



The perceived and actual diabetes knowledge of registered nurses in Montana's critical access hospitals
by Connie Sue Reichelt

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Nursing
Montana State University

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Abstract:

Critical Access Hospitals dot the landscape of Montana. A large percent of the 53,000 diagnosed diabetics, in the State, utilize these small facilities that are miles from large full-service medical centers. The registered nurses that work in these small hospitals are responsible for providing diabetes education among all their other complex duties. A non-experimental descriptive study utilizing the survey method of acquiring data investigated the perceived and actual diabetes knowledge of registered nurses working in Montana's Critical Access Hospitals.

The study examined the relationship between the rural nurses perceived and actual diabetes knowledge. The Diabetes Self Report Tool measured the perceived knowledge while the Diabetes Basic Knowledge Test explored actual knowledge of the registered nurses. A sample of 41 nurses from 12 Critical Access Hospitals comprised the study group. A moderately positive linear correlation between the mean scores of the two testing tools was revealed. The nurses also provided answers to a demographic sheet that helped increase awareness of possible reasons for low mean scores on the two testing tools. The Diabetes Self Report Tool mean score was 78.9 percent while the Diabetes Basic Knowledge Test mean score was 74.41 percent.

Rural registered nurses in Montana's Critical Access Hospitals perceive themselves as inadequate to provide diabetes education. Mean scores on the actual knowledge test revealed insufficient knowledge to provide diabetes education. A number of reasons exist for why these nurses perceived themselves as possessing inadequate knowledge and why the actual knowledge scores were low. The utilization of inexperienced nurses in the rural setting and the lack of diabetes continuing education are just two of the reasons. Regardless the cause for poor knowledge levels, Critical Access Hospitals must make continuing education a priority to ensure quality care and selfmanagement skills for Montana's diabetic population.

THE PERCEIVED AND ACTUAL DIABETES KNOWLEDGE OF REGISTERED
NURSES IN MONTANA'S CRITICAL ACCESS HOSPITALS

by

Connie Sue Reichelt

A thesis submitted in partial fulfillment
of the requirements for the degree

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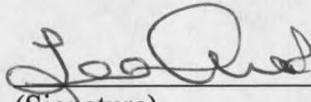
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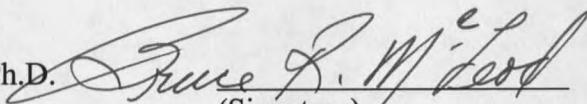
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TABLE OF CONTENTS

LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
ABSTRACT.....	ix
1. INTRODUCTION TO STUDY.....	1
The Purpose.....	2
Problem.....	2
Background.....	2
Conceptual Framework.....	4
Definitions.....	8
Assumptions.....	9
Summary.....	9
2. LITERATURE REVIEW.....	11
Diabetes Education.....	11
Nursing Education.....	12
Knowledge in the Workplace.....	14
DBKT and DSRT.....	15
Continuing Education.....	16
Physical Assessment.....	17
Environment.....	18
Summary.....	19
3. METHOD.....	21
Design.....	21
Population and Sample.....	21
Procedures for Data Collection.....	22
Instrumentation.....	23
Data Analysis.....	24
Human Rights and Consent Process.....	24
4. RESULTS.....	26
Demographic Profile.....	27
DSRT Scores.....	29
DBKT Scores.....	32

TABLE OF CONTENTS - CONTINUED

DSRT and DBKT Together.....	37
5. DISCUSSION.....	40
Introduction.....	40
Summary of Findings.....	40
Discussion of Findings.....	41
Aim 1.....	43
Demographic Profile.....	43
Actual and Perceived Diabetes Knowledge.....	44
Aim 2.....	45
Demographic Profile in Relation to the Rural Environment.....	45
Limitations.....	46
Implications of the Study.....	47
Recommendations for Further Study.....	48
Conclusions.....	48
6. REFERENCES CITED.....	50
7. APPENDICES.....	53
APPENDIX A: PERMISSION TO USE TESTING TOOLS.....	54
APPENDIX B: DEMOGRAPHIC SHEET.....	56
APPENDIX C: DIABETES SELF REPORT TOOL.....	58
APPENDIX D: DIABETES BASIC KNOWLEDGE TEST.....	61
APPENDIX E: LETTER OF INSTRUCTION.....	72
APPENDIX F: LETTER TO DIRECTORS OF NURSING.....	74
APPENDIX G: CONSENT FORM.....	76

LIST OF TABLES

Table	Page
1. Demographic Profile.....	28
2. Mean DSRT Scores in Relation to Nursing Degree, Diabetics Seen and Presence of Diabetes.....	32
3. Questions Most Frequently Missed on the DBKT.....	36
4. Pearson Bivariate Correlation for DSRT and DBKT.....	37
5. DBKT and DSRT Mean Scores for Years at CAH and Last In-Service Attendance.....	38

LIST OF FIGURES

Figure	Page
1. Prescriptive Theory Framework.....	4
2. Mean DSRT Scores for Perceived Competence.....	29
3. Mean DSRT Scores for Years Experience.....	30
4. Mean DSRT Scores for Continuing Education.....	31
5. Mean DBKT Scores and Perceived Competency.....	33
6. Mean DBKT Scores for Continuing Diabetes Education.....	34
7. Mean DBKT Scores for Years Work Experience.....	34

ABSTRACT

Critical Access Hospitals dot the landscape of Montana. A large percent of the 53,000 diagnosed diabetics, in the State, utilize these small facilities that are miles from large full-service medical centers. The registered nurses that work in these small hospitals are responsible for providing diabetes education among all their other complex duties. A non-experimental descriptive study utilizing the survey method of acquiring data investigated the perceived and actual diabetes knowledge of registered nurses working in Montana's Critical Access Hospitals.

The study examined the relationship between the rural nurses perceived and actual diabetes knowledge. The Diabetes Self Report Tool measured the perceived knowledge while the Diabetes Basic Knowledge Test explored actual knowledge of the registered nurses. A sample of 41 nurses from 12 Critical Access Hospitals comprised the study group. A moderately positive linear correlation between the mean scores of the two testing tools was revealed. The nurses also provided answers to a demographic sheet that helped increase awareness of possible reasons for low mean scores on the two testing tools. The Diabetes Self Report Tool mean score was 78.9 percent while the Diabetes Basic Knowledge Test mean score was 74.41 percent.

Rural registered nurses in Montana's Critical Access Hospitals perceive themselves as inadequate to provide diabetes education. Mean scores on the actual knowledge test revealed insufficient knowledge to provide diabetes education. A number of reasons exist for why these nurses perceived themselves as possessing inadequate knowledge and why the actual knowledge scores were low. The utilization of inexperienced nurses in the rural setting and the lack of diabetes continuing education are just two of the reasons. Regardless the cause for poor knowledge levels, Critical Access Hospitals must make continuing education a priority to ensure quality care and self-management skills for Montana's diabetic population.

CHAPTER I

INTRODUCTION TO STUDY

Montana is the fourth largest state and has more than 53,000 people with diagnosed diabetes (Montana Department of Public Health and Human Services, 2000). This number is intended to represent just half of Montana's diabetic population with the remaining diabetics being unaware of their condition. Diabetics, in Montana, face many challenges including distance to healthcare providers and healthcare supplies. Montana's access to resources for diabetics is ranked by the American Diabetes Association (ADA) as 38th out of the 50 states (Montana Department of Public Health and Human Services, 2002).

In Montana, the rural nurse is most likely to provide diabetes information when the patient has concerns about his or her condition. Certified diabetic educators are rare in the State. In 2002, the ADA recognized 55 Certified Diabetes Educators, primarily clustered in the western half of Montana (Montana Department of Public Health and Human Services, 2000). This leaves thousands of miles without certified educators. Accordingly, rural Montana nurses possess a unique opportunity to facilitate and improve the health and quality of life outcomes for patients with diabetes. Yet, nurses working in the Medicare designated Critical Access Hospitals throughout Montana live the same isolated lives as their diabetic clients.

Problem

Registered nurses in these small facilities cover every aspect of the life continuum including emergency, clinic, acute care and long term care. Yet, little is known about the diabetic education of these nurses.

Purpose

The purpose of this study was to examine the relationship between the self-perceived and actual knowledge of diabetes in rural nurses working in Critical Access Hospitals across Montana. Two specific aims were addressed in this study. Aim 1 focused on determining if a correlation relationship exists between perceived diabetes knowledge and actual diabetes knowledge. Aim 2 inspected the demographic profile of Montana rural registered nurses and how the rural environment affects perceived and actual diabetes knowledge.

Background

Forty-six percent of Montana's population lives in rural areas (Montana Census 2000). Movies and magazines romanticize the rural lifestyle and the winter weather that encompasses Montana. Residents of this sparsely populated state, coping with diabetes, find no romance in maintaining their illness in isolation. Many of these individuals live miles from a full service medical center and utilize small rural facilities known as Critical Access Hospitals for their care. These hospitals were established under the Balanced Budget Act of

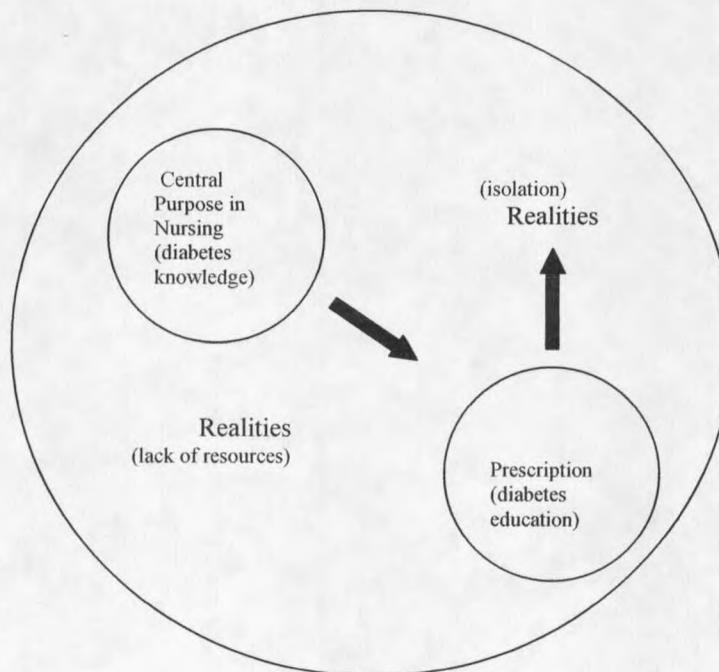
1997 (Montana Health Research and Education Foundation, 2002). The Medicare Rural Hospital Flexibility Program created under this Act, supplies grants to States that designate rural hospitals as Critical Access Hospitals (Montana Health Research and Education Foundation, 2002). These small medical centers must meet criteria including not providing inpatient care for a period exceeding 96 hours, "as determined on an average, annual basis for each patient" (Montana Health Research and Education Foundation, 2002, p. 1). These facilities also provide 24-hour emergency care and the nurses covering these shifts will often encounter the rural diabetic through the emergency room setting. This initial contact between the rural nurse and the diabetic often becomes a life long relationship.

Diabetes accounts for approximately 7,504 hospitalizations annually in Montana (Montana Diabetes Project, 2002). Each year almost 500 Montanans die from diabetes related complications (Montana Diabetes Project, 2002). According to the needs assessment survey conducted for the Montana Diabetes Project (2002), Montanans view diabetes as the least serious illness among seven major diseases. Yet, diabetes is the seventh leading cause of death among all Montanans and the fourth leading cause of death among Montana Native Americans (Montana Diabetes Project, 2002). Diabetes, without proper management, leads to cardio and cerebro vascular disease, retinal disease, neuropathy and renal disease. Scientific data show that these complications can be greatly reduced with proper treatment and management. Large randomized controlled studies, investigating Type I diabetes therapy, found tight glucose control and frequent clinical follow up to reduce or prevent retinopathy by 76% and nephropathy by 54 percent (Montana Diabetes Project, 2002).

In Montana, diabetes is responsible for medical costs and indirect costs totaling more than \$335 million annually (Montana Diabetes Project, 2002). Diabetes accounts for 27 percent of the United States' entire Medicare budget and Montanans 65 years of age and older are a population highly affected by diabetes (Montana Diabetes Project, 2002). Thus the rural nurse, working in the Critical Access Hospital surviving on Medicare and Montana Medicaid reimbursement, will undoubtedly encounter numerous diabetic patients. These encounters can positively or negatively impact the physical and financial outcomes of diabetes depending on the knowledge level of the rural nurse.

Conceptual Framework

Figure 1. Prescriptive Theory Framework



Weidenbach's Prescriptive Theory, (George, 1995, p. 181). Adapted for this study.

A conceptual framework must be established in order to investigate rural nurses' knowledge of diabetes mellitus. Ernestine Weidenbach's prescriptive theory exemplifies this interaction between knowledge and patient care.

Three major concepts comprise Weidenbach's prescriptive theory. These concepts are:

1. The central purpose which the practitioner recognizes as essential to the particular discipline.
2. The prescription for the fulfillment of the central purpose.
3. The realities in the immediate situation that influence the fulfillment of the central purpose (George, 1995, p. 181).

The central purpose, as outlined by Wiedenbach, revolves around the nurse's philosophy and goals of accomplishment (George, 1995). The nurse's purpose is his or "her reason for being and doing...Philosophy, an attitude toward life and reality that evolves from each nurse's beliefs and code of conduct, motivates the nurse to act, guides her thinking about what she is to do and influences her decisions (George, 1995, p. 182)." Wiedenbach goes on to illustrate that philosophy and purpose stem from the nurse's culture and or subculture and both are unique to each nurse (George, 1995). The rural nurse's central purpose centers on the culture or subculture of the rural and or frontier environment of Montana. The rural Montana nurse's perceived knowledge of diabetes reflects not only the nurse's environment but his or her purpose for providing diabetes care. The actual diabetes knowledge each rural nurse possesses is shaped by the environment and access to continuing education. The nurse working in the rural and frontier environment of Montana often works

alone due to the size of the rural facility. Self direction and independence are essential qualities in a rural nurse. He or she must develop a personal philosophy or standard in order to direct patient care. Continuing education for the rural nurse often relies on the philosophy to better one's self. Without an individual desire to further his or her knowledge, rural nursing could easily become stagnant and antiquated.

Wiedenbach describes the prescription as the mutually agreed upon plan of care between the nurse and the patient (George, 1995). The prescription must be based on solid knowledge and evidence based practice. The rural nurse utilizes his or her unique perspective and know-how to formulate a plan of care. Diabetes education and management rests on established ADA guidelines and always advancing technology. The rural nurse must know and understand the guidelines and current advancements when caring for and treating the diabetic patient. According to Wiedenbach, "when the nurse has determined her central purpose and has developed the prescription, she must then consider the realities of the situation in which she is to provide nursing care" (George, 1995, p.183). Wiedenbach goes on to describe the realities as the agent, the recipient, the goal, the means and the framework (George, 1995).

The rural nurse or agent must focus on isolation and adapt to the challenges of progression through distance and limited technology. The nurse must examine his or her hours of continuing education. The nurse must also be able to recognize the need for self-improvement and better nursing practice through further education. As diabetes management improves through pharmacology and technology, rural nurses must receive continuing education in order to provide solid clinical practice and adequate patient education.

The recipient, or diabetic patient, relies on the nurse's knowledge to guide them in self-care and problem solving. Wiedenbach states "the patient is the recipient of the nurse's actions or the one on whose behalf the action is taken (George, 1995, p. 184)." The nurse who possesses strong diabetes knowledge assists and guides the patient in self care practices.

"The goal is the outcome the nurse hopes to achieve through nursing practice in conjunction with the patient's ability to retain autonomy" (George, 1995, p.184). The goal of diabetic education rests on the rural nurse's ability to develop a course of action and assist the patient in self realization, direction and management of his or her diabetic condition.

"The means comprise the activities and devices through which the practitioner is enabled to attain her goal"(George, 1995, p.184). The rural nurse may or may not have access to the means to provide safe clinical diabetes care and education. The commitment to continuing education and access to learning are key factors in determining the actual level of diabetes knowledge of the rural registered nurse.

"The framework consists of the human, environmental, professional and organizational facilities that not only make up the context within which nursing is practiced but also constitute its currently existing limits" (George, 1995, p.184). The framework consists of all the outlying factors that affect the nurse's ability to provide sound nursing care and judgment (George, 1995).

The prescriptive theory is described as a situation-producing theory, one that visualizes a situation and formulates a prescription to achieve the situation (George, 1995). The framework of this study mimics the prescriptive theory. Rural diabetics and the nurses that care for them in the Critical Access Hospitals face challenges related to isolation.

Critical Access Hospitals function on state and federal reimbursement; generally funds to provide basic patient care but whether or not funding exists for continuing education remains unknown. In examining the diabetes knowledge of Critical Access Hospital registered nurses, this study formulates a prescription on whether or not sufficient continuing diabetic education exists in the rural environment.

Definitions

For the purpose of this study, the following terms are defined as follows:

1. Diabetes Mellitus: "A variable disorder of carbohydrate metabolism caused by a combination of hereditary and environmental factors and characterized by inadequate secretion or utilization of insulin (Merriam-Webster's Medical Dictionary, 1995, p. 173).

For this study, rural nurses' diabetes knowledge is tested with the Diabetes Basic Knowledge Test.

2. Rural nurse: For this study, this is a registered nurse working full time at a Critical Access Hospital, (a facility, as defined by the Montana Health Research and Education Foundation, 2002, "located more than 35 road miles or, in the case of a facility located in mountainous terrain or where only secondary roads exist, more than 15 road miles from a hospital or another critical access hospital; or be certified by the State as a necessary provider of health care services to residents in the area (in Montana, this includes all hospitals located in a frontier county)" (p.1).)

Assumptions

The wide open spaces of Montana provide long car rides between home and health care for many Montanans. These spaces also leave a vacant field for much needed continuing education in Critical Access Hospitals. The nurses that work in these small facilities are dedicated and hard working but whether or not they stay atop the current treatments and technology of diabetes care is doubtful. In the planning of this study it is assumed:

1. Registered nurses in Critical Access Hospitals are primarily responsible for diabetic education in the rural environment of Montana.
2. Due to lack of resources and access to the most recent information, Critical Access Hospital staff nurses are likely to be deficient in the knowledge needed for effective management and education of the diabetes patient.
3. The Diabetes Basic Knowledge Test and the Diabetes Self Report Tool are reliable and accurate measurement tools for the basic concepts and knowledge needed for nurses to educate and provide safe clinical care for diabetic patients.

Summary

Diabetes plays a significant role in the health of rural Montanans. Without proper management and education, this disease can lead to numerous healthcare visits and hospital stays. Access to healthcare for many rural diabetics is part of the continuing struggle to manage the disease.

The rural nurse working in Montana's Critical Access Hospitals provides basic education and acute diabetes care. The rural diabetic relies heavily on these nurses to provide accurate and current information. However, little was known about the level of diabetes knowledge these nurses possessed. Rural isolation along with access to, or the lack there of, continuing education possibly influenced the basic diabetes knowledge. This study examined the actual and perceived diabetes knowledge of Montana's Critical Access Hospitals' registered nurses. Ernestine Weidenbach's Prescriptive Theory formed the foundation of this study through the connection of the nurse's perceived knowledge of diabetes care with actual knowledge and the influences the environment interjects.

CHAPTER II

LITERATURE REVIEW

The education and instruction provided to Montana diabetics relies heavily on the staff nurse working in the rural facility. The concept of studying nurses' diabetes knowledge is not a new one. Numerous studies have focused on nursing students, staff nurses in university hospitals, metropolitan hospitals and long term care facilities. One study also examined rural nurses' knowledge but the facilities in which these nurses worked were much larger than the Critical Access Hospitals found in Montana. Understanding rural nurses' diabetic knowledge is the reason for this study. However, to understand the outcomes of this study a review or comparison of similar studies is essential.

Diabetes today compared to twenty years ago varies greatly due to the advances in medicine and technology. Nurses working in today's medical setting must possess a different level of knowledge than those nurses in earlier studies. Despite medical progress, history indicates a diabetes knowledge deficit in nurses throughout the years.

Diabetes Education

The quality of life for a diabetic patient relies heavily on his or her ability to perform self care and treatment. Diabetics require continuing medical care and patient self-management education to prevent both acute and long term complications. The American

Diabetes Association's Standards of Care 2002 recommend implementation of diabetes self-management education as a means to improving the patient's overall health and well being. At the time of initial diagnosis, self-management education is critical in helping both the diabetic and his or her family adapt to the changes necessary to manage and maintain diabetes (American Diabetes Association, 1998). Two hundred and one insulin-treated diabetic patients were followed over a one year period after completing an intensive 5 day diabetes education program (Tankova, Dakovska, & Koev, 2001). The patients' diabetes conditions improved with HbA1c levels falling from 9.1 (SD = 1.5) to 8.0 (SD = 1.1) after six months and 7.8 (SD = 1.3) after one year following the education program (Tankova, Dakovska, & Koev, 2001). A statistically significant drop in overall depression, anxiety and increase in well being were also measured in the same study (Tankova, Dakovska, & Koev, 2001). Diabetics receiving education in self-management techniques experience an improvement in overall well-being. The majority of the diabetics in this study received education from certified diabetes educators. Therefore, staff nurses ability to instruct diabetics remains a mystery.

Nursing Education

The diabetes education received by the nurse determines the ability of the nurse to pass on adequate knowledge to the diabetic. In 1974, one of the first studies measuring diabetes knowledge was conducted with nursing students. When 144 volunteer, senior nursing students from five separate baccalaureate programs were tested on the subject of diabetes mellitus in 1974 the results were dismal (Fuestal, 1976). The Diabetes Knowledge

Test was utilized to determine if these students, who were within two months of graduation, had sufficient diabetes knowledge to teach diabetic patients and their families (Fuestal, 1976). The original tool of 34 questions, plus three demographic inquiries added by Fuestal, examined the areas of insulin effects, diabetes control, symptoms and nutrition to name a few (Fuestal, 1976). None of the study participants were able to answer all 34 questions about diabetes correctly and the researcher therefore determined these students as unable to effectively teach diabetic patients and their families. Despite the fact that this study is more than 25 years old, the registered nurses' diabetes knowledge does not appear to substantially improve overtime.

In 1999 nursing students in their junior and senior levels of nursing courses along with registered nurses from two hospitals specializing in pediatrics were tested for diabetes knowledge (Lipman & Mahon, 1999). A 20-item questionnaire was developed by the authors to test the knowledge of the nursing participants about the care and self-care of children diagnosed with diabetes (Lipman & Mahon, 1999). The mean score of the nurses was 65.3 percent while the nursing students scored 57.4 percent (Lipman & Mahon, 1999). These researchers found nurses and nursing students to be ill prepared in educating diabetics about their disease. The authors also suggested that their findings raise a concern for institutions hiring new nursing graduates if these new nurses are expected to instruct diabetic patients in self management (Lipman & Mahon, 1999). The study results indicated a need for continuing education of the staff nurse and also a need for more diabetes instruction in nursing school.

Knowledge in the Workplace

Although nursing students appear unprepared to work with diabetics, the knowledge base of the working registered nurse requires further examination. These nurses are at the forefront of diabetes education, management and treatment. In 1983, a study was conducted to measure diabetes mellitus knowledge in working registered nurses (Scheiderich, Freibaum and Peterson, 1983). The researchers utilized a 34-item multiple choice Diabetes Knowledge Test developed by Scheiderich and a panel of expert nurse diabetes educators (Scheiderich, Freibaum & Peterson, 1983). The test implemented is somewhat similar to that used by Fuestal (1976) but due to advancements in diabetes care, the subjects of foot care, exercise, effects of sulfonylureas and a definition of diabetes were added to the test (Scheiderich, Freibaum and Peterson, 1983). The targeted staff nurses were employed on either a medical or a surgical unit or a combined medical-surgical unit in which diabetic patients were often admitted (Scheiderich, Freibaum, & Peterson, 1983). The 137 nurses who completed the exam worked in one of three large hospitals in the Midwest (Scheiderich, Freibaum, & Peterson, 1983, p. 58). The completed exams were calculated with a mean average of 74 percent with 30 percent of the sample scoring less than 70 percent (Scheiderich, Freibaum, & Peterson, 1983). The researchers determined the staff nurses lacked sufficient diabetes knowledge to teach patients in the areas of urine testing, diet, oral medications, and home blood glucose monitoring (Scheiderich, Freibaum, & Peterson, 1983). These self management techniques are critical for the diabetic to understand. This lack of knowledge opened the door for further, more in depth, study of working registered nurses' diabetes knowledge.

DBKT and DSRT

After Scheiderich, Freibaum & Peterson identified a lack of diabetes knowledge in the working registered nurse, numerous studies began. Diabetes treatment, management and education change on a daily basis and thus the knowledge level of the nurses must be assessed on all levels. One study tested 194 registered nurses in a 540- bed research hospital using the Diabetes Self-Report Tool (DSRT) and the Diabetes Basic Knowledge Test (DBKT) (Drass, et al., 1989). The DSRT, developed by the investigators, assesses the nurse's self perceived knowledge of diabetes (Drass, et al., 1989). Perceived knowledge must be examined in order to determine if the nurses believe themselves capable to care for diabetics or see themselves needing further education. The nurses in this study reported themselves to be 91 percent in agreement with the DSRT on their knowledge of diabetes. The DBKT was also developed by the investigators and consists of a 45-item multiple-choice questionnaire (Drass, et al., 1989). The DBKT is an adapted version of Scheiderich's Diabetes Knowledge Test expanding on the areas Scheiderich found lacking (Drass, et al., 1989). When tested with the DBKT, the nurses who perceived themselves as knowledgeable, averaged a 64 percent (Drass, et al., 1989). The staff nurses' perceived knowledge of diabetes was inversely related to their actual knowledge of the disease (Drass, et al, 1989). Drass, et al (1989) raised the concern that if nurses perceive themselves knowledgeable in the subject, and actually are not, they may not seek further education or assistance with diabetes instruction.

Continuing Education

Registered nurses face a number of confrontations and staying abreast of the latest treatments and management of chronic illness is just one of the many challenges. Continuing education and in-service training help nurses to stay current with new changes. However, some facilities are too small to provide in-service training and often the nurses are short on time to attend continuing education courses. Two researchers, Jayne and Rankin (1993), wanted to develop a comprehensive diabetes in-service education program and therefore investigated diabetes mellitus knowledge in 98 nurses from six inpatient units and an ambulatory care center within a university medical center. The DBKT and the DSRT, designed by Drass and colleagues, were utilized as needs assessment tools for the education program (Jayne & Rankin, 1993). The mean score achieved on the DBKT was 73 percent (Jayne & Rankin, 1993). Most nurses reported they felt competent in caring for the diabetic patient but their tested knowledge proved different (Jayne & Rankin, 1993). Although the mean score in this test was higher than that found in Drass et al (1989), the researchers still found the nurses lacking in adequate knowledge to teach diabetes patients. Technology in diabetes management is exceeding the knowledge base of the nurses caring for diabetics (Jayne & Rankin, 1993). However, testing on the subject must continue and must reflect the current progresses being made in diabetes management in order for adequate continuing education and in-service training to take place (Jayne & Rankin, 1993). It was also discovered that nurses receiving continuing education in diabetes, within six months, scored higher on the DBKT exam than those that did not receive education (Baxley, Brown,

Pokorny, & Swanson, 1997). This would lead one to believe that continuing education for staff nurses, helps facilities ensure and validate competency levels in the area of staff nurse instructed diabetes education for the acute care patient.

Physical Assessment

The nurse's knowledge of diabetes and ability to explain the disease to the patient are areas proven to be of concern. The nurse's lack of knowledge can also lead to difficulty or inability to identify life threatening conditions associated with diabetes. As the general population ages, many elderly diabetics come to reside in long-term care facilities. A diabetes knowledge test developed by a diabetic educator's group was utilized to investigate the diabetes knowledge of nurses working in long-term care facilities (Leggett-Frazier, Turner, & Vincent, 1994). The test questions focused on knowledge needed by long-term care facility nurses to manage diabetic clients and included the areas of: blood glucose and ketone monitoring, medications, illness care, foot care, exercise, diet, hypoglycemia and hyperglycemia and patient/family education (Leggett-Frazier, Turner, & Vincent, 1994). Of the 59 RNs and LPNs who completed the test, a mean score of 67 percent, with 70 percent passing, was attained (Leggett-Frazier, Turner, & Vincent, 1994). The area the researchers found most alarming focused on assessment skills. These nurses scored less than 40 percent in the skill most needed in long-term care (Leggett-Frazier, Turner, & Vincent, 1994). These same nurses also scored poorly in the areas of hypoglycemia, hyperglycemia and medications (Leggett-Frazier, Turner, & Vincent, 1994). The inability to identify and treat these life-

threatening conditions causes reason for concern. What appears to be a generalized lack of knowledge in staff nurses, in all settings, raises serious implications for nursing educators.

Environment

It is postulated the work environment or area of employment influences the nurse's diabetes knowledge. Those nurses exposed to diabetics on a regular basis with access to continuing education and specialty support should possess an adept knowledge base. The nurses working in isolated areas with little to no in-service training may lack the knowledge to educate diabetic patients. Staff nurses working in a 62-bed rural acute care facility answered the DSRT and DBKT tools (Baxley, Brown, Pokorny, & Swanson, 1997). Thirty-two nurses completed the tools with a mean score of 88 percent on the DSRT (Baxley, Brown, Pokorny, & Swanson, 1997). The mean score of the exam testing the actual knowledge was 75.3 percent (Baxley, Brown, Pokorny, & Swanson, 1997). The nurses' perception of knowledge was found not related to their actual knowledge. The DBKT scores permitted the nurses to see the areas in which they lacked knowledge and thus requested educational updates in these areas (Baxley, Brown, Pokorny, & Swanson, 1997).

Often, the newly diagnosed diabetic requires in-home care and education. The nurses caring for these individuals are often more independent and self-reliant than the hospital based nurse. Nurses in a community hospital and home healthcare agency completed the DSRT and DBKT tools (El-Deirawi & Zuraikat, 2001). The response rate from the home healthcare agency far exceeded that of the community hospital. However, the two groups combined achieved a mean score of 72.2 percent on the DBKT (El-Deirawi & Zuraikat,

2001). A significant correlation between perceived and actual diabetes knowledge was determined while previous tests did not correlate as well (El-Deirawi & Zuraikat, 2001). El-Deirawi and Zuraikat (2001) contributed this relationship to the higher number of home-health care nurses completing the tools. The correlation may be attributed to these nurses possibly being more autonomous and more confident in their knowledge (El-Deirawi & Zuraikat, 2001). The overall mean score concurs with earlier studies in that registered nurses lack sufficient knowledge to instruct the diabetic patient in self-care.

Summary

The earlier studies revealed the nurses to have an average to poor level of diabetes knowledge plus an inability to identify their lack of knowledge. Identification of the lack of knowledge suggests the need for better continuing education for staff nurses so they might better educate and treat diabetic clients.

When looking at the previous studies one might conclude that environment truly interacts with knowledge level. Scheiderich, Freibaum and Peterson (1983) and Lipman and Mahon (1999) noted that hospital settings employing diabetic educators and nurse specialists to educate patients with diabetes, housed staff nurses with limited diabetes knowledge. All the nurses tested in the previous studies, worked in facilities much larger than any of Montana's Critical Access Hospitals. However, the access to continuing education played a significant role in the test outcomes. Drass, et al. (1989) found lower DBKT scores in nurses who had not received diabetes in-service training for greater than six months. Leggett-Frazier, Turner and Vincent (1994) also indicated that long term care facilities lack

continuing education programs and this deficit was evident in the nurses' knowledge. "The scores may indicate that that the nurses have forgotten the diabetes information they learned in school, or that they never learned it adequately, in either case, the need for periodic reviews is indicated by the test scores in this study" (Leggett-Frazier, Turner, and Vincent, 1994, p.309). The size of the facility in which these nurses work does not necessarily exclude them from education isolation similar to those nurses working in Critical Access Hospitals.

CHAPTER III

METHOD

While the study of diabetes education in registered nurses is not a new concept, this study is unique. The rural environment presents a challenge for the people who live and work in Montana. Therefore this study covers the distances to these rural communities and examines the perceived and actual diabetes knowledge of the staff nurses working in small and often isolated regions of the State.

Design

This study used a non-experimental descriptive design. The survey method of acquiring data was employed. As identified by Burns and Grove (2001) a "survey is used to describe a technique of data collection in which questionnaires (collected by mail or in person) or personal interviews are used to gather data about an identified population" (p.256). The design of this study was a replication of the study utilized by Drass et al., (1989). The questionnaires used to survey the nurses in the Critical Access Hospitals consisted of an anonymous demographic sheet, the DSRT and the DBKT.

Population and Sample

The Directors of Nursing from each of the 23 facilities were asked to distribute the tests to no more than five full time registered nurses. Due to the distance and isolation, many

of the Critical Access Hospitals do not employ five full time registered nurses but rather use traveling nurses. Traveling nurses were not permitted to participate in this study because of the risk they could complete the tests at more than one facility. Of the 23 Critical Access Hospitals that originally agreed to participate in the study, 12 facilities completed the questionnaires. The investigator received 41 completed packets in total.

Procedures for Data Collection

The Critical Access Hospitals' Administrators and/or Directors of Nursing were approached, via telephone, for permission to test the registered nurses working in the area of patient care. The demographic sheet, DSRT, DBKT and a letter of instruction (Appendix E) along with a consent form were mailed to each facility in individualized packets of five. A letter to the Director of Nursing (Appendix F) accompanied the testing materials. The letter stated that the Director of Nursing should choose 5 full time nurses to complete the exams. It was then requested that the tests be returned within a two-week window. Testing took place at the individual nurse's convenience over the two week period and then all tests, in each participating facility, were returned in self-addressed stamped envelopes to the investigator. All test packets were assigned an identification number for correlation purposes and to ensure anonymity.

Instrumentation

The demographic data sheet (Appendix B) includes: the number of years experience, number of years at the Critical Access Hospital, education, number of diabetics cared for per month, presence of diabetes in self, family or friend, and how competent the nurse feels in caring for diabetic patients. The investigator received permission (Appendix A) from the author of the Diabetes Self-Report Test (DSRT) (Appendix C) and the Diabetes Basic Knowledge Test (DBKT) (Appendix D) to use these tools for the purpose of the study.

The DSRT measures each nurse's perceived knowledge of diabetes mellitus including type I and type II diabetes, nursing care of a diabetic patient before an invasive procedure, loss of consciousness in the diabetic patient, performing and interpreting blood glucose levels and 'sick day' management for a diabetic patient. The test also covers insulin administration, oral hypoglycemic agents, recognition of hyperglycemia with and without diabetic ketoacidosis, effects of stress and exercise on blood sugar levels, dietary therapy and personal care of patients with diabetes. Through the suggestion of the DSRT author, the 1-4 Likert-type scale was altered to a 1-5 numerical scale with 1 indicating strong disagreement and 5 indicating strong agreement. The improved scale allows for the nurse to voice a "no opinion" when circling the number three.

The DBKT, a 45-item multiple-choice questionnaire was designed by the original author via modification of the Diabetes Knowledge Test implemented by Scheiderich (1983). The DBKT covers all the areas of diabetes mellitus management and treatment that the

DSRT contains. The author designed the two tests with the intention of comparing and contrasting the perceived and actual diabetes knowledge of the original study's participants. After receiving recommendation from Drass, the answers to one question were revised to reflect current nutritional exchange lists. Another question dealing with oral hypoglycemic agents was altered to reflect the current prescription trends of health care providers. Using Chronbach's α for internal consistency, a reliability co-efficient of .91 and .79 for DSRT and DBKT, respectively, has been obtained in earlier studies (Drass, 1989).

Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) 11.5 for Windows. Pearson's correlation coefficients described the relationship between perceived and actual diabetes knowledge of rural nurses working in Montana's Critical Access Hospitals. Descriptive statistics, such as frequencies, percentages, means and standard deviations were used to summarize the study results

Human Rights and Consent Process

The research study focused on the perceived and actual knowledge of registered nurses working in Montana's Critical Access Hospitals. There was no direct contact made with the registered nurses in these facilities. Each participating nurse voluntarily consented to the study. A signed consent form (Appendix G) was received from each registered nurse.

The questionnaires contained no information that could directly identify the registered nurse or the participating Critical Access Hospital. Results of the study were written in a thesis in partial fulfillment of the degree of master of nursing. Copies of the written study are available at the Montana State University – Bozeman, College of Nursing and the Montana State University Renne Library. The written thesis did not identify any nurses or the facilities in which they are employed. The summary proposal to the Human Subject Committee of the Montana State University – Bozeman was found exempt from the requirement of review by the human subjects committee on April 14, 2003, due to research involving the use of educational tests, survey procedures, interview procedures or observation of public behavior.

CHAPTER IV

RESULTS

A non-experimental descriptive survey and educational test were employed to determine the perceived and actual knowledge of registered nurses working in Montana's Critical Access Hospitals.

All 23 identified Critical Access Hospitals were contacted via telephone and introductory letter during April and May 2003. The demographic survey, DSRT and DBKT were then mailed in bundles of five to all 23 facilities. The nurses receiving the questionnaires were chosen by the respective Directors of Nursing. Of the 23 facilities only 12 facilities responded with completed surveys. The total number of registered nurses completing these surveys was 41, resulting in a response rate of 34.2 percent. When the Directors of Nursing were contacted via telephone for the second time as a reminder to send the completed tests back to the investigator; many stated inability to find time to distribute the tests or the fact that the facility relied heavily on traveling registered nurses to complete its work force as reasons for not returning the tests.

Descriptive statistics were utilized to present the demographic profile of the nurses completing the questionnaires. The perceived and actual diabetes knowledge test results were compared via Pearson's correlation coefficients. These results were also compared with the demographic material, especially the in-service training, educational degree, years of

experience, number of diabetic clients cared for, and level of perceived competency to determine influence on the perceived and actual knowledge level of these nurses.

Demographic Profile

The demographic profile of the registered nurses working at Montana's Critical Access Hospitals as it relates to perceived and actual diabetes knowledge was identified. This included years of experience, number of years at current facility, education level, time since last diabetes in-service, number of diabetics cared for each month, presence of diabetes in self, family or friend, and perceived diabetes competency level.

The mean number of years experience for the registered nurses was 13.24 (SD=10.86) with a range of 1 year to 35 years working experience. The mean number of years working at the current Critical Access Hospital was 6.06 (SD=7.68) with minimum of 1 year to maximum of 35 years at current job position. A total of 9.8% (n=4) held a Diploma registered nurse degree while 48.8% (n=20) earned an Associated Degree in nursing and 41.5% (n=17) possessed a Baccalaureate Degree in nursing.

Twenty-four of the 41 registered nurses (58.5%) reported no diabetes in-service training program or having attended an in-service training program more than two years ago. Greater than 60% (n=25) treat and/or care for more than 4 diabetic patients per month. Only two (4.9%) of the 41 nurses reported having diabetes themselves; 56.1% (n=23) reported having a family member or friend with diabetes. Overall, 60% (n=25) believed themselves competent to very competent when caring for a diabetic client. Table 1 further illustrates the demographic breakdown by percentages.

Table 1. Demographic Profile (n=41)

<u>Years of Experience</u>	N	(%)
0-5	13	31.7
6-10	10	24.4
11-15	4	9.8
16-20	3	7.3
21-30	7	17.0
31-35	4	9.8
<u>Years at CAH</u>		
0-5	30	73.3
6-10	3	7.3
11-15	1	2.4
16-20	5	12.2
21-25	0	0
26-30	1	2.4
31-35	1	2.4
<u>Highest Education Level</u>		
Diploma	4	9.8
Associate Degree	20	48.8
Baccalaureate Degree	17	41.5
Master Degree +	0	0
<u>Last Diabetes In-service</u>		
None	14	34.1
Within 6 months	2	4.9
More than 6m less than 1 yr	3	7.3
More than 1 yr less than 2 yr	12	29.3
More than 2 yr	10	24.4
<u>Diabetics Seen/Month</u>		
None	0	0
1-3	16	39.0
More than 4	25	61.0
<u>Presence of Diabetes</u>		
None	16	39.0
Friend	5	12.2
Immediate Family	18	43.9
Self	2	4.9
<u>Competency in Diabetes Care</u>		
Not at all	0	0
Not very	2	4.9
Somewhat	14	34.1
Competent	19	46.3
Very Competent	6	14.6

