

THE EFFECT OF OPERATING ROOM EXPERIENCE ON
STUDENTS' KNOWLEDGE OF ASEPSIS

A THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

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DENTON, TEXAS

DECEMBER 1978

The Graduate School
Texas Woman's University
Denton, Texas

October 19 1978

We hereby recommend that the thesis prepared under
our supervision by Carolyn F. Bartlett
entitled The Effect of Operating Room Experience on
Students' Knowledge of Asepsis

be accepted as fulfilling this part of the requirements for the Degree of
Master of Science

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CHAPTER I

INTRODUCTION

Use of the operating room as a clinical teaching area in the nursing curriculum is a controversial issue. The value of this type of experience has been debated by nurse educators for years without resolution. Though the literature abounds with opinions pro and con, none are based on actual research studies. Knowledge basic to the practice of nursing is constantly expanding due to rapid advances in medical science and technology. Since time allotted for the assimilation of this knowledge is not increasing, clinical experiences chosen for nursing students must offer a variety of experiences that facilitate learning. Today the emphasis in nursing is on continuity and quality of patient care, through all health and illness states.

Principles of asepsis are used in all areas of nursing practice. Procedures such as catheterizations, dressing changes, intravenous insertions and isolation technique are all based on these principles. With nosocomial infections still a current problem, knowledge of and strict adherence to aseptic practices is essential.

The intraoperative period is the most vulnerable time for the surgical patient. It is during this period in

an altered state of consciousness that he is most dependent on others for his well-being. Due to this dependency, the operating room might be considered an area which could influence the development of an aseptic conscience.

A major concern of nursing today is patient safety and well-being. To assure this outcome it is the responsibility of nursing educators to provide appropriate learning experiences for the student. Since the concept of asepsis is basic to so many nursing procedures it is essential that these principles be internalized and the development of an aseptic conscience be stimulated.

Faculty members of respective schools of nursing make decisions regarding course content and learning experiences. However, due to the lack of research in this area, there is no rational basis on which to choose one setting for learning over another. The question of where and how this can best be achieved remains. Therefore, it would seem appropriate that a survey be done, with the hope that it might benefit future decisions in this area.

STATEMENT OF PROBLEM

The problem under study was to determine if there is a difference in knowledge of asepsis between students who had an observational experience in the operating room

and those who had actively participated in an operating room experience within the nursing curriculum.

STATEMENT OF PURPOSES

The purposes of this study were to:

1. Identify knowledge of asepsis of students who have actively participated in an operating room experience
2. Identify knowledge of asepsis of students who have had an observational operating room experience
3. Compare knowledge of asepsis of the two groups

BACKGROUND AND SIGNIFICANCE

Concern about the quality of care patients were receiving prompted the American Nurses Association (ANA) to establish standards of nursing practice. The ANA felt it imperative that these standards be maintained, in all settings, throughout health and illness. Because of the variety of specialty areas within the scope of nursing practice, further delineation within each specialty was necessary (ANA 1973). The Association of Operating Room Nurses (AORN), in conjunction with the ANA, established specific standards for its area (AORN 1976). The purpose of these standards was to maintain quality care for the person undergoing surgery. To achieve quality care, psychological,

sociological, behavioral and developmental areas are considered when planning care. For effective planning, continuity of care should be provided throughout the pre-operative, intraoperative, and postoperative periods.

McNeill (1975) stated use of the operating room for clinical practice has the following advantages. Scrubbing and circulating can reinforce the student's knowledge and understanding of asepsis, applicable to all areas and many functions. Functioning in these positions also provides opportunities for independent actions as well as working as part of the team. Through interaction with and observation of the patient during the intraoperative period, students develop an awareness of the patient's physical and emotional needs and the effects of surgical trauma on the patient's ability to adapt during recovery.

Nolan (1976) made the following observations and statements about the operating room as a clinical teaching setting: It is an area where learning is increased by active participation of the student, while being supported by an experienced staff. Students develop awareness of patient and team needs and their responses to stressors. They understand the potential for postoperative pain and discomfort seemingly unrelated to the surgical procedure. In addition, students would develop awareness of their own

feelings and learn how to cope with stressful situations. Active participation in scrubbing can facilitate learning of concepts and principles of asepsis, while circulating in addition to this also assists in the acquisition of organization and management skills (Nolan 1976).

Students agree that operating room experience is valuable (MacClelland 1976; Nolan 1976). In response to questionnaires, students stated that use of strict aseptic techniques in the operating room increased their confidence in their ability to perform sterile procedures and apply principles of asepsis to other areas. They also stated observation was not sufficient (Nolan 1976). It could be assumed from these statements that active participation in the care of the patient in the operating room could increase student competence and self-confidence, facilitate application of principles of asepsis and improve preoperative teaching and postoperative care (Nolan 1976). A firm knowledge of asepsis and the ability to apply these principles regardless of the setting is important, thus learning situations which will facilitate internalization of these principles by the student, are necessary.

Reasons for excluding the operating room experience from the basic curriculum have been identified. Reasons given are: (1) it is too technical and specialized an area

to be of benefit to a student, (2) there is a lack of time in the curriculum, (3) it is not a part of professional nursing functions because the physician is responsible for the patient, and (4) the nurse has only an administrative or technical role (Fitzwater 1973).

One educator stated representative experiences are sufficient for learning skills such as aseptic technique (Hicks 1975). Others disagree, stressing the fact that skills such as aseptic technique used in all areas of nursing, are best learned where they are part of the philosophy and practiced twenty-four hours a day (Grundemann et al. 1970). Certain educators see this as unrealistic, considering the operating room to be complex, technical, and specialized; too stressful for students to learn concepts which can be applied to other situations (Nolan 1976; Kneedler 1973; Fitzwater 1973).

A century ago everyone developed postoperative infections (Litsky 1974). The advent of sterilization processes and improved aseptic practices reduced the rate of postoperative infections from 100 percent to 16 percent. The general use of antibiotics, however, caused aseptic practices to be relaxed due to the fact that they were assumed to be the ultimate cure. After thirty years of indiscriminate use organisms have become resistant and

antibiotics are losing effectiveness. Therefore, other methods such as strict aseptic practices must be reinstituted. The fact that over 100,000 people a year die from hospital-associated infections would seem to support this need (Litsky 1974).

Wound sepsis is a grave problem due to the increasing numbers of antibiotic resistant bacteria, amount of surgery performed on debilitated patients, and additional entry sites for infection created by concomitant invasive procedures and treatments (Holliday 1975). Therefore, the nurse, who spends the most time in direct contact with the patient, must be aware of all possible sites of infection and use aseptic principles as a foundation for all care administered. In this way many hospital-acquired infections could be prevented.

The AORN (1975) has published a statement giving rationales for nursing student participation in an operating room experience. Members of this Association believe that Registered Nurses are necessary in the operating room to assure quality care for the patient. They also believe that nursing behaviors learned in this area are basic for care of the surgical patient. Listed in this statement are nine behaviors which can most advantageously be learned in this setting. This study was limited to the evaluation of

one of these behaviors, the application of principles of medical and surgical asepsis. It is hoped that through this study, interest in use of the operating room as a clinical setting for learning will be stimulated.

HYPOTHESIS

The following hypothesis was tested in this study: there is no difference in knowledge of asepsis between students who have had an observational experience in the operating room and those who have actively participated in an operating room experience within the nursing curriculum.

DEFINITION OF TERMS

For the purpose of this study the following definitions were formulated:

Observation--time spent in the operating room watching patient care activities which are performed by the surgical team.

Voluntary active participation--electing to take part in operating room experience which involves scrubbing and circulating.

Knowledge of asepsis--behaviors which demonstrate the understanding, application, and evaluation of principles and techniques of medical and surgical asepsis.

Senior nursing student--person attending a four-year baccalaureate school of nursing.

LIMITATIONS

The following were limitations of this study:

1. Exchange of information among students due to their interaction may produce incidental learning
2. Variations in the method of presentation, content, and emphasis given the subject of asepsis may result from individual differences among faculty members
3. Placement of the concept of asepsis in regard to when it is taught in the curriculum may vary
4. Students as individuals have differences

DELIMITATIONS

The following were delimitations of this study:

1. The students were seniors attending a four-year baccalaureate school of nursing
2. One group of students had a two-day observational operating room experience
3. One group of students had active participation in an operating room experience

ASSUMPTIONS

For the purpose of this study it was assumed that:

1. In the learning process, active participation of the learner is more advantageous than passive reception
2. The quality of content presented and teaching methods used are crucial factors in learning
3. Understanding of basic concepts and skills is necessary before complex concepts and skills can be acquired

SUMMARY

The value of an operating room experience in the nursing curriculum is a controversial issue as yet unresolved. One reason for inclusion of this type of experience is that the learning of asepsis can easily be facilitated in this area. The nurse must have a thorough understanding of the concept of asepsis since it is basic to many nursing functions and used in all areas of nursing practice. The steady decline in effectiveness of antibiotics necessitates reinstitution of strict aseptic practices to assure patient welfare. A comparison of the knowledge of asepsis among students who have had an observational operating room experience and those who have actively participated in an operating room experience during the curriculum was done

using senior nursing students from two four-year baccalaureate schools of nursing.

In chapter II a review of the literature covering infection, learning, evaluation of learning, and previous research relevant to this study is presented. Chapter III contains a detailed explanation of the methodology used, in the study. Thirty-six senior nursing students were tested on their knowledge of asepsis. A description of the test and method for collection of data is also presented. The study results and interpretation of findings by use of the Mann-Whitney-U test comprise chapter IV. Chapter V is the final chapter which summarizes the study and gives the conclusions and recommendations for further research.

CHAPTER II

REVIEW OF LITERATURE

A search of the literature revealed two previous studies designed to determine the effect of an operating room experience on nursing students' knowledge of asepsis. Because of the limited research on this topic the major portion of this review discusses the related topics of asepsis and learning.

Operating Room and Knowledge of Asepsis

The first study done to determine the effect of an operating room experience on nursing students' knowledge of asepsis was done by Williams, Cassingham, and Ezell (1968). The study consisted of twenty-four sophomore nursing students. All twenty-four students were taught principles and practices of asepsis during the first semester of their sophomore year. In the second semester twelve of the students spent two days a week for three weeks in the operating room scrubbing on cases. Twelve other students spent their time on patient care units practicing aseptic technique with procedures such as dressing changes, catheterizations and other sterile procedures. Each of these students also accompanied at least one patient to the

operating room and observed the surgical procedure. At the end of three weeks the entire class was evaluated as to their knowledge of asepsis. The evaluation consisted of two tests, one a paper and pencil test with questions obtained from Seedor's Introduction to Asepsis, the other was a slide presentation of various aseptic procedures from which the students were to identify errors. The scores of the group having the operating room experience were higher in both the written and slide tests, than the group without the operating room experience.

The second study was done by Brown (1978). In this study 206 Associate Degree students were tested. One group consisted of 39 advanced placement students who had previously been Licensed Practical Nurses. This group because of their advanced placement did not receive the operating room experience since at this school this experience was offered during the first year of the program. The second group of 167 students did spend time in the operating room. All the students were given a quiz which tested their understanding of principles of asepsis, definitions in common use and three frequently performed bedside nursing functions. As in the earlier study, the group which spent time in the operating room scrubbing and circulating scored higher on the quiz than the group which did not spend time

in the operating room. Findings from both of these studies appear to support the hypothesis that the operating room facilitates the learning of asepsis.

Asepsis

This study involved the evaluation of nursing students' knowledge of asepsis, for the purpose of determining if an operating room experience facilitated the learning of this subject. In order to accomplish this, it was necessary to understand what knowledge is included within this concept.

Asepsis is a term used to cover the broad topic of the cause and prevention of infection. Knowledge in this area has been accumulating for the past one hundred years (Wilson 1976). It involves the knowledge of the methods by which infection is transferred from one person to another, and the numerous procedures and practices, both medical and surgical, designed to reduce or prevent the transfer of organisms which might cause disease. Despite the increased knowledge in this area, the incidence of sepsis and infection in the hospitalized patient seems to be increasing.

Infection

Nurses must assist in combating nosocomial infections. Therefore, it is important that nursing students acquire in-depth knowledge and understanding of asepsis.

There are three major reasons for the increased incidence of sepsis: (1) improved laboratory techniques, (2) impaired host resistance, and (3) an increase in the numbers of organisms resistant to antibiotics. The improved laboratory techniques involve methods for obtaining and handling specimens so that gram-negative anaerobes are now surviving long enough to be identified (Brown 1976). Once these organisms have been identified, appropriate drugs for combating the infection can be administered to the patient.

Decline in Host Resistance

Rapidly advancing technology involving improved surgical techniques, new drugs, prosthetic devices, and invasive diagnostic and treatment procedures have compromised the natural defenses of the body. Because of this, it is important that the nurse understand how and why each increases the patient's potential for developing an infection. A nurse with sufficient knowledge in this area can do much to reduce this constant threat.

There are many factors involved in the decrease in host resistance. One is improved surgical techniques, especially in the area of trauma. Because of these advances patients are now surviving long enough to contract infections when a few years ago they would have died from their injuries. The body's natural defense mechanisms for combating disease and infection have been disrupted by recent advances in the development of immunosuppressive drugs for use in organ transplants and cytotoxic drugs and radiation for treatment of cancer patients.

Immunosuppressive drugs, as the name implies, depresses the immune system of the body so that the transplanted organ will not be rejected. Since this is a generalized and not a specific action, the body is defenseless against all foreign matter, including bacteria. Therefore, a patient being treated with this type of drug is highly susceptible to infection.

Cytotoxic drugs and radiation are highly toxic treatments used to disrupt the function of and destroy cancer cells. These treatments also have a generalized effect on the body disrupting the function of and destroying many normal cells along with the cancerous cells. Thus, these patients too are highly susceptible to infection.

The body's usual barriers of skin and mucous membranes also have been disrupted by the use of artificial and natural prosthetic devices. Tubes, wires, and catheters introduced into the body for diagnostic and/or therapeutic purposes, and indiscriminate use of broadspectrum antibiotics also contribute to this problem. This disruption in body defenses has allowed a new group of infectious diseases to develop. Now even normal flora can become viscious pathogens given the proper circumstances in which to multiply (Lauter 1976; Brown 1976).

Organism Resistance

As the number of antibiotics effective against pathogenic organisms decrease the nurses' knowledge of asepsis becomes even more important. Nurses have a major role in the control and spread of infection through their knowledge of and adherence to principles of asepsis.

A few years ago high virulence organisms such as Staphlococcus and Streptococcus were the primary cause of nosocomial infections. Great strides were made in developing antibiotics and disinfectants which would eliminate these organisms and their potential threat to patients. Successful control of these organisms, however, resulted in an even greater danger. It was soon discovered that by eliminating the gram-positive organisms, gram-negative

organisms and fungi, usually low in virulence, were allowed to proliferate. These gram-negative bacteria are called opportunistic because they rarely cause disease unless there is a breakdown in normal host defenses (Brown 1976). This breakdown in body defenses is enhanced in the surgical patient who requires additional energy to stimulate the healing process and to recover from the stress of surgery.

Though gram-negative bacteria are low in virulence, they have great genetic and biochemical versatility. These organisms divide every twenty minutes (Lauter 1976), thus in twenty-four hours if left unchecked a phenomenal number may develop. Because of this rapid proliferation mutant strains are regularly seen in cultures. These mutant strains are unlikely to become a problem unless given an advantage over the other organisms present. Just such an advantage arises when a patient is given an antibiotic to which the mutant cell is resistant. In this way all other organisms are eliminated and the mutant strain is allowed to multiply without restraint. This is how resistant organisms become concentrated in hospitals (Lauter 1976; Brown 1976).

It has been discovered through recent microbiological research in the area of genetics that gram-negative organisms have the ability to transmit antibiotic resistance

to other bacteria through genetic transfer. This transfer is not restricted to a like strain but can occur between species and genera of bacteria. In addition, resistance to as many as five antibiotics can be transferred at one time. In this way antibiotic resistant organisms are being developed without ever having been exposed to an antibiotic. This fact alone has far-reaching consequences in the area of infection control (Brown 1976).

Infection Control

Both physicians and nurses are responsible for the prevention and control of hospital-acquired infections. Continuous observation is necessary to protect the patient from the hazard of hospital-acquired infections. The major responsibility for prevention falls on the nurse since she has the most contact with the patient. This is a difficult task requiring in-depth knowledge of the principles of asepsis, potential sites of infection, and the methods of transfer of organisms. Having this knowledge is not enough, for without conscientious adherence to principles of asepsis in all activities involving the patient the knowledge is useless. It is imperative then that nursing students' acquire knowledge of and understand the importance of strict adherence to principles of asepsis.

It is well documented that gram-negative enteric rods are now the most common cause of infection, accounting for 60 percent of all hospital-acquired infections. The most commonly involved sites are the urinary tract, 40 percent, skin and wound, 30 percent, and respiratory tract, 20 percent (Fisher 1976). In addition to these common sites of infection there are specific locales within the hospital where infections are more likely to occur. Examples of these areas are intensive care units, dialysis units and transplant units (Brand 1976). This is further emphasized by the fact that in the United States, hospital-associated infections occur in 5 to 10 percent of all acutely ill patients admitted (Brand 1976).

Nurses have two primary goals concerning infection, the first is prevention and the second is control if infection is present (Fisher 1976). In order to meet these goals nurses must have an aseptic conscience. Aseptic conscience means that the nurse is aware of proper aseptic practices and adheres to these practices at all times in order to assure patient well-being. This also includes observation of others assuring that they too adhere to strict aseptic technique.

At the present time it is impossible to achieve an organism-free environment so nurses must maintain as low a

colony count as possible. Since exogenous organisms are transmitted by contact and airborne particles, a certain amount of protection against the spread of infection can be provided by controlling the environment and personnel.

Environmental Control

Isolation is one method of environmental control. A major function of the nurse in the operating room is to isolate the patient from microorganisms in the environment. Nursing students might be more conscious of the importance of environmental control on patient care units if these principles were learned in the operating room.

Effective isolation requires a private room with running water, a separate ventilation system and carefully controlled air pressure to prevent spread of contaminants through air movement. In addition, the temperature should be kept at 72 degrees or higher and the humidity at 50 to 60 percent as these factors reduce the movement of organisms (Brand 1976). The nurse has no control over whether or not the hospital in which she works is equipped with the proper type of room for infectious patients. However, there are activities she can control such as traffic in and out of the room, whether or not personnel entering the room are properly attired and that anything leaving the room is bagged and labeled "isolation" so that minimal transfer of

organisms occurs (Fisher 1976). These functions are important for studies have shown that gram-negative rods are carried on 30 to 50 percent of the hands of personnel at any given time (Fisher 1976). Thus handwashing becomes the most important single measure in hospital infection control. Unfortunately it is also the measure most often neglected, especially by nurses. For example, in one instance a urinary tract infection due to *Serratia* was carried from one patient via the hands of personnel. Other infections have been traced to hand lotions, sink water traps, and various disinfectant and antiseptic solutions which had been improperly handled (Fisher 1976). In some areas even shaving cream and hand creams have been implicated. It must be remembered that any item in the environment may harbor bacteria and thus be a danger to the patient (Lauter 1976).

Infection rates have been drastically reduced in institutions where strict aseptic practices are used when handling intravenous lines, urinary catheters and respirators (Wilson 1976; Fisher 1976). In the following paragraphs some of these practices will be mentioned.

Aseptic Practices

Through an operating room experience a thorough understanding of the principles of asepsis could be learned.

As a result the nursing student would be more aware of the ease with which a patient can acquire an infection from essentially minor procedures such as intravenous insertions, catheterizations, and dressing changes done daily on patient care units.

Intravenous therapy, usually considered a life-saving procedure can become a life-threatening procedure very quickly. It has been found that catheter tip cultures in patients receiving intravenous therapy for over forty-eight hours were positive in 4 to 57 percent of the patients when plastic catheters were used and in 0 to 12 percent when steel needles were used. A second factor discovered was that the frequency of associated septicemia was as high as 33 percent (Wilson 1976). It is imperative that all individuals concerned with intravenous therapy learn and adhere to strict aseptic practices when starting the infusion or on entering the system for irrigation, injection, or piggyback additions. Careless technique may introduce additional organisms. The patient's skin prior to insertion of the line as well as any portal through which the system is later entered must be thoroughly cleaned with an appropriate disinfectant (Wilson 1976). Since this cleansing is often either omitted or carelessly done it should be emphasized that microorganisms introduced in this manner

are able to multiply and remain in the system even though the infusion rate is rapid and the bottles have been changed. It should also be noted that the administration of antibiotics does not sterilize the tubing nor does it significantly decrease the rate of associated sepsis (Wilson 1976).

The same principles mentioned above also pertain to the insertion and care of indwelling urinary catheters. Urinary tract infections are the most commonly acquired nosocomial infections. The incidence of infection from a single catheterization ranges from 2 to 28 percent (Polk and Stone 1977). As with the intravenous system the Foley drainage system is also a closed system and should not be opened. Occasionally this becomes necessary and when it does the same strict aseptic techniques should be used (Brand 1976).

For patients on long-term intravenous therapy it has been recommended that the entire system be changed every forty-eight to seventy-two hours, the same is true of nebulizers and tubing on respirators. Catheters are changed every two weeks.

Drainage from other indwelling tubes should be isolated from clean wounds and the skin around them cleaned twice a day with either a hexachlorophene or iodine base

bacteriostatic, bacteriocidal solution. In addition, all dressings should be changed using aseptic technique and the soiled dressings discarded in either a plastic or waxed bag and sealed to prevent contamination of other areas. Proper isolation procedures should also be instituted for all patients for which it is appropriate (Brand 1976). It is only by strict adherence to these principles and constant surveillance by the nurse that the numbers of nosocomial infections acquired by patients each year can be reduced. Despite the increased knowledge about the cause and control of infection, problems will continue to occur due to human error.

The frequency of human error might be reduced through a better understanding of how people learn. Through knowledge of the learning process, nursing educators may be able to facilitate the learning and retention of the principles of asepsis so that nurses will be more conscientious about adhering to them.

Learning

Nursing students are required to assimilate vast amounts of knowledge in a relatively short period of time. Because of this the methods of presentation and the content chosen for presentation are important. This is especially

true of the subject of asepsis which encompasses many complex principles and procedures.

Bigge (1976) defined learning as an enduring change in an individual not caused by genetic inheritance. He further stated that learning is something that humans have been doing since the beginning of time, for survival and progress is based on learning.

Theories of Learning

At the base of all learning are theories which explain how people learn and what facilitates learning. Which theory is used in presentation of a subject such as asepsis will naturally affect the amount of learning achieved.

Over the years a number of learning theories have been developed and instituted, though none has been universally accepted. In fact, some of the earlier theories are still being used today. Prior to the twentieth century the learning theories advocated were mental discipline, involving extensive drilling of facts to be learned with use of punishment for failure, and natural unfoldment the exact opposite, where no teaching was done until the student exhibited a desire to learn. The assumption behind this method was that in this way learning became a joyous feeling experience (Bigge 1976).

In the twentieth century a number of theories were developed though most can be categorized as either Behaviorist or Gestalt-field. The Behaviorists believed that learning involved a change in behavior resulting from a stimulus response relationship. Gestalt-field theorists on the other hand believed learning involved a process of gaining or changing insights, outlooks, and thought patterns. The cognitive field theory, though considered under the Gestalt group, is the most recent to be developed and actually is the combination of various parts of the others.

Rogers (1969) believes there are two kinds of learning, that which is meaningful and that which is meaningless. He feels meaningful learning has significance to the person and thus causes personal involvement. Meaningless learning, on the other hand, has no significance to the person and so there is no personal involvement. As Rogers described it, meaningless learning occurs from the neck up only and thus is soon forgotten.

Rogers (1969) considers the act of teaching and imparting knowledge useful only in an unchanging environment. Since the environment is not static but constantly changing, the goal of education should not be to teach but to facilitate both change and learning. The facilitation of learning can be accomplished in a variety of ways.

Evidence from industry and education indicates that participative learning is more effective than passive learning. In addition, practice in a setting where practical problems must be confronted and dealt with is also one of the most effective methods for promoting learning. It has also been found that self-initiated learning, that which involves both the feelings and intellect of a person, is the longest lasting and has the most influence (Rogers 1969).

Active Participation and the Role of Practice

Active participation and practice are necessary before sufficient understanding of certain subjects can be acquired. Asepsis is one of these subjects.

Learning becomes more efficient when the student takes an active part in the learning process rather than passively trying to assimilate what is being taught. It is strange then that with this knowledge, lectures and other methods of teaching, where the student maintains a passive role, are still the most commonly used. In the educational process effective active participation involves the use of principles which deal with readiness for learning, the nature and role of practice and part versus whole learning. Evaluating whether a person is ready for a specific learning is very difficult since this is extremely

variable among individuals. Since research in this area is still inconclusive, it is assumed a person is ready for new learning when he has developed ability and interest to the extent that the new learning is viewed as beneficial to him (Bigge 1976).

The role of practice in learning is another important aspect and in turn has certain principles which must be followed if the practice is to be beneficial and facilitate learning. It is well known that certain concepts are easily learned, and others require long hours of practice. It has been found that it is not the amount of practice, but the quality which is the crucial factor in learning. Practice must be varied in order to facilitate advanced performance. There are two methods of practice:

(1) massed, which requires lengthy periods of practice, and (2) distributed, which involves short practice periods intermingled with other activities or rest periods. Virtually all research in this area indicates that distributed practice is superior, for it avoids the fatigue and boredom associated with massed practice. In fact, in some cases it is felt that distributed practice may accelerate the learning process (Bigge 1976).

Retention of Knowledge

Adherence to the principles of asepsis is important to patient well-being. If nurses are to utilize these principles properly during patient care, knowledge of them must be retained.

Retention of knowledge is necessary for progress; however, studies have shown that specific facts are retained for only short periods. For example, after reviewing many studies in this area it was found that one year after the conclusion of a course, students remembered only one-half of the facts covered in the course, and two years after the end of the course only one-fourth of the facts could be recalled (Ellis 1965).

Forgetting is most rapid soon after initial learning, therefore, it may be assumed that review periods would be more beneficial if they followed immediately after the initial learning. Research data suggest that the most effective method for facilitating retention is short spaced, frequent reviews immediately after the initial learning followed by widely spaced reviews throughout the period of desired retention (Ellis 1965).

Retention of knowledge, however, is not sufficient. A person must also be able to transfer the knowledge retained to new situations.

Transfer of Learning

The principles of asepsis never vary, however, the situations and procedures in which they are used may be quite different. It is important, then, that nurses have the ability to transfer knowledge of principles learned to any situation which might arise.

Transfer of learning is also an area where much research has been done. Transfer of learning is described as the relation between a person's learning process and his using these learnings in future learning or life situations (Bigge 1976). Explained another way it means that experience or performance on a previous task influences the performance on a subsequent task. There are three types of transfer which can occur, positive transfer in which performance on one task improves the performance on a second task, negative transfer where performance on one task interferes with performance on a subsequent task, and zero transfer meaning there is no effect of one task on another (Ellis 1965). Many educational programs are based on the assumption that what is taught in the classroom will transfer to new situations. This is not always the case as demonstrated by the three types of transfer which are possible.

Various statements have been made about learning and transfer based on research done in this area (Ellis 1965). One is that important concepts or skills will not be acquired or retained if instruction in basic skills has been casual or haphazard. In addition it was noted that early trials were extremely significant in establishing a reliable learning set. This means that many practice trials on related problems are necessary for learning to occur, and should practice be discontinued before learning occurs then little transfer will result.

Bunch and Ellis (1965) have made some interesting observations from their studies on transfer. They found that though retention of knowledge declines with the passage of time the ability to transfer learning to a new task remained the same regardless of the time interval between the tasks. The only situation in which this varied was when the transfer task depended upon memory of specific facts from the original task. In this instance transfer varies as a function of time since retention is the predominant factor.

A summary of research findings concerning practice and transfer of learning indicates that positive transfer increases with increased practice of the original task. Conversely small amounts of practice usually resulted in

negative transfer. In addition, it was noted that an increase in the variety of practice as well as the amount of practice facilitates transfer. Finally, it was found that training on a difficult task facilitated transfer to an easier task as long as the difficult task had all the stimulus-response components of the simpler task (Ellis 1965).

Various aspects of learning have just been discussed yet one question remains. The question is how to determine how much learning, if any, has been acquired.

Evaluation of Learning

The evaluation of learning is as important as the way learning is acquired. Formalized testing is a common method used to determine learner attainment. Various levels of learning and understanding can be evaluated according to how the questions are presented.

Bloom (1975) is credited with developing a taxonomy of educational objectives for the purpose of standardizing the evaluation of educational outcomes. It is well recognized that actual behaviors of students after completing a course of instruction may differ in degree as well as kind from the behavior expected. The effects of instruction may be such that the students do not learn a given skill to the desired level or for that matter, to any

worthwhile degree. The emphasis of the taxonomy is to obtain evidence on the extent to which desired and intended behaviors have been learned by the students. However, teacher effectiveness can also be evaluated (Bloom 1975).

There are three domains which can be evaluated, the cognitive, affective, and psychomotor. At present taxonomies have been developed for only the cognitive and affective. The cognitive domain involves knowledge, intellectual abilities and intellectual skills which also may include remembering, reasoning, problem solving, and concept formation. The affective domain describes changes in interest, attitudes, values, development of appreciations, and adequate adjustment. The psychomotor domain involves the motor-skill area. Since the cognitive was the first development, most of the research has been done in this domain. In examining the types of tests most teachers give, it was found that most tests evaluate only the cognitive processes and, in fact, only the lower levels of the cognitive processes. This domain as developed has six major classes: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. Bloom (1975) stated the objectives in the higher classes are likely to make use of and be built on the behaviors found in the lower classes. As might be expected the taxonomy is

arranged from simple to complex, since simple behaviors are usually combined to form more complex behaviors. Bloom (1975) has studied a large number of problems occurring in comprehensive examinations and has found some evidence to support the hypothesis that simpler behaviors are answered correctly more often than the complex. Thus, problems requiring knowledge of specific facts are generally answered correctly more frequently than the problems requiring knowledge of the universals and abstractions in a field. It is not surprising then that problems requiring knowledge of principles and concepts are answered correctly more often than problems requiring knowledge of both the principles and some ability to apply it in new situations. Problems requiring analysis and synthesis are naturally more difficult than problems requiring only comprehension. Scatter plots of the performances of individuals on one test composed of items at a simple level of the taxonomy against performance on another test composed of items at a more complex level in the taxonomy show that it is more common to find that individuals have low scores on complex problems and high scores on less complex problems.

Bloom (1975) described the six levels of the cognitive domain taxonomy in the following way. The knowledge section contains questions which emphasize memory by

recognition or recall of ideas, material, or phenomena. Relating and judging play a small part in this section if questions are posed in a different way than when originally learned. The second level is comprehension and is considered the lowest level of understanding. At this level it is expected that the student knows what is being communicated and can utilize the material. The student does not have to be able to relate the material presented to other material at this level. Level three, application, involves the use of principles in concrete situations. Analysis, the fourth level, is more complicated. In this level a general communication of some kind must be broken down into its basic parts. Synthesis is the opposite of analysis. At this level various parts are given and must be combined to make a whole. Comprehension, application, and analysis involve this to some extent but to a much lesser degree. Evaluation is the final and most complex level because it requires the use of all the other categories to some degree. In this level qualitative and quantitative judgments are made. Though as the author stated, much more work needs to be done on the taxonomy; to this point it seems the most appropriate method by which to evaluate learner attainment (Bloom 1975).

Summary

The review presented first discussed two similar studies, the results of which indicated that an operating room experience did facilitate the learning of asepsis. The remainder of the chapter covered the subjects of asepsis and learning, both integral parts of the problem studied. Since infection control in the hospital is vital and this control depends on the knowledge of and strict adherence to principles of asepsis, the learning of these principles must be facilitated and attainment of this knowledge assured by proper evaluation.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This was a comparative study designed to identify the difference in knowledge of asepsis between a group of nursing students who had active participation in an operating room experience and a group of nursing students who had an observational operating room experience (Treece and Treece 1973). A posttest only design was used (Campbell and Stanley 1966). In this design two groups were compared. Group A experienced active participation in the operating room, and Group B had a two-day observation period in the operating room. The subjects were chosen from volunteers in the available population who met the criteria stated in the delimitations. There were no formal means for certifying that the groups were equal prior to testing. Subjects were chosen from individuals attending established programs and assigned to groups.

In order to protect the rights and welfare of the individuals involved a complete explanation of the study was submitted to the Texas Woman's University Research Committee. After examination of the proposed program

permission was granted to proceed with the research (appendix A).

Setting

The setting for this study was a large metropolitan city in the Southwest. From within this city two institutions of higher learning were selected. Also two campuses of one of the institutions were utilized. There were 104 students in the senior class of school number one and 160 students in the senior class of school number two. Each school had a two-day operating room observation for all students. Each school also offered a five-week elective for active participation in the operating room. Each institution used in the study was approached and given a copy of the proposal for examination. Those schools willing to participate completed and signed the Agency Permission form (appendix B).

Population and Sample

The population for this study was comprised of senior nursing students from the participating colleges. The sample consisted of students from each school who volunteered to participate and met the criteria stated in the delimitations. Of the thirty-seven students who volunteered to participate, three had been Operating Room Technicians,

and one was a Licensed Vocational Nurse. All but nine of the remaining students had been nursing assistants prior to entering their respective colleges of nursing.

Tool

It was necessary to construct the tool for this study since the tool used in the study by Brown (1978) could not be secured. The tool developed was a paper and pencil test covering the subject of asepsis. It was composed of thirty-three objective and short-essay questions, since these methods are considered the most valuable for measuring the student's ability to apply previously learned knowledge (Litwack, Sakata, and Wykle 1972). The questions were also of graduated difficulty according to Bloom's (1975) Taxonomy of Educational Objectives. There was more emphasis on the first three levels of the cognitive domain taxonomy for information gathered is considered sound. There was less emphasis on the last three levels of the taxonomy for it is often difficult to distinguish questions in these categories from those in the application category (Chase 1974).

The tool was submitted to three professionals involved in education, two of the three were also health care professionals. They were chosen because each had expertise in one of the following: test construction,

Bloom's Taxonomy, or testing for knowledge of asepsis. One of the three was prepared at the masters level and had taught and given tests on asepsis. Another member of the panel was prepared at the doctoral level in education and had expertise in proper test construction. The final member of the panel was also doctorally prepared in education and was familiar with the use of Bloom's Taxonomy. The tool was examined by this panel for content, proper construction, and adequate use of Bloom's Taxonomy. After face and content validity of the tool was determined by the panel, the tool was pretested by administering it to a group of five nursing students. Results of the pretest demonstrated comprehension of the questions and instructions and that the test could be completed in less than one hour, therefore, the tool remained as previously described. Validity and reliability of the tool had not been established.

Data Collection

Due to the fact that two schools were used, the test was administered on two separate dates. At each school a predetermined place and time was selected for the testing. Identical instructions were verbally given to each group and included purposes of the study, possible risks to the subjects, and an assurance of anonymity (appendix C). An invitation to participate was then

extended. Those students who expressed a desire to be included in the study were asked to sign a consent form (appendix D). These forms were collected and kept separate from the test forms to maintain anonymity of the individuals. Upon completion of the testing at each facility, the demographic sheets were examined and the tests divided into two groups--one for those who had active participation in the operating room, and one for those who had an observational experience in the operating room. The tests were scored and the number of correct responses tabulated.

Treatment of Data

After tabulation of the test scores, the mean, standard deviation, and range for each group was calculated. The statistical test used was the nonparametric Mann-Whitney-U (Siegel 1956). This test was appropriate because two independent samples were compared, the sample size was small, the data suitable for ranking, and the variable studied had an underlying continuous distribution. The analysis with this test was found to be significant at the .025 level so additional comparison among the groups was done with the Kruskal-Wallis analysis of variance.

Summary

In this chapter the methodology utilized in this study was presented. It included a description of the setting, population, tool, and collection and treatment of data.

CHAPTER IV

ANALYSIS OF DATA

The data compared in this study were obtained by testing thirty-seven senior nursing students on their knowledge of asepsis. One of the thirty-seven tests was discarded because it was incomplete. The final sample consisted of thirty-six tests divided into two groups according to the information gathered from the demographic sheets. The fifteen students tested in Group A included those students who had active participation in an operating room experience, and the twenty-one students tested in Group B included those students who had observational experience in the operating room. Since all the scores were 75 percent or less, it was not considered necessary to eliminate those students who had obtained operating room experience outside of their respective curricula.

Analysis of Scores

One point was given for each correct answer. Some questions required more than one answer. The highest score possible was 60 points. The scores of the entire group ranged from a low of 20 to a high of 45; no one received a score of 60. A score of 45 indicated that 75 percent of

the test questions had been answered correctly, only one student obtained this score. The mean for the entire group was 36, 9 points below the minimum score required to pass the test (appendix F).

A range of 12 and a standard deviation of 3.59 was obtained from the scores in Group A. The mean score for this group was 39.4. The lowest score was 32, the highest score 44 and the most common score was 40 (appendix F). A range of 25 and standard deviation of 5.86 was obtained from the scores in Group B. The mean score for this group was 33.8. The lowest score was 20, the highest 45, and the most common score was 34 (appendix F).

The Mann-Whitney-U statistical test was applied to the data to determine if there was a significant difference in the scores of the two groups. Results obtained indicated that Group A, those with active participation in an operating room experience, scored higher at the .025 level of significance than Group B, those with observational experience; thus, the null hypothesis was rejected. These results are interpreted to mean that active participation in an operating room experience may contribute to the learning of asepsis.

Analysis of Questions

Performance of Entire Sample

From the scores and the results of the statistical analysis it would seem appropriate at this time to discuss some of the individual questions asked on the test. There were thirteen questions at the knowledge level of the taxonomy in the test. Of these thirteen questions, all but four were answered incorrectly by 50 percent (18) or more of the entire group. At this level memory and recall are evaluated. It was found that 58 percent (21) of the students were unable to define either sepsis or sterilization. The most common incorrect definition of sepsis given was the presence of microorganisms. Sterilization was defined incorrectly because the students defined sterile instead of sterilization. Sixty-seven percent (24) of the students could not explain the difference between an antiseptic and disinfectant. Sixty-nine percent (25) of the total group did not know what capillary action was. Eighty-six percent (31) of the students could not name four methods of sterilization. Over 50 percent (18) did not identify urinary tract infections as the most commonly acquired nosocomial infection and that Betadine was bacteriostatic. Exactly 50 percent (18) of the students were able to identify all potential infection sites in situation number one. In that

same situation 14 percent (5) of the students were aware of all the facts which would make a patient more susceptible to infection. In question twenty-nine, 58 percent (21) of the students were unable to state a principle of asepsis which had been broken. Fifty percent (18) of them, however, could identify the incorrect action.

Performance of Individual Groups

An analysis of the questions in the knowledge level demonstrated that 47 percent (7) of the operating room group and 38 percent (8) of the nonoperating room group defined sterilization correctly. Forty percent (6) of the operating room group as opposed to 24 percent (5) of the nonoperating room group were able to explain capillary action. Fifty-three percent (8) of the operating room group and 48 percent (10) of the nonoperating room group were able to identify all potential infection sites in the patient presented. Finally, 20 percent (3) of the operating room group and 14 percent (3) of the nonoperating room group were aware of the factors which would make a patient more susceptible to infection (appendix F).

Though the operating room group did not do better in all questions the greatest difference in performance between the two groups involved questions nine and twenty-nine, which dealt with stating methods of sterilization and

the ability to state a principle of asepsis which had been broken in the situation. In question nine, 27 percent (4) of the operating room group as opposed to 5 percent (1) of the nonoperating room group were able to name four methods of sterilization. Question twenty-nine is even more notable. In this question, 80 percent (12) of the operating room group were able to state a principle of asepsis as compared to 14 percent (3) of the nonoperating room group (appendix F).

There were three questions presented to evaluate comprehension level. The total group did better on these questions than on the knowledge questions. Incorrect responses given indicated that the data presented had not been used as a basis for answers given.

Of the nine questions presented at the application level there were two questions on which the students' performance indicated minimal knowledge. On question eight, 95 percent (34) of the students could not state criteria by which to determine whether an article was sterile or not, and 69 percent (25) of the students stated that they would use a sterile article which had been dropped on the floor.

On the analysis level questions, 80 percent (12) of the operating room group as compared to 71 percent (15) of the nonoperating room group could give rationale as to why

an antiseptic shower prior to surgery would decrease the chance of wound infection. Eighty percent (12) of the operating room group as compared to 43 percent (9) of the nonoperating room group were able to analyze the data presented and give a reason why there was a lower infection rate of wounds where shaving of the skin was omitted (appendix F).

The evaluation level questions were based on three typical clinical procedures, and each question required more than one answer. Most of the students obtained partial credit for these questions, however, few received total credit as demonstrated by the following percentages. Of the students, 98 percent (35) were unable to identify all inappropriate actions in the dressing change, 98 percent (35) could not identify all improper actions used in isolation technique, and 75 percent (27) of the students could not identify all breaks in aseptic technique presented in the third situation (appendix F).

Discussion

Evaluation of these findings indicates that knowledge of asepsis was inadequate in both groups, even though the group which had active participation in an operating room experience had significantly higher scores than the group with an observational experience. This seems to

indicate that some other factor was involved which had a greater effect, since even with an operating room experience involving active participation the students' knowledge was not sufficient to obtain a score of 75 percent on the test. Students in the group with active participation were able to state principles of asepsis, identify breaks in technique, explain capillary action, and were aware of what an aseptic conscience was. This demonstrates that the operating room may facilitate the learning of asepsis.

Usually knowledge questions are answered correctly more often than questions at the other levels in the taxonomy. This was not demonstrated in this test indicating that either the information was not presented or was presented in such a superficial manner that the information was not retained. Answers to the evaluation questions indicated that technical skills for certain procedures had been partially learned, however, knowledge and understanding of the theory governing these actions was lacking.

One additional factor must be considered in this evaluation and that is the type of test administered. The students tested in this study were accustomed to taking multiple-choice tests. Since the majority of the questions in this test required short answers, the students had to know the material. They were not given the option of

choosing the best answer from a group of answers presented. How much of an effect this factor had on the results is unknown. In addition, validity and reliability of the test had not been established.

Summary

Data presented in this chapter demonstrated that there was a significant difference between the scores of the group which had active participation in the operating room and the group which had an observational experience, therefore, the null hypothesis was rejected. Both the range and standard deviation for the active participation group was less than that for the observational group indicating that the knowledge of asepsis in this group was less variable. Areas where the group with active participation in the operating room did significantly better were in identifying principles of asepsis and breaks in aseptic technique.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

Use of the operating room as a clinical teaching area in the nursing curriculum is a controversial issue. Though the literature abounds with opinions pro and con as to the value of this type of experience, the problem remains unresolved. One advantage in using the operating room as a clinical teaching area is that this area can facilitate learning of principles of asepsis since these principles are in constant use. Due to the fact that nosocomial infections, especially of the gram-negative type, are an increasing concern, knowledge of and strict adherence to the principles of asepsis in all areas of nursing is essential.

This comparative study was undertaken to determine if there was a difference in knowledge of asepsis between nursing students who had active participation in an operating room experience and those who had an observational experience in the operating room within the nursing curriculum. A test covering knowledge of asepsis was given to

thirty-six senior nursing students who were attending two institutions of higher learning. Fifteen of these students had actively participated in an operating room experience and twenty-one had a two-day observational experience in the operating room.

By use of the Mann-Whitney-U statistical test it was found that the group who had actively participated in an operating room experience had scores significantly higher at the .025 level than those students who had the observational experience. In addition, it was found that of the thirty-six students only one student was able to answer 75 percent of the questions correctly. Validity and reliability of the tool had not been established.

Conclusions

The following are conclusions of this study:

1. Active participation in an operating room experience may facilitate the learning of principles of asepsis, therefore, the operating room may have value as a clinical teaching area
2. The knowledge of asepsis on the test for the entire sample was inadequate
3. The course content as well as methods for presenting material on asepsis and other representative experiences may not have been sufficient

Implications

The following are implications for nursing education:

1. Improvement of clinical experiences which will facilitate learning of principles of asepsis and the development of an aseptic conscience are needed

2. Course content needs to be reviewed and additional emphasis placed on the importance of principles of asepsis and possible consequences resulting from nonadherence to these principles

3. An operating room experience requiring active participation should be included as part of the nursing curriculum

Implications for nursing practice involve the following:

1. Since nosocomial infections are an increasing hazard for the hospitalized patient, nurses need to be knowledgeable in all aspects of asepsis

2. If nurses' knowledge of asepsis is inadequate continuing education programs need to be instituted so that an adequate level of knowledge on this subject can be maintained

Recommendations

Recommendations of this study which can be derived from the conclusions are as follows:

1. This study should be repeated with a much larger sample using schools from various sections of the country
2. A study should be done to evaluate various methods for teaching asepsis so that sufficient content could be included and the best method or methods of presentation could be instituted

APPENDIXES

APPENDIX A

Human Research Committee

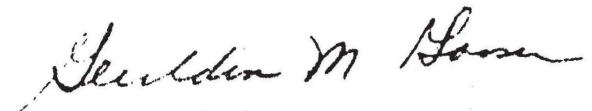
Name of Investigator: Carolyn F. Bartlett Center: DallasAddress: 3262 Chapel Creek Drive #226 Date: _____
Dallas,
Texas 75220Dear Ms. Bartlett:Your study entitled The Effect of Operating Room Experience on
Student's Knowledge of Asepsis

has been reviewed by a committee of the Human Research Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education and Welfare regulations require that written consents must be obtained from all human subjects in your studies. These forms must be kept on file by you.

Furthermore, should your project change, another review by the Committee is required, according to DHEW regulations.

Sincerely,

Chairman, Human Research
Review Committee
at Dallas.

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Texas 75235

HOUSTON CENTER
1130 M.D. Anderson Blvd.
Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _____
GRANTS TO CAROLYN F. BARTLETT

a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem:

THE EFFECT OF OPERATING ROOM EXPERIENCE ON STUDENTS'
KNOWLEDGE OF ASEPSIS

The conditions mutually agreed upon are as follows:

1. The agency (~~may~~) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (~~may not~~) be identified in the final report.
3. The agency (wants) (~~does not want~~) a conference with the student when the report is completed.
4. The agency is (~~willing~~) (willing) to allow the completed report to be circulated through interlibrary loan.
5. Other: _____

Date May 1, 1978

Carol F. Bartlett
Signature of student

Signature of Agency Personnel
Helen A. Bush, Ph.D., R.N.
Signature of Faculty Advisor

*Fill out and sign three copies to be distributed as follows: Original -- Student; first copy - agency; second copy - T.W.U. College of Nursing.

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Date _____

Signature of Agency Personnel

Carol F. Bartlett
Signature of student

Helen B. Bush, Ph.D., R.N.
Signature of Faculty Advisor

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5. Other: _____

Date 31 March 1978

Carol F. Bartlett
Signature of student

Signature of Agency Personnel

Helen A. Smith, Ph.D., R.N.
Signature of Faculty Advisor

*Fill out and sign three copies to be distributed as follows: Original -- Student; first copy - agency; second copy - T.W.U. College of Nursing.

APPENDIX C

ORAL PRESENTATION TO SUBJECTS

My name is Carolyn Bartlett and I am a graduate student in the College of Nursing at Texas Woman's University. I am doing research for my thesis and would appreciate your assistance. This is a study concerning knowledge of asepsis among senior nursing students in the area. Results obtained from this study may influence methods used for teaching asepsis in the future. The only risk to you is that you may find you do not know as much about asepsis as you thought. Participation is voluntary, you will not be identified in any way, and you may terminate participation at any time. If you wish to participate I will ask you to sign a consent form and return it to me. I will then give you a test on asepsis to complete. The entire process should take no more than one hour of your time. All information and scores obtained will be kept confidential. Now, I will be happy to answer any questions you might have.

APPENDIX D

TEXAS WOMAN'S UNIVERSITY

(Form B--Oral presentation to subject)

Consent to Act as a Subject for Research and Investigation:

I have received an oral description of this study, including a fair explanation of the procedures and their purpose, any associated discomforts or risks, and a description of the possible benefits. An offer has been made to me to answer all questions about the study. I understand that my name will not be used in any release of the data and that I am free to withdraw at any time.

Signature Date

Witness Date

Certification by Person Explaining the Study:

This is to certify that I have fully informed and explained to the above named person a description of the listed elements of informed consent.

Signature Date

Position

Witness Date

APPENDIX E

DEMOGRAPHIC SHEET

Directions: Questions 1-15 below concern your experience in selected areas of nursing practice. Information obtained will assist in determining the effect of this experience on your knowledge of asepsis. Please place an "X" or supply the information requested in the space provided after each question.

1. Have you ever worked as a (an)
ORT____, RN____, LVN____, NURS. ASSIST.____?
2. If you checked one of the above, in what department
did you work? _____
3. Have you ever attended another nursing school?
Yes____ No____
4. If you answered yes to No. 3, were you taught aseptic
technique? Yes____ No____
5. Did you spend any time in the operating room?
Yes____ No____
6. At your present institution at what point during the
curriculum was aseptic technique or asepsis introduced?
Freshman____, Sophomore____, Junior____, Senior____
7. How much lecture time was spent on the topic of
asepsis? _____hours
8. How much laboratory time was spent on the practice of
aseptic techniques? _____hours
9. What type of operating room experience was required by
your school?
None____
Observation____ for _____hours or _____days
Scrubbing____ for _____hours or _____days
Circulating____ for _____hours or _____days

10. Does your school offer an elective in operating room?
Yes _____ No _____
11. If an elective in operating room was offered did you take it? Yes _____ No _____
12. What kind of experience was included in this elective?
Observation _____ for _____ hours or _____ days
Scrubbing _____ for _____ hours or _____ days
Circulating _____ for _____ hours or _____ days
13. How much time were you required to spend in the delivery room? _____ none, _____ hours, _____ days
14. How much additional time did you spend in the delivery room? _____ none, _____ hours, _____ days
15. Are you now or have you even worked in the operating room for reasons other than to obtain credits toward your degree? Yes _____ No _____

QUESTIONNAIRE

Directions: This questionnaire is designed to evaluate your knowledge of asepsis. The results will be used to determine how selected nursing experiences affect this knowledge. There are 33 items of the objective and short essay type which you should be able to complete in 45 minutes. Since your score will be the number of items answered correctly be sure to answer every item.

Directions: Items 1-3. Define each of the following terms in one sentence or less.

1. Nosocomial infection:

2. Sepsis:

3. Sterilization:

Directions: Items 4-9. Write your answers to the following questions in the space provided. Keep answers brief.

4. Explain the difference between an antiseptic and a disinfectant.

5. What is the most effective measure the nurse can take to prevent the transfer of microorganisms?

6. Explain in your own words what the term ASEPTIC CONSCIENCE means to you.

7. Explain in your own words what the term CAPILLARY ACTION means to you.
8. What criteria would you use to determine the sterility of an article processed by the central supply department of the hospital?
9. List four methods of sterilization.

Directions: Items 10-11. Choose the one best answer for each of the following items and place the letter of your choice in the space provided.

10. What is the most common infection acquired by a patient during hospitalization?
A. Wound C. Urinary
B. Respiratory D. Local _____
11. Which of the following solutions is bacteriostatic?
A. Alcohol C. Iodine
B. Betadine D. Zepheran _____

Directions: For each of the paired items (questions 12-16) place the letter of the statement below which indicates the proper relationship in the space provided.

- A. If increase in the first item is usually accompanied by an increase in the second.
 - B. If an increase in the first item is usually accompanied by a decrease in the second.
 - C. If an increase in the first item has no effect on the second.
12. a. Number of catheters in a patient
b. Susceptibility to infection _____
 13. a. Frequency of handwashing
b. Transfer of microorganisms _____
 14. a. Boiling in excess of twenty minutes
b. Number of spores killed _____

15. a. Temperature of autoclave
b. Time necessary for sterilization _____
16. a. Time sterile article remains on shelf
b. Sterility of the article _____

Directions: Below are some statistics related to the post-operative wound infection rate of patients after various preoperative preps. (These data are to be used for answering items 17-22.)

No Shower	Shower With Soap	Shower With Antiseptic Detergent	
2.6%	2.1%	1.3%	
Shaved	No Shave-Pubis Clipped	No Shave or Clipping	Depilatory Cream
2.5%	1.7%	0.6%	0.6%

Directions: Items 17-19. In the space provided, place the letter of the statement below with which you agree.

- A. Item is true and supported by data
B. Item is true but not supported by data
C. Item is false and supported by data
D. Item is false but not supported by data

17. All patients should be shaved prior to surgery. _____
18. A Betadine shower the night before surgery will decrease the possibility of wound infection. _____
19. A patient shaved immediately prior to surgery is more likely to develop a wound infection than a patient shaved the night before surgery. _____

Directions: Items 20-22. Write your answers to the questions below in the space provided. (Keep answers brief.)

20. Give rationale for the lower postoperative wound infection rate of patients who had showered prior to surgery with an antiseptic detergent.
21. Give rationale for the higher postoperative wound infection rate of those patients who were shaved prior to surgery.
22. What proposal would you make to help reduce postoperative wound infection in your hospital based on the above data?

Directions: Items 23-30. Read the following situations and answer the questions accompanying each based on the information presented. Again keep answers as brief as possible.

Mrs. Taylor, a 65-year-old diabetic, was admitted to the hospital ten days ago for diagnostic tests. Two days ago she had a bowel resection. At present she has an NG tube to suction, an IV in her left hand, a Foley for drainage. An abdominal dressing covers a midline incision and penrose drain. Miss Jones enters the patient's room to obtain a urine specimen to test for sugar and acetone. She lifts the bed covers and disconnects the Foley from the drainage tubing. Setting the tubing down she holds the distal end of the Foley next to the container she brought and collects the urine needed for the test. She then reconnects the Foley and tubing and leaves the room.

23. Identify potential infection sites in this patient.
24. What information do you know about Mrs. Taylor which would make her more susceptible to infection?
25. Was proper aseptic technique used to obtain the urine specimen? Give rationale for your answer.

26. Is there a better method for obtaining the specimen than the one described? Explain.

Mr. Jackson has pseudomonas draining from a wound in his chest. He has been placed on isolation. You enter his room in gown and gloves to change his dressing. You remove the soiled dressing and place it in the basket next to his bed. You then put on sterile gloves and open the sterile supplies necessary for the dressing change. Before putting on the clean dressing you take a bottle of antibiotic solution from the table and dip two applicators into the bottle and apply the solution to the area around the wound. After several applications you discard the applicators and apply the sterile dressing. After securing the dressing with tape you dispose of all trash in the basket next to the bed. Before leaving the room you remove your gloves and discard them in the container near the door. You then remove your gown and place it in the same container and leave the room.

Evaluate whether aseptic principles were followed for both the dressing change and isolation technique.

27. Identify all inappropriate actions involved in the dressing change.
28. List all omissions and improper actions of the nurse in the use of isolation technique.
29. State one principle of asepsis which was broken in the above situation and explain how you would change the action to comply with the principle.

Miss Smith opened a package of sterile ABD pads on the counter of the utility room. Reaching across the pads with her right hand she carefully removed a pair of sterile forceps from their container, lightly tapping the tips on the rim. With her left hand she removed the cover from a can of sterile dressing sponges, inverted the lid and with her forceps took some dressing sponges from the can and placed them on top of the ABD pad. Deciding she had too many she then replaced one, put the cover back on the can, replaced the forceps in their container.

30. Evaluate the above procedure as to sterility and identify any breaks in aseptic technique.

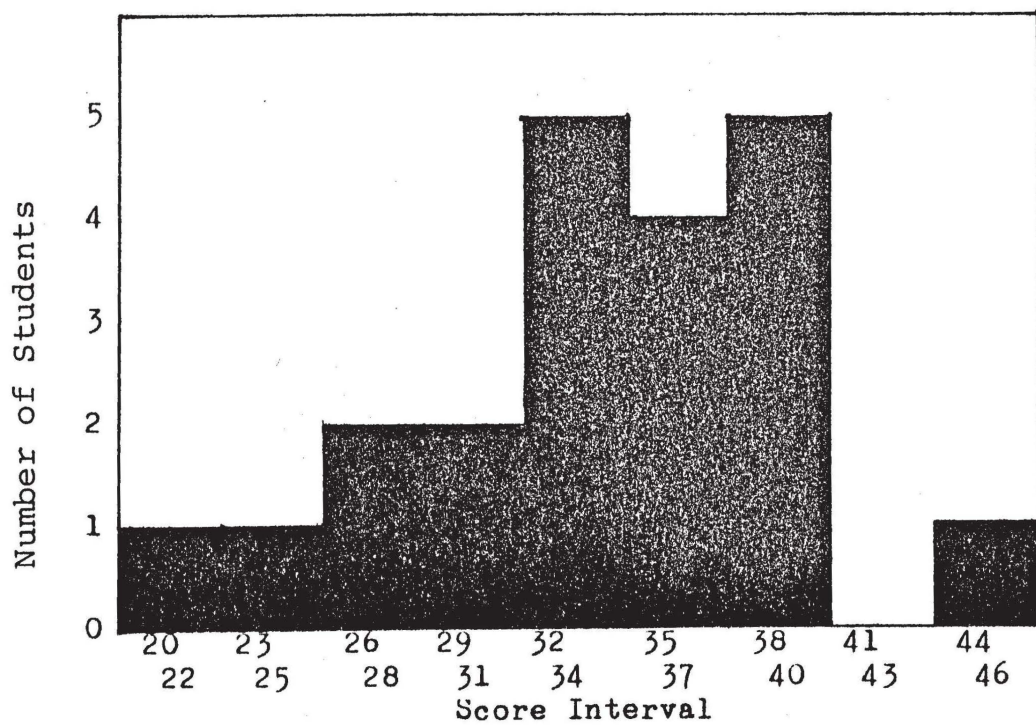
Directions: Items 31-33. State whether you would consider each of the articles below sterile or unsterile and explain your answer.

You are checking the supplies in the sterile supply closet. These articles are sterilized and packaged in the hospital central supply.

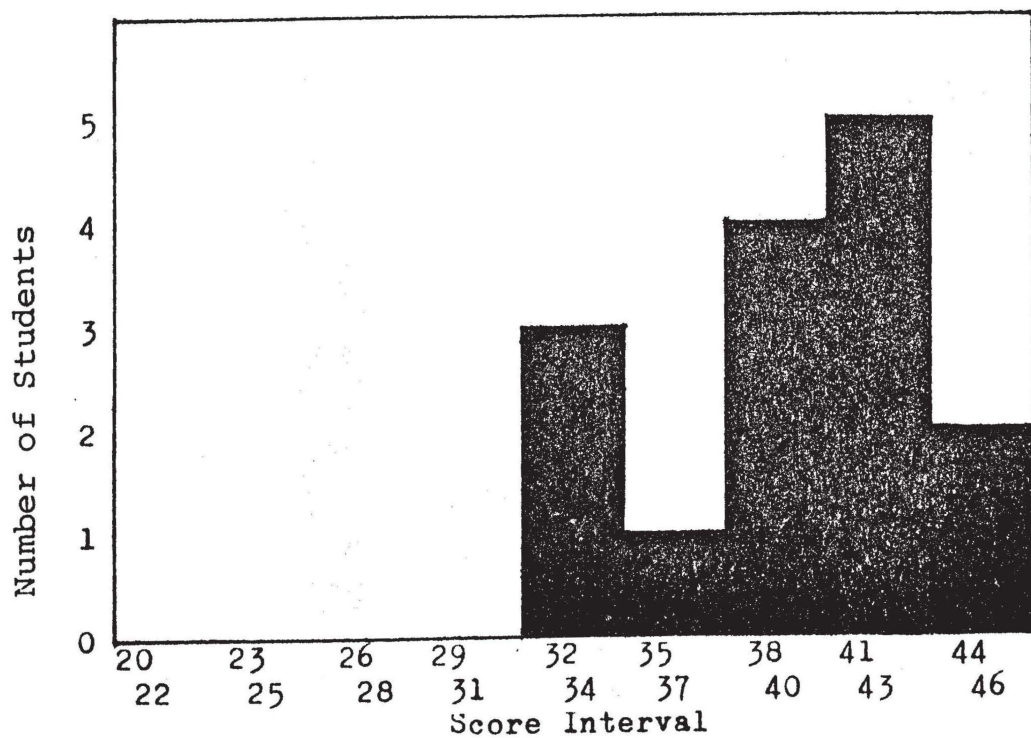
31. As you were removing supplies from the shelf one fell to the floor.
32. You found a package sealed in plastic dated November 9, 1977.
33. You found a package with no date.

APPENDIX F

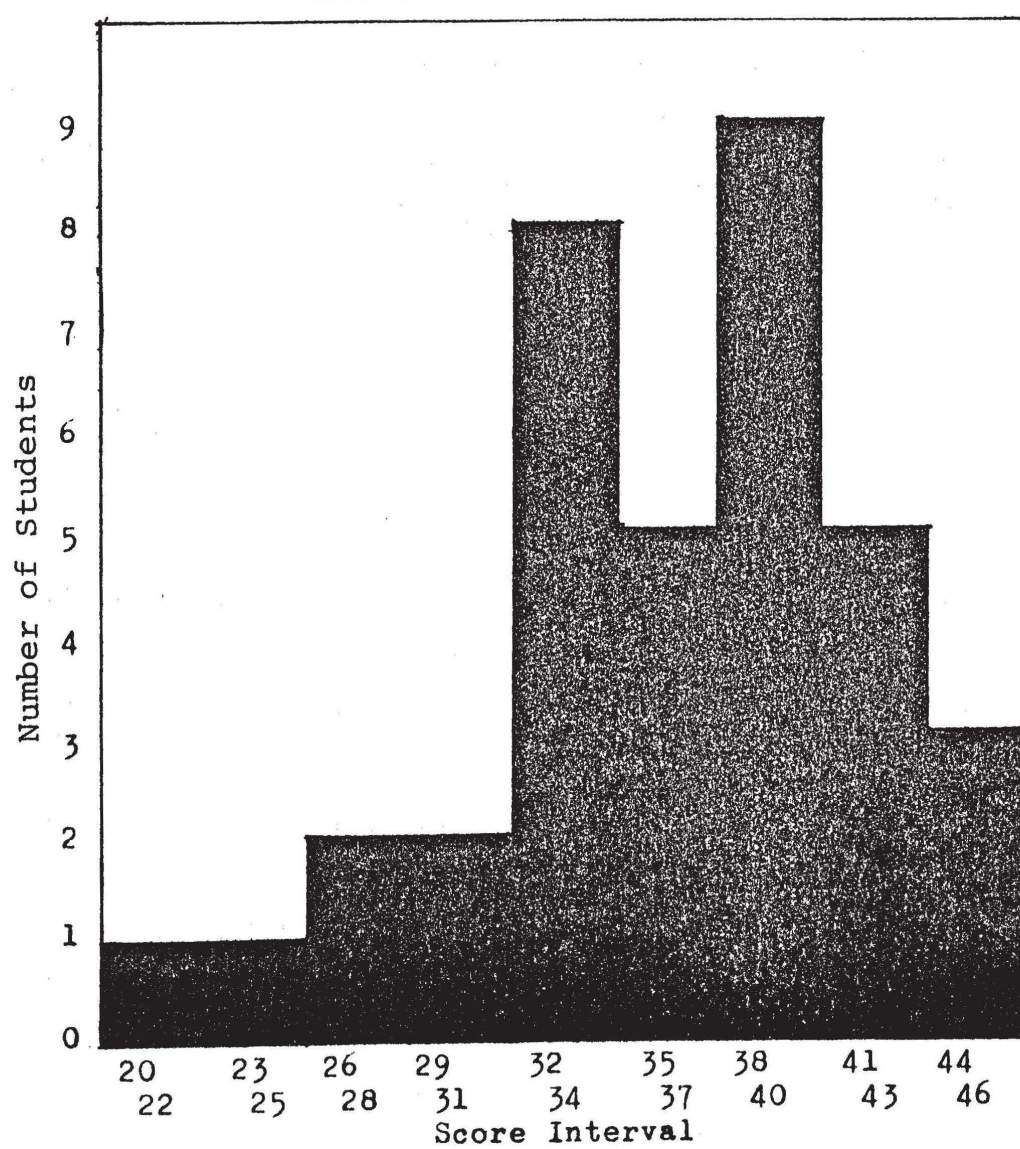
TEST SCORES NON O.R. GROUP



TEST SCORES O.R. GROUP



TEST SCORES COMBINED GROUP



SUBJECTS IN EACH GROUP AND THE COMBINED GROUP

ANSWERING QUESTIONS CORRECTLY

Questions	Group A 15-O.R.	Group B 21--Non-O.R.	Total Group 36 Total
Knowledge level			
1	11/15 (73%)	16/21 (76%)	27/36 (75%)
2	6/15 (40%)	9/21 (43%)	15/36 (42%)
3	7/15 (47%)	8/21 (38%)	15/36 (42%)
4	4/15 (27%)	8/21 (38%)	12/36 (33%)
5	14/15 (93%)	18/21 (86%)	32/36 (88%)
6	15/15 (100%)	15/21 (71%)	30/36 (83%)
7	6/15 (40%)	5/21 (24%)	11/36 (31%)
9	4/15 (27%)	1/21 (5%)	5/36 (14%)
10	5/15 (33%)	12/21 (57%)	17/36 (47%)
11	5/15 (33%)	11/21 (52%)	16/36 (44%)
23	8/15 (53%)	10/21 (48%)	18/36 (50%)
24	3/15 (20%)	3/21 (14%)	6/36 (17%)
29	12/15 (80%)	3/21 (14%)	15/36 (42%)
Comprehension Level			
17	11/15 (73%)	15/21 (71%)	26/36 (72%)
18	14/15 (93%)	19/21 (90%)	33/36 (92%)
19	8/15 (53%)	9/21 (43%)	17/36 (47%)
Application Level			
8	1/15 (6%)	1/21 (5%)	2/36 (5%)
12	15/15 (100%)	18/21 (86%)	33/36 (92%)
13	15/15 (100%)	19/21 (90%)	34/36 (94%)
14	7/15 (47%)	12/21 (57%)	19/36 (53%)
15	12/15 (80%)	12/21 (57%)	24/36 (67%)
16	15/15 (100%)	18/21 (86%)	33/36 (92%)

Questions	Group A 15-O.R.	Group B 21--Non-O.R.	Total Group 36 Total
31	6/15 (40%)	5/21 (24%)	11/36 (31%)
32	2/15 (13%)	2/21 (10%)	4/36 (11%)
33	14/15 (93%)	15/21 (71%)	29/36 (81%)
Analysis level			
20	12/15 (80%)	15/21 (71%)	27/36 (75%)
21	12/15 (80%)	9/21 (43%)	21/36 (58%)
Synthesis level			
22	11/15 (73%)	10/21 (48%)	21/36 (58%)
26	12/15 (80%)	18/21 (86%)	30/36 (83%)
Evaluation level			
25	5/15 (33%)	3/21 (14%)	8/36 (22%)
27	2/15 (13%)	2/21 (10%)	4/36 (11%)
28	0/15 (8%)	1/21 (5%)	1/36 (2%)
30	5/15 (33%)	4/21 (19%)	9/36 (25%)

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