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## Perceived and Actual Level of Knowledge of Diabetes Mellitus Among Nurses

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PERCEIVED AND ACTUAL LEVEL  
OF KNOWLEDGE OF DIABETES  
MELLITUS AMONG NURSES

By

Gayla M. Kupris

A THESIS

Submitted to  
Grand Valley State University  
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ABSTRACT

PERCEIVED AND ACTUAL LEVEL OF KNOWLEDGE OF  
DIABETES MELLITUS AMONG NURSES

by

Gayla M. Kupris

The purpose of this study was to describe and compare staff nurses perceived and actual levels of knowledge of diabetes mellitus. Little research has been done to study perceived diabetes knowledge.

This study used a descriptive correlational design. A convenience sample of 60 staff nurses from a 248 bed suburban teaching hospital was surveyed. The Diabetes Self-Report Tool (Drass, Muir-Nash, Boykin, Turek, & Baker, 1989), was used to assess staff nurses' perceived level of diabetes knowledge. The Diabetes: Basic Knowledge Test (Drass, et al., 1989), was used to measure actual level of diabetes knowledge. Subjects were found to have an overall mid level of knowledge. There was a significant relationship between perceived and actual knowledge. It was found that as years employed at the study site increased, the knowledge level of diabetes decreased. Also, nurses attending a diabetes in-service less than 6 months ago to within 2 years reported a higher perception of diabetes knowledge.

#### DEDICATION

This thesis is dedicated to my parents, whose love, support, and belief in my abilities made it possible for me to complete this degree.

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## CHAPTER ONE

### INTRODUCTION

Eleven million people in the United States have diabetes mellitus. The incidence is increasing by 6% per year (Scheiderich, Freibaum & Peterson, 1983). Given the prevalence of diabetes in the general population, it is extremely likely that the nurse working in a hospital will encounter diabetic patients on an almost daily basis.

The National Diabetes Commission (1976) noted that the proper instruction of diabetic patients in self-care was not being achieved, in part, because there was a lack of knowledge among health-care professionals (DHEW Publication No. NIH 76-1021, 1976). Nursing students, primary health-care workers, and medical-surgical staff nurses, as groups, were found to have significant deficits in areas of basic diabetes knowledge (Fevstal, 1976; Leichter, Ferguson, Collins, Rhodes, Garrity & Hernandez, 1980; Scheiderich et al., 1983). Major advances in theory and knowledge related to many aspects of diabetes, and changes in the treatment are occurring regularly. Changes include: glycosylated hemoglobin, management of insulin-dependent diabetes mellitus and non-insulin-dependent diabetes mellitus,

complications, blood glucose monitoring, Somogyi effect, stress, and surgery (Drass, Muir-Nash, Boykin, Turek, & Baker, 1989; Moriarty & Stephens, 1990). The knowledge explosion makes it difficult for the average nurse to stay abreast of the most recent advances.

Many hospitals rely on staff nurses to educate diabetic patients. Since the diagnosis of diabetes crosses all nursing and medical specialties, it is appropriate and essential that all staff nurses have basic knowledge of diabetes. The effectiveness of patient education is largely dependent on knowledgeable teachers. Nurses who perceive that they are knowledgeable about diabetes may be unaware of a lack of knowledge and fail to seek out educational resources (i.e., Certified Diabetes Educators and Clinical Nurse Specialists) for their diabetic patients. This potential misperception raises questions regarding the current level of staff nurses' knowledge of diabetes as well as their ability to conduct initial and continuing diabetes education for patients (Drass et al., 1989).

The purpose of this study was to describe and compare nurses' perceived and actual level of knowledge of diabetes mellitus. The identified knowledge deficits will form the basis for the development of future planned teaching/learning experiences which would benefit nurses, and in turn patients.

## CHAPTER TWO

### REVIEW OF LITERATURE

Successful diabetes management requires the acquisition and application of complex information and skills. Learning these skills requires individualized instruction. Nurses caring for hospitalized diabetic patients are in an ideal position to teach patients and also to reinforce teaching (Magill, Williams & Caspi, 1986). The effectiveness of patient education is largely dependent upon knowledgeable health-care professionals.

Research studies reported have demonstrated a lack of knowledge of diabetes mellitus among both patients and health professionals (Drass et al., 1989; Feustel 1976; Leichter, et al., 1980; Moriarty & Stephens, 1990; Scheiderich et al., 1983). Further, these studies suggest that patient knowledge deficit can often be attributed to health professional knowledge deficit.

A recent study by Moriarty & Stephens (1990), was conducted to answer the questions: 1) According to nurses' perceptions, what factors influence conducting diabetes education? and 2) Do staff nurses have sufficient knowledge to teach diabetes management principles? Thirty-nine staff nurses from adult units of a university hospital completed an investigator-designed

survey and a Diabetes Knowledge Test (DKT). Eleven nurses attending a workshop on diabetes patient management were pre- and post-tested to determine the workshop's effect on perceptions and knowledge. Perceived factors that interfered with patient teaching included lack of time, inadequate teaching skills, lack of patient interest in learning, and absence of a physician's order for teaching. The workshop had little influence on perceptions but significantly increased the mean DKT score from 70% to 78% ( $p = .03$ ). These findings suggested that expecting all staff nurses to adequately educate patients in diabetes management may not be realistic.

Another recent study, (Drass, et al., 1989) surveyed staff nurses about their perceived and actual level of knowledge of diabetes mellitus. A convenience sample of 184 professional staff nurses, from both inpatient and outpatient settings of a large research-teaching hospital, was surveyed. The investigators developed the Diabetes Self-Report Tool (DSRT) to assess staff nurses' perception of diabetes knowledge. To assess actual level of diabetes knowledge, the Diabetes: Basic Knowledge Test (DBKT), a 45-item multiple choice questionnaire was used. The DBKT is a modification of Scheiderich's (1983) Diabetes Knowledge Test. A moderately low negative correlation ( $r = -.36$ ,

$p < .001$ ) indicated that the higher the staff nurses' perceived knowledge of diabetes, the less they actually knew. The study findings raised questions as to the adequacy of staff nurses' knowledge of diabetes and their ability to conduct initial and continuing diabetes education. Also, nurses who perceive that they are knowledgeable about diabetes may be unaware of a lack of knowledge and as a result may not seek out additional educational resources for their diabetic patients.

In other studies, Feustel (1976) and Scheiderich (1983) used similar tests of diabetes knowledge in research studies to assess basic knowledge level among health professionals. Scheiderich (1983) developed the Diabetes Knowledge Test (DKT) to explore the level of diabetes knowledge among registered nurses in ten hospitals in the midwest. Significant differences were found in scores among participating nurses, with the lowest scores found in a hospital where a Diabetes Teaching Service (two nurse specialists and a dietitian) gave classes and follow-up teaching to diabetic patients. This study concluded that four hours or less of diabetes continuing education for nurses within a six month period was not sufficient to maintain essential knowledge for teaching diabetic patients. Scheiderich (1983) recommended clinical nurse specialists work with staff nurses to increase their knowledge base.

Feustel (1976) studied senior nursing students within two months of graduation from four baccalaureate colleges in a metropolitan area. This population was characterized as "near the peak of their general nursing knowledge." A student was considered eligible to teach diabetic patients if he or she could answer all questions on the DKT correctly. None of the participants answered all questions correctly and only two questions were answered correctly by all students. Feustel therefore concluded that graduating nursing students were not prepared to do diabetic teaching. Results from an early study conducted by Etzwiler (1967), to determine the knowledge of health professionals in diabetes, indicated that graduate nurses were not adequately prepared to teach diabetic patients how to manage their disease.

The levels of diabetes knowledge held by nurses, dietitians, health educators, and other health workers were studied by Leichter (1980) using the diabetes knowledge survey, a 20 item multiple choice questionnaire. This study involved a group of 136 public health professionals who attended a symposium on diabetes. At the beginning and end of the symposium a questionnaire was distributed unannounced. The questionnaire was completed by all 136 participants before the symposium, and by 128 participants after the program. One year later, 37 of these health care workers

again completed the questionnaire. Pre-testing indicated similar performance levels. Immediately post-symposium, significant score improvements were noted. One year later scores showed a significant deterioration of knowledge, but not to pre-training levels. Leichter suggested the need for an increased emphasis on continued professional education in diabetes. Leichter concluded that infrequent conferences may not be adequate for health care workers to maintain up to date knowledge of diabetes.

In outlining needs of the patient and professional for diabetes education, Williams (1976) pointed out the importance of repeated, long-term instruction, and the necessity of assessing the patient to determine educational needs and preferences of individual patients. Knowledgeable health professionals are essential to this process.

Many authors have investigated the role of staff nurses as patient educators. Lack of time, lack of preparation for the role, and confusion about the nurses' formal teaching role have been cited as reasons for the general reluctance on the part of staff nurses to initiate and document patient teaching activities (Etzwiler, 1967; Moriarty & Stephens, 1990).

Weinzierl (1986) surveyed 56 nurse orientees over a four month period to determine "how comfortable they

felt about their knowledge or skills in 23 teaching areas related to diabetes education". The results indicated that newly hired staff nurses felt most comfortable about their knowledge and ability to teach the patient skills which the nurse, herself, used on a daily basis (e.g. urine test methods, administration of insulin, foot care). But the nurse felt less comfortable with topics such as teaching symptoms or treatment of hypoglycemic reactions. The study concluded that unless the staff nurse was highly motivated and had time to review the topics and skills she was uncomfortable with, it would be unlikely that she would initiate teaching for a patient or family. This study also found that staff nurses were hesitant to participate in diabetes education because of a lack of clear expectations and discomfort regarding their knowledge of diabetes as well as their teaching abilities.

In 1986 Leichter surveyed several sources to describe and define the organization and delivery of education programs for diabetic patients. The sources included the American Diabetes Association, the American Hospital Association, Blue Cross/Blue Shield, the Joslin Diabetes Center, and the Diabetes Control Program of the centers for Disease Control. One finding was that most hospital-based primary care nurses do not have sufficient knowledge about diabetes or patient education to provide



high-quality services.

Similar studies conducted on health care/nursing personnel working with patients with other diagnoses including acquired immunodeficiency syndrome (AIDS), have reached similar conclusions. AIDS becomes important because nurses have a responsibility to educate the public, particularly members of high-risk groups. Patient teaching or providing accurate information requires well informed nurses in order to appropriately target continuing education interventions.

Several studies have been conducted to determine the strengths and weaknesses of nurses' knowledge about AIDS and to gauge their attitudes to the subject and to related topics (Haughey, Scherer & Wu, 1989; Prince, Beard, Ivy & Leister, 1989; Stanford, 1988). The data for these studies were collected by means of questionnaires voluntarily completed by several hundred registered nurses. All researchers concluded that nurses' knowledge of AIDS was generally unsatisfactory. However, the positive attitudes exhibited were encouraging. They also recommended that continuing education programs for nurses are needed to prepare them to meet the needs of the increasing AIDS crisis.

Based on this assessment of needs for AIDS related information a study was conducted to determine the effects of an AIDS continuing education conference on

nurses knowledge and attitudes (Flaskerud, Lewis, Shin, 1989). The conclusion of this study was that appropriate continuing education does increase knowledge. Subjects were pre-tested and post-tested using a structured questionnaire that measure AIDS related knowledge and attitudes.

Nurses' knowledge of human sexuality has been studied in much the same way as diabetes knowledge and AIDS knowledge. There is increasing evidence that the problems related to human sexuality are more pervasive and more important than has been recognized previously. As this multiplicity of problems affecting human sexual behavior becomes more complex, individuals continue to look to health professionals for guidance and advice. Therefore, the need for health personnel who are competent in providing sex education and counseling increases. Since nurses have an important role in daily patient management, they have an excellent opportunity to provide such counseling.

In 1975, Lief & Payne found that student nurses were less knowledgeable about sexuality than medical students, and even had knowledge scores lower than other students whose studies and future work roles might have no links with sexuality. Payne (1976) further studied nurses using the sexual knowledge and attitudes test (developed by Lief & Reed, 1972) to explore the relationship between

knowledge, attitudes and behavior among nurses. Her study suggested that nurses' knowledge levels and attitudes are such that they are not equipped to meet patients' needs in the area of sexuality. Similar findings were obtained in studies by Fisher and Levin (1983) and Webb (1987).

This review of the literature supports the need to continually assess nurses' knowledge in all areas of nursing care. The knowledge of nurses on diabetes, AIDS, and human sexuality has been measured using valid and reliable questionnaires designed to test these areas of nursing care. These descriptive studies suggest the existence of serious deficiencies in the delivery of patient education in the health care system. The existence of these deficiencies has been attributed to lack of knowledge among nurses. Periodic continuing education classes for all staff nurses are imperative for safe clinical practice and effective patient education. Continuing research of nurses' knowledge is needed to design the continuing education of nurses.

#### Conceptual Framework

Adult education, andragogy, describes a set of organized activities carried on by a wide variety of institutions for the accomplishment of specific educational objectives. Within Malcolm Knowles theory of adult learning, four crucial assumptions of andragogy

are identified (Knowles, 1980).

1) The Concept of the Learner

It is a normal aspect of the process of maturation for a person to move from dependency toward increasing self-directedness, but at different rates for different people and in different dimensions of life. Teachers have a responsibility to encourage and nurture this movement. Adults have a deep psychological need to be generally self-dependent in particular temporary situations (Knowles, 1980, p. 43).

2) Role of Learners' Experience

As people grow and develop they accumulate an increasing reservoir of experience that becomes an increasingly rich resource for learning for themselves and for others. Furthermore, people attach more meaning to learnings they gain from experience than those they acquire passively. Accordingly, the primary techniques in education are experiential techniques - laboratory experiments, discussion, problem solving cases, simulation exercises, field experience and the like (Knowles, 1980, p. 44).

3) Readiness to Learn

People become ready to learn something when they

experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems. The educator has a responsibility to create conditions and provide tools and procedures for helping learners discover their "needs to know." And learning programs should be organized around life-application categories and sequenced according to the learners readiness to learn (Knowles, 1980, p. 44).

#### 4) Orientation to Learning

Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply whatever knowledge and skill they gain today to living more effectively tomorrow. Accordingly, learning experiences should be organized around competency-development categories. People are performance-centered in their orientation to learning (Knowles, 1980, p. 44).

Andragogy is viewed as a philosophical orientation for adult education. While it is based on a humanistic way of thinking, it has also been influenced by behaviorists, Gestalt psychologists, and cognitive theorists (Darkenwald, 1982).

Andragogy grew out of such propositions as Carl

Rogers' (1969) student-centered approach to learning. Rogers wrote that teaching is a vastly overrated function, pointing out that the facilitation of learning should be the aim of education. Rogers expressed the view that "Learning takes place when the subject matter is perceived by the student as having relevance for his own purpose" (p. 158). Internal threats should be kept to a minimum when learnings are perceived as threatening to the self. Likewise, self-evaluation and self-criticism are more acceptable to adults than evaluation by others.

Mezirow (1981) offered another definition of andragogy. He wrote, "Andragogy is an organized and sustained effort to assist adults to learn in a way that enhances their capacity to function as self-directed learners" (p. 21). In this view andragogy becomes a personal interactive agreement between the learner and the learning endeavor.

Andragogy is a dynamic educational process. In this educational process, the assumptions that form the fundamental tenets of andragogy are reflected in such program practices as using the learner's experience as a resource for learning, grouping learners according to interests and developmental tasks, and organizing learning experiences according to problem areas. The

learner is central in this model. The teaching/learning process is one of mutual inquiry with the educator serving as the resource person or facilitator of learning. The goal of such a process is to assist learners to become self-directed, i.e., to learn how to learn (Nielsen, 1989).

The ultimate responsibility and accountability for continuing education to enhance professional practice rests with the individual nurse. Given Knowles (1980) theory of adult learning, perception of diabetes knowledge may influence readiness to learn and self-directedness in learning. The previously cited research suggests periodic continuing education classes for all staff nurses as being imperative for safe clinical practice and effective patient education. Continuing education is a life long learning process that builds on and modifies previously acquired knowledge, skills, and attitudes. The structure and content of continuing education must be flexible in order to meet the nursing practice needs. True learning is that which is desired and sought after by the individual. Adults want to learn and will learn what is important to them. Thus, continuing education is most beneficial when a plan would offer participants freedom to identify their learning needs and choose methods of sharing information (Knowles, 1985).

This research will measure the learner's perceived and actual level of diabetes knowledge and compare them to determine whether or not a relationship exists. This understanding is significant in planning future educational experiences.

Hypotheses to be tested:

1. There is a relationship between perceived level and actual level of current knowledge of diabetes mellitus in staff nurses.
2. There is a relationship between years of practice as a staff nurse and level of actual knowledge of diabetes mellitus.
3. Nurses with recent in-service education will have a higher level of actual diabetes knowledge.

#### Definition of Terms

Diabetes knowledge (theoretical)- basic information thought to be required for a staff nurse to care for a diabetic patient.

Diabetes knowledge (operational)- total score on the Diabetes: Basic Knowledge Test (Drass, Muir-Nash, Boykin, Turek & Baker, 1989).

Perception of Diabetes Knowledge (theoretical)- an intuitive awareness of one's level of diabetes knowledge.

Perception of Diabetes Knowledge (operational)-



total score on the Diabetes Self-Report Tool (Drass, Muir-Nash, Boykin, Turek & Baker, 1989).

Staff nurse - nurse with direct patient care responsibilities assigned to either inpatient or outpatient units.

## CHAPTER THREE

### METHODOLOGY

#### Study Design

A descriptive correlational study design was used to examine the relationship between perceived diabetes knowledge and actual diabetes knowledge among staff nurses and is a modification of the Drass et, al., 1989 study. There was no attempt made to control extraneous variables, or to do random assignment to groups. The aim of this study was to describe the relationship among the variables. A questionnaire method was used. The advantages of this method include: relatively inexpensive, assurance of anonymity for the participant, and the removal of one source of possible bias, namely observer error (Polit & Hungler, 1987).

#### Population and Sample

The study was conducted in a 248 bed suburban teaching hospital. Data were collected from a convenience sample of staff RN's. The 306 RN's employed by the study hospital have a variety of educational backgrounds including diploma preparation, associate degree, university bachelor degree (BSN or BS in health related area), and masters degree. The

hospital offers the following services: Radiology, Intensive Care, Pediatrics, Obstetrics, Rehabilitation, Ambulatory Care, Emergency Room, Operating Room, Post Anesthesia Care, Cardiology, Orthopedics, Oncology and Gynecology.

At this facility there is a designated diabetic educator responsible for diabetic patient education on a follow up outpatient basis and to serve as a resource for inpatient staff nurses. However, the individual staff nurse has the responsibility for initial assessment and teaching of diabetic patients. Patients diagnosed with diabetes mellitus are admitted to inpatient and outpatient units. Given the above, the target population for this study included all RN staff nurses.

All RN staff nurses available on April 18, 1991 were invited to participate in the study. Data were collected over a twenty-four hour period. The final sample size consisted of 60 staff nurses

#### Human Subjects

Anonymity was maintained through the use of code numbers, no names were used. Voluntary agreement to participate was considered informed consent. To assure human subject protection the research proposal was submitted to the Grand Valley State University Human Research Review Committee for approval before any data

collection. Also, written permission to conduct the research was granted by the study hospital's Vice President of Nursing.

### Instruments

Three instruments were used in this study. Two instruments were used to measure actual and perceived diabetes knowledge among staff nurses: The Diabetes: Basic Knowledge Test (DBKT) (Drass et al., 1989); and The Diabetes Self Report Tool (DSRT), (Drass et al., 1989).

Demographic data were collected using the Demographic Data Sheet (Appendix B). Information sought included: general demographic information; years in nursing; years worked as nurse at this hospital; education; and presence of diabetes in self, family or friends.

The Diabetes: Basic Knowledge Test (Drass et al., 1989) (Appendix C), a 45 item multiple choice questionnaire, adapted from the Scheiderich (1983) Diabetes Knowledge Test, was used to assess the level of basic diabetes knowledge among staff nurses. Drass et al., (1989), submitted this test to six experts in the field of diabetes education for review of content validity, item construction, and test format and reported a reliability coefficient of .79 using Cronbach's alpha for internal consistency. The reliability for internal consistency for this group of subjects was determined to

be .63 using Cronbach's alpha. The DBKT was scored by using each correct answer as one point. Each of the 45 questions were followed by 3 responses and an "I do not know" response. There was one best response per question. The "I do not know" response was considered a wrong answer. Individual scores were determined by each correct answer with a possible score ranging from 0-45.

The Diabetes Self-Report Tool (Appendix D), was used to assess staff nurses perception of diabetes knowledge (Drass et al., 1989). This tool consists of a 22 item Likert-type scale with positive and negative statements reflecting perception of knowledge in each diabetes-related content area from the DBKT. The content areas included; complications, diabetic ketoacidosis, diet, emergencies, etiology of insulin dependent diabetes, and non-insulin dependent diabetes, exercise, glucose monitoring, glycosylated hemoglobin, hygiene, hyperglycemia, hypoglycemia, injections, insulin, management, oral hypoglycemic agents, sick day guidelines, somogyi effect, stress, surgery, and urine testing. A numerical scale of 1-5 was used with 5 indicating strong agreement with a specific statement, and 1 indicating a strong disagreement with a specific statement. The higher the total score the more positive the perception of diabetes knowledge. Possible scores range from 22-110. The tool was submitted to six experts

in the field of diabetes education for a review of content validity, item construction, and test format. Drass et al., (1989), reported a reliability coefficient of .91 using Cronbach's alpha for internal consistency. A reliability coefficient of .81 using Cronbach's alpha for internal consistency was determined for this group of subjects.

#### Procedure

Staff nurses at the research site were invited to participate in a study of diabetes knowledge. One month prior to the study, the researcher contacted the head nurses throughout the hospital to individually discuss the study, its purpose, how the data would be collected along with the rationale for data collection methods.

The optimal data collection day was based on the percentage of RN's scheduled to work, thus potentially available to participate in the study. One day prior to the planned study day, the head nurse announced to the RN staff that an investigator would be coming to the nursing unit at the change of shift on the next day to ask for voluntary participation in a nursing research study. On the study day, the investigator approached all available RN staff nurses in a group and read section I on the "Investigator Script" (Appendix A). Staff nurses choosing to participate were asked to remain in the lounge area and questionnaires were then distributed. To

control for investigator bias/influence on results the investigator read the prepared script section II (Appendix A) describing the purpose of the study and instructions for completing questionnaires.

The Diabetes: Self-Report Tool was administered first and took approximately two minutes to complete. This was followed by the attached Demographic Data Sheet. These two instruments were collected when completed, and the Diabetes: Basic Knowledge Test was administered and took approximately fifteen minutes to completed.

Each questionnaire contained an identification number for data analysis purposes only. To assure anonymity, no record identifying staff name with questionnaire identification number was kept. As stated in the Investigator Script Section II (Appendix A), subjects were requested to remember their identification number if they wished to know their scores on the DBKT and the DSRT. At the completion of data collection, scores by code number, were posted in the predesignated area in the Staff Services/Nursing Administration Office.

## CHAPTER FOUR

### RESULTS

#### Characteristics of Subjects

Data were collected over a twenty four hour period. Sixty registered nurses participated in the study. The Demographic Data Sheet (Appendix B) listed ten categories of nursing service: medical-surgical, ambulatory units (endoscopy, radiology, ambulatory surgery), rehabilitation, emergency room, intensive care, operating room, post anesthesia, supervision, pediatrics, and education. Due to the small number of subjects in the nursing service categories of rehabilitation (n=3), emergency room (n=1), intensive care (n=2), operating room (n=1), supervision (n=5) and education (n=6), these groups were combined for statistical purposes as follows: rehabilitation, supervision and education were combined with medical surgical nurses; emergency room nurses were combined with intensive care nurses; operating room nurses were combined with post anesthesia care nurses. Final analysis was performed with the following five nursing service categories; medical-surgical, ambulatory units, intensive care, post anesthesia care, and



pediatrics (see Table 1).

The Demographic Data Sheet also requested information from subjects concerning the presence of diabetes in self, family, friend or none of the above. One subject reported having diabetes herself/himself. To aid statistical analysis the categories for presence of diabetes in self and family were combined. Final analysis was performed with the three categories of self and or family member, friend, and none of the above.

Other demographic information reported on the Demographic Data Sheet included: setting (inpatient/outpatient); number of years of nursing experience; number of years employed at study hospital; educational preparation; most recently attended diabetes in-service; and number of diabetics patients cared for per month (see Table 1).

Table 1  
Demographic Characteristics of Subjects

Characteristic	n	Percent
Nursing Service		
Medical-Surgical	35	58.3
Ambulatory units	13	21.7
Intensive care	3	5.0
Post anesthesia	7	11.7
Pediatrics	2	3.3
Setting		
Inpatient	44	73.3
Out-patient	16	26.7

Table 1 continued

Characteristic	n	Percent
<b>Years in Nursing</b>		
0-5	18	13.4
6-10	16	26.7
11-15	14	23.3
16-20	18	30.0
≥ 21	2	3.4
<b>Years as Nurse at Study Hospital</b>		
1-5	19	31.7
6-10	14	23.2
11-15	16	26.8
16-20	9	15.1
≥ 21	2	3.3
<b>Education</b>		
Diploma	12	20.0
Associate	25	41.7
BSN	14	23.3
MSN	2	3.3
BS not in nursing	5	8.3
MS not in nursing	2	3.3
<b>Most Recent Diabetes In-Service</b>		
None	13	21.7
Within 6 months	4	6.7
>6 months, <1 year	9	15.0
>1 year, <2 year	9	15.0
>2 year	25	41.7
<b>Number of Diabetic Patients Cared for Per Month</b>		
None	10	16.7
1-3	16	26.7
>4	33	55.0
<b>Presence of Diabetes</b>		
Self and or family	17	28.4
Friend	8	20.0
None of the above	35	58.3

To evaluate the significance between the demographic variables and perceived and actual diabetes knowledge several statistical tests were performed.

Descriptive statistics were used to evaluate the perceived and actual levels of diabetes knowledge among this sample of nurses. A mean  $\pm$  SD score of 77.58  $\pm$  8.92 was obtained by the sample on the DSRT (Drass et al., 1989), which measured perceived knowledge. Table 2 illustrates the test scores.

Table 2

Test Scores on the DSRT

Score	n	Percent
52-55	2	3
56-59	3	5
60-63	0	0
64-67	2	3
68-71	3	5
72-75	6	10
76-79	17	28
80-83	12	20
84-87	13	22
88-101	2	3

Note. Score range = 22 - 110    M = 77.58    SD = 8.92

On the test measuring actual knowledge, the DBKT (Drass et al., 1989), a mean  $\pm$  SD score of 31.63  $\pm$  4.13 (70% correct) was obtained by the sample. Table 3 illustrates the test scores.

Table 3

Test Scores on the DBKT

Score	n	Percent
22-25	6	10
26-29	9	15
30-33	25	42
34-37	17	28
38-43	3	5

Note. Score range = 0 - 45    M = 31.63    SD = 4.13

A one way analysis of variance (ANOVA) was used to evaluate the mean scores obtained on the DSRT (Drass et al., 1989) and the DBKT (Drass et al., 1989) by the five categories of nursing service. Results,  $F = 1.1931$ , and  $F = .8809$ , demonstrated no two groups were significantly different at the .05 level.

The mean scores on the DBKT (Drass et al., 1989) obtained by the outpatient and inpatient nurses were 31.3125 and 31.7500, respectively. To test the difference between these two groups means a two-tailed t-test was applied. Results indicated no significance ( $t = .36$ ,  $p < .720$ ). The mean scores on the DSRT (Drass et al., 1989) for these two groups were 77.272 and 78.437 respectively. This t-test also indicated no significance ( $t = -.44$ ,  $p < .659$ ).

To analyze the relationship between nursing experience and perceived diabetes knowledge Pearson's

correlation was utilized. A low negative correlation ( $r = -.1773$ ) was found between number of years as an RN and the total score obtained on the DSRT (Drass et al., 1989), suggesting the more experience as an RN the lower the perceived knowledge of diabetes.

Interestingly, a low negative correlation ( $r = -.1292$ ) was found between number of years employed at the study hospital and the total score obtained on the DBKT (Drass et al., 1989), and the total score obtained on the DSRT ( $r = -.1679$ ).

As shown in Table 1 RN subjects reported varied educational backgrounds. When educational preparation was analyzed using the statistical test ANOVA no significance was found in relation to perceived knowledge ( $F = 1.1315$ ,  $p < .355$ ) measured by the DSRT (Drass et al., 1989) or actual knowledge ( $F = .8630$ ,  $p < .512$ ) measured by the DBKT (Drass et al., 1989).

In the conduct of the analysis used to test the difference in groups in relation to perceived diabetes knowledge and attendance of diabetes in-service training it was determined that the assumptions of ANOVA were met for this sample. Analysis of the DSRT (Drass et al., 1989) indicated a statistical significance. Table 4 illustrates the results.

Table 4

Analysis of Variances of Perceived Knowledge by Most Recent Diabetes In-Service Attended

Source of Variation	df	MS	F	P
Between Groups	4	302.9284	4.7755	.0022
Within Groups	55	63.4340		
Total	59			

In order to isolate the group responsible for this statistical significance a Scheffe procedure was performed. It was found that subjects attending a diabetes in-service greater than one year ago but less than two years ago reported a significantly higher perception of diabetes knowledge than the group reporting no attendance of a diabetes in-service. No other differences are significant.

ANOVA testing found no significant differences ( $F = 1.0498$ ,  $p < .3568$ ) between the number of diabetic patients cared for per month by the subjects and the scores on the DBKT (Drass et al., 1989), or the DSRT (Drass et al., 1989) ( $F = 2.1371$ ,  $p < .1275$ ). The three categories of presence of diabetes (see Table 1) was also analyzed using ANOVA. Analysis reported no significant differences in the mean scores on the DBKT or DSRT, ( $F = 1.225$ ,  $p < .3021$ ) ( $F = 1.2270$ ,  $p < .3008$ ).

Analysis of Research Hypotheses

The research hypotheses were subjected to ANOVA, and Pearson's correlation coefficients using a

computerized SPSS statistical package.

Hypothesis one: There is a relationship between perceived level and actual level of current knowledge, was analyzed using Pearson's correlation coefficients. When the scores of the DSRT (Drass et al., 1989), and the DBKT (Drass et al., 1989) were analyzed, a low positive correlation ( $r = .2306$ ,  $p = .038$ ) was found, indicating that nurses perceived knowledge of diabetes was positively related to actual knowledge. Thus, the hypothesis was supported.

Hypothesis two: There is a relationship between years of practice as a nurse and level of actual knowledge of diabetes, was also analyzed using Pearson's correlation coefficients. Analysis showed no relationship ( $r = .0984$ ,  $p = .227$ ) between numbers of years as a practicing RN and the total score obtained on the DBKT (Drass et al., 1989). The hypothesis was not supported.

Analysis of variance (ANOVA) was used to analyze hypothesis three: Nurses with recent in-service education will have a higher level of actual diabetes knowledge. The subjects mean scores on the DBKT (Drass et al., 1989), were divided by the most recently attended diabetes in-service. No two groups were found to be significantly different ( $F = 1.6825$ ,  $p < .1672$ ). The hypothesis was not supported as illustrated in table 5.

Table 5

Analysis of Variance of Actual Knowledge by Most Recent  
Diabetes In-Service Attended

<u>Source of Variation</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Between Groups	4	27.472	1.682	.167
Within Groups	55	16.328		
Total	59			



## CHAPTER FIVE

### DISCUSSION

#### Summary of Results

This descriptive correlational study was designed to investigate staff nurses perceived and actual level of knowledge of diabetes mellitus. In this study there was a positive relationship between perceived and actual level of current knowledge of diabetes. There also was no relationship between number of years as a practicing RN and knowledge of diabetes. These were both unexpected findings. In this study, as years employed by the study site increased, the perceived and actual knowledge of diabetes decreased. When testing perceived knowledge, results indicated that the more experience as an RN the lower the perceived diabetes knowledge. Also, nurses reported a higher perception of diabetes knowledge if they had attended a diabetes in-service less than 6 months ago. However, this finding was not reflected in actual knowledge.

#### Discussion

The overall, mid level of knowledge (70% correct), on the DBKT (Drass et al., 1989), which measures actual knowledge of diabetes, was unexpected since Drass et al., 1989, reported a mean score of 64% correct using the same

test. This study demonstrated a positive relationship between perceived and actual levels of diabetes knowledge, while Drass et al. reported an inverse relationship. Several factors may explain the difference in the two study results. First, this study consisted of 60 participants from a 248 bed teaching hospital that employs 306 RN's, as compared to the Drass study which was conducted with 184 participants from a 540 bed teaching hospital that employs 700 nurses. The fact that this study surveyed 19% of the total RN employees as compared to 26% surveyed in the Drass study may have impacted the results. By surveying a larger percentage of the study site RN employees, Drass et al. may have gained a more accurate representation of their target population. Also, the study site reported in this study has a designated diabetic educator responsible for patient and staff education, the Drass study site did not. This fact alone could possibly explain the positive relationship between perceived and actual diabetes knowledge. This may suggest that these RN's were aware of their knowledge deficit and relied on the diabetic educator to conduct the majority of patient education in an effort to practice safely. The diabetic educator makes rounds in the hospital on an almost daily basis and is available to answer nurses' questions concerning diabetes, thus increasing their knowledge base without

conducting formal in-service education. The diabetic educator at this study site also provides the nurses with information in the form of posters, articles, pamphlets, and videos which serve as aids for patient education as well as self-study. The majority of patient education however, remains the responsibility of the diabetic educator. It is also possible that the majority of RN's participating in the study were those having a special interest in diabetes, therefore a more congruent level of perceived and actual diabetes knowledge. Another factor which may have influenced study findings was that the researcher was formerly employed in the role as the diabetic educator at the study site. This may have cued the RN employees as to the nature of the research before actual data collection, and thus influenced self selection and in turn results.

The factors cited seem to be in direct conflict with the finding that as the years employed by this study site increase, both perceived and actual diabetes knowledge decrease. One possible explanation for this could be that as the years of employment increased the RN's moved away from the direct patient care role into more support roles, thus having less contact with the diabetic educator and diabetic patients. It is also possible that as years employed increase, so may have the reliance on the diabetic educator to conduct teaching,

thus not remaining current in their diabetes knowledge. This type of detailed demographic information was not measured.

Hypothesis number three stated: Nurses with recent in-service education will have a higher level of actual diabetes knowledge. This hypothesis was not supported. The previously stated facts may also explain this finding. With the diabetic educator randomly providing diabetes information to staff nurses, these staff nurses possibly are able to maintain a basic level of diabetes knowledge without formal in-service education. Perhaps the nurses that participated in this study had an interest in diabetes and had taken an active part in maintaining their own level of diabetes knowledge.

Even though this study reported higher knowledge scores than the Drass et al., 1989 study, scores are still relatively low. Previously cited research studies reported have demonstrated a lack of knowledge of diabetes among nurses and other health care professionals (Drass, et al., 1989, Feustel, 1976; Leicher, et al., 1980; Moriarty & Stephens, 1990; Scheiderich, et al., 1983). The reasons for this knowledge deficit have been cited as; lack of time (Moriarty & Stephens, 1990), infrequent diabetes in-service education for staff nurses (Scheiderich, 1983; Leicher 1980), lack of adequate

education focused on diabetes in nursing schools (Etzwiler, 1967), and lack of motivation (Weinzierl, 1986). Drass et al., (1989) stated that the most obvious impediment to maintaining currency in diabetes knowledge are the rapid technological advances in the field. They feel that periodic diabetes in-service education are imperative for safe clinical practice.

It was interesting to find that once the staff nurses completed the DBKT, most verbalized the realization that they had a knowledge deficit. These subjects expressed concern over a knowledge deficit to the investigator, and requested answers to specific questions. Subjects supported each other by sharing their questions and concerns. Until the scores were posted, staff nurses consistently inquired about scores. Thus, as a result of this study staff nurses realized that a knowledge deficit existed and may be ready to learn more about diabetes.

#### Implications for Nursing Practice

Malcolm Knowles (1980) theory of adult learning, andragogy, provided the theoretical framework for this study. The learner is central in this model. The teaching/learning process is one of mutual inquiry; one in which the educator serves as the resource person. The goal of an educator is to assist learners to become self-directed.

Given Knowles (1980) theory of adult learning, the perception of diabetes knowledge may influence readiness to learn and self-directed learning through continuing education. The fact that the group of RN's surveyed had an overall mid level of diabetes knowledge (70% correct) indicates the need for continuing education. Even though this study site employs a designated diabetic educator, hospitalized patients learn from staff nurses as well as the diabetic educator. Staff nurses have more day to day contact with the patient, and are in a position to reinforce the education delivered by the diabetic educator, however, a mid level of knowledge of diabetes is not adequate to carry out diabetes instruction. Periodic diabetes education classes for all RN staff nurses are imperative for safe clinical practice and effective patient education.

This study suggests that rather than expecting RN staff nurses to conduct patient diabetes education, alternative strategies should be explored. The diabetic educator should work closely with staff nurses to facilitate the identification of learning needs. As previously cited, the test utilized in this study to measure actual diabetes knowledge, the DBKT (Drass et al., 1989), consists of many content areas of diabetes knowledge, such as insulin administration and treatment

of hypoglycemia. In this study the total score was calculated, and individual content areas were not analyzed. However, by analyzing the individual content areas specific learning needs could be determined. This could provide a basis for selection of learning experiences. The diabetes educator could act as a consultant and resource person to staff as well as diabetic patients and their families, thus helping to insure safe clinical practice and continuity in teaching.

#### Limitations

The sample size was one limitation to the study; 60 RN's or 19% of the RN's employed by the study hospital were surveyed. A larger sample may have produced different results. Another possible limitation was the use of convenience sampling. Random sampling was deliberately not chosen to maximize staff participation. The investigator believes that selection bias may have been present due to the fact that the investigator was previously employed as the diabetic educator at the study site. Relationships and affiliations with staff nurses may have partially determined self selection to participate in the study. Also, the fact that the investigator was a diabetic educator may have cued the nurses as to the nature of the study, thus attracting those RN's interested in diabetes and in turn influencing the study results.

### Suggestions for Further Research

Motivating nurses toward self-directed learning is an important area for nursing research. Much information is needed on how to facilitate self-motivation. Factors that impact self-motivation could provide useful information for diabetes learning, as well as all areas of nursing.

One factor that may impact self-motivation could be the perception of knowledge. Therefore, this study should be repeated using the same questionnaires and a larger sample size. Subject perceptions of knowledge could be useful to motivating nurses toward self directed learning. If the perception of knowledge is greater than actual knowledge, this deficit may induce readiness to learn, in turn, motivating the individual toward self-directed learning. The relationship between knowledge deficit and motivation to learn needs investigation. Further investigation is also needed to determine the effectiveness of periodic educational programs and the frequency with which they must be offered to attain and maintain current knowledge and quality practice by staff nurses.

Future studies could answer: How does a reported knowledge deficit affect an individual's motivation and readiness to learn? What factors facilitate self-motivation in learning? What responsibility should a



staff nurse have on a diabetes teaching team? Should a staff nurse be familiar with teaching techniques as well as diabetes to effectively teach about diabetes?

### Conclusion

Diabetes as a primary or secondary diagnosis affects the lives of many patients. The education of individuals with diabetes should involve a diabetic educator as well as staff nurses. The effectiveness of this patient education is largely dependent upon adequate knowledge by staff nurses. This research attempted to describe and compare nurses' perceived and actual levels of diabetes knowledge, and the effects of nursing experience and in-service education on these levels of diabetes knowledge. Results suggest that more frequent in-service education is needed to maintain safe clinical practice if the staff nurse is expected to conduct diabetic teaching.

## APPENDIX

APPENDIX A  
INVESTIGATOR SCRIPT

Section I

Hello my name is . I am here to ask for your voluntary participation in a nursing research study. The study involves filling out three questionnaires and should take approximately 30 minutes of your time. Your responses will be anonymous; I am not asking for your name. However, for investigational purposes only, each packet of questionnaires is numbered.

Section II

The purpose of this study is to survey RN staff nurses on their perceived and actual level of knowledge of diabetes mellitus. Please be as truthful as you can in responding to all statements/questions. The statements/questions pertain to diabetes.

I will ask you to fill out two questionnaires first. When you complete those two questionnaires, turn them in to me and I will give you the last questionnaire to fill out. Please remember the number on each of your questionnaires.

Thank you for your cooperation. After all data analysis is complete, individual scores will be posted by number

on the bulletin board outside Staff Services/Nursing Administration.

Please do not discuss the questionnaires with anyone until data collection is complete at the end of today.

Note: You are not expected to know the answers to all questions unless you are currently specializing in the area of diabetes education. The purpose of this study is to help design continuing education programs.

APPENDIX B  
DEMOGRAPHIC DATA SHEET

ID# \_\_\_\_\_  
(1-3)

Record# 01  
(4-5)

Please circle the number corresponding to your appropriate response.

1. Nursing Service: (circle)
  - 1) Medical Surgical Unit
  - 2) Ambulatory Units (Endoscopy, Radiology, Ambulatory Surgery)
  - 3) Rehabilitation
  - 4) Emergency Room
  - 5) Intensive Care
  - 6) Operating Room
  - 7) Post Anesthesia
  - 8) Supervision
  - 9) Pediatrics
  - 10) Education

\_\_\_\_\_  
(7-8)
2. Setting: 1) Inpatient 2) Out-Patient  

\_\_\_\_\_  
(9)
3. Number of years nursing experience \_\_\_\_\_  

\_\_\_\_\_  
(10-11)
4. Number of years at Metropolitan \_\_\_\_\_  

\_\_\_\_\_  
(12-13)
5. Highest education preparation obtained: (circle)
  - 1) Diploma
  - 2) Associate degree
  - 3) Baccalaureate degree in nursing
  - 4) Master's degree in nursing
  - 5) BS not in nursing
  - 6) MS not in nursing

\_\_\_\_\_  
(14)
6. Most recently attended diabetes inservice/continuing education was: (circle)
  - 1) none
  - 2) within the last 6 months
  - 3) more than 6 months but less than 1 year ago
  - 4) more than 1 year ago but less than 2 years ago
  - 5) more than 2 years ago

\_\_\_\_\_

(15)

7. Number of diabetics cared for per month on your unit:

- 1) None (16)
- 2) 1-3 patients
- 3) more than 4 patients

8. Presence of diabetes in: (circle those that apply)

- 1) Self (17)
- 2) Immediate family (18)
- 3) Friend (19)
- 4) None of the above (20)

9. Generally speaking, how competent do you feel you are in caring for a diabetic patient. (circle)

- 1) Not at all competent
- 2) Not very competent
- 3) Somewhat competent
- 4) Competent
- 5) Very competent (21)

**PLEASE NOTE**

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not been filmed at the request of the author.  
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**Appendix C, 46-56  
Appendix D, 57-58**

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