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Staff Nurses' Knowledge of Diabetes Mellitus and Their Confidence in That Knowledge

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STAFF NURSES' KNOWLEDGE OF DIABETES MELLITUS

AND THEIR CONFIDENCE IN THAT KNOWLEDGE

by

Melanie Kay Karl

A Thesis Submitted to the Faculty of the Graduate School

of Loyola University of Chicago in Partial Fulfillment

of the Requirements for the Degree of

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<div align="right">MKK</div>

VITA

The author, Melanie Kay Karl, is the daughter of John Siedlinski and Charlotte (Savikas) Siedlinski. She was born April 26, 1952, in Chicago, Illinois.

Her high school education was obtained at Mother McAuley Liberal Arts Girls School, Chicago, where she graduated in May, 1970. In September, 1970, she entered Bradley University, Peoria, and in May, 1974, received the degree of Bachelor of Science in Nursing.

From 1974 to 1977 she worked as a professional nurse on medical-surgical units of hospitals in a suburb and in the city of Chicago. In 1975, she completed training as a Diabetes Counselor, and was additionally responsible for coordinating diabetic patient classes at Louis A. Weiss Memorial Hospital, Chicago, from 1975-1977.

She has, since that time, served as: 1) faculty for clinical and classroom medical-surgical licensed practical nursing students (1977-1978); 2) Staff Development Instructor, responsible for educational programs for professionals and diabetic patients, at Victory Memorial Hospital, Waukegan (1978-1980); and 3) Diabetes Education Coordinator, responsible for education of patients and staff nurses in the area of diabetes, at a Chicago hospital (1980-1982).

She is a member of the American Association of Diabetes Educators, the Chicago Heart Association, and the Diabetes Educators of the Chicago Areas, and currently serves as a member of the

Professional Program Planning Committee in the latter organization.

She has served as speaker for the American Diabetes Association's

Annual Public Conference, as well as for several of its local

chapters.

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CHAPTER I

OVERVIEW OF THE PROBLEM

A. Introduction

Diabetes mellitus is a chronic disorder of metabolism, due to
an absolute or relative lack of insulin, which is characterized by
hyperglycemia. In its most uncontrolled form, diabetes is
accompanied by ketosis and protein wasting. In the United States
alone there are approximately 10 million diagnosed diabetics and the
number grows each year. Diabetes mellitus is managed by controlling
the diabetic's blood glucose levels with a combination of diet,
exercise, and possibly, hypoglycemic agents or insulin injections.
Such treatment has enabled many diabetics to successfully control
their blood glucose levels. However, there are many diabetics who
are hospitalized each year for uncontrolled diabetes mellitus.

It is believed that one of the major reasons many diabetics
are admitted and readmitted to hospitals for uncontrolled diabetes is
their lack of sufficient knowledge of how to monitor and control
their condition. Many studies have demonstrated that deficiencies
exist in the diabetic's knowledge of his disease and its management,
that is, he lacks sufficient knowledge of the essential principles
necessary for controlling this disorder (Watkins, Roberts, Williams,
Martin, and Coyle, 1967a; Watkins, Williams, Martin, Hogan, and
Anderson, 1967b; Collier and Etzwiler, 1971; Miller, Goldstein,
and Nicolaisen, 1978; Etzwiler, 1980; Geller and Butler, 1981).

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One possible reason the diabetic may lack the knowledge necessary to control his condition may relate to the staff nurse's knowledge of diabetes mellitus. The staff nurse is usually the person who assumes a major responsibility for informally teaching diabetics about their condition. How often do staff nurses teach patients or their families about diabetes mellitus? Is the nurse's knowledge of diabetes and its treatment sufficient to prepare her to instruct the diabetic on his life-long regimen? How is the nurse's knowledge assessed, as well as updated or corrected, so that the nurse may be able to teach the diabetic client current practices in the management of his condition?

B. Statements of the Problem and Purpose of the Study

How knowledgeable are medical-surgical staff nurses about diabetes (as demonstrated by their Diabetes Knowledge Test scores)? How confident are medical-surgical staff nurses in their knowledge of diabetes (as indicated by their Confidence Perceptions Rating Scale scores)? Is there a relationship between the knowledge medical-surgical staff nurses have about diabetes mellitus and their confidence in that knowledge? Is there a relationship between staff nurses' knowledge of diabetes mellitus and the amount of time they report having spent continuing their education in the area of diabetes mellitus? Is there a correlation between the amount of confidence staff nurses report to have in their knowledge of diabetes and the number of hours they report having spent continuing their education in the area of diabetes mellitus?

Do the staff nurses' Diabetes Knowledge Test scores relate to the number of times they spent teaching diabetics or their families about diabetes? Is the staff nurses' confidence in their knowledge of diabetes related to the number of times they spent teaching diabetics or their families about diabetes mellitus? The purpose of this study was to obtain answers to these research questions.

C. Need and Significance of the Study

The deranged metabolism that characterizes diabetes mellitus has been implicated as a risk factor which contributes to an increased incidence of heart disease, gangrene, renal failure, vascular disease, and stroke. In addition, uncontrolled diabetes is also considered the leading cause of acquired blindness. In general, diabetes mellitus, and the many complications associated with it, constitutes the third leading cause of death by disease (Nemchik, 1982). Etzwiler (1980) stated that almost 5% of the population (i.e., 10 million persons) of the United States may have diabetes and according to national trends, this number is expected to increase by 6% each year.

Due to the devastating complications associated with diabetes, as well as the large population that is affected by the disease, much research has been directed toward increasing the body of knowledge regarding diabetes mellitus. In spite of steady advances in the knowledge of diabetes mellitus since the discovery of insulin in 1921, there is still an incomplete understanding of the etiology

and the progression of the disorder. In addition, there is presently no cure for diabetes--the major medical goal in treating the disorder consists of controlling the diabetic's blood glucose level. Therapeutic blood glucose control will restore abnormal metabolic processes in most diabetics and, hopefully, prevent further complications.

In order to assure success of the therapeutic regimen which is aimed at blood glucose control, the diabetic must assume the major responsibility for managing his diabetic condition. Thus, the diabetic individual needs to understand the need for and nature of blood glucose control to effectively manage his disease on a full-time basis. Self-management knowledge and skills can only be acquired through education. Studies have reported decreased rates of hospital admissions for uncontrolled diabetes and diabetic complications in settings in which diabetes patient education was considered an integral part of patient care (Miller et al., 1972; Kiser, 1981). The more knowledge diabetics have about their condition, the better prepared they are to capably manage their condition at home and carry out recommended therapy (Watkins et al., 1967b; Graber, Christman, Alogna, and Davidson, 1977; Miller et al., 1978). Therefore, diabetic patient education must be recognized as a vital, integral component of quality diabetes health care.

Nurses are usually the professionals involved in administration of health care and delivery of education to the hospitalized diabetic. Knowledgeable nurses are a prerequisite to effective and

pertinent diabetic patient teaching. Therefore, each nurse should be committed to updating her knowledge of diabetes and its management.

It has been demonstrated that nurses with updated diabetes knowledge, who specialize in caring for diabetes patients, and who teach diabetic patient classes can significantly increase the diabetic patient's knowledge and application of knowledge in demonstrations of urine testing skills (Nickerson, 1972; Dries and Dizzia, 1981). However, due to the fact that few hospitals employ diabetes nurse specialists, it is usually the generalist nurse practitioner (i.e., the medical-surgical staff nurse) who is expected to teach the diabetic patient. This investigator knows of no studies that have demonstrated the possible impact the medical-surgical staff nurse can have on increasing the patient's diabetic knowledge and skills. Before the impact of diabetes patient teaching is considered, it is important to ascertain how knowledgeable the staff nurse is about diabetes.

Stern (1970), Scheiderich (1978), Freibaum (1979), Distel (1981), and Villeneuve (1982) have reported that deficiencies exist in staff nurses' knowledge of diabetes mellitus. Thus, the current state of staff nurses' knowledge of diabetes must be assessed, particularly in the areas identified as deficient by previous studies. These areas include knowledge of actions and side effects of insulins, mixing insulins, and insulin injection technique. Staff nurses' confidence in their diabetes knowledge may be another factor which may influence the education that diabetics receive, especially if

staff nurses' perceptions of their level of diabetes knowledge does not relate to amounts of diabetes knowledge measured on a test. Therefore, it should be determined if a relationship exists between staff nurses' perceptions of their degree of diabetes knowledge and the level of knowledge measured on a diabetes test. Furthermore, it needs to be determined if staff nurses have attempted to update their diabetes knowledge by attending continuing education programs focused on diabetes. Finally, it should be determined if confidence in, and levels of diabetes knowledge are related to the number of times staff nurses report having spent teaching clients about diabetes.

The findings of this study may have far-reaching implications in many areas. First, it may provide a data base which would identify possible deficiencies in staff nurses' knowledge of diabetes. The data base could then be utilized by nurse educators to update the content of the diabetic programs offered to future and current staff nurses. Second, the findings may alert currently practicing nurses of the need to identify and plan for meeting their educational needs in regards to diabetes mellitus, so that they may fulfill their professional patient teaching responsibilities. Third, hospital administrators may recognize the need not only to delegate responsibility for patient education efforts, but also to support those efforts by providing continuing education opportunities to persons designated as responsible for this role. Above all, possible future benefits resulting from this study may be an

improvement in the quality of care and education the diabetic will

receive. The possible improvement in quality of diabetes patient care

and education has the potential of preventing some of the chronic

complications of diabetes. Ultimately, this could decrease

readmissions of clients for treatment of their uncontrolled diabetes

as a result of their lack of adequate diabetes education and thus,

decrease hospital costs.

D. Assumptions

    1. Staff nurses inject insulin according to physicians' orders

and possess the knowledge required to safely do so.

    2. Staff nurses are expected to teach diabetic patients and

their families about their condition and medications (Collier and

Etzwiler, 1971; Freibaum, 1979).

    3. Staff nurses need accurate knowledge as well as confidence

in that knowledge in order to perform effective diabetic patient

education.

    4. Staff nurses' knowledge of diabetes will be accurately

reflected on the Diabetes Knowledge Test.

    5. Staff nurses can quantify the number of times they spent

teaching patients and their families about diabetes within the last

two months.

    6. Staff nurses will accurately report the number of hours

spent in attendance at educational programs focusing on diabetes

mellitus within the past year.

E. Research Hypotheses

1. There will be no difference between Diabetes Knowledge Test scores of staff nurses from one hospital and staff nurses from a second hospital.

2. There will be no difference between the confidence perception scores in diabetes knowledge of staff nurses from one hospital and staff nurses from a second hospital.

3. There will be a positive correlation between staff nurses' Diabetes Knowledge Test scores and their reported confidence in their diabetes knowledge.

4. There will be a positive correlation between staff nurses' Diabetes Knowledge Test scores and the amount of time they report having spent in attendance at diabetes educational programs.

5. There will be a positive correlation between the amount of staff nurses' reported confidence in their diabetes knowledge and the amount of time they report having spent in attendance at diabetes educational programs.

6. There will be a positive correlation between staff nurses' Diabetes Knowledge Test scores and the number of times they report having spent teaching diabetics and their families about their disease.

7. There will be a positive correlation between the amount of staff nurses' reported confidence in their diabetes knowledge and the number of times they report having spent teaching diabetics and their families about their disease.

F. Definitions

1. Staff nurse: A nurse who is registered in the State of
Illinois to practice professional nursing and who is currently
practicing in an acute care setting. Included are nurses who, while
working on a medical or surgical nursing unit, would have the
occasion to carry out the physician's orders to administer insulin.
Excluded are new graduates who have not taken, have not obtained
results, or have not passed state board examinations, and nurses
practicing only under a permit. Also excluded are nurses with
primarily administrative duties involving little or no direct patient
care, staff nurses primarily assigned to the night shift, and
nurses who have obtained additional specialized training as a
diabetes educator or specialist.

2. Diabetic educational programs: Any class, inservice,
seminar, workshop, or lecture which is focused on diabetes mellitus,
conducted within or outside of the hospital in which the staff nurse
is employed. This includes any programs which the respondent has
attended in the past year.

3. Confidence in diabetes knowledge: Perceptions of the
respondent's confidence in his/her level of knowledge in each of the
four subareas of diabetes tested, as expressed by their responses on
the Confidence Perceptions Rating Scale (CPRS).

G. Limitations

1. Due to available time and resources, the hospitals
selected for the study were not chosen randomly.

2. This study was limited by time and money restraints to obtaining a sample of 100 randomly selected staff nurses, who voluntarily consented to participate. The sample was chosen from two different settings for the purpose of increasing the generalizability of the results to more than one setting.

3. The confidence perceptions reported yielded subjective data.

4. Since the Diabetes Knowledge Test contains purely multiple choice items, respondents' answers may have been subject to ordering of questions, wording, or the limited number of responses available.

5. Night-shift nurses were not included in this study because of the relatively limited opportunities to carry out client education occurring on this shift.

CHAPTER II

REVIEW OF THE LITERATURE

Diabetes mellitus is a chronic disorder which results from either a pancreatic insulin deficiency, affecting the ability to metabolize carbohydrates, proteins, and fats, or a resistance to the effectiveness of insulin on body tissues. Subsequent abnormally high blood glucose levels, if not controlled, may have short- and long-term effects on the diabetic's blood vessels, nerves, and body organs, and lead to premature aging and death for these individuals.

In order to prevent or minimize disease complications, the abnormally high blood glucose levels associated with diabetes mellitus must be controlled, so that it remains within a "normal" range on a 24-hour basis. Control of blood glucose is accomplished through a therapeutic balance of a diebetic meal plan, exercise, and, possibly, medication individualized for each diabetic. The ultimate success of diabetic control depends on diabetics' assuming a major role in management of their disease (Krysan, 1965; Etzwiler, 1967; 1980; Stern, 1970; Williams, 1976; Nemchik, 1982).

A. Diabetic Patient Education

Adequate, thorough education is necessary to give the diabetic the basic knowledge required to assume his self-management role. Diabetic patient education should provide diabetics with an understanding of diabetic pathophysiology and blood glucose control by:

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a) recognition of hyperglycemic symptoms and b) recognition of the interrelationship of the self-management principles of diet, medication administration, the side effects of the medications, urine testing, foot and skin care, and activity regulation.

Studies have demonstrated that the quality of the education the diabetic received and processed is correlated with their degree of blood glucose control (Williams, 1976; Davis, Hull and Boutough, 1981). Other studies have shown that teaching patients about diabetes unfortunately, does not always guarantee improved control (Williams, Martin, Hogan, Watkins, and Ellis, 1967; Lowery and DuCette, 1976; Miller et al., 1978). Lack of improvement of physiological parameters may be due either to the "brittle" nature of the disease itself or due to the fact that large gaps still exist which prevent a complete understanding of the diabetic disease process (Etzwiler, 1980; Nemchik, 1982). Nemchik (1982) points out that there have been many discoveries and innovations in the field of diabetes and its management (i.e., insulin pumps for treatment, glycosylated hemoglobin measurements for diagnostic purposes, changes in dietary recommendations and insulin strengths, new implications of urine test results, and home blood glucose monitoring). Health care professionals may not be aware of these recent changes. Therefore, diabetics may be receiving education from health professionals, but this information may be outdated or not individualized to the particular diabetic client receiving the information.

In spite of these facts, Etzwiler (1967), Krysan (1967), and Davis et al. (1981) believe complications can be prevented or minimized by proper education of the diabetic because he will then carry out the current recommended treatment (Williams et al., 1967; Stern, 1970; Miller et al., 1978). Other studies have shown that diabetic patient education has resulted in decreased readmissions of patients for diabetes and its complications (Miller et al., 1978; Hood and Murphy, 1978; Geller and Butler, 1981).

It is generally accepted that diabetic patient and family education should be carried out in a formal, coordinated, comprehensive manner. The organization and delivery of patient education in hospitals, however, has frequently been found to be less than adequate and has had a less than satisfactory impact on the client population (Caldera, Colangelo, and DiBlasi, 1980; Etzwiler, Hess, Hirsch, and Morreau, 1978; Villeneuve, 1982).

B. Nurses' Role in Diabetic Patient Education

Some hospitals employ diabetes nurse specialists to properly educate diabetics and their families. These nurses are considered specialists because of their advanced education and clinical practice in the area of diabetes. Studies have shown that proper education of the diabetic by nurse specialists has resulted in increasing the level of diabetics' knowledge of their disease, as well as increasing their accuracy in urine testing skills which assist them in monitoring their disease (Nickerson, 1972; Dries and Dizzia, 1981).

The more knowledge that diabetics have about their condition, the better they are able to manage their condition at home. Thus, unnecessary readmissions to the hospital for uncontrolled diabetes mellitus can be prevented (Watkins et al., 1967b; Graber et al., 1977; Miller et al., 1978; Kiser, 1981).

Although diabetic patient education is necessary and nurses can achieve an impact on increasing the diabetic's level of knowledge, other studies indicate that diabetics often lack knowledge about their disease and diabetes self-management principles (Etzwiler, 1967; Krysan, 1967; Watkins et al., 1967a; 1967b; Collier and Etzwiler, 1971; Nickerson, 1972). The greatest knowledge deficiencies were found in the areas of insulin actions, side effects, indications, and insulin injection technique (Watkins et al., 1967a; 1967b; Etzwiler, 1967; Lawrence and Cheely, 1980).

Many theories have been postulated as possible causative factors for the diabetics' lack of knowledge. Singleton's (1971) study revealed that most of the nurses that taught diabetics felt their diabetic teaching was inadequate due to insufficient time to impart their knowledge of the disease to the client. The study by Caldera et al. (1980) concluded that most discharge teaching was done with other nursing tasks or not done at all. Thus, despite the beneficial impact nurses can achieve with patient teaching, the reasons diabetics may not be adequately educated are because of the nurses' lack of time due to other demands and also because of the haphazard methods sometimes utilized by nurses in teaching.

However, these reasons may merely represent a partial explanation as to why diabetics are not educated properly.

C. Nurses' Knowledge of Diabetes Mellitus

Etzwiler (1967) was the first to hypothesize that deficiencies in the diabetic's knowledge may be due partly to the nurses' limited knowledge of the basic concepts and fundamental procedures related to diabetes and its management. His hypothesis was supported by responses to a 35-item multiple choice diabetes knowledge test given to 289 senior students from six nursing schools in Minnesota. Etzwiler (1967) studied these students because they were about to take state boards, and therefore, were assumed to be "relatively near the peak of their general nursing knowledge" (p. 112). The results revealed that 8% did not know that insulin lowers the blood glucose, 14-18% did not know the actions of insulin, insulin dose and strength were misunderstood by 18%, and 11% did not know that hypoglycemic reactions are a side effect of insulin. The relationships between diabetes, exercise/activity, insulin, and illness was misunderstood by 32-45% of respondents. Although Minnesota nursing schools required nutrition courses in their curricula, over half of the respondents did not have a basic understanding of diabetic dietary principles. Etzwiler concluded that since student nurses lacked sufficient knowledge of diabetes and its management, the patient's deficiencies may stem from poorly informed professionals. He reasoned that little diabetic classroom instruction and minimal

patient exposure results in less interest and limited knowledge of diabetes.

Stern (1970) utilized Etzwiler's test tool to assess senior registered nurse (RN) and licensed practical nurse (LPN) students as well as practicing RN's and LPN's in Louisiana. The 137 (out of 300) that responded demonstrated a lower overall knowledge level than in Etzwiler's (1967) study, especially in the areas of insulin and injection technique, despite the fact that respondents were allowed to take questionnaires home on the "honor system". However, this could have been due to the expanded population that was studied, although the results were difficult to interpret due to lack of differentiation between respondents' educational level among reported results. Stern concluded that the possibility of nurses lacking sufficient knowledge is not confined to any given institution in the country.

Feustel (1976) utilized Etzwiler's revised diabetes test instrument (Collier and Etzwiler, 1971) in a descriptive survey of 144 (out of 236) senior bachelor of science students from four nursing programs. One student was a diabetic, 18 had diabetes in their immediate family and 82 had taught diabetes to patients. Although respondents were considered "knowledgeable" if all 34 items were answered correctly the mean number of correct answers was only 22 (i.e., 65%). The questions on foot care and the cause of diabetes were the only two questions answered correctly by all 144 respondents. The one student answering more than 29 questions

correctly had performed diabetic teaching and the student with the lowest number correct had not. Although insulin effects was the strongest knowledge area, 13.2% of the students incorrectly responded to this item, which is consistent with the results of other studies (Etzwiler, 1967; Stern, 1970).

Another study by Freibaum (1977) utilized Etzwiler and Collier's (1971) updated diabetes tool (Scheiderich, 1978) and included 55 staff nurses from a hospital employing diabetes nurse specialists and 82 medical-surgical staff nurses from two other midwest hospitals (Scheiderich, 1978). The knowledge test was divided into four areas of diabetes previously studied, but respondents were additionally given a current diabetes exchange list for reference in answering questions about the diabetic diet. The mean score of 137 nurses sampled was 23.6 (i.e., 69%) out of 34 possible correct answers. Thus, results of the expanded population augmented conclusions from the previous studies, that is, staff nurses lack sufficient knowledge to care for diabetics and teach them about self-management principles.

In Freibaum's study (1979), staff nurses in the institution employing diabetes nurse specialists scored significantly (p < .05) lower than staff nurses in Scheiderich's (1978) study (e.g., mean scores were 23.6 and 26.5, respectively) from institutions that did not employ diabetes nurse specialists, in the areas of general concepts in diabetes mellitus, diabetic medications, and diabetic diet. The two staff nurse samples did not significantly differ in

the amount of diabetic teaching they performed or the number of hours
of attendance in diabetes educational programs. In addition, in
Scheiderich's (1978) study, further findings revealed that
foreign-born nurses scored significantly (p < .05) lower than
American-born nurses.

As a solution to haphazard and inadequate diabetic patient
education, multidepartmental committees and multidisciplinary
approaches to patient education have been suggested (Lee and Garvey,
1977; Hood and Murphy, 1978). However, if this approach is becoming
the expected requirement in health care settings (Williams, 1976),
then assessment of the health professional's diabetes knowledge needs
must be satisfied, in order to maintain viability of the teaching
team (Watkins and Moss, 1969; Singleton, 1976; Iveson-Iveson, 1977).

Nurses and other educational staff need to be better prepared
to this role in their basic training programs. One of the major
factors affecting the quality of nursing practice is the educational
preparation nurses receive (Caldera et al., 1980). In addition to
Etzwiler's assumption that nursing curricula provides the student
with limited diabetic knowledge, another basic educational deficiency
is that students are ill-prepared for the teaching role (Graham and
Gleir, 1980). Distel's (1981) report included observations of
diabetic patient teaching implemented by staff nurses. Some nurses
were unsure of methods of approach and had little confidence in their
knowledge of how to explain the diabetic disease process to diabetic

patients, because they had "recently graduated from nursing school and had little experience in patient education" (p. 11).

Therefore, in order to maintain viability as a patient educator, several needs of the nurse must first be assessed. Since previous studies have identified deficiencies in student nurses and a limited number of staff nurses' knowledge of diabetes, the staff nurses' current knowledge needs must be determined. In Singleton's (1977) study, it was stated that "no nurse should accept the responsibility for the care of the patient with diabetes mellitus unless she knows as much as the well-educated patient is expected to learn about his disease" (p. 4). Villeneuve (1982) reported that diabetic patient noncompliance may be a reflection of inadequate teaching based on the nurses' deficient knowledge base. Accurate self-assessment of the nurse is an essential prerequisite to accurate transfer of knowledge to diabetic clients. Therefore, the amount of confidence staff nurses have in their level of knowledge of diabetes also needs to be determined. The staff nurses' level of confidence in her diabetes knowledge should accurately reflect her measured levels of diabetes knowledge.

According to Tribble and Hollenberg (1977), nurses have difficulty meeting the patient's educational needs when they lack an adequate educational foundation to teach the fundamentals of diabetic management, as well as the proper and constant support from within the institution to facilitate her efforts. Villeneuve (1982) reported that studies indicate the need for nurses to update their knowledge

of diabetes and its application in nursing care. Therefore, one

institutional method of support for facilitating the nurses' efforts

in patient education is the amount of 'in-house' continued diabetes

education the institution offers the nurse, as well as the continuing

diabetes educational programs offered by other institutions. The

number of hours of continued diabetes education attended by staff

nurses should relate to the amount of staff nurse knowledge of

diabetes. The staff nurse that attends more continuing education,

should also have more confidence in her knowledge of diabetes than

the staff nurse who has attended a minimum amount of continuing

diabetes education. Hopefully, an increased degree of diabetes

knowledge and confidence in that knowledge will be positively

related to a greater number of times accurate diabetic patient teach-

ing will be performed by the nurse.

CHAPTER III

METHODOLOGY

A. <u>Research Method and Design</u>

The study was a descriptive survey which involved 100 medical-
surgical staff nurses. Prior to the initiation of this study,
approval was granted by the Loyola University Institutional Review
Board. Approval was subsequently obtained from the Nursing
Administrators at Hospitals A and B. Meetings were held with the
Director of Nursing Practice at Hospital A and a Nursing Education
representative in Hospital B to determine which nurses were
eligible for inclusion in the study and to determine the exact
mechanism for distribution of the data collection instruments. After
fifty nurses were randomly selected from each hospital, the
researcher then explained to each head nurse who supervised the
nurses selected for the study: 1) the purpose of the study;
2) criteria for staff nurse inclusion; 3) the staff nurses that were
involved from each head nurse's unit; and finally, 4) the length of
time required by each subject to complete the data collection
instruments. After reviewing schedules which described the dates
and shift each subject would be working, the researcher and head
nurse selected tentative dates, convenient on-duty times and
locations for data collection.

Data collection took place during the months of May and June,
1982. On each visit the researcher assembled groups of potential

participants in a lounge area or conference room on or near their nursing units. Each nurse was given a packet containing a cover letter (Appendix A), a Consent Form (Appendix B), Demographic Items Questionnaire (Appendix C), Confidence Perceptions Rating Scale (Appendix D), Diabetes Knowledge Test and Diet Exchange List (Appendix E), and an Answer Sheet (Appendix F). All respondents signed the Informed Consent prior to completing items in the packet. The researcher was present for the entire time spent by nurse subjects in Hospital A and the majority of the time spent by nurse subjects in Hospital B in responding to items in the packet.

B. Settings

Hospitals A and B were similar in size (i.e., 350-450 beds), classification (i.e., acute care, community hospitals) and location (i.e., near the city limits of Chicago). In addition, the nurses from Hospitals A and B, each were expected to deliver bedside teaching to diabetics and their families.

The two hospitals differed in the areas of availability of professional resources to aid staff nurses in diabetic patient teaching and in the availability of formal diabetic patient classes. In Hospital A, a bachelor's-prepared Diabetes Education Coordinator was available for staff nurse consultation regarding patient education problems, as well as provision of materials to augment instruction. The Coordinator assisted the staff in assessing, planning, implementing and evaluating diabetic education.

The Coordinator also participated in teaching diabetics and their families at the patient's bedside. There were no formal diabetic patient classes in Hospital A. In contrast, Hospital B had weekly, informal in-patient diabetes patient education classes delivered by a multidisciplinary team. A Masters-prepared diabetes nurse was a member of this team. The team also consisted of other nursing representatives from the Health Education Department, as well as representatives from the Pharmacy and Dietary Departments. The teaching team had no formal contact with the nursing staff regarding diabetic patient education in Hospital B.

The hospitals also differed in the amount of continued diabetes education offered to staff nurses within each institution in the past year. In Hospital A, the Diabetes Coordinator had delivered formal inservice programs on all shifts regarding urine testing, as well as insulin (i.e., actions, indications, types, side effects, injection technique, and site rotation) approximately 10-14 months prior to the study. Since that time, there were no formal classes, but there may have been incidental advice given in any area of diabetes or diabetic patient education on an informal basis. In contrast, there were no formal inservices or classes in any area of diabetes offered within Hospital B in the past year. Informal learning may have occurred on an incidental basis in patient care conferences delivered by staff nurses on each nursing unit. However, the nurses in Hospitals A and B were free to apply for, and attend educational programs offered outside of each institution.

C. Research Sample

The sample consisted of 100 staff nurses who volunteered to participate in this study. The 50 nurses from Hospitals A and B included all day and evening shift nurses who were currently registered in Illinois to practice professional nursing, as well as currently practicing in an acute care setting on a medical-surgical nursing unit. Both full-time and part-time nurses were included and there were no limitations as to age or years employed as a registered nurse (RN). The medical and/or surgical units on which nurse subjects were assigned or floated were determined by Nursing Offices' classification.

Lists of nurses working on medical-surgical units were obtained from a Staffing Coordinator in Hospital A and a Nursing Education representative in Hospital B. A total of 50 nurses meeting the sample criteria from each hospital list were selected by a random method.

D. Techniques for Data Collection

1. Demographic Items Questionnaire (DIQ)

The 19-item DIQ (Appendix C) used in this study was based on Scheiderich's (1978) DIQ in studying staff nurses' knowledge of diabetes. The DIQ was modified (e.g., suggestions for narrower response ranges were incorporated and open-ended questions were added for year graduated and country graduated from) by the researcher for use in this study.

Included in the DIQ are items about age, sex, marital status,
type of basic nursing education and highest level of education
completed, year in which this education was completed, country in which
basic nursing education was completed, number of years worked as an
RN, type of unit and length of time worked on medical-surgical units,
shift usually worked and full- or part-time status. Also included is
information regarding personal or familial diabetes history, number of
times diabetic teaching performed and number of diabetic patients
cared for in the past two months, average number of any type of
insulin injection administered every two months, and finally, number
of hours spent in continued diabetes educational programs within and
outside of each institution in the past year.

2. Confidence Perceptions Rating Scale (CPRS)

The CPRS was developed to ascertain the subjects' perceptions of
the amount of confidence they have in their knowledge of diabetes.
Staff nurses were instructed to record confidence perception ratings
prior to responding to the Diabetes Knowledge Test. Self-reports of
confidence perceptions were rated according to a 5-point Likert-type
scale (i.e., 1 = no confidence to 5 = great deal of confidence);
the possible range of scores was 10-50.

The CPRS contained four subareas of diabetes which included a
total of ten items. Subarea I pertained to general concepts about
diabetes mellitus; confidence perception ratings were assigned to
knowledge of what diabetes is, its relation to exercise, and its
relation to foot and skin care. Subarea II pertained to complica-
tions and prevention of complications; confidence perception ratings

were assigned to knowledge of hypoglycemia, hyperglycemia, and urine testing. Subarea III pertained to diabetic medications; confidence perception ratings were assigned to knowledge of insulin actions, strength, indications and side effects; drawing up and injecting insulin; and side effects of oral hypoglycemic agents. Subarea IV pertained to the diabetic diet; confidence perception ratings were assigned to knowledge of the diabetic diet. Nurse subjects were informed that a Diabetes Exchange List was included in the packet to utilize as a guide in responding to diet questions in the Diabetes Knowledge Test.

Test-retest reliability scores were calculated for ten hospital registered medical-surgical staff nurses. CPRS were administered 10-12 days apart. Using Spearman's rank order correlation technique, the test-retest correlation was .83 (p <.01).

Construct validity of the CPRS was supported with comparison of six pairs of known-group scores. One (expert) group was composed of three Masters prepared diabetes nurse specialists and three medical-surgical graduate students within four weeks of obtaining their Masters degree in nursing. A second group consisted of six nurses who had not obtained a Masters degree and have had no contact with adult diabetic patients for a number of years (i.e., nursing office supervisory nurses and nurses working in a nursery area). The Masters (expert) group scores on the CPRS were markedly higher (p < .01) than the non-Masters (supervisory, staff nurse) group scores (mean scores were 36 and 23, respectively).

3. Diabetes Knowledge Test

The 37-item Diabetes Knowledge Test (Appendix E) included a
Diabetes Exchange List as a guide in responding to test items. The
test is based on the 34-item test constructed by Etzwiler (1967),
updated by Collier and Etzwiler (1971), and utilized in Feustel's
(1976) study. The populations in these studies consisted of student
nurses. The test was updated by Scheiderich (1978) to include new
knowledge in the field of diabetes mellitus since 1971. The 34-item
test was used in Scheiderich's (1978) and Freibaum's (1979) study to
ascertain staff nurses' knowledge of diabetes. Three additional
questions were added by the researcher.

The 37-item Test used in the current study is divided into
four subareas of diabetes. Subarea I consisted of six items pertain-
ing to general concepts about diabetes mellitus. Subarea II consisted
of ten items pertaining to acute complications and prevention of
complications. Subarea III consisted of 13 items pertaining to
diabetic medications. Subarea IV consisted of eight items pertaining
to the diabetic diet. The responses were multiple choice and each
item contained a final choice of "I do not know".

Items in Subarea I and Subarea IV are identical in content to
Scheiderich's (1978) items. In Subarea II, items #11, #13, #14, #15,
and #16 were revised. In item #11, the correct response to a symptom
of diabetic ketoacidosis was changed from "fruity, acetone breath"
to "nausea and vomiting" based on two criterion judges' suggestions.
In item #13, one of the incorrect responses to treatment of

hypoglycemia was changed from "4 ounces of orange juice and 2 teaspoons of sugar" to "4 ounces of apple juice and 2 teaspoons of sugar", because, in the researcher's experience, the former response is a current practice of many staff nurses and this response may have been chosen without consideration of alternative responses. In items #14, #15, and #16, references to urine glucose values were reported in the "plus" method. Current recommendations of the American Diabetes Association (ADA) suggest changes in reporting results from the "plus" method to the "percent" method since there is variability in "plus" values with each type of urine test. Also, color charts in urine tests available to diabetics contain results in "percent" values. Therefore, items containing "plus" were converted to "percent". In Subarea III, item #17 was revised from conversion of U-80 insulin dose to U-40 insulin dose. Currently, U-80 insulin is not available for purchase and is not sanctioned by the ADA. In addition, U-40 insulin may not be utilized in the near future. Therefore, nurses caring for diabetics who are injecting U-40 insulin must know the method to convert to U-100 strength insulin. Three additional items were added to Subarea III, regarding: 1) angle of insulin injection (item #21); 2) rubbing alcohol at the injection site (item #22); and 3) mixing insulins in the same syringe (item #23). The additional items were added based on the researcher's experience with some staff nurses' lack of knowledge and ability to demonstrate these practices currently, as well as the similar deficiencies in student and staff nurses' knowledge in these

areas that have been reported in the literature (Etzwiler, 1967;
Scheiderich, 1978; Freibaum, 1979; Nemchik, 1982).

Test-retest reliability scores were calculated for 12 hospital
registered medical-surgical staff nurses. The tests were
administered 10-12 days apart. Using Pearson product moment
correlations, the test-retest coefficient was .60 ($p < .05$).

Content validity of the Diabetes Knowledge Test was supported by
five types of judges. Sample packets were given to five head nurses
on medical-surgical units, three faculty members currently
instructing baccalaureate students in medical-surgical nursing,
five Master's-prepared diabetes nurse specialists, a hospital Director
of Nursing Practice, and a board-certified endocrinologist. The 15
criterion experts were asked to judge each item of the Knowledge Test
(yes, no) as to its importance for staff nurses to know in order to
care for and educate diabetic patients. In addition, the diabetes
specialists and endocrinologist were asked to rate each items'
currency and accuracy and also add any additional information which
they believed should be content necessary for staff nurses to know.

Three out of five diabetes nurse specialists stated that, in
addition to the 37 test items, nurses should also know about home
blood glucose monitoring and psychological aspects of diabetes,
in order to care for and teach diabetics. Two nurse specialists
judged items #17 and #20 as not current. However, every item in the
Knowledge Test was judged important for staff nurses to know by 13
of the 15 judges. Two nurse educators judged items #33-37 not

important for staff nurses to know, since dieticians usually are
available for teaching patients about the diabetic diet. In addition,
one nurse educator judged three additional items (#14, #17, and #23)
as not important. Since there was not sufficient disagreement to
eliminate the items mentioned, all items remained part of the Diabetes
Knowledge Test.

Construct validity of the Diabetes Knowledge Test was supported
with comparison of eight pairs of known-group Test scores. One group
was composed of nurses who have obtained or are about to obtain
their Masters degrees in nursing. A second group consisted of
nursing office supervisory nurses and nurses working in a nursery
area. The Masters' (expert) group scores were significantly higher
(p < .0001) than the non-Masters' (supervisory and staff nurse) group
scores (i.e., respectively mean scores were 30 and 19.5).

The Diabetes Exchange List for Meal Planning was given to five
clinical hospital dieticians, who were current members of the ADA,
to judge currency and accuracy of the content. Based on agreement
from three or more dieticians, items were modified and added. The
revised Exchange List was included in the packets given to nurse
subjects.

CHAPTER IV

RESULTS

A. Descriptive Information and Characteristics of the Sample

A total of 100 staff nurses agreed to participate in this study. Of this total, 50 nurses were from Hospital A and 50 nurses were from Hospital B. All the nurses were female. As shown in Table I, the two groups differed significantly ($p < .05$) in their age composition. A total of 32% of the nurses from Hospital A and 50% of the nurses from Hospital B listed their age as 29 years or younger. In both hospitals, 36% of the nurses listed their age as 30-39 years. There were twice the number of nurses from Hospital A than from Hospital B who listed their age category as 40 years or more (32% and 14%, respectively).

In addition to age composition, the two groups differed significantly ($p < .05$) in their number of years' experience working as a registered nurse (RN) (Table II). Half of the nurses from Hospital B and 22% of the nurses from Hospital A worked as RN's for 0-2.9 years. In contrast, 32% of the nurses from Hospital A and only 16% of the nurses from Hospital B had worked for 15 to 21 years or more.

The majority of nurses from Hospitals A and B worked on the day shift (60% and 58%, respectively), worked full-time (88% and 60%, respectively), and a large number of them were married (68% and 46%, respectively).

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TABLE I

NUMBER AND PERCENTAGE OF NURSES FROM HOSPITALS A AND B
IN VARIOUS AGE CATEGORIES

Age Category	Hospital A		Hospital B	
	Number*	%	Number*	%
29 years or less	16	32	25	50
30-39 years	18	36	18	36
40 years or more	16	32	7	14
Total Number	50		50	

*x^2 = 14.81; df = 2; p < .05

TABLE II

NUMBER AND PERCENTAGE OF NURSES FROM HOSPITALS A AND B IN VARIOUS
CATEGORIES INDICATING NUMBER OF YEARS WORKED
AS A REGISTERED NURSE

Number of Years Worked as a Registered Nurse	Hospital A		Hospital B	
	Number*	%	Number*	%
0-2.9 years	11	22	25	50
3-14.9 years	23	46	17	24
15 or more years	<u>16</u>	32	<u>8</u>	16
Total Number	50		50	

*x^2 = 17.96; df = 2; p < .05.

The most striking differences between the two groups were in the areas of their nursing education. A total of 72% (N = 36) of the nurses from Hospital A received their basic nursing education in a country outside of the United States. Specifically, 24% (N = 12) received their training in Korea, 18% (N = 9) in India, 10% (N = 5) in England and the remaining 20% in the Philippines (N = 4), Thailand (N = 3), Scotland (N = 1), China (N = 1), and Czechoslovakia (N = 1). In contrast, 98% (N = 49) of the nurses from Hospital B received their basic nursing education in the United States with only 2% (N = 1) receiving her basic nursing education elsewhere (i.e., England).

The highest educational level or degree attained by the subjects is presented in Table III. The two groups differed significantly (p < .05) in their educational preparation. Seventy percent of nurses from Hospital A and 42% of the nurses from Hospital B were diploma graduates. In contrast, Hospital B had a higher percentage of nurses than Hospital A with associate degrees (28% and 10%, respectively), baccalaureate degrees (28% and 20%, respectively), and Masters degrees (2% and 0%, respectively).

B. **Nurses' Personal, Professional and Educational Experience with**

   Diabetes Mellitus

One nurse from Hospital A identified herself as being a diabetic; there were no nurses from Hospital B who reported that they were diabetic. The nurses' family history of diabetes was similar for both hospitals. Specifically, 10% of the nurses

TABLE III

HIGHEST EDUCATIONAL LEVEL OR DEGREE ATTAINED BY NURSES
FROM HOSPITALS A AND B

Highest Educational Level or Degree Attained	Hospital A		Hospital B	
	Number*	%	Number*	%
Diploma	35	70	21	42
Associate Degree	5	10	14	28
Baccalaureate or higher	<u>10</u>	20	<u>15</u>	30
Total Number	50		50	

*x^2 = 16.79; df = 2; p < .05.

(N = 5) from Hospital A and 12% (N = 6) of the nurses from Hospital B had a family history of diabetes in their family.

There were significant (p < .05) differences in the number of diabetics cared for in the last two months prior to the study by the nurses in the two samples (Table IV). For instance, 32% of the nurses from Hospital A and 14% of the nurses from Hospital B cared for 3-4 diabetics. In contrast, 16% of the nurses from Hospital A and 24% of the nurses from Hospital B had cared for 5-6 diabetics. In addition, there were more nurses from Hospital B (34%) who cared for 10 or more diabetics than from Hospital A (22%).

The nurses were similar with respect to the average number of insulin injections they reported they administer every two months (Table V). For instance, 26% of the nurses from Hospital A and 24% of the nurses from Hospital B responded that they administer approximately two injections every two months; 24% of the nurses from both Hospitals A and B reported administering 6-9 injections; and 14% of the nurses from Hospital A and 22% of the nurses from Hospital B report averaging 15 or more insulin injections every two months.

The nurses were also similar in the number of times they taught diabetes to (i.e., shared diabetic information with) diabetics and their families in the past two months (Table VI). For instance, 26% of the nurses from Hospital A and 20% of the nurses from Hospital B did not perform any diabetic teaching in the past two months, while 42% and 38% of the nurses from Hospitals A and B,

TABLE IV

NUMBER AND PERCENTAGE OF NURSES FROM HOSPITALS A AND B
IN VARIOUS CATEGORIES INDICATING THE NUMBER OF
DIABETICS CARED FOR IN THE PAST TWO MONTHS

Number of Diabetics	Hospital A		Hospital B	
	Number*	%	Number*	%
0-2 diabetics	8	16	5	10
3-4 diabetics	16	32	7	14
5-6 diabetics	8	16	12	24
7-9 diabetics	7	14	9	18
10 or more diabetics	11	22	17	34
Total Number	50		50	

$*x^2 = 17.27$; df = 4; $p < .05$

TABLE V

NUMBER AND PERCENTAGE OF NURSES FROM HOSPITALS A AND B
IN VARIOUS CATEGORIES INDICATING THE AVERAGE NUMBER OF
INSULIN INJECTIONS ADMINISTERED EVERY TWO MONTHS

Number of	Hospital A		Hospital B	
Insulin Injections	Number	%	Number*	%
0-2 injections	13	26	12	24
3-5 injections	9	18	8	16
6-9 injections	12	24	12	24
10-14 injections	9	18	7	14
15 or more injections	7	14	11	22
Total Number	50		50	

$*x^2 = 2.23$; df = 4; p > .05.

TABLE VI

NUMBER AND PERCENTAGE OF NURSES FROM HOSPITALS A AND B
IN VARIOUS CATEGORIES INDICATING THE NUMBER OF TIMES
PERFORMED DIABETIC TEACHING IN THE PAST TWO MONTHS

Number of Times Teaching Done	Hospital A		Hospital B	
	Number*	%	Number*	%
None	13	26	10	20
1-2 times	21	42	19	38
3-4 times	10	20	11	22
5 or more times	5	10	10	20
Total Number	50		50	

$*x^2 = 2.80$; df = 3; p > .05.

respectively, performed diabetic teaching 1-2 times in the past two
months. A total of 10% of the nurses from Hospital A and 20% of the
nurses from Hospital B performed diabetic teaching five times or
more in the past two months.

Generally, the nurses from Hospitals A and B spent the same
number of hours in continuing education programs focused on diabetes
(Table VII). Nurses at Hospital A reported they had attended
significantly more (p < .05) in-hospital diabetes inservice
educational programs than nurses at Hospital B; 84% of the nurses
from Hospital B reported they had not attended any diabetes inservice
programs. However, both hospitals were similar in that 86-90% of the
nurses reported they had not attended any continuing educational
diabetes programs outside of their hospital in the past year.

C. Testing of the Research Hypotheses

1. Hypothesis I. This research hypothesis predicted that there
would be no difference between Diabetes Knowledge Test Scores of
staff nurses from one hospital and staff nurses from a second
hospital. A significant difference (p <.05), however, was found
between the mean scores of the nurses from Hospitals A and B, with
the latter scoring higher (Table VIII). Therefore, Hypothesis I
was not supported.

In order to explore this significant difference further, an
independent t-test was used to determine if there were significant
differences in the mean scores from each hospital for each subarea
of the Diabetes Knowledge Test (Table IX). Nurses sampled in

TABLE VII

CONTINUED DIABETES EDUCATION HOURS ATTENDED BY NURSES FROM
HOSPITALS A AND B IN THE PAST YEAR

Number of Hours Attended	Within Hospital A		Outside of Hospital A		Within Hospital B		Outside of Hospital B	
	Number	%	Number	%	Number	%	Number	%
None	16	32	45	90	42	84	43	86
1 or more hours	34	68	5	10	8	16	7	14
Total Number	50		50		50		50	

TABLE VIII

TOTAL DIABETES KNOWLEDGE TEST SCORES FOR NURSES FROM HOSPITALS A AND B

Hospital[a]	Test Scores[b]	t value	Probability
A	22.7 $\pm$ .57		
		6.48	< .001
B	26.8 $\pm$ .46		

[a]N = 50 subjects per hospital.

[b]Mean $\pm$ S.E.M.; maximum possible score: 37.

TABLE IX

SCORES IN SUBAREAS OF THE DIABETES KNOWLEDGE TEST OF NURSES
FROM HOSPITALS A AND B

Diabetes Knowledge Test -- Subareas	Maximum Possible Score	Hospital[a]	Test Scores[b]	t value	Probability
I. General Concepts	(6)	A	4.82 $\pm$ .15	-2.76	<.05
		B	5.32 $\pm$ .74		
II. Acute Complications and Prevention of Complications	(10)	A	6.26 $\pm$ .22	-2.11	<.05
		B	6.90 $\pm$ .21		
III. Insulin and Oral Hypoglycemic Agents	(13)	A	7.06 $\pm$ .25	-3.07	<.05
		B	8.16 $\pm$ .26		
IV. Diabetic Diet	(8)	A	4.80 $\pm$ .26	-4.93	<.001
		B	6.38 $\pm$ .19		

[a]N = 50 subjects per hospital.

[b]Mean $\pm$ S.E.M.

Hospital B had significantly higher mean test scores for all four subareas of the Diabetes Knowledge Test than nurses in Hospital A.

2. <u>Hypothesis II</u>. This research hypothesis predicted that there would be no difference between the Confidence Perception Rating Scale (CPRS) scores in diabetes knowledge of staff nurses from the two hospitals. No significant difference was found between the CPRS scores of the nurses from Hospitals A and B (Table X). Thus, Hypothesis II was supported.

3. <u>Hypothesis III</u>. This research hypothesis predicted that there would be a positive correlation between the staff nurses' Diabetes Knowledge Test scores and their reported confidence in their diabetes knowledge. A significant ($p < .05$), but small, positive correlation between Diabetes Knowledge scores and CPRS scores was demonstrated for the staff nurses from Hospital A, but not for the nurses from Hospital B (Table XI). Thus, Hypothesis III was supported for Hospital A, but not for Hospital B.

The two coefficients of correlation were compared to ascertain if they were significantly different from one another. The t value was 1.33 ($p > .05$). Therefore, in spite of finding a significant correlation for Hospital A, there was no significant difference between the correlations of the two hospitals' Knowledge and CPRS scores.

4. <u>Hypothesis IV</u>. This research hypothesis predicted there would be a positive correlation between the staff nurses' Diabetes Knowledge Test scores and the amount of time they reported having spent in attendance at diabetes educational programs. No significant

TABLE X

CONFIDENCE PERCEPTION SCORES (CPRS) FOR NURSES FROM HOSPITALS A AND B

Hospital[a]	CPRS Scores[b]	t value	Probability
A	33.74 $\pm$ .85	-.126	>.05
B	35.12 $\pm$ .68		

[a] $N = 50$ subjects per hospital.

[b] Mean $\pm$ S.E.M.; maximum possible score: 50.

TABLE XI

SPEARMAN'S RANK ORDER COEFFICIENTS OF CORRELATIONS BETWEEN TOTAL
DIABETES KNOWLEDGE TEST SCORES AND CONFIDENCE PERCEPTION
SCORES (CPRS) FOR NURSES FROM HOSPITALS A AND B

Hospital[a]	Diabetes Knowledge Test Scores[b]	CPRS Scores[c]	r_s	t value	Probability
A	22.7 ± .57	33.7 ± .85	.328	2.40	<.05
B	26.8 ± .46	35.1 ± .68	.141	.99	>.05

[a]N = 50 subjects per hospital.

[b]Mean ± S.E.M.; maximum possible score: 37.

[c]Mean ± S.E.M.; maximum possible score: 50.

correlations were found, however, between the staff nurses' Diabetes Knowledge Test socres and the amount of time they spent in diabetes continuing educational programs (Table XII). This was true for the nurses at both hospitals. When the two coefficients of correlations from Hospitals A and B were compared, it was found that there was no significant (p > .05) difference between the two hospitals. Thus, Hypothesis IV was not accepted.

5. Hypothesis V. This research hypothesis predicted that there would be a positive correlation between the staff nurses' reported Confidence Perceptions in their diabetes knowledge Scores (CPRS) and the amount of time they reported having spent in attendance at diabetes educational programs in the past year. Spearman's rank order coefficients of correlation between the CPRS scores and the amount of time nurses reported having spent in continuing diabetes educational programs during the past year were not found to be significant (p > .05) for the nurses at either Hospital A or Hospital B. The correlations were r_s = .002 for Hospital A and r_s = -.08 for Hospital B. In addition, the two coefficients of correlation were compared and the t value (-0.75) indicated that the two correlations were not significantly (p > .05) different from each other. Therefore, Hypothesis V was not supported.

6. Hypothesis VI. This research hypothesis predicted that there would be a positive correlation between staff nurses' Diabetes Knowledge Test scores and the number of times they reported having spent in teaching diabetics and their families about their disease

TABLE XII

COEFFICIENTS OF CORRELATIONS BETWEEN DIABETES KNOWLEDGE TEST SCORES
AND APPROXIMATE NUMBER OF HOURS REPORTED SPENT IN CONTINUING
DIABETES EDUCATION FOR NURSES FROM HOSPITALS A AND B

Hospital[a]	Correlation (r)	Probability
A	-0.01	>.05
B	0.06	>.05

[a]N = 50 subjects per hospital.

in the past two months. The coefficients of correlations between the Knowledge Test scores and the number of times diabetic teaching was performed were similar to those between the Knowledge Test scores and the amount of time the nurses spent in attendance at diabetes educational programs; that is, they were not significant ($p > .05$) for the nurses at either hospital. The correlations were $r = .08$ for the nurses at Hospital A and $r = -.01$ for the nurses at Hospital B. When the two coefficients of correlations from Hospitals A and B were compared, it was found that there was no significant ($p > .05$) difference between the two hospitals. Thus, Hypothesis VI was not supported.

7. <u>Hypothesis VII</u>. This research hypothesis predicted that there would be a positive correlation between staff nurses' reported Confidence Perceptions in their diabetes knowledge scores (CPRS) and the number of times they reported having spent in teaching diabetics and their families about their disease in the past two months. A significant ($p < .05$), but relatively small correlation between CPRS scores and the number of times diabetic teaching was performed in the past two months was demonstrated for the staff nurses from Hospital B, but not for the nurses from Hospital A (Table XIII). Thus, Hypothesis VII was supported for Hospital B, but not for Hospital A.

The two coefficients of correlation were compared to ascertain if they were significantly different from one another. The t value was 1.52 ($p > .05$). Therefore, in spite of finding a significant

TABLE XIII

SPEARMAN'S RANK ORDER COEFFICIENTS OF CORRELATION BETWEEN CONFIDENCE
PERCEPTION SCORES (CPRS) AND THE NUMBER OF TIMES NURSES FROM
HOSPITALS A AND B SPENT TEACHING DIABETICS AND THEIR
FAMILIES IN THE PAST TWO MONTHS

Hospital[a]	Correlation (r_s)	t value	Probability
A	.117	.82	>.05
B	.348	2.57	<.02

[a]N = 50 subjects per hospital.

correlation for Hospital B, there was no significant difference between the two hospitals.

D. Testing of Other Variables

Findings of forward multiple linear regression analysis (using the Statistical Analysis System) are summarized in Table XIV. A total of 25 independent variables were entered; the dependent variable was Diabetes Knowledge Test score.

In analyzing the variables that were significant in explaining the variance in Diabetes Knowledge Test scores, it was found that only two of the 25 variables were significant at the $p < .05$ level. In fact, the country in which basic nursing education was obtained (i.e., FORIN--either in the U.S.A. or outside of the U.S.A.) was found to be significant at the .0001 level, accounting for 26% of the variance in Test scores. The average number of insulin injections nurses administered every two months (i.e., variable NEWINJ) was found to be significant at the .03 level, accounting for an additional 4% of the variance in Test scores. In summary, the multiple R of FORIN and NEWINJ with Knowledge scores was .55; the R^2 was .30. This would indicate that 30% of the variance in Knowledge scores were accounted for through the two variables FORIN and NEWINJ.

TABLE XIV

SUMMARY TABLE OF MULTIPLE REGRESSION ANALYSIS OF THE DEPENDENT VARIABLE
(DIABETES KNOWLEDGE TEST SCORE) AS A FUNCTION OF
INDEPENDENT VARIABLES (FORIN, NEWINJ)[a]

Step Number	Independent Variable Entered	Multiple R	df	F of R	Significance of F	R^2	Incr. in R^2	F to Enter	df for Entering	Significance of F
1	FORIN[b]	.51	1/98	35.20	.0001	.26	.26	35.20	1/98	.0001
2	NEWINJ[c]	.55	2/97	20.55	.0001	.30	.04	4.61	1/97	.03

[a]A total of 25 independent variables were entered, one dependent variable.

[b]FORIN = country in which nursing degree was received (i.e., USA or outside of USA).

[c]NEWINJ = mean of response (i.e., 1.5, 4, 7.5, 12, 17, 22, 27) chosen indicating average number of insulin injections administered every two months.

CHAPTER V

DISCUSSION

A. Demographic Characteristics of the Sample

The demographic data revealed that the two groups of nurses differed significantly in the areas of age composition ratio, basic educational preparation, number of years experience working as an RN, and the country in which they received their basic nursing education. In general, the nurses from Hospital A were primarily foreign educated, older, nursing diploma graduates with many years of experience working as RNs. On the other hand, the nurses from Hospital B were primarily educated in the United States, significantly ($p < .05$) younger and with markedly ($p < .05$) less years of experience working as RNs, as well as having significantly ($p < .05$) more nurses prepared at the associate degree level or higher than Hospital A. Also, the nurses from Hospital A cared for a significantly ($p < .05$) smaller number of diabetic patients within the past two months than the nurses from Hospital B. No significant ($p > .05$) differences, however, were found between the two groups in the number of diabetic patients taught or the average number of times insulin was administered. The majority of nurses from both hospitals worked full-time and worked primarily on the day-shift. In summary, it is obvious that the nurses from Hospitals A and B represent two very heterogenous groups.

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B. Variations in Diabetes Knowledge

Significant (p < .05) differences were found between nurses
from Hospital A and Hospital B in mean total Diabetes Knowledge Test
scores, as well as between each subarea score. If the three items
which the researcher added (#21-23) to Scheiderich's (1978) Knowledge
Test are eliminated, the mean scores of the nurses from Hospitals A
and B are similar to the scores of the 55 staff nurses sampled by
Freibaum (1979) and the 82 staff nurses sampled by Scheiderich (1978).

A total of 13 of 15 criterion judges supporting validity of
this Knowledge Test stated that all 37 items are important for
staff nurses to know in order to care for and educate diabetic
patients properly. Scheiderich's (1978) criterion group validating
her 34-item test estimated that a staff nurse with a minimal level
of competence should have answered 88.9% of the items correctly.
If the latter criteria is used, this would mean that a score of
33 (88.9%) on this 37-item test would be considered the lowest pass
level for the Knowledge Test. In this study, only one nurse from
Hospital B and no nurses from Hospital A answered 33 or more items
correctly. These findings are similar to those of Freibaum (1979)
(i.e., only one nurse out of 137 sampled answered 30 or more items
correctly). Likewise, these data support the results of previous
studies which strongly suggest that the majority of staff nurses
sampled lack sufficient knowledge to care for and/or teach diabetic
patients.

A review of the Diabetes Knowledge Test revealed that there were more items answered incorrectly in Subarea III, which addresses insulin and oral hypoglycemia agents, than in other subareas. This finding is also consistent with the results of many previous studies (Etzwiler, 1967; Stern, 1970; Feustel, 1976; Scheiderich, 1978; Freibaum, 1979). Approximately 85% of the nurses from Hospitals A and B received a score of 74% or less in this 13-item subarea. Six of the 13 items in this subarea were answered incorrectly by 50% or more (range = 24 to 86%) of the 100 nurses sampled. These six items were: #17, conversion of 20 units of U-40 insulin to 20 units of U-100 insulin (answered incorrectly by approximately 65% of all the nurses; #20, possible sites insulin can be injected (answered incorrectly by 82% and 74% of the nurses from Hospitals A and B, respectively); #23, drawing up Regular insulin into the syringe first before the intermediate-acting insulin when mixing insulins (answered incorrectly by 62% and 42% of the nurses from Hospitals A and B, respectively); #25, insulin storage at room temperature (answered incorrectly by 66% and 24% of the nurses from Hospitals A and B, respectively); #27, physiologic anabolic and anticatabolic actions of insulin (answered incorrectly by 84% and 76% of the nurses from Hospitals A and B, respectively); and #29, common side effects of sulfonylurea agents (answered incorrectly by 86% and 80% of the nurses from Hospitals A and B, respectively). Interestingly, from 49-75% of the nurses in Scheiderich's (1978) and Freibaum's (1979) studies also answered incorrectly the items

concerned with conversion, sites, mixing, storage and actions of

insulin, and side effects of oral agents.

In addition to item #23, items #21 and #22 were added by the

researcher to the original test (Scheiderich, 1978). It was found

that item #21, 90° angle of insulin injection, was answered

incorrectly by 40% and 52% of the nurses from Hospitals A and B,

respectively, and item #22, rubbing the injection site vigorously

before the injection only, was answered incorrectly by 44% and 32%

of the nurses from Hospitals A and B, respectively.

The results of the three nurse educators purposively sampled

as part of the criterion group validating this Knowledge Test

were very interesting. All three educators incorrectly answered

items related to insulin conversion, site rotation, and actions of

insulin, as well as angle of insulin injection. Furthermore, two

out of three nurse educators answered incorrectly the items

relating to mixing insulins and treating hypoglycemia. Although

the three nurse educators responded to the Knowledge Test items

unsupervised, their scores only ranged from 76-81% of correct

answers.

An additional item in Subarea II, concerning diabetic

complications and prevention of complications, was noteworthy.

In item #13, the correct response for treatment of hypoglycemia

was '3 ounces of regular cola'. This response was chosen by only

13% of the 100 nurses sampled. An incorrect response was '4 ounces

of apple juice with 2 teaspoons of sugar' (overtreatment for a

hypoglycemic reaction). Although this item was previously worded '4 ounces of orange juice with 2 teaspoons of sugar', it was changed to apple juice because the researcher reasoned that the latter response was a common incorrect practice and would be chosen by the nurses without regard to other response choices for this item. However, this response was incorrectly chosen by 79% of the 100 nurses sampled, indicating that the majority of nurses might commonly overtreat hypoglycemic reactions, with the possible effects of increasing the diabetic's blood glucose levels. These findings are also consistent with those found by Scheiderich (1978) and Freibaum (1979).

Although 99 of the 100 nurses did not have "passing" scores, it was noted that nurses from Hospital A chose more incorrect responses to all 37 items in the Knowledge Test than did the nurses from Hospital B. There may be several reasons for the higher scores of nurses from Hospital B on the Diabetes Knowledge Test. First, the fact cannot be discounted that the researcher was not present for some of the time spent by nurses in Hospital B in completing the data collection tools. Therefore, peers or other resources may have been consulted during this time. Another possible explanation for the nurses at Hospital A scoring so low was the fact that a total of 72% of the nurses from Hospital A and only 2% of the nurses from Hospital B received their basic nursing education in a country outside of the United States. This finding is in accord with Scheiderich (1978) who reported that foreign-born nurses scored

markedly lower than American-born nurses. The country in which the subjects received their basic education was found to significantly ($p < .0001$) contribute to 26% of the variance in Diabetes Knowledge Test scores. Possibly, the educational preparation of foreign nurse graduates, especially in the Asian countries, did not stress the essentials of diabetes or its management. There is also the possibility that foreign nurse graduates are unfamiliar with multiple-choice testing formats. In addition, a possible language barrier may exist. Foreign nurses were required to pass the Council of Foreign Nurse Graduates' Nursing Service Examination which, according to a spokesperson for the Illinois Nurses' Association, in part demonstrates mastery of the English language from a written perspective and a command of the English language regarding comprehension and interpretation of written orders. Although passing this Examination is required before state nursing boards may be taken, foreign nurses who passed this Examination may still experience some language difficulties and this may have affected their test results.

Language difficulties and knowledge deficiencies may affect the quality of education and care the diabetic receives. The nurses in Hospitals A and B were expected to teach the diabetics under their care. Problems may exist if nurses do not have an adequate knowledge base from which to impart information to diabetic clients and their families. Even when nurses do not engage in diabetic patient teaching, they are expected to possess adequate knowledge of diabetic medication they administer, in relation to actions, strengths,

administration and side effects, and knowledge of common disease

symptomatology so that they may recognize progression or attenuation

of the disease process and plan their nursing care accordingly.

C. Variations in Confidence in Diabetes Knowledge

No strong relationship was found between staff nurses' knowledge

of diabetes and their confidence in that knowledge. Therefore, it

seems possible that, in relation to diabetes mellitus, it is just as

likely for knowledgeable nurses to be confident in their amount of

knowledge, as it is likely for knowledgeable nurses to lack

confidence in their knowledge base. Similarly, nurses who are not

as knowledgeable about diabetes may just as likely be confident as

not confident about the amount of diabetes knowledge they have.

The actual diabetes knowledge scores and confidence scores

were rank-ordered and compared. The maximum possible score on the

CPRS Confidence Scale was 50 and the mean CPRS scores for nurses

from Hospital A (34) and Hospital B (35) were similar, although

their mean diabetes knowledge scores differed significantly

($p < .05$) (23 and 27, respectively). It would seem desirable for

nurses' confidence in their diabetes knowledge to be positively

related to their levels of knowledge, therefore, a problem exists

for diabetic patients who may be taught by nurses who believe they

are more knowledgeable than they actually are and who may be

caring for and educating the diabetic with an inadequate or outdated

knowledge base. Additional problems exist for diabetic patients

who may be taught only minimally, if at all, by nurses who have an

adequate knowledge base but who lack confidence in that knowledge so that they avoid any involvement in diabetic patient education.

D. Variations in Diabetic Patient Teaching

The approximate number of times the nurses reported they spent teaching diabetic patients and their families in the past two months was 1-2; the average number of times nurses from Hospitals A and B taught diabetics was 2.5 and 3.7 times, respectively. It is interesting to note that: 1) although only 6% of the nurses from each hospital reported that they had not cared for any diabetic patients in the past two months, more nurses from Hospital A (26%) than Hospital B (20%) reported not having done any diabetic teaching to patients or their families during that time, and 2) more nurses from Hospital B (42%) than Hospital A (30%) reported teaching three or more times in the past two months. The latter could be accounted for by the greater number of diabetic patients these nurses cared for in the past two months. However, the fact remains that many of the diabetic patients who were admitted to both hospitals may not have received any teaching about their condition or management, although teaching was an expected function of the nurses in both hospitals. Some diabetic patients may have been considered "unteachable" (i.e., lacking in the ability or resources to comprehend or manage the disease); however, teaching should still be performed with family members or significant other representatives of the patient.

In addition, nurses from Hospital B performed diabetic teaching a greater number of times than Hospital A nurses. In Hospital B, weekly diabetic patient classes were administered by a multi-disciplinary team and the staff nurses received no inservices on diabetes in the past year. Yet, these nurses had a higher measured diabetes knowledge level and taught a greater number of times than the nurses from Hospital A, who had a Diabetes Coordinator serving as a resource person at the unit level and who offered some inservices in the past year. In Hospital A, there were no formal diabetes patient classes. Therefore, this may have been the reason the Diabetes Coordinator performed diabetic patient teaching at the bedside. The nurses from Hospital A may not have taught diabetic patients because they knew they had this resource person who was willing to teach diabetics. This finding is consistent with the nurses sampled in Scheiderich's (1978) and Freibaum's (1979) studies. In the former study, there were no clinical nurse specialists in diabetes, and the staff nurses scored significantly higher on the knowledge test and taught a greater number of times than staff nurses from the latter study in an institution that employed diabetes nurse specialists, who also taught diabetics and offered diabetic inservices for the nursing staff.

E. <u>Variations in Continued Diabetes Educational Program Attendance</u>

Although some diabetes inservices were offered in Hospital A, the approximate total amount of continued diabetes educational hours

nurses in Hospitals A and B reported attending in programs in and outside of each hospital was minimal. If it is assumed that diabetes educational program attendance results in increased diabetes knowledge, then the minimal amount of continued diabetes education attended may account for the low mean scores on the Diabetes Knowledge Test obtained herein.

Perhaps one of the reasons staff nurse's attendance at continuing educational programs was so low was that some staff nurses may have been overconfident in their amount of diabetes knowledge. Therefore, these nurses did not feel the need to attend lectures which focused on diabetes mellitus.

Only 6% of the nurses from each hospital reported that they had not cared for any diabetic patients in the past two months. This would indicate that there are a great number of diabetic patients admitted to these medical-surgical nursing units. Since the field of diabetes knowledge is rapidly expanding each year, nurses caring for the large population of diabetic patients must possess current knowledge of the disease process and its management, in order to keep the diabetic patient current.

F. Conclusion

The results of the Diabetes Knowledge Test showed that diabetes knowledge among nurses varies greatly and that one group of nurses (Hospital B) scored significantly higher than the other group (Hospital A). Yet, if Scheiderich's (1978) criteria for passing were used, only one nurse out of 100 would pass. Furthermore, the

nurses' knowledge was not strongly correlated with: 1) their confidence about their knowledge; 2) the number of patients taught; and 3) the amount of continuing education received. Finally, the results indicate that nurses attended few or no continuing education programs. These findings are not very encouraging if we expect the staff nurse to be the diabetes knowledge resource person and educator of diabetic patients.

G. Nursing Implications and Recommendations

The results of this study have implications for all nurses, including those working as staff nurses, nurse administrators, and academic and continuing nurse educators. There are also implications for hospital administrators.

Nurses are expected, indeed required by legal Nurse Practice Acts to deliver safe patient care based on an adequate knowledge base. Unfortunately, the data base provided in this study supports previous related findings of insufficient knowledge of diabetes by staff nurses. Due to the low Diabetes Knowledge Test scores found, there is reason to doubt that these nurses were sufficiently knowledgeable to impart correct information to diabetic patients and their families. There is also reason to doubt that these nurses possess the basic knowledge necessary to care safely for diabetic patients.

Another related finding that emerged from this study is that all 100 staff nurses were most deficient in their knowledge regarding diabetic medications, especially in the areas of actions, storage,

side effects, conversion, site rotation, preparation of the site, angle of injection and drawing up mixed doses of insulin. Although these nurses may not have represented a geographic sample, findings for this sample are consistent with Scheiderich's (1978) and Freibaum's (1979) findings from staff nurses in three additional Chicago area hospitals, which included a suburban community hospital, an urban community teaching hospital and a major urban medical center teaching hospital. Some of the incorrect responses could have been due to the items' structure or readability; however, this is unlikely since, prior to its use, the Knowledge Test was submitted to criterion experts for content validity. Foreign nurses had also passed a Nursing Service Examination, indicating comprehension of the English language from a written perspective.

Therefore, the education of staff nurses must be examined. For example, item #13, answered incorrectly by more nurses than any of the 37 Knowledge Test items, asked for treatment of a hypoglycemic episode. The incorrect response may be traced to several areas. Perhaps the nurses' received inadequate or incorrect information in their basic nursing program, or perhaps in their experience, the wrong information was transmitted during hospital orientation or peer contact. It is recommended that nursing educators need to examine their own knowledge as well as examine their programs to determine whether the information they are disseminating regarding diabetes mellitus is adequate, accurate, and current.

If nursing programs are found to be delivering correct information, then textbooks, nursing journals, inservices, and continuing diabetes educational programs need to be surveyed to determine if they are the sources of adequate information. State nursing boards must be evaluated to ascertain the amount of diabetes knowledge that the examiners consider necessary for nurses to possess, as determined by the number of test questions that focus on diabetes mellitus. Since diabetes mellitus is a major health problem experienced by more than 10 million Americans, it is hoped that this disease entity is adequately taught in schools of nursing and tested on the state board of nursing examinations.

In relation to clinical practice, it is also recommended that, since staff nurse's confidence in their diabetes knowledge was not related to their tested levels of knowledge, then nursing administrators must assess the knowledge level of nurses working with diabetic patients in their institutions to determine if staff nurses are delivering safe care and correct information to diabetic patients. Perhaps if more diabetes programs offered by each hospital as well as outside of each hospital were attended by the staff nurses sampled, their Knowledge Test scores may not have been so low. It is therefore recommended that hospital administrators recognize the need for, support, and promote continuing nurse education programs within their hospitals, as well as encourage staff nurse attendance at programs offered by other institutions (other than their own). It is additionally recommended that staff

nurses attempt to accurately assess their own weaknesses in knowledge and skills and seek out continuing education programs to help keep their knowledge current and increase their confidence in the amount of knowledge they have, so that, hopefully, more diabetics can be taught by nurses with an adequate knowledge base.

One of the most global trends suggested by this study in relation to other studies concerns diabetes nurse specialists. It was found that staff nurses in institutions employing diabetes nurse specialists who taught patients, families and nurses about diabetes, had a more deficient knowledge base and performed less diabetic patient teaching than staff nurses in institutions not employing diabetes specialists or where diabetes specialists were not regularly in contact with the staff. Although all staff nurses were expected to perform bedside diabetic patient teaching, the staff nurses in the former type of institutions possibly abdicated this responsibility to the diabetes nurse specialists.

Therefore, it is recommended that future studies be conducted in institutions employing diabetes nurse specialists to investigate the relationship between staff nurse's diabetes knowledge and patient teaching, and the quality and quantity of diabetes specialist's contact with the staff. Possibly, as suggested by studies sampling student and staff nurses, diabetes specialists should perform less direct patient teaching and more direct counseling of staff nurses regarding their patient teaching, so that these nurses will learn with personal experience. Then

studies can be conducted by the diabetes specialists to determine the efficacy of staff nurse's diabetic patient teaching, as well as to determine how inadequacies and misconceptions of diabetic patient's knowledge are related to inadequacies and misconceptions of the nurse.

According to the national trends, the incidence of diabetes is estimated to increase by 6% yearly. The results of current research tend to support the fact that the diabetic patient's poor blood glucose control is positively related to an increased number of complications of the disease. Therefore, diabetics must become knowledgeable about their disease and about current trends in self-management of diabetes mellitus, in order for them to possess the ability to maintain adequate blood glucose control on a 24-hour basis. Nurses are responsible for teaching these diabetics about their disease and self-management. Knowledgeable nurses are prerequisites to effective and pertinent diabetic patient teaching. Nurse's existing diabetic knowledge base must be improved and expanded, so that the diabetic patient may be supplied with the knowledge and tools necessary to control his condition.

CHAPTER VI

SUMMARY

This study was conducted to determine the relationship between
staff nurse's knowledge of diabetes mellitus, as well as their
confidence in that knowledge, and two specific behaviors of staff
nurses. These behaviors were the amount of time nurses spent in
continued diabetes education and the number of times the nurses
instructed patients and/or their families about diabetes. It was
hypothesized that there would be no differences in the amount of
diabetes knowledge or confidence in diabetes knowledge for the staff
nurses sampled. It was also hypothesized that nurses' diabetes
knowledge and confidence in that knowledge would be positively
related to the amount of time they spent in continued diabetes
education and the number of times they performed diabetic patient
teaching.

The sample consisted of 100 staff nurses; 50 nurses randomly
selected for inclusion in the study from Hospital A and Hospital B,
from lists of medical-surgical nurses who met the selection
criteria.

A packet of data collection tools was given to each nurse
volunteering to sign the informed consent and participate in this
study. The tools included a Demographic Items Questionnaire, a

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Confidence Perceptions in Diabetes Knowledge Rating Scale, and a Diabetes Knowledge Test with Meal Planning Exchange List to utilize for reference in answering diabetic diet test items. The researcher was present for most of the time staff nurses spent completing the tools.

A t-test between the two staff nurse groups showed that the nurses in Hospital A had significantly lower ($p < .001$) mean Knowledge Test scores than the nurses in Hospital B. Significantly lower ($p < .05$) mean scores were also found in all four subareas of the Knowledge Test: I – general concepts about diabetes mellitus; II – acute complications and prevention of complications; III – diabetic medications; and IV – diabetic diet. There was no difference in mean Confidence Perception (CPRS) scores between the nurses sampled from both hospitals. A significant ($p < .05$), though small, positive correlation between Diabetes Knowledge Test scores and CPRS scores was demonstrated for Hospital A, but not for Hospital B. However, when these correlations for Hospitals A and B were compared, they were not found to be significantly ($p > .05$) different from each other.

No significant ($p > .05$) correlations were found when Hospital A or Hospital B nurses' Knowledge scores were compared to the number of hours they spent in continued diabetes educational programs in the past year, as well as when nurses' Knowledge scores were compared to the number of times they performed diabetic teaching in the past two months.

In addition, no significant (p > .05) correlation was found when Confidence scores were compared to the amount of times spent in continued diabetes educational programs in the past year by nurses from both hospitals. Although a significant (p < .05) relationship was found when Confidence scores were compared to the number of times nurses from Hospital B, but not Hospital A, performed diabetic patient teaching, the correlation was low, and the t test to evaluate the significance of the difference between the two correlation coefficients was not significant (p > .05).

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APPENDIX A

COVER LETTER FOR NURSE SUBJECTS' PACKETS

Dear Staff Nurse:

I am currently involved in a research study examining medical-surgical staff nurses' knowledge about Diabetes Mellitus, as well as examining some of the feelings about the knowledge they have, in order to further the field of diabetes education. I am hoping that you will assist me to complete the study by agreeing to fill out and return the questionnaires in this packet. The information you provide will remain confidential and will not be connected with your name in any way. You are free to withdraw from the study at any time.

At the beginning of each questionnaire, there are instructions for its completion. Please write all responses only on the answer sheet provided. The answer sheet has three parts: each part corresponds to a specific questionnaire. Fill in ALL blanks that are on the answer sheet. Please do not discuss the questions with anyone else until all answer sheets have been returned to me. The entire packet takes approximately thirty minutes to complete. Thank you for your cooperation.

Sincerely,

Melanie Karl, R.N.
Graduate Student
Medical-Surgical Nursing
Loyola University

Enclosures: Part I - Consent Form
Part II - Demographic Items
Part III - Confidence Perceptions Rating Scale
Part IV - Diabetes Knowledge Test
Answer Sheet

APPENDIX B

INFORMED CONSENT

Participant's Name: _____ Date: _____

Project Title: Staff Nurses' Knowledge of Diabetes Mellitus and their

Confidence about that Knowledge

Participant Information

The purpose of this study is to investigate medical-surgical staff
nurses' knowledge of diabetes, as well as some feelings about the
knowledge they have. The packet you will be given to complete con-
tains three questionnaires requesting information on: 1) demographic
data, 2) how confident you are in your diabetes knowledge, and
3) your diabetes knowledge. The packet may take approximately
25-30 minutes to complete. Conclusions about possible relationships
among the data collected will benefit future nurses' involvement in
diabetic patient education.

Consent

I have fully explained to _____ the nature and purpose
of the above project and the time involved to complete the question-
naires. I have answered and will answer all questions to the best
of my ability.

_____
Principal Investigator

I agree to allow my name and questionnaires' answer sheet to be avail-
able to other researchers for the purpose of evaluating the results
of this study. I consent to the publication of any data which may
result from these investigations for the purpose of advancing
knowledge in diabetes education, providing my name or any other
identifying information is not used in conjunction with such
publications. All precautions to maintain the confidentiality of
these results will be taken. I have been fully informed of the above
study and the extent of my participation. I give permission for my
participation. I understand I may discontinue my participation at
any time. I know that Melanie Karl or her associates will be
available to answer any questions I may have.

_____   _____
Witness to Signature   Participant's Signature

APPENDIX C

PART I: DEMOGRAPHIC ITEMS QUESTIONNAIRE

Choose only ONE answer for each question. Place the letter of your answer on the answer sheet provided. Please do not write on this questionnaire.

1. What was your age on your last birthday?

   A. 18-20 years   E. 30-34 years
   B. 21-23 years   F. 35-39 years
   C. 24-26 years   G. 40 years or more
   D. 27-29 years

2. What is your sex?

   A. Female
   B. Male

3. What is your marital status?

   A. Married   D. Widowed
   B. Single   E. Separated
   C. Divorced

4. a) What is the most basic type of nursing program from which you first received your nursing degree?

      A. Diploma Nursing
      B. A.A. Nursing
      C. Baccalaureate Nursing

   b) In what year did you complete the above nursing program? (Place your answer on the answer sheet.)

5. Where did you receive your basic nursing education?

   A. In the United States
   B. In a country other than the United States. Please name the country on the answer sheet.

6. a) What is the highest level of education you have completed?

      A. Diploma Nursing   E. Baccalaureate Other
      B. A.A. Nursing   F. Masters Nursing
      C. A.A. Other   G. Masters Other
      D. Baccalaureate Nursing

6. b) In what year did you complete the above nursing program?
    (Place your answer on the answer sheet.) Note: Your answer
    may be the same year as in 4b; if so, please repeat the year.

7. Approximately how many years have you worked as a Registered
    Nurse?

    A. 0-1 year   F. 5-9 years
    B. 1-2 years   G. 9-15 years
    C. 2-3 years   H. 15-21 years
    D. 3-4 years   I. 21 years or more
    E. 4-5 years

8. Which type of nursing unit PRIMARILY describes the unit where
    you are presently working?

    A. Medical
    B. Surgical
    C. Medical-Surgical

9. Which time category best describes how long you have worked on
    your present unit?

    A. 0-6 months   E. 3-5 years
    B. 6-12 months   F. 5-9 years
    C. 1-2 years   G. 9 years or more
    D. 2-3 years

10. NOT including the unit you work on presently, how much additional
     time have you worked on a. . .

     1) Medical nursing unit?   A. 0-1 year   D. 3-5 years
                                 B. 1-2 years   E. 5-9 years
                                 C. 2-3 years   F. 9 years or more

     2) Surgical nursing unit?   G. 0-1 year   J. 3-5 years
                                 H. 1-2 years   K. 5-9 years
                                 I. 2-3 years   L. 9 years or more

11. What shift do you normally work?

     A. Day shift
     B. Evening shift

12. What is your present working status?

     A. Full-time
     B. Part-time

13. Are you a diabetic?

   A. Yes
   B. No

14. Is anyone in your immediate family a diabetic? (i.e., mother, brother, husband, child)

   A. Yes
   B. No

15. How many times have you done diabetic teaching within the last two months? (This includes any instance in which you gave information about diabetes to a diabetic patient or his family--formally or informally. The session(s) may have lasted from several minutes up to 1/2 hour or more.)

   A. None   E. 9-12 times
   B. 1-2 times   F. 13-16 times
   C. 3-4 times   G. 17-20 times
   D. 5-8 times   H. 21 times or more

16. How many diabetic patients have you cared for which the last two months?

   A. None   E. 7-9 patients
   B. 1-2 patients   F. 10-14 patients
   C. 3-4 patients   G. 15-19 patients
   D. 5-6 patients   H. 20 patients or more

17. On the average, how many injections of ANY type of insulin do you administer every two months?

   A. None   E. 10-14 injections
   B. 1-2 injections F. 15-19 injections
   C. 3-5 injections G. 20-24 injections
   D. 6-9 injections H. 25 injections or more

18. How many hours of classes, seminars, workshops or lectures focused on diabetes mellitus or diabetic teaching-learning have you attended within your institution in the past year?

   NOTE: An all day workshop is usually 6 to 8 hours. A half-day workshop is usually 4 hours.

   A. None   F. 9-13 hours
   B. 1-2 hours   G. 14-18 hours
   C. 3-4 hours   H. 19-23 hours
   D. 5-6 hours   I. 24 hours or more
   E. 7-8 hours

19. How many hours of classes, seminars, workshops or lectures focused on diabetes mellitus or diabetic teaching-learning have you attended <u>outside</u> your institution in the past year?

A.	None	F.	9-13 hours
B.	1-2 hours	G.	14-18 hours
C.	3-4 hours	H.	19-23 hours
D.	5-6 hours	I.	24 hours or more
E.	7-8 hours		

APPENDIX D

PART II: CONFIDENCE PERCEPTIONS RATING SCALE

Using the scale below, please rate yourself on how much confidence you feel you have in your current knowledge of each area of diabetes mentioned. These areas represent the general categories of diabetes knowledge you will be tested on in Part III. Place the number representing your amount of confidence on the answer sheet provided. Please do not write on this questionnaire.

1.	2.	3.	4.	5.
No	Little	Moderate Amount of	A Lot of	Great Deal of
Confidence	Confidence	Confidence	Confidence	Confidence

I. GENERAL CONCEPTS ABOUT DIABETES MELLITUS

    A. What it is
    B. Its relation to exercise
    C. Its relation to foot and skin care

II. ACUTE COMPLICATIONS AND PREVENTION OF COMPLICATIONS

    A. Hypoglycemia
    B. Hyperglycemia
    C. Urine testing

III. MEDICATIONS

    A. Insulin actions, strength, indications, and side effects
    B. Drawing up and injecting insulin
    C. Side effects of oral hypoglycemic agents

IV. DIABETIC DIET (You are allowed to use a diabetes exchange list
                    as a guide in answering all diet questions.)

APPENDIX E

PART III: DIABETES KNOWLEDGE TEST

1. What is diabetes?

    A. Malfunctioning of the pancreas in which an excessive amount
       of insulin is produced.
    B.[1] Failure of the pancreas to produce a sufficient amount of
       insulin to meet the needs of the body.
    C. Failure of the pancreas to filter properly the excessive
       glucose from the blood.
    D. I do not know.

2. What effect does exercise have on blood glucose?

    A. Decreases blood glucose.
    B. Increases blood glucose.
    C. Has little effect on glood glucose.
    D. I do not know.

3. What effects does increased exercise have on a diabetic's food
   intake needs if he is of normal weight?

    A. Decreases his need for food.
    B. Increases his need for food.
    C. Has little effect on his need for food.
    D. I do not know.

4. Why is it necessary that diabetics especially take proper care
   of their feet?

    A. A number of years of injecting insulin into the thighs can
       cause edema in both the legs and the feet.
    B. Flat feet are commonly associated with diabetics unless
       preventive measures are used routinely.
    C. Persons with diabetes often have poor circulation of blood
       to their feet.
    D. I do not know.

5. A diabetic has a small corn on his foot which he wants removed.
   What should he do first?

    A. Have a podiatrist remove the corn.
    B. Use a liquid corn remover, following directions carefully.
    C. Carefully trim the corn with a sterile cutting instrument.
    D. I do not know

---

[1]Underlined letter denotes correct answer.

6. A diabetic has just received a minor abrasion on his leg. What should he do to treat the abrasion?

    A. Wash gently with mild soap and water, dry with a clean towel, and observe carefully for any signs of infection.
    B. Wash gently with mild soap and water, apply a small amount of iodine or merthiolate, and observe carefully for any signs of infection.
    C. Apply a small amount of iodine or merthiolate and call the doctor.
    D. I do not know.

7. A symptom of hypoglycemia (low blood sugar) is:

    A. Frequent urination.   C. Feeling of nervousness.
    B. Dry mouth and skin.   D. I do not know.

8. A symptom of hyperglycemia (high blood sugar) is:

    A. Increased thirst.   C. Cool, clammy skin.
    B. Low grade fever.   D. I do not know.

9. What is one case of hypoglycemia (low blood sugar)?

    A. Skipping a meal.   C. Too little exercise.
    B. Emotional stress.   D. I do not know.

10. What is one cause of hyperglycemia (high blood sugar)?

    A. Decreased food intake.   C. Excessive insulin.
    B. Infection.   D. I do not know.

11. What is one symptom associated with diabetic ketoacidosis (diabetic coma)?

    A. Cold, clammy skin.   C. Negative urine for glucose.
    B. Nausea and vomiting.   D. I do not know.

12. What is one cause of diabetic ketoacidosis (diabetic coma)?

    A. Excessive exercise.
    B. Excessive intake of diet soft drinks over a prolonged period.
    C. Repeated failure to take daily insulin dose.
    D. I do not know.

13. Which one of the following is the MOST APPROPRIATE intial action
    to take for a diabetic who feels that he is beginning to have a
    hypoglycemic episode (low blood sugar)?

    A. Drink 3 ounces of regular cola (Coca-cola, 7-Up).
    B. Drink 4 ounces of apple juice with 2 teaspoons of sugar.
    C. Eat 4 crackers with butter or margarine.
    D. I do not know.

14. When is one time that a well-controlled diabetic should always
    check his urine for acetone?

    A. Whenever he exercises.
    B. Whenever he tests his urine for glucose.
    C. Whenever his urine glucose is 1% to 2%.
    D. I do not know.

15. What does 1% or 2% urine glucose indicate about blood glucose in
    a diabetic with a normal renal threshold?

    A. He has a low blood glucose.
    B. He has a high blood glucose.
    C. He has a normal blood glucose.
    D. I do not know.

16. What should a diabetic do who is showing 1% to 2% urine sugars
    and positive acetone for two consecutive days?

    A. Call his doctor, continue to test his urine every 4 hours
       or as directed by the physician, and continue his insulin
       or oral hypoglycemic.
    B. Omit his next dose of insulin or oral hypoglycemic and
       test his urine as he would normally do.
    C. Continue with his insulin or oral hypoglycemic and urine
       testing as he normally would. These are normal results
       for diabetics.
    D. I do not know.

17. If a patient is receiving 20 units of U-40 insulin, how many
    units of U-100 would be the equivalent?

    A. 20   C. 50
    B. 40   D. I do not know.

18. When does the maximum effect (peak) of regular insulin occur?

    A. 2 to 4 hours after injection.
    B. 6 to 12 hours after injection.
    C. 24 to 28 hours after injection.
    D. I do not know.

19. When does the maximum effect (peak) of NPH or Lente insulin occur?

    A. 2 to 4 hours after injection.
    B. 6 to 12 hours after injection.
    C. 24 to 28 hours after injection.
    D. I do not know.

20. What areas of the body can be used for injecting insulin?

    1. Upper arms   A. 1, 2, and 3
    2. Abdomen   B. 1 and 3
    3. Thighs   C. 1, 2, 3, 4, and 5
    4. Back (scapular area)   D. 2, 4, and 5
    5. Buttocks   E. I do not know.

21. Which one of the following BEST describes the angle most diabetics should use when injecting insulin (with a standard 1/2" needle)?

    A. 45°   C. 90°
    B. 60°   D. I do not know.

22. When must the injection site be vigorously rubbed with alcohol?

    1. Before the injection.   A. 1 only.
    2. After the injection.   B. 2 only.
                               C. 1 and 2.
                               D. I do not know.

23. A diabetic wants to put Regular and NPH insulin into the same syringe. If the physician has not specified a preference, which one of the following sequences is preferred?

    A. Draw up the Regular first, then the NPH.
    B. Draw up the NPH first, then the Regular.
    C. Regular and NPH should not be drawn up into the same syringe.
    D. I do not know.

24. A diabetic patient contaminates the needle while preparing his insulin injection. What would be the BEST action for him to take?

    A. Dispose of the needle even if this means disposing of the insulin and syringe and starting preparation from the beginning.
    B. Wipe the needle with an alcohol sponge and continue with preparation of the injection.
    C. Continue with preparation of the injection, but wipe well with alcohol the area of skin where the injection will be given.
    D. I do not know.

25. Where should one store insulin which is presently being used?

    A. In the refrigerator near the freezer section.
    B. In the refrigerator away from the freezer section.
    C. In a place that is away from light and at room temperature (approximately 70° F).
    D. I do not know.

26. What is the effect of insulin on the blood glucose?

    A. Insulin causes the blood glucose to increase.
    B. Insulin causes the blood glucose to decrease.
    C. Insulin has no effect on the blood glucose.
    D. I do not know.

27. Which of the following are physiological actions of insulin?

    1. Transports glucose across cell membranes for use by the cells.
    2. Enhances the formation of amino acids into proteins.
    3. Enhances the breakdown of fats for energy.

       A. 1 and 2.   D. 2 and 3
       B. 1, 2, and 3.   E. I do not know.
       C. 1 and 3.

28. What effect does illness have on a diabetic's insulin requirements?

    A. Illness causes a decrease in insulin requirements.
    B. Illness causes an increase in insulin requirements.
    C. Illness causes no change in insulin requirements.
    D. I do not know.

29. Side effects of the sulfonylureas (Orinase, Diabinese) include?

    1. Drowsiness
    2. Gastrointestinal irritation
    3. Hypersensitivity to alcohol

        A. 1 and 2.   D. 2 and 3.
        B. 1 and 3.   E. I do not know.
        C. 2 only.

30. A diabetic patient does not like one of the items on his tray. What would be the BEST action for the nurse to take?

    A. Advise the patient to eat all other items on his tray and omit that one item.
    B. Consult with the dietitian about exchanging this item for a comparable item which the patient would eat.
    C. Explain to the patient that his diet is carefully calculated for needed nutrients and that it is important that he eat everything given to him.
    D. I do not know.

31. What would be the BEST action for a diabetic to take when ordering a meal at a restaurant?

    A. Order only foods in the meat, vegetable and milk exchange lists.
    B. Order anything he would normally eat at home but request that it be specially prepared.
    C. Order his meal from the menu using his food exchange lists and avoiding casseroles, gravies and fried foods.
    D. I do not know.

32. A diabetic diet is calculated for which of the following food nutrients?

    1. Carbohydrates   A. 1 and 2.
    2. Proteins   B. 1 and 3.
    3. Fats   C. 1, 2, and 3.
                            D. 2 and 3
                            E. I do not know.

33. For the following items, use the diabetic exchange list provided. 1/2 cup of cooked cauliflower may be exchanged for:

    A. 1/2 cup of tomato juice.   C. 1/2 cup orange juice.
    B. 1/3 cup corn.   D. I do not know.

34. Which of the following items can be eaten freely if raw?

    A. Radishes   C. Mushrooms
    B. Tomatoes   D. I do not know.

35. One cup of whole milk can be exchanged for:

    A. 1/2 cup buttermilk.
    B. 1 ounce of cheese.
    C. 1 cup of skim milk and 2 fat exchanges.
    D. I do not know.

36. One ounce of cheddar cheese (high fat meat exchange) can be exchanged for:

    A. 2 frankfurters.
    B. 1/4 cup canned tuna (lean meat exchange) and 1 fat exchange.
    C. 1 strip bacon.
    D. I do not know.

37. Two slices of white bread may be exchanged for:

    A. 3 saltines.   C. 2/3 cup corn.
    B. 1 small potato.   D. I do not know.

THANK YOU FOR YOUR ASSISTANCE!!!

EXCHANGE LISTS FOR MEAL PLANNING
Adapted from American Diabetes Association, Inc.
The American Dietetic Association, 1976

List 1 - MILK EXCHANGES (includes Non-Fat, Low-Fat and Whole Milk)

This list shows the kinds and amounts of milk or milk products to use for one milk exchange. Those which appear in CAPITAL LETTERS are NON-FAT. Low-Fat and Whole Milk contain saturated fat.

NON-FAT FORTIFIED MILK

SKIM OR NON-FAT MILK	1 cup
POWDERED (NON-FAT DRY, BEFOFE ADDING LIQUID)	1/3 cup
CANNED, EVAPORATED SKIM MILK	1/2 cup
BUTTERMILK MADE FROM SKIM MILK	1 cup
YOGURT MADE FROM SKIM MILK (PLAIN, UNFLAVORED)	1 cup

Low-Fat Fortified Milk

1% fat fortified milk (omit 1/2 fat exchange)	1 cup
2% fat fortified milk (omit 1 fat exchange)	1 cup
Yogurt made from 2% fortified milk (plain, unflavored) (omit 1 fat exchange)	1 cup

Whole Milk (omit 2 fat exchanges)

Whole milk	1 cup
Canned, evaporated whole milk	1/2 cup
Buttermilk made from whole milk	1 cup
Yogurt made from whole milk (plain, unflavored)	1 cup

List 2 - VEGETABLE EXCHANGES

This list shows the kind of VEGETABLES to use for one vegetable exchange. One exchange is 1/2 cup.

ASPARAGUS	GREENS:	MUSHROOMS
BEAN SPROUTS	BEET	OKRA
BEETS	CHARDS	ONIONS
BROCCOLI	COLLARDS	RHUBARB
BRUSSEL SPROUTS	DANDELION	RUTABAGA
CABBAGE	KALE	SAUERKRAUT
CARROTS	MUSTARD	STRING BEANS, GREEN OR
CAULIFLOWER	SPINASH	YELLOW
CELERY	TURNIP	SUMMER SQUASH
GREEN PEPPER		TOMATOES
EGG PLANT		TOMATO JUICE
		TURNIPS
		VEGETABLE JUICE COCKTAIL
		ZUCCHINI

The following RAW VEGETABLES may be used as desired:

CHICHORY   LETTUCE
CHINESE CABBAGE   PARSLEY
ENDIVE   PICKLES, DILL
ESCAROLE   RADISHES
CUCUMBER   WATERCRESS

STARCHY VEGETABLES are found in the Bread Exchange list.

List 3 - FRUIT EXCHANGE

This list shows the kinds and amounts of FRUITS to use for one
Fruit Exchange.

APPLE	1 small	MANGO	1/2 small
APPLE JUICE	1/3 cup	MELON:	
APPLESAUCE	1/2 cup	CANTALOUPE	1/4 small
(UNSWEETENED)		HONEYDEW	1/8 medium
APRICOTS, FRESH	2 medium	WATERMELON	1 cup
APRICOTS, DRIED	4 halves	NECTARINE	1 small
BANANA	1/2 small	ORANGE	1 small
BERRIES:		ORANGE JUICE	1/2 cup
BLACKBERRIES	1/2 cup	PAPAYA	3/4 cup
BLUEBERRIES	1/2 cup	PEACH	1 medium
RASPBERRIES	1/2 cup	PEAR	1 small
STRAWBERRIES	3/4 cup	PERSIMMON,	
CHERRIES	10 large	NATIVE	1 medium
CIDER	1/3 cup	PINEAPPLE	1/2 cup
DATES	2	PINEAPPLE JUICE	1/3 cup
FIGS, FRESH	1	PLUMS	2 medium
FIGS, DRIED	1	PRUNES	2 medium
GRAPEFRUIT	1/2	PRUNE JUICE	1/4 cup
GRAPEFRUIT JUICE	1/2 cup	RAISINS	1 Tbs.
GRAPES	12	TANGERINE	1 medium
GRAPE JUICE	1/4 cup		

CRANBERRIES may be used as desired if no sugar is added.

List 4 -
BREAD EXCHANGES (includes BREAD, CERAL AND STARCHY VEGETABLES)

This list shows the kinds and amounts of BREADS, CEREALS, STARCHY
VEGETABLES and prepared foods to use for one Bread Exchange. Those
which appear in CAPITAL LETTERS are LOW FAT.

BREAD:

WHITE (INCLUDING FRENCH AND ITALIAN)	1 slice
WHOLE WHEAT	1 slice
RYE OR PUMPERNICKLE	1 slice
RAISIN	1 slice
BAGEL, SMALL	1/2
ENGLISH MUFFIN, SMALL	1/2
PLAIN ROLL, BREAD	1
FRANKFURTHER ROLL	1/2
HAMBURGER BUN	1/2
DRIED BREAD CRUMBS	3 Tbs.
TORTILLA, 6"	1

CEREAL:

BRAN FLAKES	1/2 cup
OTHER READY-TO-EAT UNSWEETENED CEREAL	3/4 cup
PUFFED CEREAL (UNFROSTED)	1 cup
CEREAL (COOKED)	1/2 cup
GRITS (COOKED)	1/2 cup
RICE OR BARLEY (COOKED)	1/2 cup
PASTA (COOKED - SPAGHETTI, NOODLES, MACARONI)	1/2 cup
POPCORN (POPPED, NO FAT ADDED)	3 cups
CORNMEAL (DRY)	2 Tbs.
FLOUR	2 - 1/2 Tbs.
WHEAT GERM	1/4 cup

CRACKERS:

ARROWROOT	3
GRAHAM, 2- 1/2" sq.	2
MATZOH, 4" x 6"	1/2
OYSTER	20
PRETZELS, 3 - 3" long x 1/8" dia.	25
RYE WAFERS, 2" x 3 1/2"	3
SALTINES	6
SODA, 2 - 1/2" sq.	4

DRIED BEANS, PEAS AND LENTILS:

BEANS, PEAS, LENTILS (DRIED AND COOKED)	1/2 cup
BAKED BEANS, NO PORK (CANNED)	1/4 cup

STARCHY VEGETABLES:

CORN	1/3 cup
CORN ON THE COB	1 small
LIMA BEANS	1/2 cup
PARSNIPS	2/3 cup
PEAS, GREEN (CANNED OR FROZEN)	1/2 cup
POTATO, WHITE	1 small
POTATO (MASHED)	1/2 cup
PUMPKIN	3/4 cup
WINTER SQUASH, ACORN OR BUTTERNUT	1/2 cup
YAM OR SWEET POTATO	1/4 cup

Prepared Foods:

Biscuit 2" dia. (omit 1 fat exchange)	1
Corn Bread, 2"x2"x1" (omit 1 fat exchange)	1
Corn Muffin, 2" dia. (omit 1 fat exchange)	1
Crackers, round butter type (omit 1 fat exchange)	5
Muffin, plain small (omit 1 fat exchange)	1
Potatoes, French Fried, length 2" to 3-1/2" (omit 1 fat exchange)	8
Potato or Corn Chips (omit 2 fat exchanges)	15
Pancake, 5" x 1/2" (omit 1 fat exchange)	1
Waffle, 5" x 1/2" (omit 1 fat exchange)	1

List 5 - MEAT EXCHANGES, LEAN MEAT

This list shows the kinds and amounts of LEAN MEAT and other protein-rich foods to use for one Low-Fat Meat Exchange.

BEEF: BABY BEEF (VERY LEAN), CHIPPED BEEF, CHUCK, FLANK STEAK, TENDERLOIN, PLATE RIBS, PLATE SKIRT STEAK, ROUND (BOTTOM TOP), ALL CUTS RUMP, SPARE RIBS, TRIPE . . . . 1 oz.

LAMB: LEG, RIB, SIRLOIN, LOIN (ROAST AND CHOPS), SHANK SHOULDER. . . . . 1 oz.

PORK: LEG (WHOLE RUMP, CENTER SHANK), HAM, SMOKED (CENTER SLICES). . . . . 1 oz.

VEAL: LEG, LOIN, RIB, SHANK, SHOULDER, CUTLETS . . . . 1 oz.

POULTRY: MEAT WITHOUT SKIN OR CHICKEN, TURKEY, CORNISH HEN, GUINEA HEN, PHEASANT . . . . . 1 oz.

FISH: ANY FRESH OR FROZEN . . . . 1 oz.
CANNED SALMON, TUNA, MACKEREL, CRAB AND LOBSTER . . . . 1/4 cup
CLAMS, OYSTERS, SCALLOPS, SHRIMP. . . . . 5 or 1 oz.
SARDINES, DRAINED 3

CHEESES CONTAINING LESS THAN 5% BUTTERFAT . . . . . 1 oz.
COTTAGE CHEESE, DRY AND 2% BUTTERFAT. . . . . 1/4 cup
DRIED BEANS AND PEAS (omit 1 Bread Exchange). . . . 1/2 cup

List 5 - MEAT EXCHANGES, MEDIUM FAT MEAT (For each exchange of Medium Fat Meat, omit 1/2 Fat Exchange)

This list shows the kinds and amounts of Medium-Fat Meat and other foods to use for one Medium-Fat Meat Exchange.

Beef: Ground (15% fat), Corned Beef (canned), Rib Eye, Round (ground commercial). . . . 1 oz.

Pork: Loin (all cuts Tenderloin), Shoulder Arm (picnic), Shoulder Blade, Boston Butt, Canadian Bacon, Boiled Ham. . . . . 1 oz.

Liver, Heart, Kidney and Sweetbreads (these are high in cholesterol). . . . . 1 oz.

Cottage Cheese, creamed . . . . 1/4 cup

Cheese: Mozzarella, Ricotta, Farmer's Cheese, Neufchatel, Parmesan. . . . . 3 Tbs.

Egg (high in cholesterol) 1

PEANUT BUTTER (omit 2 additional Fat Exchanges) . . 2 Tbs.

List 5 - <u>MEAT EXCHANGES, HIGH FAT MEAT</u> (For each exchange of High
Fat Meat, omit 1 Fat Exchange)

This list shows the kinds and amounts of High-Fat Meat and other
protein-rich foods to use for one High-Fat Meat Exchange.

Beef:	Brisket, Corned Beef (Brisket), Ground Beef (more than 20% fat), Hamburger (commercial), Chuck (ground commercial), Roasts (Rib), Steaks (Club and Rib).	1 oz.
Lamb:	Breast.	1 oz.
Pork:	Spare Ribs, Loin (Back Ribs), Pork (ground), Country-Style Ham, Deviled Ham	1 oz.
Veal:	Breast.	1 oz.
Poultry:	Capon, Duck (domestic), Goose	1 oz.
Cheese:	Cheddar Types	1 oz.
Cold Cuts		4 (1/2" x 1/8" slice)
Frankfurter		1 small

List 6 - FAT EXCHANGES

This list shows the kinds and amounts of Fat-Containing Foods to use
for one Fat Exchange. To plan a diet low in Saturated Fat, select
only those Exchanges which appear in CAPITAL LETTERS. They are
POLYUNSATURATED.

MARGARINE, SOFT, TUB OR STICK[a]	1 teaspoon
AVOCADO (4" IN DIAMETER)	1/8
OIL, CORN, COTTONSEED, SAFFLOWER, SOY, SUNFLOWER	1 teaspoon
OIL, OLIVE[b]	1 teaspoon
OIL, PEANUT[b]	1 teaspoon
OLIVES[b]	5 small
ALMONDS[b]	10 whole
PECANS[b]	2 large whole
PEANUTS[b]	
SPANISH	20 whole
VIRGINIA	10 whole
WALNUTS	6 small
NUTS, OTHER[b]	6 small
Margarine, regular stick	1 teaspoon
Butter	1 teaspoon
Bacon fat	1 teaspoon
Bacon, crisp	1 strip
Cream, light	2 tablespoons
Cream, sour	2 tablespoons
Cream, heavy	1 tablespoon
Cream Cheese	1 tablespoon
French Dressing[c]	1 tablespoon
Italian Dressing[c]	1 tablespoon
Lard	1 teaspoon
Mayonnaise[c]	1 teaspoon
Salad Dressing, mayonnaise type[c]	2 teaspoons
Salt pork	3/4 inch cube

[a] Made with corn, cottonseed safflower, soy or sunflower oil only.

[b] Fat content is primarily nonsaturated.

[c] If made with corn, cottonseed safflower, soy or sunflower oil only,
can be used on fat modified diet.

APPENDIX F

ANSWER SHEET

PART I: DEMOGRAPHIC ITEMS			PART II: CONFIDENCE PERCEPTION SCALE	

1. ___   7. ___   14. ___   I. A ___   III. A ___

2. ___   8. ___   15. ___   B ___   B ___

3. ___   9. ___   16. ___   C ___   C ___

4. a) ___   10. 1) ___ 17. ___   II. A ___   IV. ___

   b) ___   2) ___ 18. ___   B ___

5. ___   11. ___   19. ___   C ___

6. a) ___   12. ___

   b) ___   13. ___

PART III:
DIABETES KNOWLEDGE TEST

I	II	III	IV
1. ___	7. ___	17. ___	30. ___
2. ___	8. ___	18. ___	31. ___
3. ___	9. ___	19. ___	32. ___
4. ___	10. ___	20. ___	33. ___
5. ___	11. ___	21. ___	34. ___
6. ___	12. ___	22. ___	35. ___
	13. ___	23. ___	36. ___
	14. ___	24. ___	37. ___
	15. ___	25. ___	
	16. ___	26. ___	
		27. ___	
		28. ___	
		29. ___	

APPROVAL SHEET

The thesis submitted by Melanie Kay Karl has been read and
approved by the following committee:

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The final copies have been examined by the director of the thesis
and the signature which appears below verifies the fact that any
necessary changes have been incorporated and that the thesis is
now given final approval by the Committee with reference to
content and form.

The thesis is therefore accepted in partial fulfillment of the
requirements for the degree of Master of Science in Nursing.

December 9, 1982   _Dorothy M. Lanuza_

Date   Director's Signature