy (PDR), to an ophthalmologist who is knowledgeable and experienced in the management and treatment of diabetic retinopathy (Fong, Aiello, Ferris, & Klein, 2004; Klein, 2003; Leske et al., 2005).

Neuropathy screening and treatment. Patients with type 2 diabetes should have an initial and annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations. The foot examination can be accomplished in a primary care setting and should include the use of a monofilament, tuning fork, palpation, and visual examination. All patients with type 2 diabetes should be provided with general foot-care education and should be instructed to take their shoes and socks off for an examination of their feet when they visit their health care provider. Screening for signs and symptoms of autonomic neuropathy and distal symmetric polyneuropathy (DPN) should be conducted at diagnosis and at least annually thereafter. For those with DPN, facilitate enhanced foot care education and refer for special footwear. Recommendation of medications for the relief of symptoms specific to DPN and autonomic neuropathy often improve the quality of life of the patient (Mayfield, Reiber, Sanders, Janisse, & Pogach, 1998; Vinik, Maser, Mitchell, & Freeman, 2003).

The recommendations discussed above should be followed as closely as possible to encourage proper glycemic control. When symptoms and complications are controlled in patients with type 2 diabetes the short- and long-term outcomes should be improved (Clark et al., 2001; O'Connor et al., 2005).

Family Support

Some background information provides the emphasis of the researcher on the importance of family support. Family support has been mentioned in the literature of many disciplines supporting its significance as an important component of diabetes care. This researcher, a diabetes educator, interviewed patients with diabetes as part of a diabetes education program and asked the question, "Who is the person that you will count on to support you the most in caring for your diabetes?" In most cases, the answer was "a spouse, child, parent, or close relative." Rarely did patients state that a person outside of their immediate family was the person most supportive for them (J.B. Hensarling, personal practice notes).

When following up with patients 3-6 months after they completed the diabetes education program, they were asked, "Who is the person who has supported you in caring for your diabetes?" The person's name given was generally the same one mentioned at the initial assessment session. Another question asked was, "How did they support you?" Frequent answers were similar to, "I don't think I could have made it without them." Often, specific areas were noted where they felt the support of the person(s) had made the difference in their success of learning about diabetes and being able to follow the diabetes management program (J.B. Hensarling, personal practice notes).

Sparked by these experiences, the concept of "family support" was developed using the method of systematic analysis by Walker and Avant (1988). According to this suggested analysis, "concept analysis" is a strategy that allows the examination of a

concept, and it was through this process that the researcher began the literature review. Gaining a fuller understanding of what the concept was, as well as what it was not, was the intent of systematically developing the concept “family support.” Some of the literature reviewed for accomplishing that process is included in this review.

A body of evidence suggests that family support is linked to well-being and health (Callaghan & Morrissey, 1993; House, Umberson, & Landis, 1988; Stewart & Tilden, 1995). According to Cox (2003), the family environment is where individuals learn lifelong attitudes and health care behaviors. Results of a study by Lo (1999) indicated that success in complying with a health regime of people with diabetes was associated with good family support. Family support was identified as a crucial factor in the compliance to disease management for adolescents with a chronic disease (Kyngas, Kroll, & Duffy, 2000; LaGreca, Auslander, & Greca, 1995; Miller-Johnson et al., 1994; Price, 1996). It was also shown to play a significant role in earlier discharge for patients who had undergone heart surgery (Dunstan & Riddle, 1997).

A failed support system, including family support, has also been identified as one factor that contributed to readmission to the hospital of patients with heart failure (Dunbar, Jacobson, & Deaton, 1998). Family support was reported to be significant in overcoming barriers to following diabetes meal planning in 138 older Hispanic adults with type 2 diabetes (Wen, Shepherd, & Parchman, 2004). Keller and Stevens (1997) stated, “Using critical family and kinship members to support and encourage health-promoting behavior can facilitate attendance at programs and health events and support

risk modification efforts” (p. 15). In agreement with this finding, family support has been identified by others as a variable affecting an individual's adherence to a health regimen (Barnhoorn & Adriaanse, 1992; Sherbourns, Hayes, Ordway, DiMatteo, & Kravitz, 1992; Tillotson & Smith, 1996). Neff (2000) reported that family support was the strongest indicator of positive self-care practices in individuals with diabetes.

While research has been limited in determining what family support is for an individual with type 2 diabetes and the effect it has on the patient's success in managing diabetes, some studies have been done that suggest its importance. In a study done to identify barriers to dietary therapy of African Americans with non-insulin dependent diabetes mellitus (NIDDM), lack of family support was a common problem. Based on their findings, the researchers attempted “to provide both dietary and diabetes education for patient's families to familiarize them with the recommended meal plan as well as with the complications that result in poor metabolic control” (El-Kebbi et al., 1996, p. 491).

Active family support was significantly associated with control of triglyceride, cholesterol and HbA1c levels in a study of 163 Navajos with type 2 diabetes (Epple, Wright, Joish, & Bauer, 2003). One of the findings, when looking at the day-to-day self-management of type 2 diabetes in African American women, suggested that influences may best be understood from a sociocultural and family context (Samuel-Hodge et al., 2000). Martire (2005) reviewed and synthesized 12 studies with various illness populations including type 2 diabetes and concluded, “Inclusion of a close family

member (e.g. spouse) in psychosocial interventions for chronic illness may be more efficacious than focusing solely on the patient...Family members play an important role in a patient's recovery from and adjustment to chronic illness" (p. 312).

These studies would seem to indicate the benefits of family support to the success of patients with diabetes. Therefore, determining what the concept of family support is for a person with type 2 diabetes and how it makes a difference in diabetes management seems worthy of further investigation.

Defining "Family Support"

Before looking at family support as a concept, common definitions of family were explored. The United States Census Bureau (2004) defines family, family group, and family household; these definitions are used in government regulations as well as legal issues. Family is defined as

a group of two persons or more (one of whom is the householder) residing together and related by birth, marriage, or adoption. All such persons (including related subfamily members) are considered as members of one family. Beginning with the 1980s, unrelated subfamilies (referred to in the past as secondary families) are no longer included in the count of families, nor are the members of unrelated subfamilies included in the count of family members. (Fields, 2003, p.1)

It defines a family group as

any two or more people (not necessarily including a householder) residing together, and related by birth, marriage, or adoption. A household may be

composed of one such group, more than one or none at all. The count of family groups includes family households, related subfamilies, and unrelated subfamilies. (Fields, p. 6)

It defines family household as

a household maintained by a family (as defined above), and may include among the household members any unrelated persons (unrelated subfamily members and/or secondary individuals) who may be residing there. The number of family households is equal to the number of families. The count of family household members differs from the count of family members, however, in that the family household members include all persons living in the household, whereas family members include only the householder and his/her relatives. (Fields, p. 2)

Hanson and Boyd (1996) stated that the word “family” conjures up different images for different people. The specific focus of how family is defined often depends on the discipline that is studying it. For example, "sociologists define family as a group of people living together; psychologists define it as a group with strong emotional ties" (Hanson & Boyd, p. 6). For the purpose of this study family was defined as “a group of intimates living together or in close geographical proximity with strong emotional bonds (identification, attachment, loyalty, reciprocity, solidarity), and with a history and future” (Fisher et al., 1998, p. 206).

There are at least six characteristics that define the most important psychological dimensions inherent in the term "family": (a) a sense of mutual commitment, (b) a sense

of history and continuity, (c) the potential for and expectation of long-lasting relationships that are (d) extensive and (e) intense, and (f) social responsibility of the adults for the welfare and development of any children in the group (Lindsey, 1981).

According to Berg-Cross (2000), "a sense of commitment and sense of continuity and history are probably the most critical psychological dimensions" (p. 97). Most relationships in families begin at birth or at a major adult developmental milestone, as in the case of marriage, and are expected to continue until death. Family members help each other mark the progress of their own development on the continuum of life.

Definitions of Support

After reviewing articles and common definitions it appears there was more than one definition of support that could be applied when looking at the term "family support." Kyngas (2001) regarded family support as a crucial factor in the compliance of adolescents with a chronic disease. Such family variables as a positive family climate and open relationships between family members are related to good compliance, while "family conflicts and poor relationships between family members seem to be associated with poor compliance" (p. 768). Niska (1999) described family support in Mexican American families as being "kin-based, with material support oriented toward household needs; with emotional support grounded in shared stories, problem solving, and prayer; and with emotional support offered in consejos (wisdom sayings and words of advice), stories, and guidance" (p. 45).

A qualitative study by Patterson and Dorfman (2002) investigated family support in hospice patients. Family support was conceptualized in terms of who offers support, types of support, frequency of support, family communication, and change in family relationship during the care giving process. Findings indicated that (a) family members provided instrumental and emotional support, (b) the frequency of assistance was appropriate, and (c) families had grown closer since learning of the terminal illness.

In a study by Stamler, Cole, and Patrick (2001), a participant provided an interpretation of family support in giving examples of how it had increased following diabetes education classes. These examples included reading literature participants brought home, attending the educational sessions with the participant, or sharing with the individual in making the lifestyle changes.

Social Support

It seems that family support is sometimes "lumped" with social support and that measurement instruments and their use reflect this. According to Ford-Gilboe (1997), "social support refers to interpersonal resources available from a network of family and friends that provide a sense of belonging as well as tangible assistance for dealing with life's problems and tasks." Social support is defined by Rodriguez (1991) as "information, knowledge, and/or advice that helps the individual to understand the environment and to adjust to changes within it" (p.124). The author noted that the person providing social support may be a family member or a friend whom the client feels can provide the

support and she measured social support using the *Family APGAR Scale* (Smilkstein, Ashworth, & Montano, 1982).

A study done by Fitzgerald et al. (2000) used the *Diabetes Care Profile*, a 234-item questionnaire that assesses an individual's diabetes attitudes. Two of its 16 scales deal with social support. This study found that, in comparisons with Caucasians, African Americans reported receiving more support from family and friends. In a study by Boehm, Schlenk, Funnell, Powers, and Ronis (1997), using the *Diabetes Care Profile*, the authors surmised that, "Support from family members and friends appears to play an important role in patients initiating and maintaining adherence behaviors" (p. 163).

The research which looked at the relationship of social support to health has emerged over the past decade resulting in general agreement among researchers that individuals with greater amounts of social support enjoy better health than persons with less support (Berkman, 1986; Callaghan & Morrissey, 1993; Glasgow & Toobert, 1988; Toljamo & Hentinen, 2001). Caplin (1974) defined social support as formal or informal group relationships in which an individual receives cognitive, material, and emotional resources needed to master stressful experiences.

Measurement of Family Support

Instruments measuring family support in diabetes-related studies closely resemble those measuring the concept of social support. The most commonly cited instruments that were found in the diabetes literature measuring family support and/or social support were the (a) *Family Environment Scale* (FES), (b) *Diabetes Empowerment Scale* (DES),

(c) *Diabetes Family Behavior Scale* (DFBS), and (d) *Family Adaptation, Partnership, Growth, Affection, and Resolve Scale* (Family APGAR Scale). These tools are discussed below.

The Family Environment Scale (FES)

The FES developed by Moos and Moos (1994) has been used extensively in clinical settings to facilitate family counseling and psychotherapy, to educate clinicians and program evaluators about family systems and in program evaluation. The 90 items of the FES are grouped into three dimensions: relationship, personal growth, and system maintenance. Relationship has three subscales (i.e., cohesion, expressiveness, and conflict); these address the degree of commitment and support family members supply for one another, the extent that family members are encouraged to communicate their feelings directly, and the amount of openly expressed anger and conflict among family members. Personal growth has five subscales:

1. Independence - assesses the degree to which family members are assertive, self-sufficient and make their own decisions;
2. Achievement orientation - reflects how much activities in areas such as employment or education are cast into an achievement-oriented or competitive framework;
3. Intellectual - cultural orientation measures the extent of interest in political, intellectual, and cultural activities;

4. Active-recreational orientation - measures the amount of involvement in social and recreational activities;
5. Moral-religious emphasis - assesses the importance of ethical and religious issues and values.

System maintenance measures the organization and control present in the family. The degree of importance of clear organization and structure in planning family activities and responsibilities are explored, as well as how much set rules and procedures are used to direct the family (Moos, 2004; Moos & Moos, 1994). The FES has been used extensively in diabetes research. In the study of "The Marital Relationship and Psychosocial Adaptation and Glycemic Control of Individuals with Diabetes" the FES was used and the findings indicated that stronger family support related to such varied outcomes as better psychological adjustment and enhanced compliance with medical regimens (Trief, Grant, Elbert, & Weinstock, 1998; Trief, Himes, Orendorff, & Weinstock, 2001).

The Diabetes Empowerment Scale (DES)

The DES is a 28-item scale, developed by Anderson, Funnell, Fitzgerald, and Marrero (1995) to measure the patient's diabetes related psychosocial self-efficacy. There are three subscales:

1. Managing the psychosocial aspects of diabetes.
2. Assessing dissatisfaction and readiness to change.
3. Setting and achieving diabetes goals.

It has been shown to be a useful outcomes measure for various educational and psychosocial interventions related to diabetes (Anderson et al., 2000). The DES was also translated into Chinese (C-DES-20) and, using qualitative and quantitative components, was determined to be a reliable and valid outcome measure for patient education and psychosocial interventions among Hong Kong Chinese people with diabetes (Ann, Shiu, Wong, & Thompson, 2003).

Diabetes Family Behavior Scale (DFBS)

The DFBS was designed to measure diabetes-specific family support in children and adolescents. McKelvey et al. (1993) stated that the DFBS might be a useful tool to assess functional ability specific to diabetes. Their suggestion for use was that better functioning families might then benefit from development or adjustment recommendations, while poorer functioning families may be helped most from a structured means of evaluation and treatment. This 47-item instrument has two subscales, one to reflect guidance-control and one to reflect warmth-caring.

It was also recommended to perform longitudinal studies "to determine whether interventions in family behavior specific to Insulin Dependent Diabetes Mellitus (IDDM) can be developed to correct the deficit areas identified by the DFBS, improve metabolic control, and thereby possibly reduce complications from the disease" (McKelvey et al., 1993). Whittemore, Urban, Tamborlane, and Grey (2003) used the instrument in a study to examine the child, parent, and family factors associated with quality of life and

metabolic control in school-aged children with type 1 diabetes on an intensive treatment regimen.

Based on the use of this instrument in a study looking at the clinical and psychosocial factors associated with achievement of goals in adolescents with diabetes, the authors stated that providers need to pay attention to poorer metabolic control and impact of diabetes on quality of life. They suggested that behavioral interventions such as coping skills training might help adolescents achieve their goals (Grey, Davidson, Boland, & Tamborlane, 2001). The instrument was also used in a study to examine the metabolic trend and factors associated with an unexpected rise in HbA1c levels during the summer, with a return to baseline when school resumed, in 40 intensively treated adolescents with type 1 diabetes. Factors associated with the summer increase in HbA1c included lower guidance scores on the DFBS (Boland, Grey, Mezger, & Tamborlane, 1999).

The instrument was used in a study looking at personal and family factors associated with quality of life in adolescents with diabetes. The findings of this study indicated that diabetes treatment teams need to pay equal attention to the psychosocial needs of the quiet, non-rebellious teen with well-controlled diabetes from a supportive family as they do the rebellious adolescent with poorly controlled diabetes (Grey, Boland, Yu, Sullivan-Bolyai, & Tamborlane, 1998).

The Family Adaptation, Partnership, Growth, Affection, and Resolve Scale (Family APGAR Scale)

The Family APGAR Scale may be used to determine the level of functionalism in the family unit. It is described as a family-functioning measure assessing adult satisfaction with family support. The instrument has five components for measuring family functioning: adaptation, partnership, growth, affection, and resolve (Powazki & Walsh, 2002; Smilkstein et al., 1982). The family member in Rodriguez' (1991) study was "the family member or friend selected by the non-insulin dependent diabetes mellitus (NIDDM) client, who attended the diabetes education program with the NIDDM client" (p.112). Satisfaction with this support was measured with the *Family APGAR Scale* (Rodriguez). "Although originally introduced as an assessment of adult satisfaction with family support, the Family APGAR has developed a research following as a measure of family functioning" (Gardner, 2001, p. 6). Gardner used the instrument with a large community-based study of behavioral problems in children that raised a question about the use of the instrument for measuring family dysfunction. He suggested that a goal for future research would be to clarify what the Family APGAR does measure (Gardner).

Fick, Goff, and Oppliger (1996) used the *Family APGAR Scale* to determine the frequency with which an individual's commitment to "running," as a means of exercise, conflicts with family life and whether runners who reported conflict received less support for "running" from their significant other. The instrument was used in a study assessing couples patterns of adjustment to colon cancer and the Family APGAR was used with

other instruments. Findings demonstrated that both patients and their spouses reported decreases in their family functioning and social support, but they also decreased in emotional distress over time (Northouse, Mood, Templin, Melon, & George, 2000).

Summary

The author examined information about type 2 diabetes, current treatment regimens for type 2 diabetes, the concept of family support, the concept of social support and instruments that have been developed and used in measurement of family/social support in adults with type 2 diabetes. Additionally, current evidenced-based ADA recommendations for treatment measures that will have a positive influence on glycemic control were reviewed.

The concept of family support for this study was developed using Walker and Avant's (1988) method of systematic analysis of a concept. The goal of the research is to refine and psychometrically test a specific instrument to measure how individuals with type 2 diabetes perceive their family support. The literature was reviewed extensively and although there are instruments that have been developed to measure family/social support, items in *Hensarling's Diabetes Family Support Scale* were developed to reflect how adults with type 2 diabetes rate the perceived support received from family members. An improved understanding of an individual's perceived family support may affect the management of the health care regimen.

CHAPTER III

METHODOLOGY

Research Design

The purpose of this methodological study was to perform psychometric testing of an instrument, *Hensarling's Diabetes Family Support Scale* (HDFSS). This instrument is intended to measure the concept of “family support” in adult patients with type 2 diabetes mellitus. Family support has been identified as an influence on how well patients with diabetes adhere to recommended treatment plans (Epple, Wright, Joish, & Bauer, 2003; Gerstle, Varenne, & Contento, 2002; Wen, Shepherd, & Parchman, 2004). The psychometrics of the HDFSS was assessed by estimating its internal consistency, construct validity, criterion-related validity, and convergent validity. Given a valid and reliable instrument, nurses can incorporate the patient's assessment of family support into diabetes education and management programs. Such an instrument will expand the understanding of “family support” for patients with diabetes and allow the measurement of this concept for both clinical and research purposes.

Preliminary Study

A pilot study was completed prior to this study for the purpose of initiating the development of the instrument. The original instrument developed, *Diabetes Family Support Scale*, was 32 items. A draft was sent to five health care providers and six adults with type 2 diabetes for evaluation of each item. Revisions were made to the terminology

of the questions to improve clarity based on the suggestions of these “experts.” The revised instrument was then sent to six diabetes educators, serving as content experts, for rating the relevance of the 32 items to the concept of “diabetes family support.” They were instructed to review and rate each item’s relevance to the concept (Lynn, 1986): 1 = *Item does not measure concept*, 2 = *Item measures concept but is not clearly stated*, 3 = *Item needs minor revision for clarity*, and 4 = *Item measures concept and is clearly stated*. All six experts returned the questionnaires. Three items which were rated with a “1” were deleted. The revised instrument of 29 items was resent to the same six reviewers for evaluation and input, and the items were all rated 3 or 4 with a Content Validity Index (CVI) of 1.00.

A pilot study was then completed. The revised 29-item *Diabetes Family Support Scale* (DFSS) instrument was administered to a group of adults attending a diabetes support group. Adults with type 2 diabetes were asked to participate by signing a consent form, completing the DFSS and returning it to the researcher. Twenty-six instruments were returned with signed consent forms; 18 were used for the analysis since these had no missing data. Analysis of the data to estimate reliability for the instrument was then completed, recognizing that the sample was small. According to respected researchers (Henderson, 1993; Topp & Stevenson, 1994), coefficient alpha for a new instrument should be at least 0.70. The estimate of internal consistency with this sample exceeded this recommendation with a Cronbach’s coefficient alpha of 0.956. The refined HDFSS tested with the current sample was composed of 29 items.

The importance of family support has been reported in the literature; but, until the time of the DFSS's initial development, there was not a specific instrument developed to measure family support in adults with type 2 diabetes. Since the pilot study appeared to be successful, the researcher planned to continue development and psychometric testing of the instrument in evaluating "family support" with a larger sample (~ 150 to 175 participants) of patients with type 2 diabetes. This larger sample allowed for reliability (internal validity) and validity (internal construct validity) testing. The name of the instrument was changed to *Hensarling's Diabetes Family Support Scale* (HDFSS).

Sample and Setting

Approximately 150 to 175 individuals were targeted for participation in the study. This number was based on the need for at least 5 participants per item for performing the statistical analyses (Cattell, 1978; Gorsuch, 1983; Nunnally & Bernstein, 1994). The participants met the following inclusion criteria: (a) adults aged 18 or older, (b) a diagnosis of type 2 diabetes, and (c) able to speak and read English. Exclusion criteria included: (a) persons with type 1 diabetes and (b) persons who do not speak and read English. Even though type 1 and type 2 diabetes involve similar issues for the individual, the HDFSS was developed specifically for those with type 2 diabetes. It is only available in English.

Participants were recruited with the assistance of health care providers (HCPs) or diabetes educators asked to share information about this research with their patients. Providers and educators distributed the data-collection packets to those patients who

expressed an interest in participating. The recruiting HCPs did not participate in any way with the completion of the research packet by the participants. They were not under any obligation to the researcher and did not have any knowledge as to whether the potential participant returned the packet to the researcher.

The participants chose where to complete the questionnaires; this decision was under the participants' control. They were encouraged to find a comfortable setting with no distractions so that they would be able to better concentrate on the information they were being asked to give. It was suggested that they take breaks if they became fatigued. They were asked by the researcher to complete the packet within 24 hours if possible. They were given contact information for the researcher in case they have questions. The participants could have chosen not to answer any questions that made them feel uncomfortable or they could discontinue their study participation at any time.

Data Collection Procedure

The principal investigator (PI) sent a letter to HCPs and Diabetes Educators who were randomly selected from a list of HCPs or Diabetes Educators listed on the American Association of Diabetes Educator's Website. She included an introduction letter and a sample of the instruments included in the data-collection packet (i.e., *General Information Form* [GIF], HDFSS, and *Social Support in Chronic Illness Inventory* [SSCII]; see Appendix A). In the introduction letter to the HCPs/Diabetes Educators, she explained the research project and requested their assistance in recruiting participants for

the project. The HCPs and Diabetes Educators were asked to distribute research packets to 5-10 of their patients who met the inclusion and exclusion criteria for this study.

The packet the participants received included a letter of explanation, consent form, GIF, HDFSS, and SSCII in a large self-addressed envelope for return of the completed forms to the researcher. Additionally, a legal size envelope for participants to request the study results should they choose to do so was included. There was no place on the actual instruments for persons to identify themselves. As soon as the sealed envelopes were returned to the researcher in the mail, they were numbered starting with #1. Once the information was collected, the data were put into the SPSS version 16 statistical software program by the researcher for analysis. The reliability (i.e., internal consistency), construct validity, criterion-related validity (i.e., predictive and concurrent), and convergent validity of the HDFSS instrument were estimated.

Instruments

Three data-collection instruments, including the HDFSS, were completed by participants in this study (see Appendix A). Each of these is described below.

General Information Form (GIF)

The GIF, divided into three parts includes fill-in-the-blank, rating scales, and check box items. Part 1 has 13 questions that elicit individual information about the participant (e.g., age, gender, year of diabetes diagnosis, and type of diabetes). Part 2 has (a) a single-item rating (from 0 to 10) of “the overall support your family offers you in caring for your diabetes”; (b) a yes/no question about participation in a diabetes support

group; and (c) a single-item rating of “the overall satisfaction with the support you receive from the group.” Part 3 asks participants to record their latest Hemoglobin A1c (HbA1c) result and the date of that blood test.

Hensarling’s Diabetes Family Support Scale (HDFSS)

The HDFSS measures the concept of perceived family support, conceptually defined as how persons with type 2 diabetes view their family’s support. The operational definition is the total HDFSS score. The higher the score, the higher was the perceived family support. The HDFSS includes 29 questions to be answered by placing a check in one of five boxes: 0 = *Never*, 1 = *Hardly ever*, 2 = *Sometimes*, 3 = *Most of the time*, and 4 = *All the time*. Preliminary testing of the 29-item instrument with a small sample of persons with type 2 diabetes demonstrated a coefficient alpha of .96. The item-to-total correlations ranged from .31 and .93 (Hensarling, 2006).

Social Support in Chronic Illness Inventory (SSCII)

The SSCII consists of 38 Likert-type items measuring the concept of the “perceived satisfaction with social support received by chronically ill persons” (Hilbert-McAllister, 2003, p. 173). The instrument was included for estimating the convergent validity of the HDFSS. Possible responses, with a rating of 1 to 6 for each item, are as follows: 1 = *Dissatisfied*, 2 = *Somewhat dissatisfied*, 3 = *Partly satisfied*, 4 = *Somewhat satisfied*, 5 = *Satisfied*, and 6 = *Very satisfied*. The participants were asked to note how satisfied they were with the helping behaviors of persons toward them in the past month. The higher the score, the higher was the perceived satisfaction with social support.

Reported coefficient alpha for the total SSCII scale was .98. Reliability coefficients for the SSCII subscales ranged from .84 to .94. The individual items demonstrated item-to-total correlations ranging from .56 to .87 (Hilbert-McAllister).

Plans for Data Analysis

The statistical analyses were performed by the researcher using the SPSS version 16 statistical software programs. The data collected from participants were entered into the personal home computer of the PI as soon as the data collection packets were received. Reliability (i.e., internal consistency), construct validity, and criterion-related (i.e., concurrent and predictive) validity of the instrument were tested in this research study with 158 adults with type 2 diabetes. Internal consistency was estimated using Cronbach's alpha. Principal components analysis (PCA) with orthogonal varimax rotation and common factor analysis (CFA) with oblique rotation provided an exploratory analysis of possible underlying dimensions of the concept (i.e., internal construct validity). Factor loadings were .40 or greater.

The Cronbach's alpha reliability procedure was also run in a back-and-forth pattern with PCA for the purpose of possible item reduction; only those items that met the set criteria and reflected the construct were retained. Kendall's tau (τ) was used to test all correlations involving the HDFSS and the SSCII, because these scales did not meet the assumption of normality with this sample. To estimate predictive validity, the HDFSS score was related to the self-reported HbA1c value. Concurrent validity was estimated by correlating the total HDFSS score with a 1-item rating of "perceived overall family

support” on a scale of 0 to 10 (Youngblut & Casper, 1993). To assess convergent validity, the HDFSS were correlated with the SSCII. Permission was given to use the SSCII by Gail A. Hilbert-McAllister, the developer of the instrument (Hilbert-McAllister, 2003).

The following research hypotheses were tested using appropriate statistical tests with set criteria (Ferketich, 1990, 1991; Hinshaw, Chance, & Atwood, 1981; Jensen, Musaeus, Molsing, Lyholm, & Mandrup-Poulsen, 2002; Lynn, 1986; Nunnally & Bernstein, 1994):

The HDFSS will demonstrate an estimate supporting content validity.

1. The HDFSS will demonstrate estimates supporting internal consistency.
 - a. Item-item average correlation of .30 or greater
 - b. Item-total score correlations between .40 and .70
 - c. Cronbach’s alpha of .70 or greater
2. The HDFSS will demonstrate estimates supporting criterion-related validity.
 - a. Concurrent ($\tau \geq .55$)
 - b. Predictive ($\tau \geq -.40$)
3. The HDFSS will demonstrate an estimate ($\tau \geq .55$) supporting convergent validity.
4. The HDFSS will demonstrate internal construct validity through emergent dimensions that are consistent with the concept of “Diabetes Family Support.”

Protection of Human Subjects

The researcher received approval of the research application from the Texas Woman's University Institutional Review Board (IRB) for the involvement of human participants in the research. This approval also required that the principal investigator (PI) successfully complete the online training module for researchers at <http://cme.cancer.gov/c01/>. Prior to participating in the study, each individual completed the consent form to be returned with the completed study instruments. When the researcher received the participant's packet, the consent form was separated from the instruments and placed in a separate locked file. The anonymity of the person was protected; no attempt was made to match the consent form with the completed forms.

Potential risks and protection for participant's rights were included in the IRB application, as well as in the consent form the participant signed. Potential risks were (a) loss of confidentiality, (b) fatigue and physical discomfort, and (c) emotional discomfort. Steps were taken to minimize the risk of loss of confidentiality. Participants were told not to put their names on any of the forms completed. Prior to inputting the data into a computerized dataset, the researcher numbered each completed packet starting with #1 for the first packet received, #2 for the second packet of forms, and so on. No one other than the PI had access to this information.

Two stamped mailing envelopes were included in the data collection packets: one for returning the completed instruments and one for requesting a summary of study results. No personal data was being gathered via email. Participants completed the study forms at

their leisure, in a setting that was comfortable to them in order to minimize fatigue, physical discomfort and emotional discomfort. They could take a break or choose not to answer any questions that made them uncomfortable. They could choose to discontinue participation in this study at any time. The informational letter included the researcher's cell phone number, personal address, and e-mail address. Participants were instructed to contact the researcher personally, at the researcher's expense, if they had questions or concerns. The participants could also contact the faculty advisor whose name, phone number, and e-mail address were provided.

There was not any identifiable information on the returned data collection forms. As soon as the researcher received the instruments in the returned self-addressed envelope provided, the information was placed in a locked file cabinet in the researcher's home office. No one had access to these files except the researcher. The researcher entered the data from the instruments on her home computer; the identification (ID) number for each participant matched that placed on the returned test packet. The researcher provided the participants with a pre-paid return envelope with her address in the upper left hand corner and the center of the front of the envelope. The participants did not give any information that could be linked to them on the instrument and there was no place on the instrument for their signature. Once the data was analyzed and the dissertation completed, the researcher mailed a copy of the findings, at her expense, to the participants who have requested a copy. The consent forms and the request forms were destroyed by shredding as soon as the results were sent.

Summary

The data collected from the study sample of 158 individuals with type 2 diabetes mellitus were analyzed to perform psychometric testing of the 29-item HDFSS, which had been previously pilot tested with a small sample. Other instruments administered included the GIF and SSCII. All three were included in a packet mailed to potential participants. The procedures for collection and treatment of data in this study, as approved by Texas Woman's University IRB were adhered to strictly to assure that the information and efforts of the participants were treated with the utmost respect and value. Through accurate collection and proper treatment of the data, participants and future researchers can be assured that appropriate techniques were performed to test the validity and reliability of HDFSS in measuring the concept of "diabetes family support" in adult patients with type 2 diabetes mellitus.

CHAPTER IV

RESULTS

Introduction

This methodological study was performed to further develop and estimate the psychometric properties of *Hensarling's Diabetes Family Support Scale* (HDFSS). The HDFSS was developed to measure the concept of “diabetes family support” in adult patients with type 2 diabetes mellitus. The initial instrument tested was a self-administered 29-item questionnaire with Likert-type scale items designed to be specific in measuring family support of adults with type 2 diabetes. Each item is rated on a 5-point scale: 0 = *Never*, 1 = *Hardly ever*, 2 = *Sometimes*, 3 = *Most of the time*, and 4 = *All the time*. Five of the items were reverse scored since they were negatively stated. The lowest total score possible for the HDFSS tested is zero (0) and the highest total score possible is 116. The operational definition of family support is “the measurement of perceived family support by the total HDFSS score.” The closer the total HDFSS score is to the possible maximum score of 116, the greater the individual’s family support is perceived to be. The closer the total HDFSS score is to 0, the less is the individual’s perceived family support.

Family support is significant in assisting individuals to control diabetes; the perception of support from family members is important to how well the disease is

managed (Lo, 1999; Scollan-Koliopoulos, 2004; Sherbourne, Hayes, Ordway, DiMatteo, & Kravitz, 1992; Tillotson & Smith, 1996).

Descriptive statistics were used to describe the sample. Primarily, these included frequencies and percentages. Additionally, measures of central tendency (i.e., means and standard deviations) were used. The psychometrics estimated for the HDFSS included content validity, internal consistency, criterion-related validity (concurrent and predictive), convergent validity, and internal construct validity. Content validity was estimated using Lynn's Content Validity Index (CVI) (1986). Internal consistency was estimated using Cronbach's alpha. Criterion-related validity included investigating predictive and concurrent validity. Predictive validity was estimated using *Kendall's tau* (τ) to determine the correlation of the total HDFSS score and the individual's self-reported Hemoglobin A1c (HbA1c) value.

Concurrent validity was estimated by correlating the total HDFSS score with the 1-item rating of the participant's "perceived overall family support." Skewness of the total HDFSS score, total SSCII score, HbA1c reported value, "perceived overall family support" and "perceived overall group support" were also reported. Convergent validity was estimated by correlating the total HDFSS score with the total *Social Support in Chronic Illness Inventory* (SSCII) score using *Kendall's tau* (τ). Factor analysis, both principal components analysis (PCA) and common factor analysis (CFA), was run to estimate the tool's internal construct validity (Pett, 2003). According to Ferketich and

Muller (1990), factor analysis is commonly used in nursing research and is “most often used in the examination of instrument validity” (p. 59).

Statistical Assumptions and Treatment of Data

The data collected were entered into SPSS version 16.0. All data were entered by the principal investigator (PI) on her personal home computer. Information was entered as packets were returned from participants. Missing data were carefully reviewed by the PI and values were replaced using a standardized method if appropriate. According to Polit (1996), “When missing values are reasonably random and when the extent of the problem is not large, researchers sometimes perform a mean substitution. That is, they calculate a mean based on the cases that are not missing, and then replace the missing values with the value of the mean” (pp. 61-62). The PI noted a minimal number of variables with missing data and made the substitutions by inserting the mean. If an individual’s test packet had more than 6 answers missing, the whole packet was set aside and not used for data entry. Data entry was tested for accuracy by (a) running descriptive analysis and examining frequencies to verify that the information entered was within range and (b) reviewing 100% of the questionnaires for possible entry errors.

Normality of data, a requirement of parametric testing, included examination of the frequency distributions of the total scores for the HDFSS and SSCII, 1- item rating of the participant’s “perceived overall family support,” and the HbA1c values using the Fisher skewness coefficient (Skewness/standard error skewness). Coefficients between + or – 1.96 suggest the distribution is not significantly skewed (Pett, 1997). All of these

distributions were found to be skewed; thus additional exploration was done using the Kolmogorov-Smirnov (K-S), Lilliefors, and Shapiro-Wilks tests. These tests verified the skewness, or nonnormality, of these variables with computed values that were significant; thus, the null hypothesis of normality was rejected (Pett, 2003). Based on these findings, a nonparametric statistical test (*Kendall's tau*) was used to test the relationships between these variables (i.e., Hypotheses 3 and 4).

The HDFSS rating scale represented Likert-type scaling commonly used in measurement (Jamison, 2004). Likert scales are considered to represent ordinal level of measurement (Pett, 1997). Treating ordinal scales as interval scales has been controversial (Knapp, 1990), yet it has “become common practice to assume that Likert-type categories constitute interval-level measurement” (Blaikie, 2003). For the purposes of psychometric testing, individual HDFSS variables (i.e., items) and total subscale and scale scores were treated as interval-level data (Pett, 2003).

Internal consistency (reliability) was estimated using Cronbach's alpha. Cronbach's alpha was also run in a back-and-forth fashion with PCA for the purpose of item reduction, or the aim of retaining the best set of items. Correlations, to estimate criterion-related validity, were run using *Kendall's tau* (τ) which is a nonparametric statistical technique for determining the relationship between two continuous variables that are at least ordinal level (Portney & Watkins, 2000). Using a nonparametric procedure is appropriate when one or both variables do not meet the assumption of normality (Pett, 1997). The three applications of factor analysis considered for this study

included (a) exploration of data for patterns, (b) reduction of the number of variables to concisely represent the concept being studied, and (c) confirmation of the construct validity hypothesis. This hypothesis stated that the HDFSS demonstrates internal construct validity through emergent dimensions that are consistent with the concept of “diabetes family support.” The results of two statistical tests were examined to determine that the use of factor analysis was appropriate for analyzing the HDFSS items. These tests were Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett’s Test of Sphericity (Pett, 2003). KMO values nearer to 1.0 indicate that variables can be grouped into principal factors or dimensions. Bartlett’s Test of Sphericity compares the correlation matrix to an identity matrix. A significant value indicates that the correlation matrix is not an identity matrix and that factor analysis is an appropriate test.

The actual sample size of this study was 158 participants. Recommended sample size of at least 145 participants was based on researcher’s suggestions of 5 or more participants per item (29 items in this study $\times 5 = 145$) for performing the statistical analyses (Cattell, 1978; Gorsuch, 1983; Nunnally & Bernstein, 1994).

Description of Participant Sample

The sample of 158 participants met the following criteria: diagnosis of type 2 diabetes mellitus, 18 years of age or older, and able to read English. Prior to participation, each signed an informed consent form approved by Texas Woman’s University’s Institutional Review Board (IRB). Participants were recruited with the assistance of health care providers (HCPs), including physicians, nurse practitioners, physician

assistants, diabetes educators, and nurses. Initially, the PI sent letters to HCPs including diabetes educators who were randomly selected from the list of providers practicing throughout the United States who were on the American Association of Diabetes Educator's (AADE) Website. The providers handed out the data collection packets to interested participants, but were not responsible for any part of the data collection. The participants returned the completed packets in the self-addressed stamped envelope provided by the PI.

The study sample ($N = 158$) consisted of 93 (58.9%) females and 65 (41.1%) males. The age range for participants was 21 to 87 years with a mean age of 61.36 ($SD = 12.6$) years. Table 3 shows the frequency of participants' ages as grouped by decades. The majority were over age 50.

Participant responses to "Marital Status" revealed that most ($n = 103$) were "married" and an additional three were living with someone. The sample, then, reflects that over half of the participants had the potential for social support from another living in the home. A summary of specific responses to "Marital Status" is shown in Table 3

Ethnic origin, or race, of the participants included primarily "white-not Hispanic or Latino" ($n = 131$, 82.9%). Clearly, they represented the majority of the participants. The remaining 17.1% included "white-Hispanic or Latino," "Black or African American-Not Hispanic," "Black or African American and White – Not Hispanic or Latino," "American Indian or Alaska Native and White – not Hispanic of Latino," and "Other Hispanic or Latino."

Table 3

Demographics of Participants with Type 2 Diabetes Mellitus (N = 158)

Variable	N	%
Age in years		
21-30	4	2.5
31-40	3	1.9
41-50	20	12.7
51-60	42	26.6
61-70	47	29.8
71-80	34	21.6
81-90	8	5.0
Gender		
Female	93	58.9
Male	65	41.1
Ethnicity		
White-not Hispanic or Latino	131	82.9
White- Hispanic or Latino	10	6.3
Black or African American- Not Hispanic	9	5.7
Black or African American and White- not Hispanic	3	1.9
American Indian or Alaska Native and White- non Hispanic	2	1.3
Other Hispanic or Latino	3	1.9
Marital Status		
Never married	9	5.7
Married	103	65.2
Separated/Divorced	22	13.9
Widowed	21	13.3
Living with Someone/Partnered	3	1.9

Table 3, continued

Demographics of Participants with Type 2 Diabetes Mellitus (N = 158)

Variable	N	%
Where Participant Lives Most of the Time		
Your Home	143	90.5
Home of Relative or Friend	13	8.2
Nursing Home	1	.6
Other	1	.6
Number of People Living with the Participant		
Live alone	26	16.5
One Person	82	51.9
Two People	24	15.2
Three People	14	8.9
Four People	4	2.5
Five or More People	8	5.1
Education		
Eight grades or less	9	5.7
Some high school	16	10.1
High school graduate or GED	38	24.1
Some college or technical school	55	34.8
College graduate (bachelor's degree)	22	13.9
Graduate degree	14	8.9
Post graduate degree	4	2.5
Current Employment Status		
Full-time, 35 hours or more a week	51	32.3
Part-time, less than 35 hours a week	11	7.0
Unemployed/laid off and looking for work	3	1.9
Unemployed and not looking for work	2	1.3
Homemaker	12	7.6
In School	1	.6
Retired	57	36.1
Disabled, not able to work	21	13.3

Participants were asked, “Where do you live most of the time?” Responses indicated that the majority (143, 90.5%), lived in “their own home, apartment, or condo.” Only the remaining 9.5% lived in another setting; 13 (8.2%) lived in the home of a “relative/friend,” 1 in a nursing home, and 1 noted “other.”

Of interest in relation to this study of family support was how many people lived in the home with each individual. Slightly over half of the participants (82, 51.9%) lived with one person. Twenty-four (15.2%) lived with two people, 14 (8.9%) lived with three, 4(2.5%) lived with four, and 8(5.1%) lived with five or more. Twenty-six persons (16.5%) lived alone.

In answer to the question, “How much schooling (formal schooling) have you had?” the majority, 55 (34.8%), had “some college or technical school.” Twenty-five (15.8%) had not completed high school. Table 4 shows a further breakdown of the responses, reflecting a wide range of responses.

Participants were asked to describe their current employment status. Greater than 65% were either retired (36.1%) or working 35 hours or less a week (32.3%). The third most common response “Disabled, not able to work” described 13.3% of participants’ current employment status. “Homemaker” and “working less than 35 hours a week” accounted for 7.6% and 7.0% of participant responses respectively. Least common responses included participants indicating their current employment status as “Unemployed or laid off and looking for work” (1.9%), “Unemployed and not looking for work” (1.3%) or “In school” (0.6%).

Table 4

Diabetes Specific Demographics of Participants

Variable	N	%
Type 2 diabetes as Reported by Participants		
Type 2 – taking “no medications”	6	3.8
Type 2 – “taking diabetes medication by mouth	94	59.5
Type 2 – “taking insulin”	19	12.0
Type 2 – “taking diabetes medication by mouth and taking insulin	36	22.8
Type 2 – “taking Byetta”	3	1.9
Length of Time Participants Have Had Diabetes		
1-10 years	83	52.5
11- 20 years	51	32.3
21- 30 years	18	11.5
31- 40 years	4	2.5
41- 50 years	2	1.2
Family Member Who Supports Them in Caring for Their Diabetes		
Husband	21	13.3
Wife	44	27.8
Mother	4	2.5
Father	0	.0
Brother	1	.6
Sister	6	3.8
Daughter	8	5.1
Son	3	1.9
Friend	4	2.5
Other	1	.6
I do not feel any support from my family	8	5.1
Husband & Daughter	4	2.5
Wife & Daughter	4	2.5
Daughter & Son	9	5.7
Husband & Daughter & Son	4	2.5
Other multiple responses	37	23.6

Table 4, continued

Diabetes Specific Demographics of Participants

Variable	N	%
Rate Overall Support Your Family Offers You in Caring for Your Diabetes		
0-No Support	9	5.7
1	2	1.3
2	4	2.5
3	5	3.2
4	0	.0
5	10	6.3
6	3	1.9
7	6	3.8
8	23	14.6
9	12	7.6
10-Support as Good as it can be	82	51.9
Missing data	2	1.3
Participants Who Participated in a Diabetes Support Group		
Attend	24	15.2
Do not attend	133	84.7
Missing data	1	.6

Participants were asked to indicate how their type 2 diabetes was being categorized by their HCP provider based on treatment with or without any medications, and the route or type of any medications taken. Only 6 (3.8%) participants did not take any medications. Over half (94, 59.5%) were taking diabetes medications orally. Nineteen (12%) were injecting insulin only. Thirty-six (22.8%) were taking diabetes

medications orally, as well as insulin. Three (1.9%) were injecting Byetta, one of the newest medicines for treatment of type 2 diabetes.

Participants were asked the length of time (in years) they had had diabetes (see Table 4). The time ranged from 1 to 49 years, with a mean of 11.5 ($SD = 8.9$). When the years were arranged in decades, the greatest number of participants ($n = 83$, 52.5%) noted having had this diagnosis from 1 to 10 years.

The question “Who do you consider to be the family member(s) that support(s) you in caring for your diabetes?” allowed the participants to choose one family member or multiple family members, as well as the options of “friend you consider as a family member” and “Other.” Twenty-one (13.3%) of the participants answered “Husband,” 44 (27.8%) answered “Wife,” 4 (2.5%) answered “Mother,” “Father” by itself was not chosen (0%), 1 (0.6%) answered “Brother,” 6 (3.8%) answered “Sister,” 8 (5.1%) answered “Daughter,” 3 (1.9%) answered “Son,” 4 (2.5%) answered “Friend you consider as a family member,” and 1 (0.6%) answered “Other.” Participants were given the added opportunity to specify those to whom they were referring. No explanation was provided by the respondent selecting the option of “Other.” Eight (5.1%) participants responded to the question by marking the answer, “I do not feel any support from my family.” Combinations of more than one family member being supportive were given by 34 (22%) participants. Of these 34 participants, 11 (6.0%) participants responded that 2 family members were supportive and 23 (14.6%) participants responded that 3 to 7 “family members” were supportive. The most common combinations were “Husband and

Daughter” (4, 2.5%), “Wife and Daughter” (4, 2.5%), “Daughter and Son” (9, 5.7%), and “Husband and Daughter and Son” (4, 2.5%). All the other combination options were given by just 1 or 2 participants.

Participants were asked to provide a global response to their perception of overall family support in caring for diabetes. Their perception was rated on a scale of 0 = *No support* to 10 = *Support as good as it could possibly be*. The mean rating was 7.99 (*SD* = 3.0). Over half (82, 51.9%) circled 10. Twelve (7.6%) circled 9, 23 (14.6%) circled 8, 6 (3.8%) circled 7, 3 (1.9%) circled 6, 10 (6.3%) circled 5, no one circled 4, 5 (3.2%) circled 3, 4 (2.5%) circled 2, 2 (1.3%) circled 1, and 2 participants did not circle any answer (1.3% missing data).

The participants were asked to respond to the question, “Do you currently participate in a diabetes support group?” Most (133, 84.2%) did not, while 24 (15.2%) did participate in a support group. Those who answered “yes” were asked to rate their overall satisfaction with the support received. The 24 who attended a support group rated their satisfaction on a scale of 0 to 10, with the higher score showing greater satisfaction. None of the responders rated their support as 0 (Not satisfied), and 18 (75%) of the 24 rated group support as 8 to 10 (see Table 5).

Table 5

Overall Satisfaction with Diabetes Support

Variable	N	% of 24	% of 158
0-Not Satisfied	0	0	0
1	1	4.2	0.6
2	0	0	0
3	0	0	0
4	0	0	0
5	2	8.3	1.3
6	2	8.3	1.3
7	0	0	0
8	3	12.5	1.9
9	4	16.7	2.5
10 – Completely Satisfied	11	45.8	7.0

Note. Frequencies not summing to 24, and percentages not summing to 100 reflect missing data.

The HbA1c levels of the participants ranged from 4.6 to 13 ($M = 7.2$, $SD = 1.718$). These HbA1c levels (see Table 6) can be compared with those levels in Table 7, which indicates what the average blood sugar level is for each of the HbA1c whole numbers. For example, if a participant has an HbA1c value of 7.0, the mean blood glucose over the past 3 months was 170 g/dl. The American Diabetes Association (2007) recommends that the HbA1c be less than 7.0 for a person with type 2 diabetes mellitus. The higher the HbA1c level (greater than 7.0), the less controlled the participant's

diabetes is considered to be and the higher the risks are for the complications related to diabetes.

Table 6

Latest HbA1c Reported

Variable	N	%	Valid %
HbA1c 4.6 – 6.0	28	23.1	17.7
HbA1c 6.1 – 7.0	54	44.6	34.3
HbA1c 7.1 – 8.0	18	14.9	11.4
HbA1c 8.1 – 9.0	6	5	3.8
HbA1c 9.1 – 10.0	4	3.3	2.5
HbA1c 10.1 – 11.0	4	3.3	2.5
HbA1c 11.1 – 12.0	4	3.3	2.5
HbA1c 12.1 – 13.0	3	2.5	1.9
Missing Data	37	0	23.4

Table 7

HbA1c and Mean Glucose Levels Shown in mg/dl

HbA1c	6.0%	7.0%	8.0%	9.0%	10.0%	11.0%	12.0%	13.0%
g/dl	135	170	205	240	275	310	345	380

Psychometric Evaluation of the HDFSS

Psychometric evaluation of the HDFSS was completed using SPSS version 16.0 statistical software. The research hypotheses were tested using appropriate statistical tests with set criteria in a group of 158 adult participants diagnosed with type 2 diabetes (Ferketich, 1990, 1991; Hinshaw Chance, & Atwood, 1981; Jensen et al., 2002; Lynn, 1986; Nunnally & Bernstein, 1994). The results related to each of these are discussed.

Hypothesis 1

Hypothesis 1 stated that the HDFSS will demonstrate an estimate supporting content validity. A pilot study was completed prior to this study for the purpose of initiating the development of the instrument. The original instrument developed, *Diabetes Family Support Scale*, had 32 items. A draft was sent to five health care providers and six adults with type 2 diabetes for evaluation of each item. Revisions were made to the wording of the questions to improve clarity based on the suggestions of these “experts.” The revised instrument was then sent to six diabetes educators, serving as content experts, for rating the relevance of the 32 items to the concept of “diabetes family support.” They were instructed to review and rate each item’s relevance to the concept which was defined as “diabetes family support” (Lynn, 1986): 1 = *Item does not measure concept*, 2 = *Item measures concept but is not clearly stated*, 3 = *Item needs minor revision for clarity*, and 4 = *Item measures concept and is clearly stated*. All six experts returned the questionnaires. Three items which were rated as “1” were deleted. The revised instrument of 29 items was resent to the same six reviewers for evaluation and

input, and the items were all rated 3 or 4 with a Content Validity Index (CVI) of 1.00.

This CVI remained the same for the 24-item HDFSS, after item reduction in the current study.

Hypothesis 2

Hypothesis 2 stated that the HDFSS will demonstrate estimates supporting internal consistency: (a) Item-item average correlation of .30 or greater, (b) Item-total score correlations between .40 and .70, and (c) Cronbach's alpha of .70 or greater (Henderson, 1993; Topp & Stevenson, 1994). Hypothesis testing began with the original 29 items, and the findings revealed that the reverse-scored variables had unacceptable estimates. When an item had a low item-to-total correlation ($< .40$) and also made a questionable contribution to the emergent factor when PCA was run, it was eliminated from the questionnaire. This represented the data, or item, reduction portion of the tool's development and testing. This procedure resulted in the deletion of 5 items. Twenty-four items were retained in the final instrument that met the criteria for internal consistency. The item-to-item average correlation among all 24 items in the scale was .52. The Cronbach's coefficient alpha was .96. The item-total correlations ranged from .50 to .84. All met the minimum correlation criterion of .40, while 15 were above .70. Additionally, all of the items retained contributed to the obtained alpha. Table 8 gives a summary of the item-total correlations for the 24 items retained in the instrument.

Table 8

Item Statements of Hensarling's Diabetes Family Support Scale

Item Statement	Item-total correlation	Cronbach's Alpha if Item deleted
A family member goes with me to my doctor appointments if asked.	.564	.959
A family member attends diabetes classes/education with me if asked.	.567	.960
My family member keeps up with current information about diabetes.	.716	.958
My family member knows when I am having problems related to my diabetes.	.752	.957
My family member listens to me when I talk about my diabetes	.731	.958
My family member shows understanding of how I feel about my diabetes.	.785	.957
I feel free to seek advice from my family member about my diabetes.	.782	.957
A family member reminds me to check my blood sugar if I forget.	.767	.957

Table 8, continued

Item Statements of Hensarling's Diabetes Family Support Scale

Item Statement	Item-total correlation	Cronbach's Alpha if Item deleted
A family member supports my efforts to exercise.	.681	.958
A family member encourages me to follow my meal plan	.790	.957
A family member reminds me to reorder my diabetes medications.	.556	.960
I feel comfortable asking a family member for help when I am struggling with my diabetes.	.785	.957
My family has regular meal times.	.495	.960
A family member encourages me to see the eye doctor at least once a year.	.684	.958
A family member encourages me to check my feet.	.688	.958
A family member encourages me to go to the dentist at least once a year.	.592	.959
I feel free to ask a family member for support to help me care for my diabetes.	.709	.958

Table 8, continued

Item Statements of Hensarling's Diabetes Family Support Scale

Item Statement	Item-total correlation	Cronbach's Alpha if Item deleted
My family keeps food available for me that I can eat.	.716	.958
A family member supports my efforts to eat as I should.	.778	.957
A family member encourages me to go to the doctor at least once a year.	.759	.957
A family member helps me when I am stressed about diabetes.	.842	.956
A family member knows when I feel sad/blue about my diabetes.	.767	.957
A family member knows how to help me handle sick days.	.819	.957
A family member will help me pay for diabetes medication/supplies if necessary.	.528	.960

Hypothesis 3

Hypothesis 3 stated that the HDFSS will demonstrate estimates of concurrent validity and predictive validity supporting criterion-related validity. Concurrent validity

was estimated by correlating the total HDFSS score with a 1-item rating of “perceived overall family support” on a scale of 0 to 10 (Youngblut & Casper, 1993). *Kendall’s tau* (τ) correlation was used, resulting in a moderate and significant computed correlation of .58 ($p = .01$). A 1-tailed significance is reported for testing this directional hypothesis. Because these are similar concepts and were measured at the same point in time, the criterion for concurrent validity was set at .55 (moderately high).

Predictive validity was estimated by correlating the total HDFSS to the self-reported HbA1c value using *Kendall’s tau* (τ). Generally, the predicted variable is measured at a later time than the predictive variable (Waltz, Strickland, & Lenz, 2005). In this case, an assumption was made that the family support that existed over the time period covered by accumulated measure of the HbA1c was reflected in the support measure by the HDFSS. Because the HbA1c is a physiological measure that may be influenced by a variety of variables, the criterion set for its correlation with the HDFSS was moderate and in a negative direction. In other words, the higher the HDFSS score, the lower the HbA1c is expected to be. The obtained correlation (*Kendall’s tau* $\tau = -.048$, $p = .45$) was low, but in the predicted direction.

Hypothesis 4

Hypothesis 4 stated that the HDFSS will demonstrate a moderately high correlation ($\tau \geq .55$) supporting convergent validity. The SSCII was selected for testing because the concept it measures is similar to that of “family support for the person with diabetes. Based on the similarity of the concepts measured, the correlation criterion ($\tau \geq$

.55) was expected to be moderately high. The SSCII consists of 38 Likert-type items measuring the concept of the “perceived satisfaction with social support received by chronically ill persons” (Hilbert-McAllister, 2003, p. 173). Possible responses, with a rating of 1 to 6 for each item, are as follows: 1 = *Dissatisfied*, 2 = *Somewhat dissatisfied*, 3 = *Partly satisfied*, 4 = *Somewhat satisfied*, 5 = *Satisfied*, and 6 = *Very satisfied*. The participants were asked to note how satisfied they are with the helping behaviors of persons toward them in the past month. The higher the score, the higher is the perceived satisfaction with social support. Reported coefficient alpha for the total SSCII scale was .98. Reliability coefficients for the SSCII subscales ranged from .84 to .94. The individual items demonstrated item-to-total correlations ranging from .56 to .87 (Hilbert-McAllister, 2003). The estimation of convergent validity was moderate; the correlation (τ) of the total HDFSS score and the total SSCII score was .52.

Hypothesis 5

Hypothesis 5 stated that the HDFSS will demonstrate internal construct validity through emergent dimensions that are consistent with the concept of “Diabetes Family Support.” As discussed earlier in this chapter, KMO Measure of Sampling Adequacy and Bartlett’s Test of Sphericity were run to determine if the correlation matrix was appropriate for using factor analysis with this study’s data. The results showing the KMO of .941 and Bartlett’s Test of Sphericity of 3.09 ($p < .000$) supported the use of factor analysis with the data (Pett, 2003; Waltz et al., 2005).

Factor Analysis was performed in SPSS 16.0 using both the principal components analysis (PCA) and common factor analysis (CFA). For PCA, the choice of orthogonal varimax rotation was used, and the rotated factor matrix was used for interpretation of the results. For CFA, the oblique rotation (direct oblimin) was chosen and both the pattern matrix and structure matrix were interpreted. The various approaches to running the factor analysis confirmed the initial findings of the PCA with orthogonal varimax rotation that the concept of “Diabetes Family Support” consisted of 4 dimensions. These dimensions were identified, or named, as follows: (a) empathetic support, (b) encouragement, (c) facilitative support, and (d) participative support.

Eigenvalues, and the percent of variance explained, for factors 1, 2, 3 and 4 were 13.05 (54.4%), 1.47 (6.1%), 1.36 (5.7%), and 1.05 (4.3%) respectively (see Tables 9-12). Factor 1 included HDFSS variables 5, 6, 27, 4, 7, 26, 15, and 3 that noticeably indicated a sense of “empathetic support” as the statements contained the words “listens to me,” “shows understanding,” “knows when I.” Factor 2 included HDFSS variables 18, 19, 20, 8, 14, 25, and 10 that strongly indicated a sense of “encouragement” with the words “encourages me” or “reminds me” in all of the statements. Factor 3 (PCA) and Factor 4 (CFA) included HDFSS variables 16, 21, 23, 29, 9, and 22; these items indicated “facilitative support” with the words “helps,” “supports,” and “keeps” in the statements. Factor 4 (PCA) and Factor 3 (CFA) included variables 1 and 2 and indicated a sense of “participative support” with the words “goes with me” and “attends.” Tables 9-12 show

the findings of the factor analysis and the resulting four dimensions. Pearson's r was used to examine the relationships among the factors; these ranged from .50 to .79.

Table 9

Factor 1 of the Four Factors (Dimensions) of HDFSS

HDFSS Question	PCA	CFA Pattern Matrix	CFA Structure Matrix
Factor 1 (Empathetic support)			
5. My family member listens to me when I talk about my diabetes. (hdfss5)	0.808	0.888	0.853
6. My family member shows understanding of how I feel about my diabetes. (hdfss6)	0.775	0.818	0.867
27. A family member knows when I feel sad/blue about my diabetes. (hdfss27)	0.748	0.754	0.823
4. My family member knows when I am having problems related to my diabetes. (hdfss4)	0.748	0.768	0.816
7. I feel free to seek advice from my family member about my diabetes. (hdfss7)	0.748	0.7	0.836
26. A family member helps me when I am stressed about diabetes. (hdfss26)	0.675	0.611	0.842
28. A family member knows how to help me handle sick days. (hdfss28)	0.678	0.644	0.826
15. I feel comfortable asking a family member for help when I am struggling with my diabetes. (hdfss15)	0.671	0.602	0.798
3. My family member keeps up with current information about diabetes. (hdfss3)	0.597	0.549	0.725

Table 10

Factor 2 of the Four Factors (Dimensions) of HDFSS

HDFSS Question	PCA	CFA Pattern Matrix	CFA Structure Matrix
Factor 2 (Encouragement)			
18. A family member encourages me to see the eye doctor at least once a year. (hdfss18)	0.8	0.821	0.838
19. A family member encourages me to check my feet. (hdfss19)	0.747	0.729	0.796
20. A family member encourages me to go to the dentist at least once a year. (hdfss20)	0.705	0.638	0.698
8. A family member reminds me to check my blood sugar if I forget. (hdfss8)	0.67	0.631	0.8
14. A family member reminds me to reorder my diabetes medications. (hdfss14)	0.612	0.546	0.62
25. A family member encourages me to go to the doctor at least once a year. (hdfss25)	0.578	0.47	0.736
10. A family member encourages me to follow my meal plan. (hdfss10)	0.592	0.481	0.765

Table 11

Factor 3 of the Four Factors (Dimensions) of HDFSS

HDFSS Question	PCA	CFA Pattern Matrix	CFA Structure Matrix
Factor 3 (Facilitative support)			
16. My family has regular meal times. (hdfss16)	0.78	0.658	0.655
21. I feel free to ask a family member for support to help me care for my diabetes. (hdfss21)	0.652	0.635	0.785
23. A family member supports my efforts to eat as I should. (hdfss23)	0.595	0.613	0.827
29. A family member will help me pay for diabetes medication/supplies if necessary. (hdfss29)	0.546	0.355	0.508
9. A family member supports my efforts to exercise. (hdfss9)	0.496	0.386	0.678
22. My family keeps food available for me that I can eat. (hdfss22)	0.463	0.369	0.641

Table 12

Factor 4 of the Four Factors (Dimensions) of HDFSS

HDFSS Question	PCA	CFA Pattern Matrix	CFA Structure Matrix
Factor 4 (Participative support)			
1. A family member goes with me to my doctor appointments if asked. (hdfss1)	0.853	0.921	0.948
2. A family member attends diabetes classes/education with me if asked. (hdfss2)	0.736	0.518	0.645

Summary

Ninety-three women and 65 men ($N = 158$), ages 21 to 87 years ($M = 61.36$, $SD = 12.6$) who had been diagnosed with type 2 diabetes mellitus by their HCP, participated in psychometric testing of HDFSS. Description of the sample on numerous descriptive variables was reported, primarily through the use of frequencies and percentages.

This instrument, the HDFSS, was developed by the PI to measure the concept of “Diabetes Family Support” in adult patients with type 2 diabetes mellitus. Psychometric estimates for HDFSS included performing statistical analysis of: (a) content validity using the procedures by Lynn (1986), (b) internal consistency using Cronbach’s alpha, (c)

criterion-related validity (concurrent validity estimated by correlation of total the HDFSS score with a 1-item rating of “perceived overall family support” and predictive validity estimated by correlation of total HDFSS score and self-reported HbA1c), (d) convergent validity estimated by correlation of total HDFSS score and total SSCII score, and (e) internal construct validity estimated by using factor analysis (Pett, 2003). Prior to performing the appropriate statistical tests, statistical assumptions were tested. The results of each of these tests are provided.

CHAPTER V

DISCUSSION OF FINDINGS

Summary of the Study

Family members have been documented as an important source of support for patients with type 2 diabetes who are maintaining control of their diabetes, as well as providing care and comfort during times of acute exacerbations (ADA, 2008a; Barnhoorn & Adriaanse, 1992; Lo, 1999; Hutchison, 1999; Sherbourne, Hayes, Ordway, DiMatteo, & Kravitz, 1992; Stewart, 1993; Tillotson & Smith, 1996). Despite the importance of family members' support, no psychometrically sound instrument has been identified by the researcher that guides the health care practitioner in assessing the adult patient's perception of that support. This lack of a diabetes-specific instrument to measure the concept of family support in adults with type 2 diabetes presents a problem for the patient and practitioner in planning for optimum disease management. The purpose of this methodological study was to develop *Hensarling's Diabetes Family Support Scale* (HDFSS) as a valid and reliable instrument to measure how adults with type 2 diabetes perceive their family's support and to estimate the instrument's psychometric properties. Such a tool would be valuable for research, as well as clinical, applications.

Family, for the purpose of this research, was defined as "a group of intimates living together or in geographical proximity with strong emotional bonds (identification, attachment, loyalty, reciprocity, solidarity), and with a history and future" (Fisher et al.,

1998, p. 602). Conceptually, *perceived family support* is defined as *how persons with type 2 diabetes view their family's support*. The conceptual framework that guided the study combined the work of several authors with Bowen's Family Systems Theory. Bowen's selected concepts of (a) differentiation of self, (b) nuclear family emotional system, and (c) multigenerational transmission process, were integrated with the importance of individual patient characteristics, patient-family relationships, and characteristics of the patient-healthcare-provider relationship (Bowen Center, 2004). The framework, which guided the development of the HDFSS items, emphasizes issues that have an effect on disease outcomes from the perspective of a family context of care (Fisher et al.).

Perceived family support is measured by the total HDFSS score. The higher the HDFSS score, the greater the individual perceives their family member's support to be. This measurement may assist in gaining a better understanding of how perceived family support helps the individual's control of the disease and prevention of disease specific complications. The principal investigator (PI) proposes that use of the instrument in practice may lead to development of a more patient-specific treatment regime, individualized patient and family education modalities, and group programs that will assist those affected by type 2 diabetes to have more positive outcomes. HDFSS will allow the measurement of the concept of family support for clinical and research purposes.

Hypotheses Summary

Five hypotheses guided the psychometric testing of the newly-developed HDFSS instrument. Hypothesis 1 stated that the HDFSS will demonstrate an estimate supporting content validity. Hypothesis 2 stated that the HDFSS will demonstrate estimates supporting internal consistency which included: (a) Item-item average correlation of .30 or greater, (b) Item-total score correlation between .40 and .70, and (c) Cronbach's alpha of .70 or greater. Hypothesis 3 stated that the HDFSS will demonstrate estimates of concurrent validity and predictive validity supporting criterion-related validity. Hypothesis 4 stated that the HDFSS will demonstrate an estimate supporting convergent validity. Lastly, Hypothesis 5 stated that the HDFSS will demonstrate internal construct validity through emergent dimensions that are consistent with the concept of "Perceived Family Support."

Suggestions for use of the instrument in research and clinical settings are based on the study's findings and the PI's years of professional experience as a Family Nurse Practitioner and Diabetes Educator providing health care for individuals with type 2 diabetes. Conclusions of this study, as well as recommendations for future studies, will be presented based on the analysis and interpretation of the study data.

Discussion of Findings

Sample

The recommended sample size for psychometric testing of an instrument with 29 items was 145 (29 items x 5 = 145; Cattell, 1978; Gorsuch, 1983; Nunnally & Bernstein,

1994). The PI planned to recruit 150 to 175 individuals for this study. The PI contacted health care providers including physicians, diabetes educators, nurse practitioners and physician assistants to get an adequate number of participants. Four hundred and forty packets were mailed to individuals who the health care providers identified as meeting the study criteria. The method of recruitment of participants seemed to be effective, given that, of those 440 packets, 174 (39.5%) were returned to the PI. Of those 174 packets that were returned, 158 packets were used in the study. Eleven were not used because of too much missing data; 6 of these had as much as one page of the instrument with no answers and 1 had no answers on either the HDFSS or the Social Support in Chronic Illness Inventory (SSCII). Five packets were excluded because the consent form was not signed.

The 158 participants met the criteria for the study which included diagnosis of type 2 diabetes, 18 years of age or older, and able to read English. The sample included 65 males (41%) and 93 females (59%), however, the percentages of those with type 2 diabetes in the United States (U.S.) are almost evenly divided by gender with 12% being male and 11.5%, female. The study sample would have been more representative of the U.S. population if the percentages of males and females had been more nearly equal. The mean age of this sample was 61.36 years ($SD = 12.6$), and 56.4% of participants were over age 60. The age group with the highest prevalence of diagnosed and undiagnosed diabetes in the U.S. is 60 years of age and older (Centers for Disease Control [CDC], 2007).

According to the CDC, 6.6% of all non-Hispanic whites, 7.5% of Asian Americans, 10.4% of Hispanics, and 11.8% of all African Americans age 20 years and older have diabetes in the U.S. (CDC, 2007). In this study, non-Hispanic whites ($n = 131$, 82.9%) were overrepresented. The ethnic groups in the U.S. 20 years and older who were underrepresented in the sample included Asian Americans ($n = 0$), Hispanics ($n = 13$, 8.2%) and, African Americans ($n = 12$, 7.6%; see Table 4, p.68).

One hundred and thirty-two of the participants lived with one or more people. This could present them with a possible family support member on a regular basis. The time the participants had been diagnosed with diabetes ranged from approximately 1 year to 49 years ($M = 11.5$, $SD = 8.9$), indicating many levels of experience in living with diabetes for both the patient and family members.

Content Validity of HDFSS

Content validity determines if each of the items in the instrument is relevant to the construct being measured (Lynn, 1986). Hypothesis 1 stated that the HDFSS will demonstrate an estimate supporting content validity, and it was found to do so. Testing began with the instrument of 29 items, developed in a previous pilot study. It was resent to the same six reviewers who had evaluated it earlier for evaluation and input, and the items were all rated as relevant with a Content Validity Index (CVI) of 1.00. The HDFSS, therefore, was determined to have content validity for measuring the concept of perceived family support of the individual with type 2 diabetes.

Reliability (Internal Consistency) of the HDFSS

Reliability (i.e., internal consistency) refers to how internally consistent the instrument's items are in measuring the concept of interest (Burns & Grove, 2001). Hypothesis 2 stated that the HDFSS will demonstrate estimates supporting internal consistency using the following criteria: (a) Item-item mean correlation of .30 or greater, (b) Item-total score correlations between .40 and .70, and (c) Cronbach's alpha of .70 or greater (Henderson, 1993; Topp & Stevenson, 1994). Five negatively worded items were deleted because they did not meet the desired relationship ($\geq .30$) with other items in the instrument or the criterion of .40 for item-total correlations. After the 5 questions were removed, the mean inter-item correlation increased from .411 to .515. Fifteen of the items had item-total score correlations above .70 (see Table 8, p.76). Following is a list of the items deleted with the less than desired relationships: (a) Item number 11, "My family member keeps sweet snacks around," (b) Item number 12, "My family member eats foods around me that are not on my meal plan," (c) Item number 13, "My diabetes makes my family member(s) very nervous," (d) Item number 17, "My family member seems embarrassed that I have diabetes," and (e) Item number 24, "Some of my family members do not believe that I have diabetes" (see Appendix F).

The 24-item HDFSS was determined to be internally consistent with this sample. The item-to-item average correlation among all 24 items in the scale was .52. The Cronbach's coefficient alpha for the total scale was .96, which is greater than the criterion

of .70 for a new instrument. Additionally, all of the 24 items retained contributed to the obtained alpha.

Criterion-Related Validity

Criterion related validity measures the degree to which the outcomes of an instrument correlate with the outcomes of a criterion test. Criterion related validity consists of concurrent and predictive validity (Portney & Watkins, 2000). Concurrent validity tests the correlation between the instrument and a criterion test when both tests are given at about the same time frame. Predictive validity predicts the future performance of the instrument (Portney & Watkins). Hypothesis 3 stated that the HDFSS will demonstrate estimates of concurrent validity and predicative validity supporting criterion-related validity.

Concurrent validity. Concurrent validity was estimated by correlating the total HDFSS score with a 1-item rating of “perceived overall family support” on a scale of 0 to 10 (Youngblut & Casper, 1993). *Kendall’s tau* (τ) correlation was used, resulting in a moderate and significant computed correlation of .58 ($p = .01$). A 1-tailed significance was reported for testing this directional hypothesis. Because these are similar concepts and were measured at the same point in time, the criterion for concurrent validity was set at .55 (moderately high). The results support concurrent validity, or that the total HDFSS score captures the individual’s perception of family support.

Predictive validity. Predictive validity was estimated by correlating the total HDFSS score with the self-reported HbA1c value using *Kendall's tau* (τ). Because the HbA1c is a physiological measure that may be influenced by a variety of variables, the criterion set for its correlation with the HDFSS was moderate. The direction of the association was expected to be negative; the higher the HDFSS score, the lower (or better) the HbA1c is expected to be. The obtained correlation (*Kendall's* $\tau = -.048, p = .45$) was low, but in the predicted direction.

According to the American Diabetes Association (ADA; 2008a), the health care provider (HCP) and patient should work together to meet the treatment regimen goals. Epidemiologic studies have suggested that the HbA1c goal in individual patients should be as close to normal (<6%) as possible without significant hypoglycemia (Cagliero, Levina, & Nathan, 1999; Miller et al., 2003; Sacks et al., 2002). The ADA recommendations are that (a) the HbA1c test is performed at least two times a year for patients who are meeting the treatment goals of a HbA1c of 7% or less (and who have stable glycemic control), (b) HbA1c is performed quarterly in patients whose therapy has changed or who are not meeting glycemic goals, and (c) point-of-care testing of HbA1c is to be done for making timely decisions on therapy changes when needed (ADA, 2008a; Resnick, Foster, Bardsley, & Ratner, 2006).

When looking at the correlation between family support (total HDFSS score) and the HbA1c variable, in this study, an assumption is made that the family support that existed over the time period of the accumulated measure of the HbA1c (3months) was

reflected in the support measured by the HDFSS. In actuality, the dates the participants documented they had had an HbA1c drawn were from 6/18/06 through 10/4/08. The collection forms for this study were dated between 6/8/08 and 10/20/08. Consequently, in some of the participants, the last HbA1c could conceivably have been drawn up to 2 years before the HDFSS was completed. It is obvious that some of the participants were not meeting the recommendation noted above. Thirty seven of the participants did not record an HbA1c result. Of the 121 participants who did record an HbA1c, it is obvious from the documentation of the participants that many were outside the 3-6 month time frame recommendation.

To encourage proper documentation of the HbA1c in the future, including the date it was completed, changes in the format of the HbA1c documentation need to be made. The data collection tool needs to be revised to document the date the previous HbA1c was drawn and the date the most current HbA1c was drawn. If the HDFSS is used at each diabetes-specific follow-up visit with the HCP, but not more often than every 6 months, it will be much easier to see if there is a correlation between the total HDFSS score and the recorded HbA1c. This will be easy to assess for individual patients in the clinic or office setting. The literature indicates that availability of the HbA1c result at the patient's visit with the HCP has been reported to increase compliance with therapy and improvement in glycemic control (Cagliero et al., 1999; Miller et al., 2003).

Since the obtained correlation in this study was in the predicted direction, even though low, the researcher projects that routine (every 3-6 months) HbA1c values will

show a greater negative correlation with the HDFSS total scores in patients who perceive a greater degree of support from family members. Even though there are many etiologies for changes in the HbA1c levels, many of the diabetes specific self-management techniques can be improved with the support of family members. In consideration of possible causes of an increase in HbA1c values, the HCP, patient, and family member should evaluate whether some changes in support might be needed to assist the patient in meeting goals.

Convergent Validity

Convergent validity assesses the degree to which two different instruments are able to measure a construct (Portney & Watkins, 2000). Hypothesis 4 stated that the HDFSS will demonstrate a moderately high correlation ($\tau \geq .55$) supporting convergent validity when related to the SSCII. The SSCII was selected for testing because the concept it measures is satisfaction with “family support” for the person with a chronic illness (Hilbert-McAllister, 2003). The participants are asked to rate, on a 6-point scale, how satisfied they are with the helping behaviors of family members in the past month. The higher the score, the higher is the perceived satisfaction with social support. The estimation of convergent validity was moderate ($\tau = .52$), rather than moderately high ($\tau = .55$) as projected.

Construct Validity

Construct validity is the degree to which a theoretical construct is measured by an instrument (Portney & Watkins, 2000). Hypothesis 5 stated that the HDFSS will

demonstrate internal construct validity through emergent dimensions that are consistent with the concept of “Diabetes Family Support.” The concept of diabetes family support that guided this study was based on, “how patients with diabetes view their family’s support” and the importance of each patient’s view of family support. There is clear documentation in the review of diabetes specific literature that family support is a major influence on diabetes self-care in adult patients (AADE, 2006; ADA, 2006, 2007b, 2008b; Epple, Wright, Joish, & Bauer, 2003; Franz, 2003; Gerstle, Vareene, & Contento, 2002; Wen, Shepherd, & Parchman, 2004).

Family systems theory was chosen as the basis of the conceptual framework guiding this study. Bowen’s Family Systems Theory seemed to be a fit because it is founded on the premise that family members profoundly affect each others’ thoughts, feelings and actions (Kerr & Bowen, 1988; Titelmam, 1998). It was the supposition of the researcher based on professional experience and review of the literature, that the perceived family support or lack thereof for patients with diabetes is based on their perception of how family members think, feel, and act toward them. Diabetes specific family support is important to the patient because this is how the family member(s) are seen as supporting and assisting the patient in the diabetes specific self-management, day-to-day, interventions that lead to the best possible outcomes. Bowen’s theory had eight interlocking concepts: (a) triangles, (b) differentiation of self, (c) nuclear family emotional system, (d) family projection process, (e) multigenerational transmission process, (f) emotional cutoff, (g) sibling position, and (h) societal emotional process. The

framework for this study focused on the second, third and fifth concepts of Bowen's Family Systems Theory.

Bowen's second concept, differentiation of self, expresses the idea that an individual with a well-differentiated self realizes his or her realistic dependence on others and the need for help in guiding decisions about important issues (Bowen Center, 2004). Patients with diabetes, depending on the state of their disease process, often have to learn to depend somewhat on others to maintain their optimal health. Those closest to them and whom they most often can seek help from are family members.

Bowen's third concept, nuclear family emotional system, presents the idea that relationships may cause family tensions, meaning that some family members maintain functioning while having adverse affects on others in the family (Bowen Center, 2004). Diabetes, as well as other chronic health care conditions, may cause added stress to the family emotional system. The extent of the stress and reaction to that stress by family members can be either supportive or restrictive to the patient with diabetes. Measurement of the perception of the support from family members for the patient with diabetes can be useful in determining the need for development, encouragement, or interventions at an individual and family level.

Bowen's fifth concept, multigenerational transmission process, indicates that the process of mutigenerational transmission may affect the stability in relationships and also health care decisions (Bowen Center, 2004). The understanding of this process will help family members in assisting the patient with diabetes to deal with the added stress of the

disease. For the patient to accept and meet the daily challenges of having diabetes, both the patient and family members should come to grips with the multigenerational transmission process and how the necessary changes will be addressed. The differences between ideologies, coping, transference of knowledge, and ways change and stress are dealt with makes a substantial difference in the family support system. The support of family members, including parent-to-child, child-to-parent, sibling-to-sibling, spouse-to-spouse, grandchild-to-grandparent, etc. needs to be evaluated and necessary adaptations made based on diabetes-specific support that is required to make the health care plan regimen successful.

Factor Analysis of the HDFSS questions was performed in SPSS 16.0 using both the principal components analysis (PCA) and common factor analysis (CFA). Both the PCA and CFA indicated that there were four dimensions (factors) with very similar variables of the HDFSS included in each factor. The dimensions were clearly identified as follows: (a) Factor 1 was “empathetic support,” (b) Factor 2 was “encouragement,” (c) Factor 3 was “facilitative support,” and (d) Factor 4 was “participative support.” Tables 9-12 (pp. 82-85) show the items that factored into each.

Factor 1 included HDFSS variables 5, 6, 27, 4, 7, 26, 15, and 3 that noticeably indicated a sense of “empathetic support” as the statements contained the words “listens to me,” “shows understanding,” “knows when I.” Factor 1 seems to be supported by Bowen’s fifth concept, multigenerational transmission, and the understanding that member(s) of a family seem to have for each other based on generations of coping skills.

The methods of showing understanding have been passed on from generation to generation and also across generations of family members. The researcher's experience suggests that behaviors of communication and interactions between family members are often based on what is considered to be acceptable for that family situation. For example, family members may have the attitude of a warm loving environment and nourishment of those who are in need or they may have the attitude of "pull yourself up by your boot straps" and "deal with it."

Using the HDFSS and being able to access how the patient views the support of the family may become a very valuable insight for the patient, family member(s) and HCP. There may be times when the patient may need or want more support than the family member or HCP realizes. There may also be times that appearances suggest to the HCP that the family needs to be more supportive, when the patient actually feels the family member(s) are being very supportive and understanding. The HDFSS measures the patient's perception of the family member(s) support and the process of completing the HDFSS and reviewing the findings may give voice to the individual's perception, instead of relying on the perception of the HCP when developing the patient's plan of care.

Factor 2 included HDFSS variables 18, 19, 20, 8, 14, 25, and 10 that strongly indicated a sense of "encouragement" with the words "encourages me," or "reminds me" in all of the statements. Interestingly enough, Bowen's third concept, nuclear family emotional system, presents the idea that relationships may cause family tensions; some

family members maintain functioning while, at the same time, having adverse affects on others in the family (Bowen Center, 2004). Measurement of perceived family support by the HDFSS may be helpful for the patient, family member(s), and HCP in determining the need for development, encouragement, or interventions at an individual and/or family system level.

Factor 3 (PCA) and Factor 4 (CFA) included HDFSS variables 16, 21, 23, 29, 9, and 22; these items indicated “facilitative support” with the words “helps,” “supports,” and “keeps” in the statements. Factor 4 (PCA) and Factor 3 (CFA) included variables 1 and 2 and indicated a sense of “participative support” with the words “goes with me” and “attends.” Both the facilitative and participative types of family support seem to be supported by Bowen’s second concept, differentiation of self, where the patient realizes his or her dependence on others and the need for assistance in making decisions and in help with the day-to-day self-management of diabetes (Bowen Center, 2004). At some time in the progression or acute exacerbation of the disease process, the patient with diabetes will need help.

The HDFSS may become a more valuable assessment tool as the disease process continues and needs change over time. Initially the person may feel a great deal of support from the family member(s). There may even be too much support, interfering with the individual’s assumption of responsibility for self-care. In some cases, the family may be more sympathetic and helpful during the newness of the diagnoses but as time goes on and the day-to-day grind of the disease and the need for more assistance

increases, the support - or at least the patient's perception of that support - may change.

The HDFSS will make it possible to measure the perception of support over time, making it possible for the patient, family member(s) and HCP to stay up to date with any change in perception.

Research Implications

This study, completed with 158 participants, focused on psychometric testing of the HDFSS. Based on the estimation of the instrument's internal consistency, construct validity, criterion validity and convergent validity with this sample, the instrument now needs to be tested with additional samples of patients with type 2 diabetes to determine if the findings replicate. Further research and similar statistical correlations and outcomes will give the instrument more credence and will support its use for both clinical and research applications. Since the instrument is relatively short and can be quickly completed, it does not require a lengthy time commitment from research participants. Any measures that can be taken to study ways to improve management approaches and positive outcomes for patients with type 2 diabetes, family members, and health care providers (HCPs) will be beneficial.

Clinical Implications

The HDFSS provides an efficient, valid, and reliable tool that can be used to collect important information in the clinical setting. Again, patients can complete the 24-item HDFSS in a short period of time. The completed tool could provide a basis for discussion and planning of diabetes self-management, with the support of family

members. With an increased understanding of how family support is perceived by the patient, as reflected by the total HDFSS score, the HCP can bolster this support system with encouragement, education, and inclusion in the management of the disease process to the limit the patient desires.

Conclusions and Recommendations for Future Study

Conclusions

Based on these study findings, the following conclusions are made:

1. The HDFSS demonstrated content validity for the measurement of the perception of “diabetes family support” of adults with type 2 diabetes. Its Content Validity Index was 1.00.
2. The HDFSS demonstrated estimates supporting internal consistency which included: (a) Item-item average correlation of .52, (b) Item-total score correlations between .49 and .87, and (c) Cronbach’s alpha of .96.
3. The HDFSS demonstrated an estimate of concurrent validity. This was tested by correlating the total HDFSS score with a 1-item rating of “perceived overall family support” (on a scale of 0 to 10). *Kendall’s tau* (τ) correlation was used, resulting in a moderate and significant computed correlation of .58 ($p = .01$).
4. Predictive validity, as tested by correlating the total HDFSS score with the self-reported HbA1c, was not supported. While the computed correlation ($\tau = -.048$, $p = .45$) was in the predicted direction, it was low. Evaluation of these results led the researcher to believe the selection of the criterion (HbA1c) was appropriate, but that

the collection of the HbA1c results must be done in a timely manner along with the HDFSS data collection.

5. The HDFSS demonstrated an estimate slightly below that expected to support convergent validity. The estimation of the convergent validity was moderate ($\tau \geq .52$), rather than moderately high ($\tau \geq .55$) as desired. The moderate correlation does indicate that there is similarity between the concepts measured, keeping in mind that the HDFSS measures perception of family support by persons with type 2 diabetes, while the SSCII measures satisfaction with the family support perceived by those with chronic illness.
6. The HDFSS demonstrated internal construct validity through emergent dimensions that are consistent with the concept of “Diabetes Family Support.” Using both the principal components analysis (PCA) with the orthogonal varimax rotation and the common factor analysis (CFA) with the oblique rotation (direct oblimin), four dimensions were identified for the concept of “Diabetes Family Support”: (a) empathetic support, (b) encouragement, (c) facilitative support, and (d) participative support. The dimension correlations are all above .50 indicating that these are dimensions of one instrument (or construct) not “true” subscales that are measuring different constructs.

Recommendations for Future Study

The recommendations for future study are based on the analysis of the data which supports the HDFSS as a valid and reliable instrument which can be used to measure the

concept of “family support” for adults with type 2 diabetes. First, the tool needs to be used with other samples of persons with type 2 diabetes to see if the findings replicate. A sample more representative of the ethnicities of those with diabetes is desirable. A longitudinal study would allow researchers and clinicians to determine changes that may occur in perception over time. This would also assist in clarifying the relationship between the HDFSS and HbA1c results by allowing one to view the relationship at different times.

Recommendations for Clinical Application

The PI recommends that the HDFSS be clinically used with adults who have been recently (in the past 1 to 6 months) diagnosed with type 2 diabetes to evaluate their baseline perception of their family support. The HDFSS should then be administered 6 months after the initial administration and then at least yearly to measure the disease-specific family support as perceived by the patient. Instructions should stress that the patient think carefully about each question and answer honestly. The values of the answers will be of little application if the individual is not honest with his or her answers. It should be stressed that this instrument will not only help with evaluation of the patient’s perceived support overall, but will help point out disease-specific areas of family support that are strong and those where improvement is needed. Identification of areas of concern will provide planning for individual and group education.

The PI also recommends that data elicited from the HDFSS be entered into the patient’s electronic record to make the process less cumbersome over time for the patient,

as well as the HCP. This would make the whole process even less time consuming for the patient.

REFERENCES

- American Association of Diabetes Educators. (2006). *Members of the aade*. Retrieved October 31, 2006, from https://members.aadenet.org/script/content/AADEDirectory_Form.cfm
- American Diabetes Association. (2006). *Type 2 diabetes*. Retrieved October 14, 2006, from <http://www.diabetes.org/type-2-diabetes.jsp>
- American Diabetes Association. (2007a). *Consensus statement on the world wide standardization of the hemoglobin a1c measurement*. Retrieved March 1, 2009, from <http://www.diabetesjournal.org/cgi/content/full/30/9/2399>
- American Diabetes Association. (2007b). *Diabetes symptoms*. Retrieved March 1, 2009, from <http://www.diabetes.org/diabetes-statistics/prevalence.jsp>
- American Diabetes Association. (2008a). Standards of medical care in diabetes 2008: Position statement. *Diabetes Care*, 31, S12-S54.
- American Diabetes Association. (2008b). *Diabetes symptoms*. Retrieved March 10, 2008, from <http://diabetes.org/diabetes-symptoms.jsp>
- American Diabetes Association. (2008c). Nutrition recommendations and interventions for diabetes: A position statement of the American Diabetes Association. *Diabetes Care*, 31, S55-S78.

- Anderson, R.J., Grigsby, A.B., Freedland, K.E., deGroot, M., McGill, J.B., Clouse, R.E., et al. (2002). Anxiety and poor glycemic control: A meta-analytic review of the literature. *International Journal Psychiatric Medicine*, 32, 235-247.
- Anderson, R.M., Funnell, M.M., Fitzgerald, J.T., & Marrero, D.G. (1995). The diabetes empowerment scale. *Diabetes Care*, 18, 412-415.
- Anderson, R.M., Funnell, M.M., Fitzgerald, J.T., & Marrero, D.G. (2000). The diabetes empowerment scale. *Diabetes Care*, 23, 739-743.
- Ann, T. Y., Shiu, M.S., Wong, R.Y., & Thompson, D.R. (2003). Development of a reliable and valid Chinese version of the diabetes empowerment scale. *Diabetes Care*, 26, 2817-2821.
- Antithrombotic Trialists' Collaboration. (2002). Collaborative meta-analysis of randomized trials of antiplatelet therapy for prevention of death, myocardial infarction, and stroke in high risk patients. *British Medical Journal*, 324, 71-86.
- Arauz-Pacheco, C., Parrott, M.A., & Raskin, P. (2002). The treatment of hypertension in adult patients with diabetes. *Diabetes Care*, 25, 134-147.
- Baigent, C., Keech, A., Kearney, P.M., Blackwell, L., Buck, G., Pollicino, C., et al. (2005). Efficacy and safety of cholesterol-lowering treatment: Prospective meta-analysis of data from 90,056 participants in 14 randomized trials of statins. *Lancet*, 366, 1267-78.

- Bakris, G.L., Williams, M., Dworkin, L., Elliott, W.J., Epstein, M., Toto, R., et al. (2000). Preserving renal function in adults with hypertension and diabetes: A consensus approach: National Kidney Foundation Hypertension and Diabetes Executive Committee Working Group. *American Journal of Kidney Disease*, 36, 646-661.
- Barnhoorn, F., & Adriaanse, H. (1992). In search of factors responsible for non-compliance among tuberculosis patients in WARDA district, India. *Social Science and Medicine*, 34(3), 291-306.
- Barrett, E.J. (2004). Diabetes epidemic is a worldwide threat. *Clinical Diabetes*, 22, 47-48.
- Bax, J.J., Young, L.H., Frye, R.L., Bonow, R.O., Steinberg, H.O., & Barrett, E.J. (2007). Screening for coronary artery disease in patients with diabetes. *Diabetes Care*, 30, 2729-2736.
- Berg-Cross, L. (2000). *Basic concepts in family therapy: An introductory text*. New York: Haworth Press.
- Berkman, L.F. (1986). Social networks, support, and health: taking the next step forward. *American Journal of Epidemiology*, 123, 559-562.
- Beverly, E.B., Wray, L.A., & Miller, C.K. (2008). Practice implications of what couples tell us about type 2 diabetes management. *Diabetes Spectrum*, 21, 39-45.
- Blaikie, N. (2003). *Analyzing quantitative data*. London: Sage.

- Boehm, S., Schlenk, A., Funnell, M.M., Powers, H., & Ronis, D.L. (1997). Predictors of adherence to nutrition recommendations in people with non-insulin-dependent diabetes mellitus. *The Diabetes Educator*, 23, 157-165.
- Boland, E.A., Grey, M., Mezger, J., & Tamborlane, W.V. (1999). A summer vacation from diabetes: Evidence from a clinical trial. *Diabetes Educator*, 25(1), 31-40.
- Boulé, N.G., Haddad, E., Kenny, G.P., Wells, G.A., & Sigal, R.J. (2001). Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: A mega analysis of controlled clinical trials. *JAMA*, 286, 1218-1227.
- Bowen, M. (1978). *Family therapy in clinical practice*. New York: Jason Aronson.
- Bowen Center (2004). *Bowen theory*. Retrieved April 5, 2008, from <http://www.thebowencenter.org>
- Brown, J. (1999). Bowen family systems theory and practice: Illustration and critique. *Australia and New Zealand Family Therapy*, 20, 94-103.
- Burns, N., & Grove, S.K. (2001). *The practice of nursing research: Conduct, critique, and utilization*. Philadelphia: W.B. Saunders.
- Buse, J.B., Ginsberg, H.N., Bakris, G.L., Clark, N.G., Costa, F., Eckel, R., et al. (2007). Primary prevention of cardiovascular diseases in people with diabetes mellitus: A scientific statement from the American Heart Association and the American Diabetes Association. *Circulation*, 115, 114-126.
- Callaghan, P., & Morrissey, J. (1993). Social support and health: A review. *Journal of Advanced Nursing*, 18, 203-210.

- Cagliero, E., Levina, E.V., & Nathan, D.M. (1999). Immediate feedback of hba1c levels improves glycemic control in type 1 and insulin-treated type 2 diabetic patients. *Diabetes Care*, 22, 1785-1789.
- Caplin, G. (1974). *Social support systems and community mental health*. New York: Behavioral Publications.
- Carter-Edwards, L., Skelly, A.H., Cagle, C.S., & Appel, S.J. (2004). "They care but don't understand": Family support of African American women with type 2 diabetes. *Diabetes Educator*, 30, 493-501.
- Cattell, R.B. (1978). *The scientific use of factor analysis*. New York: Plenum.
- Centers for Disease Control and Prevention. (2005). National diabetes fact sheet. Retrieved April 4, 2008, from http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2005.pdf
- Centers for Disease Control and Prevention. (2007). *Complications of Diabetes in the United States*. Retrieved May 1, 2007, from <http://www.cdc.gov/diabetes/>
- Chobanian, A.V., Bakris, G.L., Black, H.R., Cushman, W.C., Green, L.A., Izzo, J.L., et al. (2003). Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. *Hypertension*, 42, 1206-1252.
- Clark, C.M., Fradkin, J.E., Hiss, R.G., Lorenz, R.A., Vinicor, F., & Warren-Boulton, E. (2001). The national diabetes education program, changing the way diabetes is treated: comprehensive diabetes care. *Diabetes Care*, 24, 617-618.

- Colwell, J.A. (2001). Aspirin therapy in diabetes is underutilized. *Diabetes Care*, 24, 195-195.
- Cox, R (2003). *Health related counseling with families of diverse cultures: Families, health, and cultural competencies*. Westport, CO: Greenwood Press.
- Delamater, A.M., Jacobson, A.M., Anderson, B., Cox, D., Fisher, L., Lustman, P., et al. (2001). Psychosocial therapies in diabetes. *Diabetes Care*, 24, 1286-1292.
- Dunbar, S.B., Jacobson, L.H., & Deaton, C. (1998). Heart failure: Strategies to enhance patient self-management. *AACN: Clinical Issues Advanced Practice in Acute Critical Care*, 9(2), 244-256.
- Dunstan, J.L., & Riddle, M.M. (1997). Rapid recovery management: The effects on the patient who has undergone heart surgery. *Heart & Lung: The Journal of Acute and Critical Care*, 26(4), 289-298.
- El-Kebbi, I.M., Bacha, G.A., Ziemer, D.C., Musey, V.C., Gallina, D.L., Dunbar, V., et al. (1996). Diabetes in urban African Americans v. use of discussion groups to identify barriers to dietary therapy among low income individuals with non-insulin-dependent diabetes mellitus. *The Diabetes Educator*, 22, 488-492.
- Epple, C., Wright, A.L., Joish, V.N., & Bauer, M. (2003). The role of active family nutritional support in navajos' type 2 diabetes metabolic control. *Diabetes Care*, 26, 2829-2834.
- Ferketich, S. (1990). Focus on psychometrics: Internal consistency estimates of reliability. *Research in Nursing & Health*, 13, 437-440.

- Ferketich, S. (1991). Focus on psychometrics: Aspects of item analysis. *Research in Nursing & Health, 14*, 165-168.
- Ferketich, S., & Muller, M. (1990). Factor analysis revisited. *Nursing Research, 39*, 59-62.
- Fick, D.S., Goff, S.F., & Oppliger, R. (1996). Running and its effect on family life. *Archives of Family Medicine, 5*(7), 385-388.
- Fields, J. (2003). America's families and living arrangements: 2003. *Current Populations Reports*, 1-20. Washington DC: U.S. Census Bureau.
- Fisher, E.B., Brownson, C.A., O'Toole, M.L., & Anwuri, V.V. (2007). Perspectives on self-management from the diabetes initiative of the Robert Wood Johnson Foundation. *The Diabetes Educator, 33*, 216S-224S.
- Fisher, L., Chesla, C.A., Bartz, R.J., Gilliss, C., Skaff, M.A., Sobogal, F., et al. (1998). The family and type 2 diabetes: A framework for intervention. *Diabetes Educator, 24*, 599-607.
- Fitzgerald, J.T., Gruppen, L.D., Anderson, R.M., Funnell, M.M., Jacobson, S.J., Grunberger, G., et al. (2000). The influence of treatment modality and ethnicity on attitudes in type 2 diabetes. *Diabetes Care, 23*, 313-318.
- Fong, D.S., Aiello, L.P., Ferris, F.L., & Klein, R. (2004). Diabetic retinopathy. *Diabetes Care, 27*, 2540-2553.

- Ford-Gilboe, M. (1997). Family strengths, motivation, resources and predictors of health promotion behavior in single-parent and two-parent families. *Research in Nursing and Health*, 20, 205-217.
- Franz, M.J. (Ed.). (2003). *A core curriculum for diabetes education: Diabetes education and program management*. Chicago: American Association of Diabetes Educators.
- Franz, M.J., Bantle, J.P., Beebe, C.A., Brunzell, J.D., Chiasson, J.L., Garg, A., et al. (2002). Evidence-based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications. *Diabetes Care*, 25, 148-198.
- Funnell, M.M., Brown, T.L., Childs, B.P., Haas, L.B., Hosey, G.M., Jensen, B., et al. (2007). National standards for diabetes self-management education. *Diabetes Care*, 30, 1630-1637.
- Gall, M.A., Hougaard, P., Borch-Johnsen, K., & Parving, H.H. (1997). Risk factors for development of incipient and overt diabetic nephropathy in patients with non-insulin dependent diabetes mellitus: Prospective, observational study. *British Medical Journal*, 314, 783-788.
- Gambert, S.R. (1990). *Diabetes mellitus in the elderly: A practical guide*. New York: Raven Press.

- Gardner, W. (2001). Does the family apgar effectively measure family functioning? *Journal of Family Practice*. Retrieved January, 1, 2001, from www.findarticles.com/p/articles/mim0689/is_1_50/af_70450770/print
- Gerstle, J.F., Varenne, H., & Contento, I. (2002). Post-diagnosis family adaptation influences glycemic control in women with type 2 diabetes mellitus. *Journal of the American Dietetic Association*, 101, 918-923.
- Glasgow, R.E. (2003). Translating research to practice: Lessons learned, areas for improvement, and future directions. *Diabetes Care*, 26, 2451-2456.
- Glasgow, R.E., & Toobert, D.J. (1988). Social environment and regimen adherence among type II diabetic patients. *Diabetes Care*, 11, 377-86.
- Glasgow, R.E., Toobert, D.J., & Gillette, C.R. (2001). Psychosocial barriers to diabetes self-management and quality of life. *Diabetes Spectrum*, 14, 33-41.
- Gorsuch, R.L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Grey, M., Boland, E.A., Yu, C., Sullivan-Bolyai, S., & Tamborlane, W.V. (1998). Personal and family factors associated with quality of life in adolescents with diabetes. *Diabetes Care*, 21, 909-914.
- Grey, M., Davidson, M., Boland, E.A., & Tamborlane, W.V. (2001). Clinical and psychosocial factors associated with achievement goals in adolescents with diabetes mellitus. *Journal of Adolescent Health*, 28, 377-385.
- Grotevant, H.D., & Carlson, C.I. (1989). *Family assessment: A guide to methods and measures*. New York: The Guilford Press.

- Haas, L.B. (2006). Caring for community-dwelling older adults with diabetes: Perspectives from health care providers and caregivers. *Diabetes Spectrum, 19*, 240-244.
- Haffner, S.M. (1998). Management of dyslipidemia in adults with diabetes. *Diabetes Care, 21*, 160-178.
- Haire-Joshu, D. (1992). *Management of diabetes mellitus*. St. Louis, MO: Mosby.
- Haire-Joshu, D., Glasgow, R.E., & Tibbs, T.L. (1999). Smoking and diabetes. *Diabetes Care, 22*, 1887-1898.
- Hanson, S.M., & Boyd, S.T. (1996). *Family health care and nursing: Theory, practice, and research*. Philadelphia: F.A. Davis.
- Harrison, V. (1999a). Educational programs in Bowen theory: Part two. *Family Systems Forum, 1*(2), 1-2.
- Harrison, V. (1999b). A better chance: A series on systems therapy based on Bowen theory. *Family Systems Forum, 1*(4), 1-3.
- Harrison, V. (2002a). A better chance: Part iv. *Family Systems Forum, 4*(3), 1-4.
- Harrison, V. (2002b). A better chance: Part v: Understanding and managing emotional reactivity in chronic illness. *Family Systems Forum, 6*(2), 1-7.
- Henderson, M.C. (1993). Measuring managerial motivation: The power management inventory. *Journal of Nursing Measurement, 1*, 67-80.
- Hensarling, J.S. (2006). *Hensarling's diabetes family support scale*. Unpublished Manuscript, Texas Woman's University, Denton.

- Hilbert, G.A. (1990). Measuring social support in chronic illness. In O.L. Strickland & C.F. Waltz (Eds.), *Measurement of nursing outcomes: Measuring client self-care and coping skills* (pp. 79-95). New York: Springer.
- Hilbert-McAllister, G.A. (2003). The social support in chronic illness inventory. In O.L. Strickland & C. Dilorio (Eds.), *Measurement of nursing outcomes: Self care and coping* (Vol. 3, pp. 173-181). New York: Springer.
- Hinshaw, A.S., Chance, H.C., & Atwood, J. (1981). Research in practice: A process of collaboration and negotiation. *Journal of Nursing Administration*, 11, 33-38.
- House, J.S., Umberson, D., & Landis, K.R. (1988). Structures and process of social support. *Annual Review of Sociology*, 14, 293-318.
- Hutchison, S. (1999). Social support: Factors to consider when designing studies that measure social support. *Journal of Advanced Nursing*, 29, 1520-1526.
- Hurst, N.C., & Sawatzky, D.D. (1996). Families with multiple problems through a bowenian lens. *Child Welfare*, 75, 693-699.
- Jacobson, A.M. (1993). Depression and diabetes. *Diabetes Care*, 16, 1621-1623.
- Jamison, S. (2004). Likert scales: How to (ab)use them. *Medical Education*, 38, 1212-1218.
- Jensen, T., Musaeus, L., Molsing, B., Lyholm, B., & Mandrup-Poulsen, T. (2002). Process measures and outcomes research as tools for future improvement of diabetes treatment quality. *Diabetes Research Clinical Practice*, 56, 207-211.

Keller, C.S., & Stevens, K.R. (1997). Cultural considerations in promoting wellness.

Journal of Cardiovascular Nursing, 11, 15-25.

Kerr, M.E. (1992). Physical illness and the family emotional system: Psoriasis as a model. *Behavioral Medicine, 18*, 101-113.

Kerr, M.E. (2003). *One family's story: A primer on Bowen theory*. Washington, DC: Georgetown Family Center.

Kerr, M.E., & Bowen, M. (1988). *Family evaluation: An approach based on Bowen theory*. New York: W.W. Norton & Company.

Klein, R. (2003). Screening interval for retinopathy in type 2 diabetes. *Lancet, 361*, 190-191.

Klein, S., Sheard, N.F., Pi-sunyer, X., Daly, A., Wylie-Rosett, J., Kulkarni, K., et al. (2004). Weight management through life style modification for the prevention and management of type 2 diabetes: Rational and strategies: A statement of the American Diabetes Association. The North American Association for the Study of Obesity, and the American Society for Clinical Nutrition. *Diabetes Care, 27*, 2067-2073.

Knapp, T. A. (1990). Treating ordinal scales as interval scales: An attempt to resolve the controversy. *Nursing Research, 39*, 121-123.

Kyngas, H. (2001). Support as a crucial predictor of good compliance of adolescents with a chronic disease. *Journal of Clinical Nursing, 10*(6), 767-773.

- Kyngas, H., Kroll, T., & Duffy, M. (2000). Compliance of adolescents with chronic disease: Literature review. *Journal of Adolescent Health, 26*, 379-388.
- LaGreca, M.A., Auslander, W.R., & Greca, P. (1995). I get by with a little help from my family and friends: Adolescent's support for diabetes care. *Journal of Pediatric Psychology, 20*, 449-476.
- Leske, M.C., Wu, S.Y., Hennis, A., Hyman, L., Nemesure, B., Yang, L., et al. (2005). Hyperglycemia, blood pressure, and the 9-year incidence of diabetic retinopathy: The Barbados eye studies. *Ophthalmology, 112*, 799-805.
- Lewis, E.J., Hunsicker, L.G., Bain, R.P., & Rohde, R.D. (1993). The effect of angiotensin converting-enzyme inhibition on diabetic nephropathy: The collaborative study group. *New England Journal of Medicine, 329*, 1456-1462.
- Lindsey, K. (1981). *Friends as family*. Boston: Beacon Press
- Lo, R. (1999). Correlates of expected success at adherence to health regimen of people with IDDM. *Journal of Advanced Nurses, 30*, 418-24.
- Lynn, M.R. (1986). Determination and quantification of content validity. *Nursing Research, 35*, 382-385.
- Marrero, D.G., & Ackermann, R.T. (2007). Providing long-term support for lifestyle changes: A key to success in diabetes prevention. *Diabetes Spectrum, 20*, 205-209.

- Martire, L.M. (2005). The “relative” efficacy of involving family in psychosocial interventions for chronic illness: Are there added benefits to patients and family members? *Families, Systems, & Health*, 23, 312-328.
- Mayfield, J.A., Reiber, G.E., Sanders, L.J., Janisse, D., & Pogach, L.M. (1998). Preventative footcare in people with diabetes. *Diabetes Care*, 21, 2161-2177.
- McKelvey, J., Waller, D.A., North, A.J., Marks, J.F., Schreiner, B., Travis, L.B., et al. (1993). Reliability and validity of the diabetes family behavior scale. *The Diabetes Educator*, 19(2), 125-132.
- Mensing, C., Boucha, J., Weinger, K., Barta, P., Kopher, W., Lamb. B., et al. (2002). National standards for diabetes self-management education. *Diabetes Care*, 25, S140-S147.
- Miller, C.D., Barnes, C.S., Phillips, L.S., Ziemer, D.C., Gallina, D.L., Cook, C.B., et al. (2003). Rapid a1c availability improves clinical decision-making in a urban primary care clinic. *Diabetes Care*, 26, 1158-1163.
- Miller-Johnson, S., Emery, R.E., Marvin, S.R., Clarke, W., Lovinger, R., & Martin, M. (1994). Parent-child relationships and management of insulin-dependant diabetes mellitus. *Journal of Consulting and Clinical Psychology*, 62, 603-610.
- Moos, R.H. (2004). *The family environment scale*. Retrieved March 15, 2006, from <http://www.mindgarden.com/products/fescs.htm>

- Moos, R.H., & Moos, B.S. (1994). *Family environment scale manual: Development, applications, research* (3rd. ed.). Palo Alto, CA: Consulting Psychologist Press.
- Mulcahy, K., Maryniuk, M., Peeples, M., Peyrot, M., Tomky, D., Weaver, T., et al. (2003). Diabetes self-management education core outcomes measures. *Diabetes Educator*, 29, 768-84.
- Neff, M. (2000). Conference highlights: Family support is strongest indicator of self-care compliance. *American Family Physician*, 62, 2665.
- Niska, K.J. (1999). Mexican American family process: Nurturing, support, and socialization. *Nursing Science Quarterly*, 12(2), 138-142.
- Norris, S.L., Lau, J., Smith, S.J., Schmid, C.H., & Engelgau, M.M. (2002). Self-management education for adults with type 2 diabetes: A meta-analysis of the effect of glycemic control. *Diabetes Care*, 25, 1159-1171.
- Northouse, L.L., Mood, D., Templin, T., Melon, S., & George, T. (2000). Couples' patterns of adjustment to colon cancer. *Social Science Medicine*, 50(2), 271-284.
- Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- O'Connor, P.J., Desai, J., Solberg, L.I., Reger, L.A., Crain, A.L., Asche, S.E., et al. (2005). Randomized trial of quality improvement intervention to improve diabetes care in primary care settings. *Diabetes Care*, 28, 1890-1897.
- Patterson, L.B., & Dorfman, L.T. (2002). Family support for hospice caregivers. *American Journal of Palliative Care*, 19(5), 315-323.

- Pastors, J.G., Warshaw, H., Daly, A., Franz, M., & Kulkarni, K. (2002). The evidence for the effectiveness of medical nutrition therapy in diabetes management. *Diabetes Care*, 25, 608-613.
- Pastors, J.G., Franz, M.J., Warshaw, H., Daly, A., & Arnold, M.S. (2003). How effective is medical nutrition therapy in diabetes care? *Journal of American Dietetic Association*, 103, 827-831.
- Peleg-Popko, O. (2002). Bowen theory: A study of differentiation of self, social anxiety, and physiological symptoms. *Contemporary Family Therapy*, 24, 355-369.
- Pett, M.A. (1997). *Nonparametric statistics for health care research*. Thousand Oaks, CA: Sage.
- Pett, M.A. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*. Thousand Oaks, CA: Sage.
- Polit, D.F. (1996). *Data analysis & statistics for nursing research*. Los Angeles: Appleton & Lange.
- Portney, L.G., & Watkins, M.P. (2000). *Foundation of clinical research: Applications to practice*. Upper Saddle River, NJ: Prentice Hall Health.
- Powazki, R.D., & Walsh, D. (2002). Family distress in palliative medicine: A pilot study of the family apgar scale. *American Journal of Hospice and Palliative Care*, 12, 392-396.
- Price, J.E. (1996). Issues in adolescents' asthma. *Current Problems in Pediatrics*, 29, 82-93.

- Procidano, M. E. & Heller, K. (1983). Measures of perceived social support from friends and family: Three validation studies. *American Journal of Community Psychology, 11*, 1-24.
- Psaty, B.M., Lumley, T., Furberg, C.D., Schellenbaum, G., Pahor, M., Alderman, M.H., et al. (2003). Health outcomes associated with various antihypertensive therapies used as first-line agents: A network meta-analysis. *JAMA, 289*, 2534-2544.
- Ranney, L., Melvin, C., Lux, L., McClain, E., Morgan, L., & Lohr, K.N. (2006). Tobacco use: Prevention, cessation, and control. Evidence Report/Technology Assessment, (Prepared by the rit international–university of north carolina evidence-based practice center under contract no. 290-02-0016). *AHRQ Publication No. 06-E015. Rockville, MD: Agency for Healthcare Research and Quality. 140, 1-120.*
- Remuzzi, G., Macia, M., & Ruggenenti, P. (2006). Prevention and treatment of diabetic renal disease in type 2 diabetes: The Benedict Study. *Journal of American Nephrology, 17*, S90-S97.
- Resnick, H.E., Foster, G.I., Bardsley, J., & Ratner, R.E. (2006). Achievement of American Diabetes Association clinical practice recommendations among U.S. adults with diabetes, 1999-2002: The national health and nutrition examination survey. *Diabetes Care, 29*, 531-7.

- Rodriguez, M.F. (1991). *The effects of a diabetes education program on social support, diabetes knowledge level, blood glucose level, and weight among non-insulin dependent diabetics*. (Doctoral dissertation, Texas Woman's University, 1991)
- Rohlfing, C.L., Wiedmeyer, H.M., Little, R.R., England, J.D., Tennill, A., & Goldstein, D.E. (2002). Defining the relationship between plasma glucose and hba1c: Analysis of glucose profiles and hba1c in the diabetes control and complications trial. *Diabetes Care*, 25, 275-278.
- Rubin, R.R. (2001). Facilitating self-care in people with diabetes. *Diabetes Spectrum*, 14, 55-57.
- Rubin, R.R., & Peyrot, M. (1992). Psychosocial problems and interventions in diabetes: A review of the literature. *Diabetes Care*, 15, 1640-1657.
- Sacks, D.B., Bruns, D.E., Goldstein, D.E., Maclaren, N.K., McDonald, J.M., & Parrott, M. (2002). Guidelines and recommendations for laboratory analysis in the diagnosis and management of diabetes mellitus. *Clinical Chemistry*, 48, 426-472.
- Salmeron, J., Hu, F.B., Manson, J.E., Stampfer, M.J., Colditz, G.A., Rimm, E.B., et al. (2001). Dietary fat intake and risk of type 2 diabetes in women. *American Journal of Clinical Nutrition*, 73, 1019-1026.
- Samuel-Hodge, C.D., Headen, S.W., Skelly, A.H., Ingram, A.F., Keyserling, T.C., Jackson, E.J., et al. (2000). Influence on day-to-day self-management of type 2 diabetes among African American women. *Diabetes Care*, 23, 928-933.

- Scollan-Koliopoulos, M. (2004). Consideration for legacies about diabetes and self-care for the family with a multigenerational occurrence of type 2 diabetes. *Nursing & Health Science*, 6, 223-227.
- Sherbourne, C.D., Hayes, R.D., Ordway, L., DiMatteo, M.R., & Kravitz L. (1992). Antecedents of adherence to medical recommendations: Results from the medical outcomes study. *Journal of Behavioral Medicine*, 15(5), 447-468.
- Sigal, R.J., Kenny G.P., Wasserman, D.H., & Castaneda-Sceppa, C. (2004). Physical activity/exercise and type 2 diabetes. *Diabetes Care*, 27, 2518-2539.
- Smilkstein, G., Ashworth, C., & Montano, D. (1982). Validity and reliability of the family apgar test and its use by physicians. *Journal of Family Practice*, 15, 303-317.
- Stamler, L.L., Cole, M.M., & Patrick, L.J. (2001). Expanding the enablement framework and testing an evaluative instrument for diabetes patient education. *Journal of Advanced Nursing*, 35(3), 365-372.
- Stewart, M.J. (1993). *Integrating social support in nursing*. London: Sage.
- Stewart, M.J., & Tilden, V.P. (1995). The contributions to nursing science of social support. *International Journal of Nursing Studies*, 32, 535-544.
- Stys, A.M., & Kulkarni, K. (2007). Identification of self-care behaviors and adoption of lifestyle changes result in sustained glucose control and reduction of comorbidities in type 2 diabetes. *Diabetes Spectrum*, 20, 55-58.

- Surwit, R.S., Schneider, M.S., & Feinglos, M.N. (1992). Stress and diabetes mellitus, *Diabetes Care*, 15, 1413-1422.
- Titelman, P. (1998). *Clinical applications of bowen family systems theory*. New York: The Haworth Press.
- Tillotson, L.M., & Smith, M.S. (1996). Locus of control, social support, and adherence to the diabetes regimen. *Diabetes Educator*, 22(2), 133-139.
- Toljamo, M., & Hentinen, M. (2001). Adherence to self-care and social support. *Journal of Clinical Nursing*, 10(5), 618-627.
- Topp, R., & Stevenson, J. (1994). The effects of attendance and effort on outcomes among older adults in a long-term exercise program. *Research in Nursing & Health*, 17, 15-24.
- Trief, P.M., Grant, W., Elbert, K., & Weinstock, R.S. (1998). Family environment, glycemic control, and the psychosocial adaptation of adults with diabetes. *Diabetes Care*, 21(2), 241-245.
- Trief, P.M., Himes, C.L., Orendorff, B.S., & Weinsack, R.S. (2001). The marital relationship and psychosocial adaptation and glycemic control of individuals with diabetes. *Diabetes Care*, 24, 1384-1389.
- UK Prospective diabetes study group. (1998). Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: Ukpds 38. *British Medical Journal*, 317, 703-713.

U.S. Census Bureau. (2004). *Defining family, family group, and family household*.

Retrieved March 10, 2009, from

<http://www.census.gov/population/www/cps/cpsdef.html>

Vinik, A.I., Maser, R.E., Mitchell, B.D., & Freeman, R. (2003). Diabetic autonomic neuropathy. *Diabetes Care*, 26, 1553-1579.

Walker, L.O., & Avant, K.C. (1988). *Strategies for theory construction in nursing*, (2nd ed.). Norwalk, CT: Appleton and Lange.

Waltz, C.F., Strickland, O.L., & Lenz, E.R., (2005). *Measurement in nursing and health research* (3rd ed.). New York: Springer.

Welschen, L.M., Bloemendal, E., Nijpels, G., Dekker, J.M., Heine, R.J., & Stalman, W.A. (2005). Self-monitoring of blood glucose in patients with type 2 diabetes who are not using insulin: A systematic review. *Diabetes Care*, 28, 1510-1517.

Wen, L.K., Shepherd, M.D., & Parchman, M.L. (2004). Family support, diet, and exercise among older Mexican Americans with type 2 diabetes. *Diabetes Education*, 30, 980-93.

Whittemore, R., Urban, U., Tamborlane, A., & Grey, M. (2003). Factors associated with metabolic control and quality of life in school-age children on intensive therapy. *The Diabetes Educator*, 29, 847-854.

- Wolf, A.M., Conaway, M.R., Crowther, J. Q., Hazen, K.Y., Nadler, L., Oneida, B., et al. (2004). Translating lifestyle intervention to practice in obese patients with type 2 diabetes: Improving control with activity and nutrition (ican) study. *Diabetes Care*, 27, 1570-1576.
- Youngblut, J.M., & Casper, G.R. (1993). Focus on psychometrics: Single item indicators in nursing research. *Research in Nursing & Health*, 16, 459-465.

APPENDIX A

Texas Woman's University Cover Letter for Research Health Care Providers and Diabetes Educators

Janice Hensarling RN, MSN, FNP-BC
298 CR 392
Nacogdoches, Texas 75961

Dear Health Care Provider/Diabetes Educator:

Thank you for your interest in assisting with recruiting participants for this research study. The purpose of this study is to perform a research study using the instrument, "Hensarling's Diabetes Family Support Scale" (HDFSS), which I developed in a course taken at Texas Woman's University toward my PhD in Nursing. The HDFSS should be useful to clinicians in assessing the family support of patients with Type 2 diabetes and to use this knowledge in the ongoing planning of diabetes self-management. In order to further evaluate the reliability and validity of the instrument in the measurement of "family support" for patients with Type 2 diabetes, I am asking the participants (adults with type 2 diabetes) to complete three questionnaires: a General Information Form, the HDFSS, and the Social Support in Chronic Illness Inventory (SSCII). I have attached a copy of the letter to the participant, along with the data-collection forms, for your information.

I am requesting that you ask adult patients (ages 18 and older) with Type 2 diabetes if they might be interested in participating in the study by completing the 3 questionnaires and returning them to me in a self-addressed stamped envelope. If so, please give them a study packet that includes a cover letter explaining the study and their rights as study participants. Their participation should take no more than 30 minutes.

I am very appreciative for your assistance in helping me contact possible participants for this project that I hope will result in a valid and reliable tool that we can use to improve the care of patients with diabetes. I am attempting to get a larger sample size (~150 or more) than the 26 I surveyed in my original pilot study. If you are willing to assist in the recruitment of 5-10 participants by distributing packets at your workplace or at support group meetings please complete and return the attached form specifying how many packets you would like to have for distribution and the address to which they should be mailed. If you prefer, you may e-mail the information to me instead.

If you have any questions concerning the study, I hope that you will feel free to contact me or my faculty advisor. Our names and contact information are

Investigator: Janice Hensarling, RN, MSN, FNP-BC936-462-3747
e-mail: janicehfnp@hotmail.com

Advisor: Gail Davis RN, Ed.D940-898-2409
e-mail: gdavis@twu.edu

Thanks so much for your interest. Your participation in this research study is appreciated.

Sincerely,

Janice Hensarling RN, MSN, FNP-BC

APPENDIX B

Letter to Research Health Care Providers and Diabetes Educators

Janice Hensarling RN, MSN, FNP-BC
298 CR 392
Nacogdoches, Texas 75961
936-362-2228 (Home)
936-462-3747 (Cell)
936-468-1788 (Office)
936-468-1696 (Fax)
janicehfnp@hotmail.com

Again, let me say how important your assistance is in helping me with this research project.

I have included a copy of the information that I am asking the participants to fill out.

Please write in the number of packets that you will be willing to pass out to your patients.

Please write the address that you would like me to send the packets to:

I have included a stamped self-addressed envelope for you to return this form in or you can just e-mail this information to me.

I wish you the best as you assist patients and their families in caring for their Diabetes.

Sincerely,

Janice Hensarling RN, MSN, FNP-BC

APPENDIX C

Script for Health Care Providers to Use When Recruiting Participants in the Study

Script for Health Care Providers to use When Recruiting Participants in the Study

Hello, I'm _____, (HCPs will give their name). I have been requested to help Janice Hensarling, who is a RN, Advanced Practice Nurse, Diabetes Educator, and student at Texas Woman's University to recruit participants for her dissertation study. The study is to help understand how patients with Type 2 Diabetes perceive the support they receive from family members. She has successfully completed a pilot study to test an instrument to measure family support in patients with Type 2 Diabetes. She needs to further test this instrument with a larger group of adult patients with Type 2 diabetes. As your health care provider I would like to give you one of these packets to complete and return to Ms. Hensarling. This will be at no expense to you except for your time to complete the information and return it to Ms. Hensarling. According to Ms. Hensarling, it should take you about 30 minutes to complete the information and mail it back to her. She does ask that they all be completed within a 24-hour period.

I will not be participating in your completion of this information. My only involvement in the study is giving out the packets for Ms. Hensarling. If you choose to take a packet, I will have no way of knowing whether or not you returned it.

You are under no obligation to me as your Health Care Provider to participate in her study. She will not share any of your information with me. She has just asked me to express her appreciation for your consideration of participating in this project which she feels will be valuable in helping understand the importance of family support for patients with diabetes.

APPENDIX D

Texas Woman's University Consent to Participate in Research

TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Title: Psychometric Testing of "Hensarling's Diabetes Family Support Scale" With Adults Having Type 2 Diabetes

Investigator: Janice Hensarling, RN, MSN, FNP-BC.....936-362-2228
Advisor: Gail Davis, RN, Ed.D.....940-898-2409

Explanation and Purpose of the Research

You are being asked to participate in a research study for Ms. Hensarling's dissertation at Texas Woman's University. The purpose of this study is to refine the instrument, "Hensarling's Diabetes Family Support Scale," which was developed in a course taken at Texas Woman's University toward her PhD in Nursing. In this research, as part of her dissertation study at Texas Woman's University, she plans to use this instrument for the purposes of measuring the perceived family support of adults with a diagnosis of Type 2 Diabetes and for testing how well and how consistently it measures this support.

Research Procedures

For this study, you will be asked to complete three questionnaires: (1) a General Information Form that has 3 parts, (2) Hensarling's Diabetes Family Support Scale (HDFSS), and (3) the Social Support in Chronic Illness Inventory (SSCII). You are asked to answer all of the questions, unless answering a question makes you feel uncomfortable. For the HDFSS, you will be asked to answer each question to indicate how satisfied you are with the helping behaviors of another person. The maximum time for responding to these forms is estimated to be about 30 minutes. You are asked to complete all 3 questionnaires within a 24-hour period. Because your views are important to the study, please answer these questions without help from others.

Potential Risks

Potential risks related to your participation in the study include fatigue, physical discomfort, and emotional discomfort during your completion of the instruments. To avoid fatigue and physical discomfort, you may complete the study forms at your leisure in a setting that is comfortable to you. You may take breaks. To avoid or lessen any emotional discomfort, you may choose not to answer any questions that make you feel uncomfortable, or you may choose to discontinue your participation in this study at any time.

Participant's initials
Page 1 of 2

Another possible risk to you as a result of your participation in this study is release of confidential information. Confidentiality will be protected to the extent that is allowed by law. The only place that your name will be on any of the information that will be returned to me is on this signed "consent to participate" form. The signed consent form will be separated from your completed test forms and will be placed in a separate file so that there will be no possibility of linking your responses to you. Your name will not appear on the instrument. No personal data are being gathered via email. If you choose to communicate via e-mail, there is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. It is anticipated that the results of this study will be published in the investigator's dissertation as well as in other research publications. However, no names or other identifying information will be included in any publication.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Participation and Benefits

Your involvement in this research study is completely voluntary, and you may discontinue your participation in the study at any time without penalty. A benefit of this study is that at the completion of the study a copy of the findings will be made available to you. I will mail you a copy of the findings at my expense, if you would so indicate your interest by providing your name and address at the bottom of this form*.

Questions Regarding the Study

Completion and return of this form to the researcher will constitute consent by the participant. If you have any questions about the research study you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu.

Signature of Participant

Date

* If you would like to receive a copy of the findings, please provide an address to which this summary should be sent:

Participant's initials

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APPENDIX E

General Information Form

General Information Form

Part 1

Please answer each of the following questions. Fill in the blanks with the correct answers or choose the single best answer.

Q1. Age: ___ years old

Q2. Birth date: ___/___/___
(Month / Day / Year)

Q3. Zip Code: _____

Q4. Sex: ☐₁ Male ☐₂ Female

Q5. When you were first told you had diabetes? _____
(Year)

Q6. Which type of diabetes does your health care provider (Doctor, Nurse Practitioner, Physician Assistant) say that you have? (Check one box)

☐₁ Type 1

☐₂ Type 2 - no medication

☐₃ Type 2 - taking diabetes medicine by mouth

☐₄ Type 2 - taking Insulin

☐₅ Type 2 - taking diabetes medicine by mouth and taking insulin

☐₆ Didn't say, but I believe it is (write in 1 of choices above) _____

☐₇ Don't know

Q7. What is your marital status? (Check one box)

- ☐₁ Never married
- ☐₂ Married
- ☐₃ Separated/Divorced
- ☐₄ Widowed
- ☐₅ Living with someone/Partnered

Q8. What is your ethnic origin/race? (Check one box)

- ☐₁ White - not Hispanic or Latino
- ☐₂ White - Hispanic or Latino
- ☐₃ Black or African American - not Hispanic or Latino
- ☐₄ Black or African American and White - not Hispanic or Latino
- ☐₅ Asian - not Hispanic or Latino
- ☐₆ Asian and White - not Hispanic or Latino
- ☐₇ Native Hawaiian or Other Pacific Islander - not Hispanic or Latino
- ☐₈ American Indian or Alaska Native - not Hispanic or Latino
- ☐₉ American Indian or Alaska Native and White - not Hispanic or Latino
- ☐₁₀ American Indian or Alaska Native and Black or African American - not Hispanic or Latino
- ☐₁₁ Other Hispanic or Latino

Q9. Where do you live most of the time? (Check one box)

- ☐₁ Your home, apartment or condo
- ☐₂ Apartment/condo in retirement community
- ☐₃ Home of a relative/friend
- ☐₄ Assisted living residence
- ☐₅ Adult foster care
- ☐₆ Nursing home
- ☐₇ Other _____

Q10. How many people live with you? (Check one box)

- ☐₀ I live alone
- ☐₁ One person
- ☐₂ Two people
- ☐₃ Three people
- ☐₄ Four people
- ☐₅ Five or more people

Q11. How much schooling have you had? (Formal schooling completed)

- ☐₁ Eight grades or less
- ☐₂ Some high school
- ☐₃ High school graduate or GED
- ☐₄ Some college or technical school
- ☐₅ College graduate (bachelor's degree)
- ☐₆ Graduate degree
- ☐₇ Post graduate degree

Q12. Which of the following best describes your current employment status? (Check one box)

- ☐₁ Working full-time, 35 hours or more a week
- ☐₂ Working part-time, less than 35 hours a week
- ☐₃ Unemployed or laid off and looking for work
- ☐₄ Unemployed and not looking for work
- ☐₅ Homemaker
- ☐₆ In school
- ☐₇ Retired
- ☐₈ Disabled, not able to work
- ☐₉ Something else? (Please specify): _____

Q13. Who do you consider to be the family member(s) that supports you in caring for your diabetes? (Check one or more boxes)

☐₁ Husband

☐₂ Wife

☐₃ Mother

☐₄ Father

☐₅ Brother

☐₆ Sister

☐₇ Daughter

☐₈ Son

☐₉ Friend you consider as a family member

☐₁₀ Other (Please specify) _____

☐₁₁ I do not feel any support from my family

Part 2

Directions: Please circle the number which best describes how you would rate the overall support your family offers you in caring for your diabetes?

0	1	2	3	4	5	6	7	8	9	10
No					Support					Support
Support										as Good
										as It
										Could
										Possibly Be

Do you currently participate in a diabetes support group? (Please check)

Yes ____ No ____

If “Yes,” please rate your overall satisfaction with the support you receive from the group.

0	1	2	3	4	5	6	7	8	9	10
Not										Completely
Satisfied										Satisfied

Part 3

Please record your latest Hemoglobin A1c result: _____

Date/Approximate date of last HbA1C: _____

APPENDIX F

Hensarling's Diabetes Family Support Scale

Hensarling's Diabetes Family Support Scale

Please answer each of the items below by putting a check in one of the boxes following it to tell how often it happens with your family members in relation to your diabetes care.

There is no right or wrong answer; just give your best estimate. No one else in your family will see your answers.

Question	Never	Hardly Ever	Some times	Most of the time	All the time
1. A family member goes with me to my doctor appointments if asked.					
2. A family member attends diabetes classes/education with me if asked.					
3. My family member keeps up with current information about diabetes.					
4. My family member knows when I am having problems related to my diabetes.					
5. My family member listens to me when I talk about my diabetes.					
6. My family member shows understanding of how I feel about my diabetes.					
7. I feel free to seek advice from my family member about my diabetes.					
8. A family member reminds me to check my blood sugar if I forget.					
9. A family member supports my efforts to exercise.					
10. A family member encourages me to follow my meal plan.					
11. My family member keeps sweet snacks around.					
12. My family member eats foods around me that are not on my meal plan.					
13. My diabetes makes my family member(s) very nervous.					

Question	Never	Hardly Ever	Some times	Most of the time	All the time
14. A family member reminds me to reorder my diabetes medications.					
15. I feel comfortable asking a family member for help when I am struggling with my diabetes.					
16. My family has regular meal times.					
17. My family member seems embarrassed that I have diabetes.					
18. A family member encourages me to see the eye doctor at least once a year.					
19. A family member encourages me to check my feet.					
20. A family member encourages me to go to the dentist at least once a year.					
21. I feel free to ask a family member for support to help me care for my diabetes.					
22. My family keeps food available for me that I can eat.					
23. A family member supports my efforts to eat as I should.					
24. Some of my family members do not believe that I have diabetes.					
25. A family member encourages me to go to the doctor at least once a year.					
26. A family member helps me when I am stressed about diabetes.					
27. A family member knows when I feel sad/blue about my diabetes.					
28. A family member knows how to help me handle sick days.					
29. A family member will help me pay for diabetes medication/supplies if necessary.					

APPENDIX G

Social Support in Chronic Illness Inventory

Social Support in Chronic Illness Inventory

Directions: This section refers to the person whom you named as most important to you in terms of being helpful on a day-to-day basis. In the past month, how satisfied were you with the helping behaviors of that person toward you? Indicate your degree of satisfaction with each behavior listed below by circling the number that applies to you. The number 1 indicates dissatisfaction. The number 6 indicates that you are very satisfied.

HOW SATISFIED ARE YOU WITH THE AMOUNT THE PERSON YOU NAMED DOES THIS FOR YOU?

	1 = Dissatisfied	2 = Somewhat dissatisfied	3 = Partly satisfied	4 = Somewhat satisfied	5 = Satisfied	6 = Very satisfied
1. Told me that I am OK just the way I am.	1	2	3	4	5	6
2. Comforted me by showing some physical affection.	1	2	3	4	5	6
3. Let me know that (s)he can be counted on if I need help.	1	2	3	4	5	6
4. Expressed interest and concern in my well-being.	1	2	3	4	5	6
5. Told me that (s)he feels very close to me.	1	2	3	4	5	6
6. Was available to listen when I wanted to talk.	1	2	3	4	5	6
7. Enjoyed hearing about what I think.	1	2	3	4	5	6
8. Consoled me when I was upset.	1	2	3	4	5	6
9. Allowed me to come to him/her when I was feeling down.	1	2	3	4	5	6
10. Accepted me totally, including my worst and best parts.	1	2	3	4	5	6
11. Made it clear what was expected of me.	1	2	3	4	5	6

	1 = Dissatisfied	2 = Somewhat dissatisfied	3 = Partly satisfied	4 = Somewhat satisfied	5 = Satisfied	6 = Very satisfied
12. Gave me some information on how to do something.	1	2	3	4	5	6
13. Gave me some information to help me understand a situation I was in.	1	2	3	4	5	6
14. Told me who I should see for assistance.	1	2	3	4	5	6
15. Told me what to expect in a situation that was about to happen.	1	2	3	4	5	6
16. Taught me how to do something.	1	2	3	4	5	6
17. Talked with me about a problem in order to help solve it.	1	2	3	4	5	6
18. Checked back with me to see if I had followed the advice I was given.	1	2	3	4	5	6
19. Helped me understand why I didn't do something well.	1	2	3	4	5	6
20. Gave me feedback on how I was doing without saying it was good or bad.	1	2	3	4	5	6
21. Contributed to my income or gave me money.	1	2	3	4	5	6
22. Gave me a gift.	1	2	3	4	5	6
23. Did a task that is usually done by me.	1	2	3	4	5	6
24. Provided transportation for me.	1	2	3	4	5	6
25. Did some activity together to help me get my mind off of things.	1	2	3	4	5	6
26. Talked with me about some interests of mine.	1	2	3	4	5	6
27. Joked or kidded to try to cheer me up.	1	2	3	4	5	6
28. Shared an interest.	1	2	3	4	5	6

1 = Dissatisfied
2 = Somewhat dissatisfied
3 = Partly satisfied
4 = Somewhat satisfied
5 = Satisfied
6 = Very satisfied

29. Could count on her/him to distract me from worries.	1	2	3	4	5	6
30. Shared information with me about recommendations that were made by the health team.	1	2	3	4	5	6
31. Helped me to understand about my disease.	1	2	3	4	5	6
32. Told me whom I should see for assistance when I had problems with the health team recommendations.	1	2	3	4	5	6
33. Told me how useful the health team recommendations were in preventing complications.	1	2	3	4	5	6
34. Taught me how to carry out the health team recommendations.	1	2	3	4	5	6
35. Talked with me about problems I was having with the health team recommendations.	1	2	3	4	5	6
36. Encouraged me to take proper care of myself.	1	2	3	4	5	6
37. Checked back to see if I had carried out recommendations I consider important.	1	2	3	4	5	6
38. Commented favorably when (s)he noticed me doing something that the health team recommended.	1	2	3	4	5	6

APPENDIX H

Permission Letter to use Social Support in Chronic Illness Inventory (SSCII)

M c A L L I S T E R

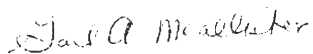
Gail A. McAllister
Michael Kay McAllister
8 Riverdale Road
Yardley, PA 19067
Phone 215.736.0836
heronsnestbaja@earthlink.net

7/6/05

To Whom It May Concern:

I grant permission to Janice Hensarling to use the Social Support in Chronic Illness Inventory (SSCI) in her dissertation research. She also has my permission to modify it and to use it to collect data over the internet. Feel free to contact me if you need any further information.

Sincerely,



Gail A. McAllister, DNSc
Professor Emerita of Nursing at The College of New Jersey

APPENDIX I

Texas Woman's University
Institutional Review Board



Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378 Fax 940-898-3416
e-mail: IRB@twu.edu

March 14, 2008

Ms. Janice Hensarling
298 CR 392
Nacogdoches, TX 75961

Dear Ms. Hensarling:

Re: Development and Psychometric Testing of "Hensarling's Diabetes Family Support Scale"

The request for an extension of your IRB approval for the above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and appears to meet our requirements for the protection of individuals' rights.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. A copy of all signed consent forms and an annual/final report must be filed with the Institutional Review Board at the completion of the study. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use a copy of this stamped consent form when obtaining consent from your participants.

This extension is valid one year from April 5, 2008. According to regulations from the Department of Health and Human Services, another review by the IRB is required if your project changes in any way. If you have any questions, feel free to call the TWU Institutional Review Board.

Sincerely,

Dr. David Nichols, Chair
Institutional Review Board - Denton

cc. Dr. Marcia Hem, College of Nursing
Dr. Gail Davis, College of Nursing
Graduate School