

THE EMERGENCY ROOM NURSE'S
KNOWLEDGE OF FIRST AID

A THESIS

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CHAPTER I

INTRODUCTION

A screaming siren and flashing red lights send a momentary shock through most of us and signal a crisis, an unwelcome interference in the everyday life of the individual involved. For that brief moment, each of us is curious about the crisis, not necessarily the individual or others involved, but the occurrence itself. Then there is the relief that "I'm glad that's not me," or belief that "that won't happen to me." Each of us is relieved of responsibility, the drama is in someone else's hands, most assuredly capable hands.

Before us, as we travel the highways, the scene of an accident appears. Several cars have already stopped, so we travel on, knowing that any accident victims are receiving aid and reassurance, that authorities and emergency services have been notified, and that the injured will be transported to medical facilities where they will receive prompt, efficient attention.

These sudden or unexpected occurrences are emergencies which both imply and demand the need for prompt action. The drama of an emergency can happen to anyone at anytime or

any place. A prompt response is necessary. We assume that capability, promptness and efficiency occurs in response to that urgency. How valid is this assumption?

Certainly, the public expects trained medical personnel regardless of their specialty, to be capable of administering aid in an emergency. For instance, inside the hospital the health team responds to many emergency situations as a part of their daily activities. The team works together as a unit. Each member contributes his knowledge and skills to help overcome the emergency. The supporting effort of each person and the availability of sophisticated equipment provides a sense of security to each member of the team.

However, lay people assume that because a nurse is a nurse, she knows what to do when an accident or an emergency occurs. The emergency room nurse should be able to respond instantly and have the knowledge to administer first aid in any situation. Outside of the hospital, the nurse does not have the security of other supporting personnel and sophisticated equipment. The individual nurse must feel assured that she possesses a degree of emergent readiness if she is to institute life-saving measures. Her knowledge of first aid could prevent a fatal or crippling outcome in a critical situation. Has she become so accustomed to the hospital

setting that she is afraid to rely on her own judgments and skills when faced with a crisis?

The subject of first aid is included with disaster nursing in various medical-surgical nursing texts, and professional schools of nursing teach cardiopulmonary resuscitation. The need for a knowledge of first aid is never argued. The possibility of civil disaster, either natural or military, is always present. The need to know first aid before a disaster strikes is intensely felt when the alarm of a siren forewarns of an impending disaster.

Do emergency room nurses really know first aid? Do they possess enough knowledge of first aid to take the initiative to diagnose and treat life-threatening conditions when there is no supporting physician to rely upon for direction? The emergency room nurse's knowledge of first aid needs to be verified if she is to be considered competent in rendering safe care to accident victims.

Statement of Problem

This study was designed to investigate the emergency room nurse's knowledge of first aid.

Purpose:

The purpose of this study was to:

1. Compare the emergency room nurses' knowledge of first aid with that of

- a. Lay persons, and
 - b. Master's level nursing students.
2. Determine if months of experience in the emergency room influenced the test scores.
 3. Determine if the educational background of the emergency room nurse influenced the test scores.

Background and Significance

According to the Statistical Bulletin, Metropolitan Life Insurance Company (1971, p. 6), the number of deaths attributed to accidents in the United States have in recent years risen from a low of about 90,000 in 1954 to a high of 115,000 in 1968 and 1969 with the figure for 1970 being estimated at 113,000. In 1968 motor vehicle fatalities accounted for about half the total death rate from accidents among males and for about two-fifths of the total death rate from accidents among females.

With the increasing number of fatalities from automobile accidents, it was recognized that efforts needed to be increased to improve the care that accident victims receive. Cole (1970, p. 184) stated that this need was accentuated by the fact that first aid was not always available, and when it was, it may have been greatly delayed or improperly carried out.

According to the American College of Surgeons, Committee on Trauma (1965, p. viii), the fate of the injured person depended to a large extent upon initial care. If the first aid worker understood the basic principles of treatment, he could more logically understand his role in the care of the patient (Cole and Puestow, 1965, p. ix).

The nurse may be the first line of defense in emergency care in the emergency room. The Program Area Committee on Accident Prevention (1961, p. 287) found that nurses are frequently the first professional to see an emergency patient. Since they may be called upon to deliver life-saving first aid, it was desirable that all emergency room nurses be trained in first aid. Furthermore, when a nursing school was present, an integral part of the student's work should be in the emergency room. If immediate emergency care depended upon nursing personnel until a physician arrived, it seemed apparent that the nurse should be competent in life-saving procedures (Pilcher, 1972, p. 638).

Many nurses realize the need for continuing education. Gaston (1971, pp. 196-197) stated that a post-graduate course for emergency room nurses sponsored by the Chicago Committee on Trauma of the American College of Surgeons had a continuing increase in nurse attendance. These courses were taught at the level of the third year of medical school

because nurses were frequently called upon to perform tasks ordinarily performed by physicians. The nurses felt that they should have the necessary training to perform the tasks efficiently, without error.

Nurses are often concerned about their legal liability in handling injured persons. States differ in their laws governing the administration of first aid. Some states require the first person upon the scene of an accident to stop and render aid. Other states have "Good Samaritan" laws which protect medical personnel from liability when administering first aid at the scene of an accident. The nurse needs to be aware of the state laws enacted governing the practice and the administration of first aid (Chayet, 1969, p. 161).

The Good Samaritan Law for the State of Texas is stated:

No person shall be liable in civil damages who administer emergency care in good faith at the scene of an emergency for acts performed during the emergency unless such acts are willfully or wantonly negligent; provided that nothing herein shall apply to the administering of such care where the same is rendered for remuneration or with the expectation of remuneration or is rendered by any person or agent of a principal who was at the scene of the accident or emergency because he or his principal was soliciting business or seeking to perform some services for remuneration (Texas State Law, Revised Civil Statutes).

The Texas state law also requires that if you were involved in an accident you must stop and render aid. The law states:

The driver of any vehicle involved in an accident resulting in injury to or death of any person or damage to any vehicle which is driven or attended by any person shall give his name, address, and the registration number of the vehicle he is driving and shall upon request and if available exhibit his Operator's, Commercial Operator's, or Chauffeur's license to the person struck or the driver or occupant of or person attending any vehicle collided with and shall render to any person injured in such accident reasonable assistance, including the carrying, or the making of arrangements for the carrying, of such person to a physician, surgeon, or hospital for medical or surgical treatment if it is apparent that such treatment is necessary or if such carrying is requested by injured person (Texas State Law, Revised Civil Statutes, 6701d, Sec. 40).

Review of the literature did not produce studies regarding the emergency room nurse's knowledge of first aid. Regardless of the nurse's educational background her knowledge of first aid needs to be verified if she is to function effectively in giving safe care in emergency situations.

The art and science of nursing requires the use of specialized knowledge, judgment, and skills (Ethicon, Vol. 9, No. 6, p. 16; Peplau, 1965, pp. 268-287; Reiter, 1966, pp. 274-280). This study attempted to verify the knowledge of first aid possessed by the emergency room nurse.

Hypothesis

For the purpose of this study the following null hypotheses were formulated:

1. There would be no significant difference between the emergency room nurse's test scores and the lay person's test scores.
2. There would be no significant difference between the emergency room nurse's test scores and the Master's level nursing students test scores.
3. There would be no significant difference between the emergency room nurse's test scores and their educational background.
4. There would be no significant difference between the emergency room nurse's test scores and their months of emergency room experience.

Definition of Terms

For the purpose of this study the following terms were defined:

1. Emergency--an urgent or critical condition that required immediate care; may be life-threatening.
2. Accident--an unexpected event that results in injury, loss or damage.

3. First Aid--initial care given to a victim of an accident or sudden illness before regular medical care is available from a physician.
4. Emergency room nurse--a person who has graduated from an accredited school of nursing; who has successfully taken a state board examination for licensure as a registered nurse; who is regularly employed in an emergency room or department; and is familiar with emergency situations.
5. Hospital--an institution that provides 24-hour emergency room facilities and is capable of handling any patient with illness or injury that is sudden and injurious in nature.
6. Large metropolitan city--a community with a population of 300,000 or more.

Delimitations

For the purpose of this study the following delimitations were selected:

1. The emergency room nurse will have been educated in a United States school of nursing.
2. Only registered nurses working full time in the emergency room will be selected.

Assumptions

For the purpose of this study the following assumptions were offered:

1. Initial first aid could prevent fatal or crippling outcomes.
2. Lay people assume nurses were capable of functioning in emergency situations and would know what to do when an accident or emergency occurred.

Summary

Chapter I presented a rationale to support the emergency room nurse's need for a knowledge of first aid. Authorities were cited regarding the utilization of the basic principles of first aid in relationship to the initial care received by the injured person. The role of the nurse in emergency care was presented. This study was designed to investigate the emergency room nurse's knowledge of first aid. It was hypothesized that there would be no significant relationship between the test scores and (1) educational background, (2) months of emergency room experience.

Chapter II, Review of Literature, is composed of a review of the literature pertinent to the need for a knowledge of first aid by the lay public as well as professionals. Statistical data is presented regarding

accidents in an effort to support the need to know first aid as a means of saving lives. Fear of litigation in Good Samaritan situations by physicians is presented in an effort to dispel this fear. Testing of the subject's knowledge with multiple choice questions is presented as a method to determine how much an individual knows about a subject.

Chapter III, Procedure for Collection and Treatment of Data, contains descriptions of the locale, population, methodology, and procedure for the analysis of data obtained.

Chapter IV includes the analysis of data.

Chapter V consists of the summary, recommendations, implications and conclusions.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The increase in morbidity and mortality rates resulting from accidents has focused more attention on emergency medical services. Emphasis is being placed upon the need for "crash" courses on first aid for both professional and lay groups; for the development and coordination of large-scale emergency medical services for trauma care; and for legislation requiring completion of an advanced first aid course prior to issuance of a driver's license. In an effort to demonstrate the critical importance of a knowledge of first aid, this chapter will review the status of present emergency medical services; accident statistics; the nature of first aid; the A-B-C-D of emergency resuscitation; recommendations for changes in emergency care; the nurse and first aid; and Good Samaritan legislation. Finally having demonstrated the necessity for a knowledge of first aid, the development of a test utilizing the multiple choice format is offered as one method of determining one's knowledge of a particular subject.

Emergency Medical Services

Emergency medical care involves many phases, including detection of the incident, notification and dispatch of the proper emergency service agency with the appropriate personnel and necessary equipment, rendering of initial care and transportation of the patient to the hospital for emergency treatment (Reid, 1973, p. 99). It is a complex procedure that involves many persons, including the victims, the persons detecting the incident, emergency medical technicians, police and fire department personnel, physicians, nurses and other hospital staff (Reid, 1973, p. 99).

Emergency medical services for trauma care are being developed throughout the nation. Essential components of the system include: hospital categorization, communications, transportation, training and education of both professionals and the public, and program evaluation (Boyd, 1973a, p. 275). During the 70's emergency medical services received close attention from both within and outside the health care delivery system. This attention is a reaction to the fact that trauma is the number one killer of Americans under the age of thirty-eight, and the fourth largest killer of Americans of all ages ("The Potentials and Limitations of Emergency Medical Services," Hospitals, May 16, 1973, p. 57).

Few areas of the United States have adequate emergency services. This is the result of poor planning and

management of emergency logistics, communications, and transportation facilities (Roberts, 1971, p. 923). Today a large gap exists in many areas throughout the country between the scene of the accident and the administration of medical care (Wagner, 1973, p. 375). Many people injured in multiple vehicle accidents die needlessly or are permanently disabled because they did not receive prompt and proper emergency care. A study was done by Frey, Huelke, and Gikas (1969, pp. 292-310) on autopsy protocols of 159 patients dying as a result of motor vehicle accidents in Michigan. They concluded that twenty-eight victims were salvageable if adequate resuscitation had been provided initially. Their impression was that fifteen of the twenty-eight salvageable patients needed immediate airway control at the scene of the accident. Such correction of respiratory obstruction is one of the most important first aid obligations since cessation of respiratory exchange will result in death in three or four minutes (Cole, 1970, p. 184; Shires, 1966, p. 74; Moore, 1972, p. 73; Condon and Nyhus, 1972, p. 93). The need for prompt medical attention is further accentuated by the fact that the mortality rate for victims of serious accidents rises precipitously for each half-hour of delay in treatment (Roberts, 1971, p. 18).

That efforts are being made to improve emergency medical services is apparent in the increased research, planning and legislation now underway ("The Potentials and Limitations of Emergency Medical Services," Hospitals, May 16, 1973, p. 57). One salient example is that highway safety program standards now include coverage of emergency services (Highway Safety Act, 1966, p. 19). These emergency services include a system that: (1) will provide quick identification and response to accidents; (2) will sustain and prolong life through the proper use of first aid measures at the scene of the accident and in transit; and (3) will bring the injured and definitive medical care together in the shortest time through the use of adequate coordination, transportation and communication.

More emphasis is being placed on the pre-hospital phase of care. Waller (1973, p. 54) states that this phase may be the single most critical determinant whether the acutely ill or injured victim survives or suffers prolonged disability or whether he recovers rapidly and to the full extent of his physiologic capabilities.

In addition he did an analysis of emergency care among 723 persons fatally injured or ill in the nonhighway setting in Sacramento, California (Waller, 1973, p. 58). Four components to emergency care were identified. The study showed that the first two components (survival for sufficient duration and discovery of the ill or injured

person quickly enough that care can be instituted) were not met in a substantial proportion of the deaths examined. In 50 per cent of the deaths no one was available to help until some time after the event; while if the event was observed or quickly discovered, help almost always was provided or sought. The third component was a willingness by potential rescuers to intervene, and the rapidity of their response. In this study it was found that the age of the patient played a role in determining willingness. If the patient was young, he received preferential treatment over middle-aged or older adults. Several instances were uncovered in which individuals probably would have survived if they had been able to get medical aid in time. In each of these instances, as many as six physicians were called consecutively and refused to provide such life-saving service. The fourth component was the quality and appropriateness of treatment provided. The treatment was further divided into treatment at the site, enroute to the hospital and within the hospital. This study found that there was insufficient information to determine survivability or quality of care; however, most of the individuals in this study died before they reached the hospital. The author surmised therefore, that quality of care at the site and enroute to the hospital must be very high if the patient is to survive past the pre-hospital phase. This study also showed that

nearly one quarter of the deaths were of individuals who had injuries from which they should have been able to survive. In 50 per cent of the deaths no one was available to help until sometime after the event.

Efforts to improve the care for critically injured patients is exemplified by the Illinois Plan. This state has developed a program for a statewide system of trauma centers to provide the critically injured patient optimum care (Boyd, et al., 1973b, p. 24). The basic premise of this plan is the extension of the intensive care concept for treatment of trauma to other hospital facilities throughout the state. Regionalization of the state's emergency facilities is a major objective of the plan and is based on categorization of presently available hospital emergency services. Hospitals are designated to a specific care category as either local, areawide, or regional trauma centers. Essential to the plan are totally integrated and reliable transportation and communication systems. A regionally based program for training of emergency medical technicians-ambulance personnel is being initiated and legislation is pending which will lead toward the improvement of ambulance services to meet the requirements of the Federal Highway Safety Act. Other elements incorporated in the plan include: (1) the development of a trauma coordinator; (2) the development of a four-week trauma nurse

"specialist" training program to upgrade the education of emergency room and trauma unit nurses; (3) a trauma core library; (4) a trauma registry; and (5) the formation of emergency medical councils which will combine lay and professional interests to coordinate first aid training, transportation, emergency medical care, and definitive treatment of victims of accidental injury.

The success of the Illinois trauma program has improved the overall care of injured patients and is now being used as a basic model for other components of the health care system, including emergency medicine, transplantation, and rehabilitation. The initial results of the trauma program showed a 7.4 per cent decrease in death from highway accidents throughout the state and 15.4 per cent in the initial eighteen-county area (Boyd, et al., 1973c, p. 282).

Accident Statistics

While disasters with their relatively few fatalities occupy the front pages of newspapers, the silent steady rise of deaths from ordinary accidents go unnoticed (Accident Facts, 1970, p. 21). An estimated 117,000 deaths were caused by accidents in 1972, approximately 2,000 more than 1971 figures (Statistical Bulletin, January, 1973, p. 10). An accident is defined as "that occurrence in a sequence of

events which usually produces unintended injury, death, or property damage" (Accident Facts, 1970, p. 97).

The cost to the nation in 1969 from accidents in which death and injuries occurred together with noninjury motor vehicle accidents and fires was at least \$25 billion (Accident Facts, 1970, p. 4). Accidents are the fourth leading cause of death among persons of all ages, outranked only by heart disease, cancer, and strokes, and is the leading cause of death among all persons aged one to thirty-seven (Accident Facts, 1970, p. 9). Accidents in and about the home in 1971 caused approximately 27,500 fatalities and accounted for 4.2 million disabling injuries (Statistical Bulletin, March, 1973, p. 3).

The statistics on deaths, serious injuries and economic loss incurred by traffic accidents are grim. Highway violence, counting injuries alone, exceeds all crimes of violence in the United States by a ratio of no less than ten to one (Roberts, 1971, p. 29). The cost of motor vehicle accidents in the decade of the sixties was \$89.6 billion; an increase of \$44.1 billion, from the decade of the fifties (Accident Facts, 1970, p. 41). In 1968, the Committee on Medical Aspects of Automotive Safety (1968, p. 879) estimated that one out of every eight persons in the United States would be killed or injured by a motor vehicle within the next four years. The magnitude of

traffic accidents as the third leading cause of death in all age groups and the first leading cause of death among adults within their third to fifth decades cannot be ignored (Roberts, 1971, p. 3). Of the 56,400 Americans killed in motor vehicle accidents during 1969, 17,700 were between the ages of fifteen and twenty-four (Accident Facts, 1970, p. 42). Thus, auto accidents represent the leading cause of death in the fifteen to twenty-four age range (Roberts, 1971, p. 37). In the United States motor vehicle accidents account for approximately one-third of all injuries and the probability exists that one out of every two Americans will be involved sometime during his life in an injury-producing collision (Roberts, 1971, pp. 39-40).

Fatal motor vehicle accidents occur mostly in rural areas, while nonfatal injury accidents and property damage occurs mostly in urban areas (Accident Facts, 1970, p. 47). Roberts (1971, p. 822) states that the mortality of accident victims may be four times higher in rural areas than for similar injuries received in a city due to the extra delay entailed in obtaining definitive medical care. Waller (1967, pp. 94-98) did a study on accident fatality rates in eighteen agricultural, nineteen mountain, and nine urban counties in California. He found that motor vehicle fatalities were two and one-half times as frequent in the

in the mountainous counties as in the urban areas. Three factors related to these unnecessary fatalities were:

(1) problems of delay in discovery, (2) delay in transportation, and (3) delay in initial therapy.

Roberts (1971, p. 821) states that thousands of lives can be saved annually by the prompt handling and transportation of accident victims in an efficient manner and by the rendering of proper first aid in the immediate post-accident phase. This applies to first aid rendered by lay motorists and bystanders as well as physicians. In this country there is an urgent need for "crash" courses on first aid instruction on a national scale (Roberts, 1971, p. 830). Miles (1969, p. 485) indicated that there are ten persons requiring first aid treatment every minute in England. The completion of the American Red Cross advanced first aid course is recommended by Seely (1969) as a mandatory prerequisite for the issuance of a driver's license. This measure in itself would insure a minimum of knowledge concerning cardiorespiratory resuscitation, the control of hemorrhage from extremities; and other potentially lifesaving measures that a motorist might utilize in an isolated emergency situation (Roberts, 1971, p. 830).

The Nature of First Aid

First aid was defined by Miles in 1969 (p. 485) as:

the immediate assistance given in the case of injury or sudden illness by bystander or other lay person, with such further expert help as may be available until the patient reaches the hospital or other source of professional treatment.

Cole and Puestow (1965, p. 4) defined first aid as the assistance given before definitive treatment can be initiated; it is usually administered at the site of the accident and often by nonmedical personnel who take the responsibility for such treatment. Gardner and Roylance (1971, p. 3) state that first aid is the process of carrying out essential emergency treatment prior to getting the victim of an injury or illness to a hospital or physician for definitive treatment. First aid can be further divided into self-help (what the injured can do for himself) and first-help (what first aiders do for the injured). Essential emergency treatment of an injury is not completed at the scene of the accident since it is initiated with the understanding that further treatment will be required. Gardner and Roylance (1971, p. 6) further explain that essential treatment means performing what must be done to preserve life and leaving undone those things that are not essential. The first aider must be able to differentiate between what can or could be done and what is essential and

must be done. The basic aims of first aid are to preserve life, minimize the effects of injury, and transport the injured to a hospital in good condition (Gardner and Roylance, 1971, p. 7).

In first aid there are priorities of action that must be carried out in the proper order and every first aider must be able to make the correct decision regarding priorities (Gardner and Roylance, 1971, p. 9). The priorities of action are: (1) if danger exists, don't become a victim yourself; (2) remove the injured person from a dangerous situation if necessary; and (3) make sure the victim is breathing. If many accident victims are present one should place a high priority on sending for additional help (Gardner and Roylance, 1971, p. 10).

People who are directly involved in rendering emergency first aid can function more effectively in their efforts to save human life if they are well informed, experienced, and highly capable of meeting the emergency situation (Young, 1954, p. 3). Additional capabilities should include the use of sound and tested procedures; the use of sound judgment; a knowledge of the limits of one's ability; and keeping the welfare of the patient in mind at all times (Young, 1954, p. 3). A person who is well skilled in techniques and has an adequate understanding of the

general principles of first aid will be able to save a life, prevent death, relieve suffering, prevent additional injury, assist the physician and hospital staff, lessen the disability, and hasten rehabilitation (Young, 1954, pp. 4-5). The first aider must continually strive to improve his technique, increase his knowledge, and give his very best if he is to meet the responsibility inherent in life and death situations (Young, 1954, p. 5).

Why do people need training in first aid? Cole and Puestow (1965, p. 1) state that there is a need for training in first aid because the type of first aid care rendered to the accident victim often determine whether the patient survives or dies. An additional reason for extending and improving first aid care is that accident statistics continue to rise in spite of innumerable precautions to prevent accidents.

When a first aider discovers a victim with multiple injuries, he must make decisions as to priority of care. Errors in judgment in determining priority of care may be detrimental as well as fatal. Hence the first aider must be cautious and reasonably sure of the indications for treatment before he performs some type of treatment (Cole and Puestow, 1965, pp. 1-2). The first aider must also know the limitations of his ability. This knowledge may

prevent the person from carrying out erroneous therapy, and inflicting more damage upon the patient (Cole and Puestow, 1965, pp. 2-3). The first aider must also be aware of errors in technique. For example, in an effort to stop bleeding bandages should not be applied to injured tissue so tightly that the blood supply is obstructed completely and gangrene results (Cole and Puestow, 1965, p. 3).

Who should be taught first aid and what should they be taught? Ideally everyone should be trained in first aid so that one will know what to do if faced with an accident or sudden injury in order to save a life, to protect the victim from further injury, to prevent the injury from becoming worse, and to obtain expert help (Miles, 1969, p. 485). First aid training should be progressive and the individual, if interested, should be able to volunteer for advanced instruction. In addition Miles (1969, p. 486) recommends that good first aid training be given to professional emergency ambulance personnel, firemen, police and other public servants; and that all physicians, nurses, medical technicians, and orderlies receive advanced instruction in first aid as early as possible during their training. Miles (1969, p. 486) discusses the attributes for first aid instruction in relation to four groups of people. First, he

recommends that every adult member of the community have a course of basic life-saving instruction relative to the maintenance and restoration of breathing, the control of bleeding, and the care of casualties. For volunteers and others who desire to become usefully competent in first aid, he recommends general first aid instruction. This program would build upon the basic life-saving course and includes heart compression, introduction to the working of the human body, bleeding, shock, special wounds, casualty management, fractures, dislocations, and sprains, poisons and drug emergencies, exposure and environmental injuries. Third, for personnel attached to emergency service units he recommends an advanced first aid course to include rescue and survival techniques, control of mass casualties, mechanical aids to resuscitation, cutting and lifting gear, and ambulance equipment. Physicians, medical students, nurses and other key persons engaged in rescue services need a professional course in first aid to include management and establishment of emergency casualty centers, provision of relief services (water, food, shelter, medical supplies, etc.), mass casualty management, organization in major disasters, and rescue and retrieval techniques. For physicians he also suggests skill in conduct of on-site emergency treatment to include intubation, use of emergency

drugs, and management of mass casualties and emergency medical service. He further states that first aid is a branch of medicine in which the whole of the population should have some basic knowledge, that as many as possible should be given some formal training, and that a limited number must be highly skilled.

In the United States one of the main organizations which teaches first aid is the American Red Cross. Since its beginning in 1909, the American Red Cross First Aid Service has had a single objective--the conservation of human life through the prevention of accidents. The program is two-fold, consisting of (1) first aid training through formal classes, demonstrations, films, and the use of other mass media education and (2) activities to involve people on a nationwide effort to reduce accidents and minimize the suffering of accident victims. Leaders of these courses must be convinced of the value of the program. The community must understand its purpose and give it support. Thus first aid is a community activity in which all persons may participate and from which all persons will benefit (American Red Cross-Program Planning for Chapters, 1962, p. 1). The American Red Cross's basic, standard, and advanced courses extend first aid recommendations of the medical profession to the lay public. These courses are

also recognized by the U.S. Department of Labor as meeting the qualifications for first aid training outlined in the 1970 Occupational Safety and Health Act (First Aid Training, 1972, p. 1).

An additional aspect of first aid training is realism so that, as Michaelson (1973, p. 57) states, when the real thing happens, a person is not taken by surprise. The person can react rationally to the emergency situation because he is not afraid of the unknown. The first aider must also be taught to improvise during a medical crisis because knowing how to improvise is fundamental to functioning in a medical emergency (Michaelson, 1973, pp. 58-59).

A-B-C-D of Emergency Resuscitation

The fundamental principles and techniques for emergency resuscitation are simple to comprehend, to practice, and to perform. Of all the problems in first aid, cardio-respiratory emergencies are the most urgent and all medical, paramedical, and professional rescuers must be well trained in the diagnosis and treatment of these conditions in any setting (Cole and Puestow, 1965, p. 237). A delay in restoring breathing and/or circulation may mean the difference between life and death or irreparable brain damage. Cardiopulmonary resuscitation is the combination of artificial ventilation and external cardiac compression

(Cole and Puestow, 1965, p. 255). It can be divided into four essential steps--Airway, Breathing, Circulation, and Definitive Treatment-Diagnosis. The basic A-B-C-D's provide a means of easily remembering the essential steps of cardiopulmonary resuscitation.

Airway

In most descriptions of emergency care and first aid measures the importance of immediately establishing an effective airway is stressed. It is recognized that an obstructed airway or interference with adequate pulmonary ventilation constitutes a life threatening condition in that hypoxia lasting in excess of three to five minutes results in irreparable cerebral damage (O'Dell, 1973, p. 413; Moore, 1972, p. 73; Shires, 1966, p. 74; Condon and Nyhus, 1972, p. 83). Emergency care in establishing an effective airway requires: (1) the recognition of partial or complete airway obstruction due to anatomic, mechanical, or pathologic conditions; (2) skill in clearing the airway; (3) maintaining the patent airway; and (4) assuring adequate ventilation (O'Dell, 1973, pp. 414, 424). The nursing care and procedures will vary from very simple measures to surgical procedures depending on the cause of the condition and the condition of the patient (O'Dell, 1973, p. 414).

Breathing

If spontaneous breathing does not return after establishing a patent airway or if the patient is not breathing adequately, the rescuer must initiate artificial ventilation immediately (American Academy of Orthopaedic Surgeons, Committee on Injuries, 1971, p. 55; Condon and Nyhus, 1969, p. 86). Common signs of inadequate breathing are: (1) no movement of the chest or abdomen is seen, (2) no movement of air is heard or felt close to the patient's mouth or nose, (3) the patient may be struggling to move air in and out of his lungs and his neck muscles stand out prominently, (4) the patient's breathing may be very slow or very noisy, and (5) cyanosis may be present especially around the membranes of the lips, nailbeds, or ears (American Academy of Orthopaedic Surgeons, Committee on Injuries, 1971, p. 50). The diagnosis of a respiratory arrest may be made by observing: (1) absence of breathing, (2) cyanosis, and (3) dilated pupils nonreactive to light (Cole and Puestow, 1965, pp. 242-243; Houser, 1973, p. 406). The ability to act independently without equipment may decide between life and death or irreparable brain damage (American College of Surgeons, Committee on Pre and Postoperative Care, 1971, p. 189). Mouth-to-mouth or mouth-to-nose ventilation should begin immediately and time

should not be spent searching for ancillary equipment (Condon and Nyhus, 1969, p. 86). Mouth-to-mouth breathing provides more effective gas exchange than the older manual methods which manipulated the thorax (American College of Surgeons, Committee on Pre and Postoperative Care, 1971, p. 189). For adequate ventilation to occur the rescuer must: (1) see the patient's chest rise, (2) feel resistance of the patient's lungs as they inflate, and (3) feel air escape during expiration (Condon and Nyhus, 1969, p. 86).

Circulation

Circulatory arrest may be defined as the "sudden and unexpected cessation of effective cardiac output which can occur as asystole, ventricular fibrillation, or a profound decrease in cardiac output" (Ravin and Modell, 1973, p. 8). Circulatory or cardiac arrest can be recognized by the absence of femoral and carotid pulses or the absence of precordial heart sounds (Ravin and Modell, 1973, p. 9; House, 1973, p. 406). With the cessation of circulation, tissue hypoxia occurs rapidly, and the rescuer must make a prompt decision to initiate artificial circulation along with artificial ventilation (Ravin and Modell, 1973, p. 9; American College of Orthopaedic Surgeons, Committee on Injuries, 1971, p. 66). Initial treatment during a cardiac arrest consists of delivering a sharp fast blow with the side

of the fist to the lower sternum. This act alone may restart the heart if it is in asystole and occasionally will convert ventricular fibrillation or ventricular tachycardia (Moore, 1972, pp. 73-74). Secondly, if a defibrillator is immediately available, "defibrillation may be carried out empirically when there is no response to the blow to the chest" (Moore, 1972, p. 74). This act is not effective if the heart is in asystole but it can be life saving if the heart is in ventricular tachycardia or fibrillation. Defibrillation may be the only treatment necessary and obviate the need for further resuscitative measures (Moore, 1972, p. 74). If the above two steps fail, the rescuer must ventilate the patient and start cardiac compression. Closed cardiac compression compresses the heart between the sternum and the vertebral bodies and produces a cardiac output so that the flow of oxygenated blood is restored to vital tissues (Ravin and Modell, 1973, pp. 10-11; Cole and Puestow, 1965, p. 254; American College of Orthopaedic Surgeons, Committee on Injuries, 1971, p. 66). Cardiopulmonary resuscitation should continue until normal mechanisms can be restored (Moore, 1972, p. 75). The effectiveness of cardiopulmonary resuscitation is best evaluated by feeling the carotid pulse and examining the size of the pupils (American College of Orthopaedic Surgeons, Committee on Injuries, 1971, p. 70).

Definitive Treatment-Diagnosis

Once an airway is established, effective cardiac massage instituted and help is available, attention can be directed towards definitive treatment and establishing a diagnosis (Condon and Nyhus, 1969, p. 87). Initial treatment may include the establishment of an intravenous route; drug therapy such as sodium bicarbonate, epinephrine, lidocaine, isoproterenol; electro-cardio-graphic monitoring; defibrillation procedures (Condon and Nyhus, 1969, p. 88; Moore, 1972, pp. 76-78). Postresuscitative procedures are directed to minimize the deleterious effects of the arrest and may include the provision of continuous artificial ventilation; recognition and treatment of injuries which may be sustained during resuscitation such as fractured ribs, pneumothorax, and hemorrhage; cerebral edema resulting from hypoxia; and support of the cardiovascular system with various drugs and maintenance of fluid and electrolyte balance (Ravin and Modell, 1973, pp. 20-21). Therapy after successful resuscitation is directed towards correcting the underlying physiologic mechanism responsible for the arrest (Houser, 1973, pp. 406, 411; Moore, 1972, p. 80).

Recommendations for Changes in Emergency Care

Standards for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC) has recently been published by

the American Heart Association (National Conference Steering Committee, 1973). These standards were derived from recommendations of a joint committee cosponsored by the American Heart Association and the National Academy of Sciences-National Research Council which met in Washington, D.C., May 16-18, 1973. Areas of significant change are listed below:

Training for Red Cross, YMCA, school districts,

boy scouts, laymen, etc. by AHA standards

Early warning signs

Foreign body in airway

S-tube airway no longer recommended

Esophageal airway

Bag-valve-mask

Precordial thump

15:2 ratio with rate of 80/min

5:1 ratio with rate of 60/min

Discontinue resuscitation

Entry into local emergency care system

Basic life support and advanced life support

Life support stations (stratified community care)

Sodium bicarbonate

Electromechanical dissociation

Unmonitored defibrillation

Pole-top resuscitation

Medicolegal aspects: Good Samaritan laws and
hospital charts

The Nurse and First Aid

Every nurse should be familiar with the general principles of first aid and capable of assuming a leadership role when accidents occur if a physician is not present (Shafer, et al., 1971, p. 223). A nurse must have a broad knowledge of nursing principles and skill with a variety of nursing techniques, so that a patient requiring emergency care will receive proper management. A nurse equipped with this knowledge and skill is able to function very effectively in any emergency regardless of the number of patients involved. In emergencies the nurse must be able to assume leadership in planning, organization, direction and supervision of emergency nursing care (Brunner, et al., 1970, p. 223). Emergency nursing requires judgment, timing, alertness and knowledge in that the nurse must be able to recognize what is an emergency, and apply first aid principles in order to function without hesitation (Smith and Gips, 1966, pp. 1097-1098).

Partly because of improved transportation techniques, more patients with severe multiple injuries are reaching the hospital alive (Riehl, 1970, p. 202). The person who

usually sees the patient initially in the emergency room is the nurse (Riehl, 1970, p. 203; Smith and Gips, 1966, p. 1097; Program Area Committee on Accident Prevention, 1961, p. 287). The nurse confronted with critical emergencies, whether in the emergency department or elsewhere, must be able to evaluate the patient systematically and act accordingly to maintain life and function (Wagner, 1973, p. 376). The right kind of first aid depends on the situation; and the nurse's judgment in an emergency should be adjusted to the particular circumstances (Smith and Gips, 1966, p. 1088). Henderson (1969, p. vii) further emphasizes that when a physician is not available, the services provided utilizing knowledge and proper techniques, quickly and correctly applied, may save a life. The emergency room nurse may have to take the initiative to diagnose and treat life-threatening conditions if she is employed in a hospital where there is no in-house physician (Wagner, 1973, p. 375; Pilcher, 1972, pp. 638-639).

Learning life-saving procedures is the responsibility of the nurse if she is to operate within the constraints of good practice (Wagner, 1973, p. 375). The responsibility to initiate emergency treatment independently in the absence of a physician obligates nurses to have advanced knowledge and skills in resuscitation and in initial care

of the injured (Boyd, et al., 1973d, p. 296). In an effort to provide optimum nursing care the State of Illinois has established a four-week trauma Critical Care Course through which nurses are able to expand their role in the total care of the critically injured (Boyd, et al., 1973d, pp. 296-297). The course stresses the pathophysiology of trauma and its application to the clinical setting so that the nurse specialist receives the knowledge of the rationale for treatment and is prepared to act independently when necessary. On completion of the course, the trauma nurse specialists are prepared to: (1) initiate and participate in resuscitative measures; (2) initiate a systematic anatomical evaluation of the injured; (3) initiate immediate treatment; (4) summon appropriate physicians; (5) observe and evaluate the patient in the emergency department or intensive care unit; (6) perform the following procedures: insertion of peripheral or central venous catheters, insertion of male or female bladder catheters, insertion of nasogastric tubes, and endotracheal tubes; (7) record and make basic interpretations of electrocardiograms; (8) make basic interpretations and order radiological studies; (9) observe and monitor patients on mechanical ventilation; (10) collect and interpret laboratory results; and (11) carry out proper transfer procedures to include enroute care of

patients (Boyd, et al., 1973d, pp. 297-297). Thus at the end of the course the trauma nurse specialist is capable of exercising her clinical judgment in determining the need for immediate therapy in the absence of a physician. In the presence of a physician, the team is more effective with a knowledgeable nurse assistant who can anticipate the patient's needs (Boyd, et al., 1973d, p. 297).

Moidel and others (1971, p. 1241) state that foresight and practice increase the effectiveness of most individuals in urgent situations because prior knowledge eliminates fear of the unknown. The individual in crisis situations will call upon previous knowledge, thereby eliminating the need for lengthy rationalization. When an emergency situation occurs there is not time to wade through a first aid manual to find out what to do.

In the event of a disaster the nurse's responsibility changes dramatically. Rather than facing the needs of one patient, the nurse may be confronted with those of many at the same time. According to the American Medical Association (1962, pp. 16-17) the first function of the nurse under a mass casualty situation is to administer first aid. This may include artificial respiration, emergency treatment of open chest wounds, treatment of shock, relief of pain, and preparation of patients for movement. However, their

function is not limited to these procedures. During a disaster the triage (sorting of casualties) principle is utilized so that the greatest number of patients will receive the best care possible (Smith and Gips, 1966, p. 1100). This system makes for efficient use of time, personnel and supplies. Smith and Gips (1966, p. 1099) offer the following guidelines which may be used during a disaster: (1) make efficient use of both skills and time, (2) make economical use of supplies, (3) follow the cardinal rules of first aid, (4) develop a philosophy as to first priority for treatment of patients from the most seriously ill to most likely to benefit from treatment, and (5) nurses may have to take the responsibility to carry out techniques usually performed by physicians.

Good Samaritan Legislation

Good Samaritan legislation has been enacted in forty-six states since 1961. (Chayet, 1971, p. 161; Sarner, 1968, p. 86). The purpose of this legislation is two-fold, "to encourage the practitioner of the healing arts to render roadside emergency care and to protect the provider of care from later claims of malpractice" (Sarner, 1968, p. 86). The essential point in the test of malpractice is determined by reasonable actions "under the same or similar circumstances" (Sarner, 1968, p. 86).

The reason most frequently offered as to why the American physician is reluctant to render aid in emergency situations is that "he fears that legal involvement will result" (Chayet, 1969, p. 24). However, Chayet (1969, p. 25) states that legal liability resulting from rendering of aid to an emergency victim does not exist. "There have been no reported cases in which an injured stranger ministered to by a physician has sued the physician for malpractice" (Chayet, 1969, p. 25).

Roberts (1971, p. 831) suspects that the reluctance of many physicians to assist in emergency situations is influenced more by their inadequate training in emergency techniques rather than fear of litigation in Good Samaritan situations. Chayet (1969, p. 39) suggests that physicians are not certain of exactly what to do for the accident victim. A recent article in Emergency Medicine (1972, pp. 27-55) presented the results of a survey concerning a group of community physicians regarding their degree of emergent readiness. The response to two questions were of particular interest. One question asked the physician what portions of his colleagues would he confidently trust his own life if he were the victim of an acute emergency. The response to this question showed that over half of the doctors chose response (c) few of them. The other choices

were (a) most of them, (b) half of them, and (d) none of them. The other question of interest again concerned the physician as the victim. The question was posed as to whether the doctor's past training had been such that they would feel complete confidence in themselves as their own doctor. Again, nearly half of the physicians answered no. In summary, the editors stated that their survey demonstrated the absolute necessity for some form of training for individuals, particularly in trauma and that medical schools need to provide a program to their students for gaining the necessary skills for meeting the common day-to-day emergencies. As a remedy to the physicians apparent professional insecurity in matters of first aid, Chayet (1969, p. 39) also recommended that more programs in emergency care instruction be incorporated in medical schools and as post-graduate courses.

The nurse may also find herself facing emergencies involving patients for whom she is responsible and strangers whom she may encounter in either disaster or Good Samaritan situations (Chayet, 1969, p. 235). Chayet (1969, p. 235) further states that "one of the most important aspects of nursing is the necessity to act when a physician is absent and the nurse's ability to do so." Sarner (1968, p. 87) states that in the event of a true emergency the nurse should

"do only what is necessary to preserve life and what the emergency dictates, and turn the patient over to the physician for continued treatment as soon as possible."

The nurse does not usually need to be concerned about the crime of practicing medicine in an emergency situation because of an exemption for emergency care in the medical licensing statute (Chayet, 1969, p. 237). Not all states include the nurse in their Good Samaritan statutes. This fact should not however discourage the nurse from rendering assistance commensurate with her ability. The nurse "will be held to exercise the same standard of care as the prudent nurse giving aid in the same community under the same circumstances" (Chayet, 1969, p. 244).

Testing with the Multiple Choice Question

As has been shown, research, planning and legislation are involved in the efforts to improve emergency medical services which will allow victims of serious accidents to receive proper treatment at the accident site and enroute to medical facilities for definitive medical care. Once all aspects of emergency care, including the training of medical personnel have been coordinated, the post-accident disability and mortality rate should decline. Because of the pivotal role of the emergency room nurse in this process as the person who frequently sees the accident victim initially upon his

arrival to the emergency department, the nurse's knowledge of first aid is crucial. However, as yet, no studies have been found to verify the emergency room nurse's knowledge of first aid. The present study offers one instrument, utilizing the multiple choice test format, for verification of this essential knowledge. The remainder of this chapter outlines the characteristics and guidelines for construction of this selection-type test.

Lindvall (1967, p. 10) states that the use of tests are valuable only if properly constructed, the results correctly evaluated and then used to improve methods of teaching. One form of testing is the multiple choice test. The multiple choice test question is one of three selection-type tests. Some advantages of the multiple choice test are: (1) it can be scored in a completely objective manner, (2) it is the most flexible and versatile of all selection-type tests, and (3) it can be used to measure instructional objectives at all levels of the cognitive domain (Blood and Budd, 1972, p. 81; Lindvall, 1967, p. 31; Marshall and Hales, 1971, p. 93). Other strengths of the multiple choice test include: (1) a large number of items can be answered during a normal examination period; (2) ambiguity is relatively less difficult to control in the multiple choice item; (3) tests may be scored rapidly, accurately, and objectively (Marshall

and Hales, 1971, p. 96). Some weaknesses of the multiple choice item are: (1) the item is difficult to write, requiring time and effort; (2) more time is required to answer multiple choice items as compared to true-false items, and (3) it cannot be used to measure an examinee's ability to organize materials or to clearly express his answers according to acceptable language usage rules (Marshall and Hales, 1971, pp. 92-93).

In format, the multiple choice test item consists of an introductory stem, foils or distractors, and a keyed response (Blood and Budd, 1972, p. 81; Marshall and Hales, 1971, p. 96; Brown, 1971, p. 56). The stem presents the problem or asks the question and sets an appropriate frame of reference (Blood and Budd, 1972, p. 81; Marshall and Hales, 1971, p. 98). The alternates, or the distractors and keyed response, serve to refine and delimit the general frame of reference established in the stem so that the one best alternate will appeal to the well-informed individual (Marshall and Hales, 1971, p. 103). When well constructed, the alternates offer an attractive set of options for answering the problem referred to in the stem (Marshall and Hales, 1971, p. 103). The keyed response must be the best of the offered responses than any other alternate and as the answer must be fully acceptable to competent authorities

(Marshall and Hales, 1971, p. 103). Distractors serve as plausible answers to the examinee who does not know the answer (Marshall and Hales, 1971, p. 106). The effectiveness of the foils and the similarity among all alternates determines the difficulty of the item (Marshall and Hales, 1971, p. 108).

The number of alternatives in an item depends on the type and content of responses used and the ability of the writer to construct good foils (Marshall and Hales, 1971, p. 109). The use of a poor foil may be a deterrent to test reliability and validity and a waste of the writer's time (Marshall and Hales, 1971, p. 108). In recommending the use of three alternatives, Tversky (1964, p. 390) maintains that:

whenever the amount of time spent on the test is proportional to its total number of alternatives, the use of three alternatives at each choice point will maximize the amount of information obtained per time unit.

Guidelines suggested for constructing multiple choice items (Blood and Budd, 1972, pp. 89-94; Brown, 1971, p. 58; Marshall and Hales, 1971, p. 111) include the following:

1. The stem contains a clearly defined problem;
2. Write as clearly, simply, briefly, and correctly as possible; eliminate all nonfunctional words;

3. Responses should not overlap so that one response includes one or more other responses;
4. Responses should be approximately the same length;
5. Write concise, unambiguous, and grammatically correct items;
6. Avoid the use of either "none of these" or "all of these" as final responses;
7. Vary the position of the answer, and have an approximately equal distribution of answers in the various response positions;
8. The stem of the item should not provide a clue to the correct response;
9. Incorporate in the stem all words which would otherwise need to appear in each alternate;
10. Adhere to any logical ordering of the alternates which might exist;
11. Make every foil appealing to the students who do not know the correct answer.

Summary

This chapter was concerned with demonstrating the critical importance of a knowledge of first aid. A review of the status of present emergency medical services; accident statistics; the nature of first aid, the A-B-C-D's

of emergency resuscitation; recommendations for changes in emergency care; the nurse and first aid; and Good Samaritan legislation was presented. Finally having demonstrated the necessity for a knowledge of first aid, the development of a test utilizing the multiple-choice format, was offered as one way to estimate the emergency room nurse's actual familiarity with proper first aid procedures.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

Introduction

In this study emergency room nurses were tested to determine their knowledge of first aid. This chapter discusses the locale and population of the study and the methods used in collecting and analyzing the data.

Locale

For convenience in collecting the data, the locale for this study was a large metropolitan city with general hospitals associated with the local hospital council and which employed emergency room nurses on a full-time basis. The fifteen general hospitals belonging to the council have bed capacities ranging from thirty-four to approximately thirteen-hundred beds, and many maintained emergency room services which were available to the public twenty-four hours each day.

In this city the hospital emergency facilities vary in their scope of capabilities, staffing and available support services. The hospitals in this city are decentralized and the emergency capabilities of the

hospitals are not categorized according to the guidelines set up by the American Medical Association.

The city in this study utilizes highly trained fire department personnel to respond to the majority of ambulance calls. These firemen are well trained in first aid techniques and are licensed by the State as emergency medical technicians. Their training emphasizes initial care and treatment at the scene of an accident rather than speed in reaching the hospital. Modern modular type vehicles with the latest equipment are used as ambulances.

Population

The target population of this study consisted of emergency room nurses from general hospitals belonging to the local hospital council and located within a large metropolitan city. The list of potential participating hospitals was obtained from the local hospital council. The hospitals in this city provided a large number of emergency room nurses who have a variety of educational backgrounds and months of emergency room experience.

The sample population consisted of emergency room nurses currently involved in emergency room nursing. Nurses comprising the sample population, chosen from the target population, met the following criteria:

1. The nurse will be an emergency room nurse.
2. The nurse will have volunteered to participate in the study.
3. The nurse will be regularly assigned to the emergency room on a full-time basis.
4. The nurse must be registered.
5. The nurse will have been educated in a United States school of nursing.

Development of the Tool

Since there was no tool available to measure first aid knowledge, a first aid test was developed. From a review of the literature (Gardner and Roylance, 1971; Committee on Injuries, American Academy of Orthopaedic Surgeons, 1971; Committee on Trauma, American College of Surgeons, 1966; Cole and Puestow, 1965; The American National Red Cross, 1969) it was found that first aid care was grouped into several main categories. The categories most frequently cited and utilized in this study included the following:

1. Immobilization and transportation, fractures;
2. Heart attack, convulsions;
3. Foreign objects: eye, air passages, food passages;
4. Diabetic shock, coma, reactions to insulin;
5. Obstetrics and emergency delivery;
6. Shock

7. Cardiopulmonary resuscitation;
8. Poisoning;
9. Burns;
10. Wounds, diagnosis and treatment;
11. Ill effects of heat and cold;
12. Head injury, internal injury;
13. Animal bites, insects.

The investigator held informal interviews between nurses, physicians and instructors involved in emergency care in this city. They were held to determine if any areas were identified that differed from those in the literature; however, areas identified were essentially the same.

From the literature and interviews, eighty-three items were collected. These items were given to ten Master's level medical-surgical nursing students to determine weaknesses in each item. From an analysis of their responses to the questions and the written comments from the nursing students, the items were reworded so that they were concise, unambiguous and grammatically correct. Items which asked the same question in a different way were analyzed to determine the optimum item.

After removal of duplicate items, the remaining seventy items were given to a panel of judges to establish

content validity. Appendix A presents the seventy items given to the panel of judges. Validity and reliability of a tool are two criteria that are important when developing a data-collecting tool. Validity is established when a tool measures what it is supposed to measure (Abdellah and Levine, 1971, p. 712), and reliability is established when the tool collects data that is consistent, accurate and precise (Abdellah and Levine, 1971, p. 707).

Panel of Judges

A panel of judges with expertise in the areas of first aid and test construction was chosen to evaluate content validity. The following persons served on the panel:

1. Doris Nelson, R.N., Supervisor, Emergency Department, Parkland Memorial Hospital, Dallas, Texas, with twenty-one years of experience in nursing including fifteen years experience in the emergency room.
2. Frank H. Kidd, Jr., M.D., Baylor University College of Medicine; Fellow American College of Surgeons; Member of the Southwestern Surgical Conference, Western Surgical Association, Texas Surgical Society; Assistant Clinical Professor of Surgery, Southwestern Medical School;

attending surgeon at Baylor, Parkland, Gaston, and Presbyterian Hospitals; presently Chairman of the local Trauma Committee, American College of Surgeons and Chairman of the Medical Advisory Committee to the City of Dallas; member of the Emergency Service Committee of the Dallas County Medical Society.

3. Howard Huntsman, E.M.T.; Emergency Medical Technician Course Coordinator and Director of Emergency Medical Services, Dallas, Texas.
4. J. Brown Greer, Ph.D. in Psychology, University of Louisville; eight years of experience in education, presently Visiting Lecturer, Texas Woman's University and Associate Professor, Northern Illinois University; member of the American Association for the Advancement of Science, the American Psychological Association, the American Statistical Association; author or co-author of fourteen articles including:
"The Estimation of Knowledge by Multiple-choice Tests," American Statistician, (22), 1968, 35-36;
"Two Models for Multiple-choice Tests," Proceedings APA, (3), 1968, 251-252; "Logical Analysis of Multiple-choice Tests," Proceedings APA. (4). 1969, 143-144.

The panel members with first aid expertise were given an explanation of the study and were asked to answer three questions concerning the seventy items.

1. How adequately do these questions sample first aid knowledge?

0 1 2 3 4 5

Not at all

Very well

2. Please list the question number with the answers with which you strongly disagree. Do you agree with the remaining answers? Yes _____ No _____.
3. Do you agree that the test is ready for preliminary testing? Yes _____ No _____.

The responses of the judges changed four of the seventy items. Each of the changes was given to each judge until all agreed upon the final seventy items. The final evaluations by the three judges were:

1. Judge 1 gave a rating of 4.
2. Judge 2 gave a rating of 4.
3. Judge 3 gave a rating of 5.

The first aid test was composed of two parts, as presented in Appendix B. Part I contained the personal data sheet and a separate answer sheet. The personal data sheet was designed to obtain factual information about

the sample population. The separate answer sheet was used to save time in scoring, increase scoring accuracy and permit reuse of the test booklet. Part II contained the instructions for the examination and the seventy items. The seventy multiple-choice items and three additional questions were developed to obtain quantitative data in terms of correct responses about the sample population's knowledge of first aid.

Guidelines given by an expert on test construction were followed in constructing the examination. To minimize the time required to take the test in the hospital setting and allow for more questions to be included in the test, speed was built into the test. His guidelines were as follows:

1. Keep the situation and the choices as short as possible.
2. Use three alternatives per question. Item analysis shows that the fourth distractor is usually a poor distractor.
3. Avoid the use of all of above, none of above, both, etc.
4. Avoid compounds or complex alternatives because of partial knowledge.

5. Avoid repeats in alternatives to maximize reading speed.
6. Try for independent alternatives.
7. Avoid use of singular stem with plural response.
8. Only include negative questions which your panel of judges feel that knowing what not to do is at least as important as knowing what to do.
9. Eliminate or reword any question where change in practice may lead to two alternatives possibly being considered proper.
10. Check the distribution of correct answers, about one-third should be alternative A, one-third alternative B, and one-third alternative C.
11. Avoid overlap in alternatives; for example, lower one-half includes lower one-fourth and hence may be partially correct.
12. Determine what policy will be used in scoring the ranking questions. Do you give partial credit for getting first item correct? Perhaps there is some debate over the order? This is a fairly important policy decision that has implications for test use and interpretation.
13. If the goal of the research is to assess how much nurses know, one approach is to be taken; but if

the goal is to make comparisons among different groups of nurses (or hospitals), another approach is desirable. The first goal is called assessment (or estimation of knowledge), while the second is called discrimination (or telling groups apart). For example, the nurses in two hospitals may have the same total score correct, but miss entirely different types of items. Unfortunately, it is impossible to meet both goals with the same test, and the next step in test construction depends on which goal is selected.

14. Group negative questions at the end of the test.

The multiple-choice type question was chosen on the following criteria (Marshall and Hales, 1971, pp. 93-96):

1. Of all the selection type tests it is the most flexible and versatile.
2. It is adaptable for use in most subject areas.
3. A large number of items can be answered.
4. It can be scored rapidly, accurately and objectively.

Preliminary Testing

Preliminary testing was conducted for the following reasons to gain familiarity with the tool; to determine if

the method of data collection was feasible; to insure that the instructions were clear and easily understood; to determine the amount of time necessary to take the test; to examine the validity; and to determine if the demographic data sheet collected personal data in a feasible manner.

It was hypothesized that if the test was really measuring specialized knowledge one would expect laymen to give different answers than nurses and, within the nursing field, one might expect Master's level nursing students to behave differently than emergency room nurses.

Three groups were selected by volunteer sampling to participate in the preliminary testing. The emergency room nurses were selected from the local emergency room nurses association. Thirty-seven nurses volunteered and thirty-three met the criteria for selection. Of the four not selected, two were licensed vocational nurses and two were not educated in a United States school of nursing. Thirty, beginning Master's level, medical-surgical, nursing students from Texas Woman's University volunteered to participate in the preliminary testing. All of these students had Baccalaureate degrees in nursing and had approximately two weeks of graduate study at the time of testing. Thirty people without degrees in nursing were selected from the surrounding area by volunteer sampling to participate in the preliminary testing.

The demographic data sheet utilized during the preliminary testing was found to present difficulties in tallying the data. Revisions were made in the data sheet to make this process easier. Additional personal data questions added included: (1) size of hospital in which the nurse was employed, (2) professional staff present in the emergency room during each eight-hour shift, (3) position of the nurse in the emergency room, and (4) whether the nurse had taken the test before. To facilitate scoring of the tests and to allow reuse of the questions, an IBM answer sheet was selected.

The tests were scored to determine the number of correct responses. The mean scores for each group were as follows: (1) lay group, 34.26; (2) emergency room nurses, 44.21; and (3) Master's level nursing students, 46.60. Appendix C presents a summary and comparison of the number of correct responses and the mean scores of the three preliminary test groups. Appendix D summarizes the proportion correct from the three groups and presents the results in the form of cumulative per cent. Figure 1 graphically presents the proportion correct from the three groups based upon the cumulative per cent for each group. From Figure 1 it is seen that the Master's level nursing students and the emergency room nurses scored higher than the lay group. The

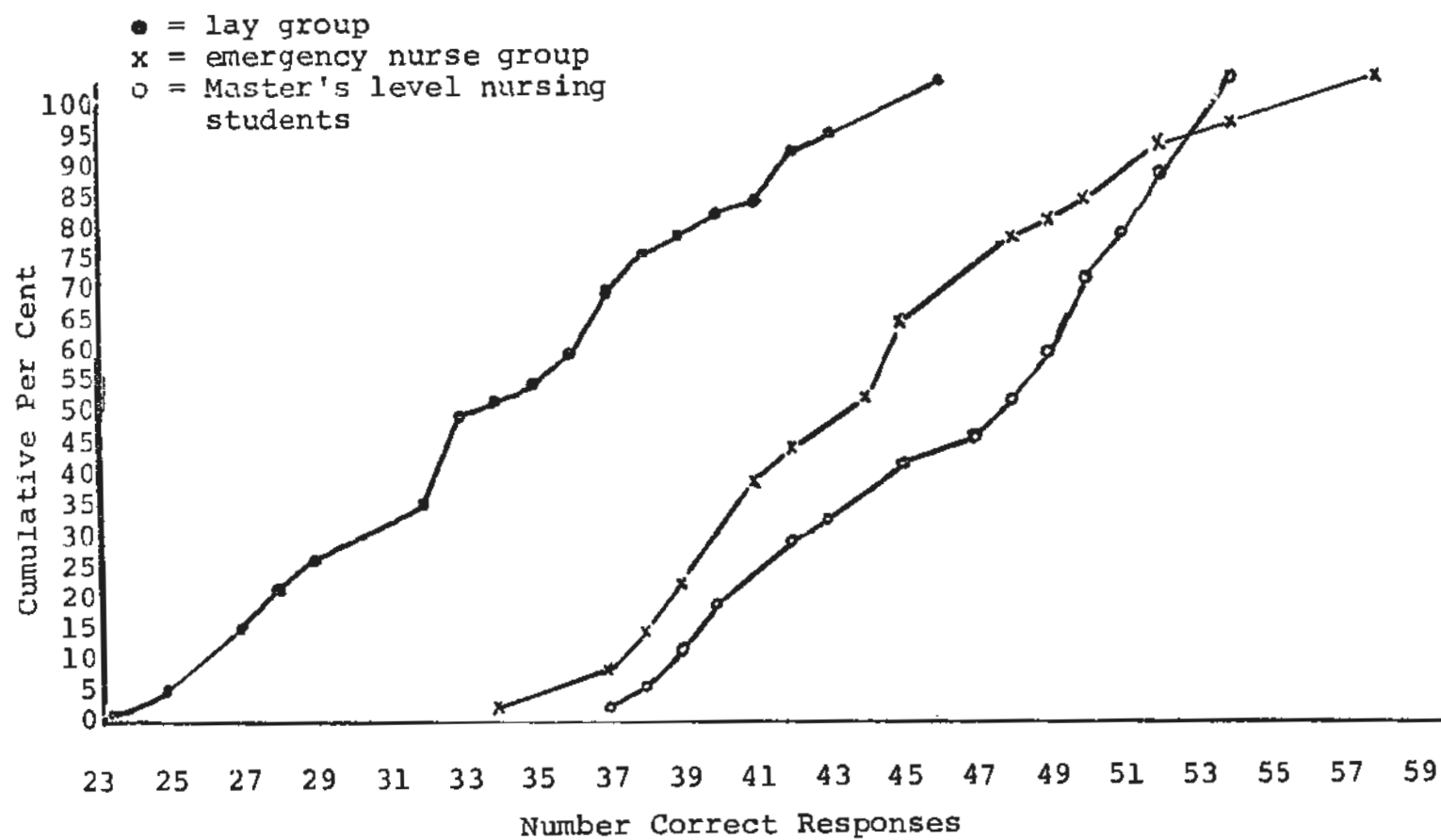


Fig. 1.--Preliminary Testing Proportion Correct from Three Groups

Master's level nursing students scored higher than the emergency room group. The results of the preliminary testing intuitively suggested that the test was valid and there was a difference between the test scores of the groups.

The reliability of the emergency room nurses' test scores was determined by the odd-even method of calculation using the Pearson Product-Moment Correlation and corrected for total test length by means of the Spearman-Brown Prophecy formula. The Pearson-Product-Moment Correlation (r) is used to determine if there is a relationship between two sets of paired numbers (Bruning and Kintz, 1968, p. 152). Application of the Spearman-Brow-Prophecy formula allows one to estimate the reliability of the complete test (Isaac and Michael, 1971, p. 87). The corrected reliability coefficient for the emergency room nurses' test scores was 0.63. The basic computational formulas for the Pearson Product-Moment correlation and the Spearman-Brown formula are given in Appendix E.

Thru the preliminary testing and revisions the foreseeable errors were eliminated and the tool was deemed valid and reliable as a data-collecting instrument. The tool was ready for actual application to a sample population.

Selection of the Sample Population

Names and locations of sixteen general hospitals in the city were extrapolated from the 1972 edition of the Dallas Hospital Council, a pamphlet containing data about the member hospitals in the area. The hospitals were called by the investigator to explain the purpose of the study and to determine the possibility of receiving permission to utilize these hospitals in obtaining the emergency room nurses for this study. Eight hospitals from this list had full-time emergency room nurses and gave verbal permission to use their hospital in the study. The hospitals were visited by the investigator and written permission was obtained from six hospitals to conduct the study (Appendix F). In two of the hospitals, it was found that all of their full-time emergency room nurses had participated in the preliminary testing. These hospitals were omitted from the list of participating hospitals. The emergency room nurses were selected who met the following criteria:

1. The nurse was an emergency room nurse.
2. The nurse volunteered to participate in the study.
3. The nurse was regularly assigned to the emergency room on a full-time basis.
4. The nurse was registered.

5. The nurse was educated in a United States school of nursing.

Method of Data Collection

All participating hospitals were visited by the investigator to obtain written permission from the hospital and to administer the tool. All nurses who met the above criteria were contacted and asked to volunteer to participate in the study. The test was given to all nurses who volunteered to participate. To insure anonymity of all participants as well as the hospitals, the investigator requested that the participants not sign their name nor their hospital name to any part of the tool.

The following procedure was utilized in administering the test:

1. Read the instructions contained in the tool and answered any questions.
2. The participants were requested to fill out the demographic data sheet.
3. The investigator did not answer any questions pertaining to the actual test items during the examination.
4. The investigator did not answer any questions contained in the tool until the study was completed in all participating hospitals.

Procedure for Analysis of Data

This study was concerned with measuring the emergency room nurse's knowledge of first aid as compared with that of: (1) lay persons, and (2) Master's level nursing students. The study was also concerned with determining if the emergency room nurse's scores were influenced by: (1) months of emergency room experience, and (2) educational background.

To measure the emergency room nurse's knowledge of first aid the tests were scored to determine the number of correct responses. The mean of the group of emergency room nurses' scores were compared with those of lay persons and Master's level nursing students to determine if a significant difference existed. The emergency room nurse's test scores were analyzed to determine if the nurses' educational background or months of emergency room experience influenced the test scores.

To compare the emergency room nurse's test scores with those of lay persons, Master's level nursing students and the nurses' educational background, Analysis of Variance was utilized. This test is a powerful statistical tool for analyzing multiple comparisons and employs the F-test in the test of significance (Abdellah and Levine, 1971, p. 344). The Scheffé test of contrasts is used when the

F-ratio from the analysis of variance is significant (Scheffé, 1959, p. 158). It is used to determine what difference or differences is responsible for the significance of the F-test.

The influence of months of emergency room experience upon the test scores was tested utilizing the Pearson Product-Moment Correlation. This test is used to determine if there is a relationship between two sets of paired numbers (Bruning, 1968, p. 152).

Summary

This chapter was concerned with the procedure used in collecting and treating data to meet the purposes of this study. A first aid examination was developed as a method to measure first aid knowledge. Content validity was established by a panel of judges with expertise in first aid. Reliability was established from preliminary testing using emergency room nurses' test scores. The data were collected by the investigator administering the test to emergency room nurses who met the selected criteria of locale, occupation, and of eligible participation. The tests were scored to determine the number of correct responses. Analysis of Variance was used to determine if the educational background of the emergency room nurse influenced the test scores and if there was a significant

difference between the test scores of the three groups. The Scheffé test of contrasts was applied to any significant F-ratio obtained from the Analysis of Variance. The Pearson Product-Moment Correlation was used to determine if months of emergency room experience influenced the test scores.

CHAPTER IV

ANALYSIS AND TREATMENT OF DATA

Introduction

This study was concerned with measuring the emergency room nurse's knowledge of first aid as compared with that of: (1) lay persons, and (2) Master's level nursing students. The study was also concerned with determining if the emergency room nurse's scores were influenced by: (1) months of emergency room experience, or (2) educational background. This chapter will be concerned with analyzing and interpreting the data collected from the sample population of forty emergency room nurses as compared to the test scores of lay persons and Master's level nursing students. The data will also be analyzed to determine if the emergency room nurses' test scores were influenced by their months of emergency room experience or their educational background.

Description of the Sample

The nurses composing the sample population were from general hospitals belonging to the local hospital council and located within a large metropolitan city. The sample

population was composed of forty emergency room nurses, all female, who: (1) were assigned to an emergency room department on a full-time basis, (2) received their education in a United States school of nursing, (3) volunteered to participate in the study, and (4) had not participated in the preliminary testing.

The age distribution of the sample population is summarized in Table 1. This table indicates that 90 per cent of the nurses in the sample population were in the twenty to thirty-four year age group, 5 per cent were in the forty to forty-four year age group, and 5 per cent were in the fifty-five to fifty-nine year age group.

TABLE 1
AGE DISTRIBUTION OF THE SAMPLE POPULATION

Age Group in Years	Number in Each Group	Per Cent of Total
20-24	16	40
25-29	16	40
30-34	4	10
35-39	0	0
40-44	2	5
45-49	0	0
50-54	0	0
55-59	2	5
Total	40	100

Seven nurses or 17.5 per cent of the sample population worked in one of four hospitals with bed capacities of 505 beds or less. The remaining thirty-three nurses or 82.5 per cent of the sample population worked in one of two hospitals with bed capacities of 800 beds or more.

Thirty-six or 90 per cent of the nurses from the sample population worked in a staff nurse position. Two nurses or 5 per cent of the population occupied head nurse positions and two nurses were assistant supervisors.

Presentation and Analysis of Data

The first aid examination, composed of seventy multiple-choice questions grouped into thirteen categories, was given to forty emergency room nurses who met the established criteria. The tests were scored to determine the number of correct responses out of the seventy questions. The sample population's test scores were compared with the preliminary test scores of the Master's level nursing students and the lay group to determine if differences existed between the groups. The emergency room nurses' test scores were analyzed to determine if the nurse's educational level or months of emergency room experience influenced the test scores.

Analysis of variance was used to determine if there was a significant difference between the test scores of the

three groups and if the emergency room nurses' test scores were influenced by their educational background. This test is a powerful statistical tool for analyzing multiple comparisons and employs the F-ratio in the test of significance (Abdellah and Levine, 1965, p. 344). The Scheffé test of contrasts was used when the F-ratio from the analysis of variance was significant. This test is used to determine what difference or differences is responsible for the significance of the F-ratio (Scheffé, 1959, pp. 66-70).

The Pearson Product-Moment Correlation was used to determine if there was a significant correlation between the emergency room nurses' test scores and their months of emergency room experience. A critical-ratio z-test was applied to test the significance of the correlation coefficient (r) obtained (Bruning and Kintz, 1968, p. 155).

Hypothesis 1

The first hypothesis formulated for the purposes of this study was that there would be no significant difference between the emergency room nurses' test scores and the lay persons' test scores. Appendix G summarizes the number of correct responses and the mean scores from the three groups (emergency room nurses, lay group, and Master's level nursing students). The mean scores from the emergency room nurses' group was 45.90, the mean score for the lay group was

34.26, and the mean score for the Master's level nursing students was 46.60. One can see that while there is a conspicuous variation between the mean scores of the lay and professional groups (12.34), between those of the emergency room nurses and the Master's level nursing students there is only a difference of 0.70. A summary of the proportion of correct responses in cumulative per cent is given in Appendix H. Figure 2 graphically presents the proportion correct from the three groups based upon the cumulative per cent for each group. From Figure 2 it is seen that the emergency room nurses scored higher than the lay group and were approximately equal to the Master's level nursing students.

The mean scores for the three groups (emergency room nurses, lay persons, and Master's level nursing students) were analyzed by Analysis of Variance to determine if there was a significant difference between the groups. The F-ratio from the Analysis of Variance was 51.65. A critical value of 7.76 with 2 and 97 degrees of freedom is significant at the .01 level. From this analysis it was concluded that there was a significant difference in test scores between the groups. Table 2 summarizes the Analysis of Variance between the three groups.

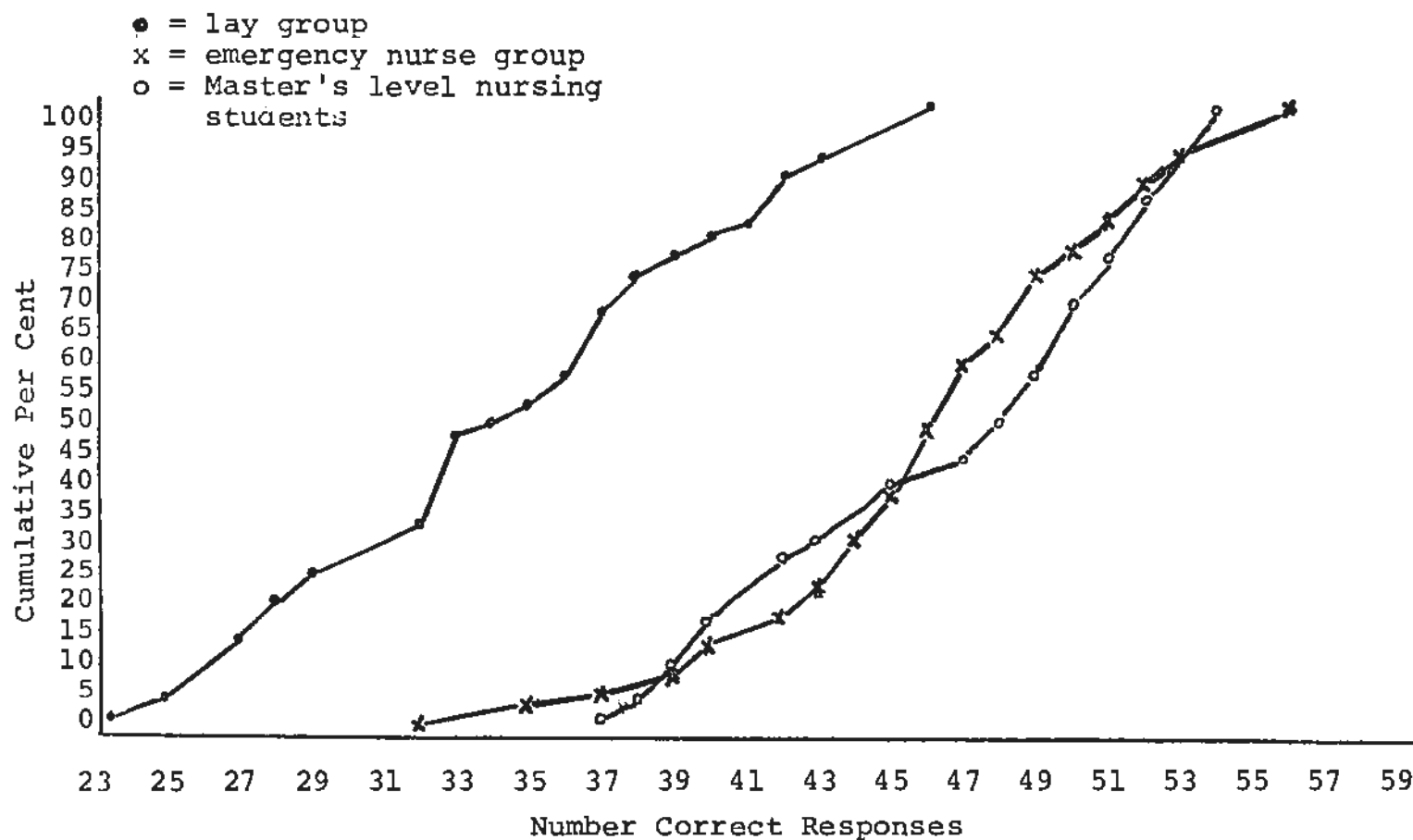


Fig. 2.--Proportion Correct from Three Groups

TABLE 2

ANALYSIS OF VARIANCE BETWEEN THREE GROUPS

Group Variance	Sum of Squares	Degrees Freedom	Mean Square	F-ratio
Between	2,998	2	1,499	51.65 ^a
Within (error)	2,815	97	29.02	
Total	5,813	99		

^aTable F $_{2,97} (.01) = 7.76$.

The Scheffé test of contrasts was applied to determine what was responsible for the significance of the F-ratio obtained from the Analysis of Variance between the three groups. An F-ratio of 6.88 was obtained from the mean scores of the emergency room nurses group and the lay group. An F-ratio of 0.289 was obtained from the mean scores of the emergency room nurses and the Master's level nursing students. A critical value of 4.00 with 2 and 97 degrees of freedom is significant at the .05 level. From the results of the Scheffé test it was concluded that there was a significant difference between the emergency room nurses group and the lay group. It was further concluded that there was not a significant difference between the emergency room nurses group and the Master's level nursing student

group. Table 3 summarizes the Scheffé test between selected groups.

TABLE 3
SCHEFFÉ TEST BETWEEN SELECTED GROUPS

<u>Group</u>	<u>F-ratio</u>
Emergency Room versus Lay.....	6.88 ^a
Emergency Room versus Master's.....	0.289

^aTable $F_{2,97} (.05) = 4.00$

The significance between the emergency room nurses group and the lay group may indicate that the emergency room nurse understands medical terminology and therefore understands the questions. The lay person has not had the nursing education and clinical exposure that the nurse has had, therefore, one might expect the lay person to score lower on the first aid test.

It was determined that there was a significant difference between the emergency room nurses' test scores and the lay groups' test scores. Therefore, the first null hypothesis was rejected.

Hypothesis 2

The second hypothesis formulated for the purposes of this study was that there would be no significant difference between the emergency room nurses' test scores and the

Master's level nursing students. Appendix G summarizes the number of correct responses and the mean scores for the emergency room nurses' group and the Master's level nursing students, and the lay group. The mean score for the emergency room nurses' group was 45.90 and the mean score for the Master's level nursing students was 46.60. Figure 2 graphically presents the proportion correct from the three groups based upon the cumulative per cent for each group. From Figure 2 it is seen that the emergency room nurses' scores were approximately equal to the Master's level nursing students.

The mean scores for the three groups were analyzed by Analysis of Variance to determine if there was a significant difference between the groups. The F-ratio obtained from the Analysis of Variance was 51.65. A critical value of 7.76 with 2 and 97 degrees of freedom is significant at the .01 level. From this analysis it was concluded that there was a significant difference between the groups. Table 2 summarizes the Analysis of Variance between the three groups. An F-ratio of 0.289 was obtained on the mean scores of the emergency room nurses group and the Master's level nursing students group. A critical value of 4.00 with 2 and 97 degrees of freedom is significant at the .05 level. From the results of the Scheffé test it was concluded that there

was not a significant difference between the emergency room nurses group and the Master's level nursing student group. Table 3 summarizes the Scheffé test between selected groups.

The lack of significance between the emergency room nurses group and the Master's level nursing students may indicate that both groups understand medical terminology and therefore understand the questions. Both groups had a nursing education background and clinical exposure which may have made the groups similar and may have contributed to the lack of significance. The first aid course content of the different types of nursing schools represented may be similar and as such, the two groups' background of first aid knowledge may be much the same. The emergency room nurse has been exposed to emergency situations and the Master's level nursing student has not been exposed to as many emergency situations, but the Master's level nursing student may have kept current on medical and nursing practices which may have made the groups again similar and contributed to the lack of significance.

It was determined that there was not a significant difference between the emergency room nurses' test scores and the Master's level nursing student's test scores. Therefore the second null hypothesis was accepted.

Hypothesis 3

The third hypothesis formulated for the purposes of this study was that there would be no significant difference between the emergency room nurses' test scores and their educational background. The test scores for the emergency room nurses were divided into three groups based upon the educational level of the nurse (Associate Degree, Diploma, Baccalaureate Degree). Table 4 summarizes the emergency room nurses' mean scores with their educational background.

TABLE 4
MEAN SCORES AND EDUCATIONAL BACKGROUND
EMERGENCY ROOM NURSES

	Groups			
	Associate Degree	Diploma	Baccalaureate	Total
Number of Nurses	8	14	18	40
Per Cent of Total	20%	35%	45%	100%
Mean Score	43.37	47.42	45.83	45.54

Table 4 shows that 45 per cent of the nurses in the sample population had Baccalaureate Degrees, 35 per cent were Diploma graduates, and 20 per cent were Associate Degree nurses. From Table 4 it is seen that the highest mean score was obtained by the Diploma nurses. Nurses with

an Associate Degree obtained the lowest mean score of the three groups.

The total scores for the three groups (Associate Degree, Diploma, Baccalaureate) were analyzed by Analysis of Variance to determine if there was a significant difference between the test scores of the groups. An F-ratio of 1.69 was obtained from the Analysis of Variance. A critical value of 3.32 with 2 and 37 degrees of freedom is significant at the .05 level. From this analysis it was concluded that there was not a significant difference between the test scores and the emergency room nurses' educational background. Table 5 summarizes the Analysis of Variance between the educational levels of the emergency room nurses.

The lack of significance between the educational levels and test scores may be due to the fact that this test was designed to measure generalized first aid knowledge and not in-depth knowledge of nursing principles as applied to the patient in need of emergency care. This test may not be sensitive enough to discriminate between the educational levels of nurses. The theoretical course content concerning first aid among the different types of nursing schools may be similar and as such, the

the emergency room nurses' knowledge of first aid may be similar, regardless of her educational background.

TABLE 5
ANALYSIS OF VARIANCE BETWEEN EDUCATIONAL LEVELS
OF EMERGENCY ROOM NURSES

Group Variance	Sum of Squares	Degrees of Freedom	Mean Square	F-ratio
Between	83.79	2	41.89	1.69 ^a
Within (error)	913.81	37	24.69	
Total	997.60	39		

^aTable F $_{2,37} (.05) = 3.32$.

It was determined that there was not a significant difference between the emergency room nurses' test scores and their educational background. Therefore, the third null hypothesis was accepted.

Hypothesis 4

The fourth hypothesis formulated for the purposes of this study was that there would be no significant correlation between the emergency room nurses' test scores and their months of emergency room experience. A summary of the

emergency room nurses' months of experience in the emergency room is presented in Table 6.

TABLE 6
EMERGENCY ROOM EXPERIENCE

Months of Experience	Number in Each Group	Per Cent of Total
0-6	12	30.0
7-12	4	10.0
13-18	4	10.0
19-24	4	10.0
25-30	2	5.0
31-36	2	5.0
37-42	1	2.5
43-48	5	12.5
49-54	1	2.5
55-60	1	2.5
61-66	1	2.5
73-78	1	2.5
79-84	1	2.5
115-120	1	2.5
Total	40	100.0

From this table it can be seen that 60 per cent of the nurses had less than twenty-four months of experience and 25 per cent of the nurses had from twenty-four to forty-eight months of experience. The remaining 15 per cent of the nurses had from forty-eight to one-hundred-twenty months of experience.

The individual examination scores and the nurses' months of emergency room experience were paired. The Pearson

Product-Moment Correlation was applied to determine if there was a significant relationship between the two sets of paired numbers. The correlation coefficient obtained from the analysis of the data was .0634. The correlation is quite low and would not lead to any predictability. A critical-ratio z-test was applied to test the significance of r . A z-value greater than 1.96 is significant at the .05 level using a two-tailed test. A z-value of .3956 was obtained from the critical-ratio z-test analysis and it was concluded that there was not a significant correlation between test scores and the nurses' months of emergency room experience.

The fact that there was no relationship between the test scores and emergency room experience may indicate that previous work experience in emergency rooms was oriented toward the technical aspects of nursing rather than the assessment of clinical findings and their interpretation. The sample population's size may not have been large enough to include a wide enough range of experience to be statistically significant.

It was determined that there was not a significant correlation between the emergency room nurses' test scores and their months of emergency room experience. Therefore, the fourth null hypothesis was accepted.

Additional Findings

The demographic data gathered from the sample population provided additional information which was of interest to the investigator. Part of these additional findings (previous first aid course, critical care nursing experience, and age of nurse) were analyzed to determine if they influenced the test scores. Three additional questions concerning the emergency room nurse's awareness of and attitude toward continuing education were asked. And finally an item analysis was made of the responses to the test and the percentages of the correct responses were determined for each of the thirteen categories of first aid content.

Previous First Aid Course

The sample population was asked if they had taken a previous first aid course. Analysis of their responses showed that 60 per cent or twenty-four nurses had taken a previous first aid course and 40 per cent or sixteen nurses had not taken any first aid course.

The positive and negative responses were paired with the individual nurse's test scores. The t-test for a difference between two independent means was applied to determine whether the performance difference between two groups of subjects was significant (Bruning and Kintz, 1968,

p. 9). A t-value of .9179 was obtained with 38 degrees of freedom. The t-value which is significant at the .05 level for 38 degrees of freedom is equal to 2.031. Since the t-value obtained in this analysis was less than 2.031 it was concluded that there was no significant difference between the test scores and the positive and negative responses to whether the nurses had taken a previous first aid course.

Critical Care Nursing Experience

The sample population was asked to state how many months of experience they had in critical care areas other than the emergency room. An analysis of their responses showed that 60 per cent of the nurses did not have any critical care nursing experience while 35 per cent had from one month to thirty-six months experience and 5 per cent had from fifty-five to seventy-two months of critical care nursing experience. Appendix I summarizes the critical care nursing experience of the sample population.

The individual examination scores and the nurse's months of critical care nursing experience were paired. The Pearson Product-Moment Correlation was applied to determine if there was a significant correlation between the two sets of paired numbers. The correlation coefficient obtained

from the analysis of the data was 0.17. A critical-ratio z-test was applied to test the significance of r . A z-value greater than 1.96 is significant at the .05 level using a two-tailed test. A z-value of 1.06 was obtained from the critical-ratio z-test analysis and it was concluded that there was not a significant correlation between the test scores and the nurse's months of critical care nursing experience.

Age and Test Scores

The nurse's age and test score were paired and the Pearson Product-Moment Correlation applied and the r tested for significance with the critical-ratio z-test to determine if there was a significant correlation between the nurses' age and their test scores. An r of .09 was obtained from the Pearson Product-Moment Correlation. A z-value of .56 was obtained in testing the significance of r . A z-value of 1.96 is significant at the .05 level using a two-tailed test. It was concluded that there was not a significant correlation between the nurses' age and their test scores.

Three Additional Questions

The sample population were asked the following three questions:

1. Does the State of Texas have a Good Samaritan Law?
2. Do you feel there is a need for continuing education among nurses for first aid?
3. Do you feel that your knowledge of first aid is adequate?

The response to question 1 showed that 82.5 per cent of the nurses knew that the State of Texas has a Good Samaritan Law and 17.5 per cent did not know. In response to question 2, 100 per cent of the nurses felt that there was a need for continuing education among nurses for first aid. The response to question 3 showed that 50 per cent of the nurses felt that their knowledge of first aid was adequate and 42.5 per cent did not feel that their knowledge of first aid was adequate. Three nurses or 7.5 per cent of the sample population were uncertain about their knowledge of first aid. Appendix J presents a summary of the nurses' responses to the three additional questions.

Item Analysis by Category

The individual test questions were grouped into thirteen separate categories and analyzed to determine the number and per cent of response to each alternative. The overall per cent correct for each category was as follows:

Category I--Immobilization, transportation, fractures.

Average per cent correct 89.37.

Category II--Heart attack, convulsions.

Average per cent correct 90.62.

Category III--Foreign objects: eye; air and food

passages. Average per cent correct 48.12.

Category IV--Diabetic shock, coma, reactions to

insulin. Average per cent correct 59.5.

Category V--Obstetrics and emergency delivery.

Average per cent correct 67.5.

Category VI--Wounds, diagnosis and treatment.

Average per cent correct 56.60.

Category VII--Shock.

Average per cent correct 80.0.

Category VIII--Cardiopulmonary resuscitation.

Average per cent correct 52.95.

Category IX--Poisoning.

Average per cent correct 75.0.

Category X--Burns.

Average per cent correct 75.0.

Category XI--Ill effects of heat and cold.

Average per cent correct 59.37.

Category XII--Head and internal injury.

Average per cent correct 75.62.

Category XIII--Animal bites, insects.

Average per cent correct 65.83.

The in-depth item analysis is summarized in Appendix K.

Summary

This chapter was concerned with the analysis and treatment of the data obtained from the sample population. The preliminary test results from the lay group and the Master's level nursing students were compared with the test scores of the sample population. It was determined that there was a significant difference between the test scores of the nurses (emergency room nurses and Master's level nursing students) and those of lay persons and that within the nursing field there was no significant difference. It was further determined that there was not a significant difference between the emergency room nurses' test scores and their months of emergency room experience or their educational background.

The purposes of this study were to:

1. Compare the emergency room nurse's knowledge of first aid with that of:
 - a. lay persons, and
 - b. Master's level nursing students.

2. Determine if the educational background of the emergency room nurse influenced the test scores.
3. Determine if months of experience in the emergency room influenced the test scores.

For the purposes of this study the following null hypotheses were formulated:

1. There would be no significant difference between the emergency room nurse's test scores and the lay person's test scores.
2. There would be no significant difference between the emergency room nurse's test scores and the Master's level nursing students.
3. There would be no significant difference between the emergency room nurse's test scores and their educational background.
4. There would be no significant difference between the emergency room nurse's test scores and their months of emergency room experience.

Analysis of Variance was used to compare the emergency room nurse's knowledge of first aid with that of lay persons and Master's level nursing students. The Scheffé test of contrasts was utilized to test a significant F-ratio obtained from the Analysis of Variance. It was determined that there was a significant difference between the test

scores of lay persons and nurses and therefore the first null hypothesis was rejected. It was also determined that there was not a significant difference between the test scores of the emergency room nurses and Master's level nursing students and therefore the second null hypothesis was accepted.

The emergency room nurse's test scores were divided into three groups based upon the educational level of the nurses and analyzed to determine if there was a significant difference between the educational levels and scores. The F-ratio from the Analysis of Variance was not significant and therefore the third null hypothesis was accepted.

The nurse's test scores and months of emergency room experience were paired to determine if there was a significant relationship. The significance of the correlation coefficient from the Pearson Product-Moment Correlation was tested with the critical-ratio z-test. It was concluded from the analysis of the data that there was no significant relationship and therefore the fourth null hypothesis was accepted.

Additional findings of the study showed that there was not a significant difference between the test scores and the positive and negative responses to whether the emergency room nurse had taken a previous first aid course.

It was also found that there was not a significant correlation between the test scores and (1) the nurse's months of critical care nursing experience, or (2) their age.

A summary of the responses to the three additional questions was given in an effort to assess the need for continuing education. Finally an item analysis of the individual test questions was presented in average per cent correct for the categories which the examination was designed for.

CHAPTER V

SUMMARY, RECOMMENDATIONS, IMPLICATIONS AND CONCLUSIONS

Introduction

This study was concerned with measuring the emergency room nurses' knowledge of first aid as compared with that of lay persons and beginning Master's level nursing students. It further attempted to determine if the emergency room nurses' test scores were influenced by their months of emergency room experience or their educational background. A summary of these findings, together with their implications concerning nursing education, nursing service and lay awareness of first aid technique is presented in this chapter. Recommendations for further studies and the conclusions of this study is presented.

Summary

Eighty-three multiple choice questions, divided into thirteen categories, were developed from a review of first aid textbooks and interviews among nurses, physicians and instructors involved in emergency care. The categories most frequently cited and utilized in this study included the following: (1) immobilization, transportation, and

fractures; (2) heart attack and convulsions; (3) foreign objects: eye; air and food passages; (4) diabetic shock, coma, and reactions to insulin; (5) obstetrics and emergency delivery; (6) shock; (7) cardiopulmonary resuscitation; (8) poisoning; (9) burns; (10) wounds, diagnosis and treatment; (11) ill effects of heat and cold; (12) head and internal injury; and (13) animal bites and insects. The eighty-three items were given to ten Master's level, medical-surgical, nursing students to determine weaknesses in each item. From an analysis of their responses to the questions and their written comments the items were reworded so that they were concise, unambiguous and grammatically correct. Items which asked the same question in a different way were analyzed to determine the most appropriate item. Seventy items remained after this analysis. These seventy items were given to a panel of judges with expertise in the areas of first aid to establish content validity. The responses of the judges changed four of the seventy items. Each of the changes were given to each judge until all agreed upon the final seventy items.

The first aid test consisted of two parts. Part I contained the personal data sheet and a separate answer

sheet. Part II contained the instructions for the examination and the seventy items.

Preliminary testing was conducted to: gain familiarity with the tool; determine if the method of data collection was feasible, insure that the instructions were clear and easily understood, determine the amount of time necessary to take the test, and to examine the validity. It was hypothesized that if the test was really measuring specialized knowledge one would expect laymen to give different answers than nurses and, within the nursing field, one might expect Master's level nursing students to behave differently than emergency room nurses.

Three groups participated in the preliminary testing. The three volunteer groups included: (1) thirty-three emergency room nurses, (2) thirty beginning Master's level, medical-surgical, nursing students, and (3) thirty people without degrees in nursing. Analysis of the preliminary test scores showed clearly that Master's level nursing students and the emergency room nurses scored higher than the lay group. The Master's level nursing students scored slightly higher than the emergency room nurses. The mean scores for each group were as follows: (1) lay group, 34.26, (2) emergency room nurses, 44.21, and (3) beginning Master's level nursing students, 46.60. The results

intuitively suggested that the test was valid and there was a difference between the groups. A 0.63 reliability coefficient was calculated from the test scores of the emergency room nurses. The Pearson Product-Moment Correlation using the odd-even method and corrected for total test length by means of the Spearman-Brown Prophecy formula was utilized to calculate the reliability coefficient.

The sample population was composed of forty emergency room nurses, all female, who: (1) were assigned to an emergency room department on a full-time basis, (2) received their education in a United States school of nursing, (3) volunteered to participate in the study, and (4) had not participated in the preliminary testing. The nurses were employed in general hospitals located within a large metropolitan city and belong to the local hospital council.

The tests were scored to determine the number of correct responses. Analysis of Variance was used to determine if there was a significant difference between the emergency room nurses' test scores and those of the lay group and beginning Master's level nursing students. The Scheffé test of contrasts was utilized when the F-ratio from the Analysis of Variance was significant. This test determines what was responsible for the difference or differences

between the groups. Analysis of Variance was used to determine if the educational background of the emergency room nurse influenced their test scores. The Pearson Product-Moment Correlation was used to determine if months of emergency room experience influenced the test scores.

It was determined that there was a significant difference between the test scores of the nurses and those of lay persons and that within the nursing field there was no significant difference. Analysis of the data concerning the sample population determined that their test scores were not influenced by their educational background or their months of emergency room experience.

Additional demographic data from the sample population were analyzed to determine if this data influenced the emergency room nurses' test scores. Three additional questions concerning the emergency room nurses' awareness of and attitude toward continuing education were asked. And finally an item analysis was made of the responses to the test and the percentages of the correct responses were determined for each of the thirteen categories of first aid content.

It was determined that there was not a significant difference between the test scores and the positive and negative responses to whether the emergency room nurse had

taken a previous first aid course. It was also found that there was not a significant correlation between the test scores and the nurse's months of critical care nursing experience or their age. A summary of the responses to the three additional questions showed that 82.5 per cent of the nurses knew that the State of Texas has a Good Samaritan Law, all of the nurses felt that there was a need for continuing education among nurses for first aid, and 50 per cent of the nurses felt that their knowledge of first aid was adequate. The item analysis revealed the percentages of correct responses for each of the thirteen categories of first aid content.

Recommendations

Based on the findings of the study, the following recommendations have been made:

1. Studies be conducted to explore additional methods of measuring first aid knowledge of emergency room nurses.
2. Studies be conducted to determine if the size of the hospital in which the nurse is employed influences the test scores of the emergency room nurses.
3. Studies be conducted between emergency room nurses from small towns and large metropolitan

cities to determine if there is a difference between the test scores of the emergency room nurses in these communities.

4. Studies be conducted between full time emergency room nurses and part-time emergency room nurses to determine if there is a difference between these groups.
5. Studies be conducted between paramedical personnel (Emergency Medical Technicians) and emergency room nurses to determine if there is a difference between test scores of these groups:
6. Studies be conducted between emergency room staff nurses and supervisory personnel to determine if there is a difference between test scores of these groups.
7. Studies be made of freshmen, sophomore, junior, and senior nursing students to determine at which level the student nurse acquires knowledge of emergency first aid techniques.
8. Studies be conducted between emergency room nurses and nurses who work in other critical care areas of the hospital to determine if there is a difference between the test scores of these groups.

9. Studies be made on a larger population utilizing the present tool to determine if there is a difference in the results.
10. Studies be conducted on a larger population of nurses with Baccalaureate Degrees with and without critical care nursing experience to determine if there is a difference in test scores.

Implications

Implications for nursing education, nursing service, and education of the lay public are based upon the findings of this study which compared the emergency room nurses' knowledge of first aid with that of lay persons and beginning Master's level nursing students, as measured by the number of correct responses on a first aid test. The emergency room nurses' months of emergency room experience and their educational background were analyzed with the nurses' test scores to determine if these variables influenced the test scores. A baseline for estimation of the emergency room nurses' first aid knowledge has been established to serve as a guide in evaluating the emergency room nurses' knowledge of first aid.

Nursing Education

The findings have implications for nursing educators who assume the responsibility of teaching students first aid and care of patients in emergency situations. This study showed that the nursing groups (emergency room nurses and beginning Master's level nursing students) tended to score low on the first aid test, indicating that nurses do not have a generalized knowledge of first aid. Moreover, the item analysis from the test seems to indicate that the nurses have a limited knowledge of the clinical signs and symptoms of life-threatening conditions and have not kept current on changes in emergency care. One could infer that nursing educators need to increase course content on first aid and emergency care and to emphasize the clinical assessment of life-threatening conditions as well as to teach skills for treatment when there is no in-house physician present.

The response to the Good Samaritan question implies that nurses need further education on Good Samaritan laws. This study indicated that only 82.5 per cent of the sample population knew that the State of Texas has a Good Samaritan law. One could speculate that nurses probably need to have a better understanding of Good Samaritan laws

so that they might be more inclined to render aid to victims of accidents as a Good Samaritan.

Nursing Service

The findings also have implications for nursing service directors who desire quality patient care as a primary goal of their institution. The overall low scores of both professional and non-professional groups imply a need for in-service education programs for each level of nursing care personnel in an attempt to up-grade their knowledge of first aid. These in-service programs should be geared to the level of understanding and the particular needs of each group, and repeated at intervals for new personnel as changes occur in emergency care. Furthermore, the staff should have the opportunity to practice the skills necessary in emergency care so that these skills do not deteriorate. These nursing service education programs could initially be concentrated on the first aid categories included in the test in this study in which a low percentage score was found which indicates the need for further education in these areas.

Nursing service should clarify policies regarding the nurses' responsibility in life-threatening emergencies when there is no in-house physician present. If the nurse takes

the responsibility to act independently in the absence of a physician in an emergency situation (and she should), she must have advanced knowledge and skills in resuscitation and in initial care of the injured. The development of a trauma nurse specialist course could be established for this purpose using the guidelines established from the Illinois plan.

Since the nurse may frequently be the first person to see an accident victim upon his arrival to the hospital, nursing service should make sure that the nurse in the emergency department is competent to render emergency care. Not only the first aid knowledge of the emergency room nurse, but also that of the nurse in other areas of critical care could be tested prior to their employment with an instrument such as the one used in this study. Since the test from this study is geared toward a generalized knowledge of first aid, it cannot be the only means of evaluating first aid knowledge and although the findings of this study cannot be generalized to the entire emergency room nurse population or to all of nursing, it does clearly indicate the need for continuing education on first aid for all people, lay and professional alike.

Education of Lay Public

Finally, the study has implications for the education of the lay public on first aid. This study also showed that the lay person had the lowest mean score out of the groups tested. By expanding the first aid skills of the lay public--a measure that has already attracted wide attention because of the continuing rise in accident mortality and morbidity rates and the increased interest in emergency medical services--the probability of having trained rescuers at the scene of accidents would be increased. Even a basic course in first aid would provide the public with the knowledge and simple skills necessary to control bleeding and position victims to provide an open airway. These two steps alone could be life saving in an emergency situation.

Conclusions

Based upon the findings of this study the following conclusions are offered:

1. The three groups studies (emergency room nurses, Master's level nursing students, lay persons) have a limited knowledge of first aid as measured by scores (number of correct responses) on a first aid test.
2. The first aid test indicates that it can discriminate between groups as shown by the preliminary

test scores between a lay group and nurses (emergency room and Master's level nursing students).

3. The first aid knowledge of the beginning Master's level nursing students and emergency room nurses seem to be approximately equal as shown by the mean scores of the groups. The Master's level nursing students had a slightly higher mean score--although it is not statistically significant.
4. The educational background of the emergency room nurse did not seem to affect the nurse's test score.
5. The emergency room nurse's months of emergency room experience did not seem to affect the nurse's test score.
6. The emergency room nurse's months of critical care nursing experience did not seem to affect the nurse's test score.
7. The emergency room nurse's age did not seem to affect the nurse's test score.
8. Whether the emergency room nurse had taken a previous first aid course did not seem to affect the nurse's test score.

9. Emergency room nurses feel that there is a need for continuing education on first aid for all nurses.

APPENDIX A

QUESTIONNAIRE FOR PANEL OF JUDGES

Instructions

The questions that follow are based on first aid. They are of the multiple-choice type, each question having three possible answers. Read each question slowly and carefully, and give careful consideration to each of the three answers. More than one of these answers may be partly correct, but for every question there is always ONE BEST answer. When you find this answer, place an "X" mark beside the proper letter on the answer sheet. Give only one answer for each question.

DO NOT SIGN YOUR NAME TO THIS EXAMINATION

Demographic data:

Age _____ Sex _____

Highest educational level attained:

Associate _____, Diploma _____, B.S. _____, Other _____

Number of years _____, months _____ experience in emergency room.

Number of years _____, months _____ experience in nursing.

Previous first aid course? Yes _____, no _____, don't remember _____.

If yes, year taken _____.

Was first aid taught in your nursing program? Yes _____, no _____, don't know _____.

Size of hospital previously employed.

0-100 beds _____, 100-500 beds _____, 500 or more beds _____.

Additional questions:

1. Does the State of Texas have a Good Samaritan Law?
Yes____, no____, don't know.
2. Do you feel there is a need for continuing education among nurses for first aid?
Yes____, no____, don't know_____.
3. Do you feel that your knowledge of first aid is adequate?
Yes____, no____, don't know_____.

Questionnaire

1. A patient involved in a multiple vehicle accident has clear fluid draining from his nose. You suspect:

A. Foreign body of the nose
B. Concussion
C. Skull fracture
2. The following symptoms: severe shock; cyanosis of head, neck, and shoulders; protruding, bloodshot eyes; swollen and cyanotic tongue and lips indicate:

A. Cardiac tamponade
B. Traumatic asphyxia
C. Tension pneumothorax
3. Which diagnostic measure is useful in cases of suspected tension pneumothorax.

A. Hearing sharp, clear breath sounds
B. Obtaining dull percussion sounds
C. Aspiration of air under pressure
4. The skin color of a patient with the diagnosis of early carbon monoxide poisoning:

A. Cherry red
B. Deeply cyanotic
C. Mottled

5. Frothy blood from the nose and mouth, followed by coughing may indicate:
 - A. Lung damage from a puncture injury
 - B. Acute respiratory acidosis
 - C. Ruptured bronchus
6. A patient with severe dyspnea, cyanosis and a history of emphysema requires oxygen at _____ liters per minute (via nasal canula).
 - A. 1-3
 - B. 3-6
 - C. 6-9
7. Severe pain in an extremity with loss of sensation and pulse may indicate:
 - A. Occlusion of the main artery
 - B. Severe shock
 - C. Injury to spinal cord
8. The pupil of an unconscious patient does not react to light, but is of normal diameter. You suspect that the patient may have a:
 - A. Cerebral vascular accident
 - B. Glass eye
 - C. Concussion
9. A patient who is not adequately ventilating would show:
 - A. Slow breathing
 - B. Flat neck veins
 - C. Passive expiration
10. The preferred treatment of chemical burns is:
 - A. Neutralized acid burns with mild alkali
 - B. Rinse alkaline burns with weak acids
 - C. Wash burned areas with generous amounts of water
11. Arterial pressure points that are most commonly used to control hemorrhage include all except:
 - A. Femoral artery
 - B. Common carotid artery
 - C. Subclavian artery

12. The first step you should take in stopping hemorrhage would be:
 - A. Pressure to common pressure points
 - B. Pressure directly to the wound
 - C. A Tourniquet proximal to wound
13. When it is necessary to apply a tourniquet to control hemorrhage, the tourniquet should be released:
 - A. Every 20 minutes
 - B. At intervals, if patient's blood pressure and pulse are stable
 - C. Only when a doctor is available to evaluate the patient
14. The pressure point for stopping hemorrhage from the wrist is located:
 - A. Inner half of arm midway between elbow and axilla
 - B. Lateral forearm just below the elbow
 - C. Axilla
15. After receiving an injection of penicillin, a patient developed generalized edema, cyanosis, a choking cough, and violent asthma. You suspect the patient is in _____ shock.
 - A. Metabolic
 - B. Anaphylactic
 - C. Respiratory
16. The treatment for the answer in question 15 is:
 - A. Epinephrine, 1:1000, 0.5 ml.
 - B. Hydrocortisone, 200 mgm
 - C. Sodium bicarbonate, 1.5% solution
17. Which of the following has first priority for treatment:
 - A. Shock due to hemorrhage
 - B. Sucking wound of the chest
 - C. Obstructed airway

18. A dinner guest chokes and suddenly stops breathing. The first action is to:
 - A. Start mouth to mouth resuscitation
 - B. Probe for the foreign body with your fingers
 - C. Perform a cricothyroidotomy
19. Which of the following positions would not facilitate an open natural airway?
 - A. Draw chin forward
 - B. Extension of the neck
 - C. Flexion of the neck
20. An adult has a foreign body obstructing his airway. The first action is to:
 - A. Use mouth to mouth ventilation
 - B. Place patient in head-down position and attempt to dislodge the foreign body by concussion
 - C. Use your finger to attempt to dislodge the foreign body
21. The most likely etiology of airway obstruction is:
 - A. Relaxed tongue
 - B. Broken teeth
 - C. Muscle spasm
22. If a large vein is lacerated in the neck, pressure should be applied:
 - A. Above the point of bleeding
 - B. Above and below the point of bleeding
 - C. To the carotid artery
23. Where do you place the heels of your hands on the patient's chest when performing cardiopulmonary resuscitation?
 - A. Xyphoid
 - B. Lower 1/2 of sternum
 - C. Upper 1/2 of sternum

24. Pupillary dilatation occurs within _____ seconds following a cardiac arrest.
- A. 5-15
 - B. 20-40
 - C. 90-180
25. Which of the following best describe the effectiveness of cardiopulmonary resuscitation?
- A. Dilated pupils constrict
 - B. Spontaneous movement may occur
 - C. Spontaneous gasping respirations may occur
26. On an adult the rate of cardiac compression during cardiopulmonary resuscitation is:
- A. 60-80
 - B. 80-90
 - C. 90-100
27. The sternum should be depressed _____ inches during cardiopulmonary resuscitation on an adult.
- A. 1-2
 - B. 2-3
 - C. 3-4
28. When two persons are performing cardiopulmonary resuscitation, which procedure should be followed:
- A. 5 cardiac compressions, stop, ventilate
 - B. 10 cardiac compressions, stop, ventilate
 - C. 5 cardiac compressions, interpose ventilation without stopping
29. One person must alternate ventilations with heart compressions at the ratio of _____ ventilations to _____ compressions during cardiopulmonary resuscitation.
- A. 1:5
 - B. 1:10
 - C. 2:15

30. An impaled carpenter's nail in the eye should be:
- A. Removed before transporting patient
 - B. Covered with paper cup, dressed and other eye also covered
 - C. Covered with paper cup, dressed and other eye left uncovered so patient can see.
31. A patient with a sucking wound of the chest should have a pressure dressing applied while he is:
- A. Exhaling
 - B. Inhaling
 - C. Holding his breath
32. An alkali burn of the eye should be irrigated _____ minutes:
- A. 5
 - B. 15
 - C. 30
33. A picket fence post was impaled through a man's chest. The length of the post is hindering transporting him to the hospital. You should:
- A. Remove the fence post
 - B. Bend it out of the way
 - C. Saw it off about 6 inches from the body
34. The treatment for a foreign body in the eye is:
- A. Flush the eye with saline
 - B. Turn the lid and try to remove the object with the corner of a clean handkerchief
 - C. If found on the cornea, remove with anything at hand
35. The treatment for spontaneous pneumothorax is:
- A. Positive pressure therapy
 - B. Aspiration of pleural cavity air
 - C. Negative pressure therapy

36. Which one of the following statements is incorrect concerning chemical burns of the eye:
- A. Acid burns should be flushed with large amounts of water
 - B. Alkali burns are more serious because the burn is progressive
 - C. Alkali burns should be washed with baking soda
37. The following symptoms, severe blunt chest trauma, immediate lower chest pain, dyspnea, narrowing pulse pressure, paradoxical pulse, distant, muffled heart sounds, elevated venous pressure indicates:
- A. Hemothorax
 - B. Flail chest
 - C. Pericardial tamponade
38. The most likely cause of rapid death after rib fracture is:
- A. Hemothorax
 - B. Tension pneumothorax
 - C. Cardiac tamponade
39. Which of the following indicates an acute abdomen?
- A. Abdominal pain, tachycardia, hypotension
 - B. Abdominal tenderness, bradycardia, hypertension
 - C. Diffuse pain, hyperventilation, hypervolemia
40. A patient, at first conscious, becomes progressively more drowsy and confused. You suspect:
- A. Hemorrhage within the cranium
 - B. Skull fracture
 - C. Concussion
41. Of the following fractures which one should not be straightened prior to splinting and transporting patient to the hospital.
- A. Shaft of humerus
 - B. Shaft of femur
 - C. Elbow

42. A 55-year-old man suddenly clutches his chest, is diaphoretic, dyspneic, and his pain is steady without relief. You suspect:
- A. Coronary thrombosis
 - B. Heart failure
 - C. Atrial fibrillation
43. Which of the following is more likely to cause brain damage:
- A. Diabetic coma
 - B. Insulin shock
 - C. Convulsions
44. The first aid treatment for a patient with a 50% total body surface area burned is:
- A. Cover with clean sheet
 - B. Pack in ice
 - C. Cover with vaseline
45. A patient has a flushed face, hot dry skin, dizziness, nausea, rapid pulse and exceedingly high temperature. You suspect:
- A. Radiation sickness
 - B. Heat exhaustion
 - C. Heat stroke
46. What is the best indicator of the patient's progress in the treatment of heat stroke when a thermometer is not available.
- A. State of consciousness
 - B. Pulse rate
 - C. Amount of sweating
47. In the burn casualty, the loss of fluids results in:
- A. Hemodilution
 - B. Hypervolemia
 - C. Hemoconcentration

48. The treatment of choice in patients with frostbite injuries is:
- A. Apply vigorous massage
 - B. Rapid rewarming
 - C. Soaking the affected extremity in cold water
49. A patient with a deformed neck and an open airway should have the neck:
- A. Splinted in the position of deformity
 - B. Straightened prior to splinting
 - C. Splinted after moving onto stretcher
50. A patient with a lumbar spinal cord injury may develop _____ shock.
- A. Psychogenic
 - B. Neurogenic
 - C. Hemorrhagic
51. A patient in hemorrhagic shock with dyspnea and cyanosis should be placed in _____ position for transportation.
- A. Supine
 - B. Trendelenburg
 - C. Semi fowlers
52. Vomiting is indicated when a patient has swallowed:
- A. Kerosene
 - B. Antifreeze
 - C. Household bleach
53. A 2-year-old child has swallowed a strong lye solution. His mouth and lips are burned. You should not:
- A. Give a glass of water
 - B. Give olive oil or egg white
 - C. Try to cause vomiting
54. A 16-month-old was found with an open half empty aspirin bottle. Aspirin tablets were found in the child's mouth. Immediate treatment consists of:
- A. Inducing vomiting
 - B. Giving egg white in water
 - C. Giving burnt toast, tea and milk of magnesia

55. Which is not characteristic of poison ivy:
- A. Severe itching
 - B. Involvement spreads from blister fluid
 - C. Immunization is "good" protection
56. To remove a tick from the skin:
- A. Burn it with a cigarette
 - B. Cover it with a thick oil
 - C. Touch it with alcohol
57. The first step you would take in the first aid treatment for a poisonous snake bite.
- A. Identify snake
 - B. Incise wound and apply suction
 - C. Application of a constricting band proximal to wound
58. Which of the following is not a characteristic of a poisonous snake bite?
- A. Single row of small red marks
 - B. Burning pain
 - C. Spreading edema
59. During an emergency breech delivery the head does not deliver. What can you do so that the baby will not suffocate from lack of oxygen?
- A. Rotate the baby and lift trunk anterior
 - B. Insert fingers into vagina to make an airway
 - C. Pull the trunk of body in straight direction
60. After emergency delivery, the baby is breathing satisfactorily, but the placenta does not deliver. You would:
- A. Leave the cord alone, lay the baby on mother's abdomen
 - B. Cut the cord right at the baby's abdomen
 - C. Tie the cord long and cut it

61. Immediately after delivery of a baby, focus your attention on:
- A. Stopping the mother's bleeding
 - B. The placenta
 - C. Getting the baby to breathe
62. Which of the following should not be used to remove a victim from contact with electric current?
- A. Moist stick
 - B. Dry rope
 - C. Leather belt
63. The first step you would take with a drowning victim with a suspected cervical fracture, in the shallow end of a swimming pool, would be:
- A. Float firm object under victim
 - B. Start mouth to mouth ventilation
 - C. Get victim out of swimming pool
64. A common cause of convulsions in children is:
- A. High fever
 - B. Soap ingestion
 - C. Hepatitis
65. Signs of diabetic coma include:
- A. Elevated blood sugar, glycosuria, acetonuria
 - B. Bounding pulse, headache, dry skin
 - C. Acetone breath, moist skin, headache
66. Symptoms of insulin shock experienced by the patient will likely include:
- A. Thirst and flushing of the face
 - B. Headache and weakness
 - C. Urinary frequency and vomiting
67. Treatment for severe hypoglycemia is _____% glucose.
- A. 10%
 - B. 50%
 - C. 60%

68. Reactions to insulin include all except:
- A. Hyperglycemia
 - B. Immunologic
 - C. Skin
69. The most serious threat to life from status epilepticus is:
- A. Physical damage to the patient
 - B. The underlying abnormality
 - C. Hypoxia 2° to impaired respiration
70. Tourniquets should be rotated every _____ minutes during treatment of pulmonary edema.
- A. 15
 - B. 30
 - C. 45

APPENDIX B

DEMOGRAPHIC DATA

Part 1

DO NOT sign your name or hospital name to any part of this examination.

1. Age.
2. Sex.
3. Year you received your:
 - a. Associate Degree
 - b. Diploma
 - c. Baccalaureate
 - d. Other (Specify)
 - e. Have you had additional education? If yes, area studied .
4. Did you receive your education in U.S. school of nursing?
 - a. Yes
 - b. No.
5. Are you regularly assigned to the emergency room on a full-time basis?
 - a. Yes
 - b. No
 - c. Other (Specify).
6. Size hospital in which you presently work:
 - a. beds.
7. Number of R.N.s including yourself that are present in emergency room on:
 - a. Days M-T 7-3
 - b. Days M-T 3-11
 - c. Days M-T 11-7am
 - d. Weekends F-S-S 7-3
 - e. Weekends F-S-S 3-11
 - f. Weekends F-S-S 11-7am

8. Number physicians present in emergency room on:
- a. _____ Days M-T 7-3
 - b. _____ Days M-T 3-11
 - c. _____ Days M-T 11-7am
 - d. _____ Weekends F-S-S 7-3
 - e. _____ Weekends F-S-S 3-11
 - f. _____ Weekends F-S-S 11-7am
9. When physician is not present in emergency room is he "on call" from inside hospital or outside?
- b. _____ Inside
 - b. _____ Outside.
10. Have you had a previous first aid course?
- a. _____ Yes
 - b. _____ No
 - c. _____ Don't remember
 - d. _____ Year taken
 - e. _____ Type of course
 - (1) _____ Red Cross
 - (2) _____ School of Nursing
 - (3) _____ Other
11. Your position in emergency room:
- a. _____ Staff
 - b. _____ Head nurse
 - c. _____ Assistant supervisor
 - d. _____ Supervisor
12. Number years, months experience in _____ as RN:
- a. Emergency room _____ Years _____ Months
 - b. Critical Care Type ICU's _____ Years _____ Months
 - c. Other "in hospital" experience
 - Med-Surg. _____ Years _____ Months
 - OB _____ Years _____ Months
 - Psych. _____ Years _____ Months
 - Peds. _____ Years _____ Months
 - Other (Specify) _____
_____ Years _____ Months
 - e. Total number of years _____ months _____ experience as RN.
13. Have you taken this examination before?
- a. _____ Yes
 - b. _____ No.

Please check one of the categories listed below which reflects the nurse/physician relationship under which you work as an emergency room nurse. A team consists of at least two R.N.'s and one or more physicians.

Category

- ☐ I. Emergency room staffed at all times with a team of R.N.'s and M.D.'s.
- ☐ II. Emergency room staffed at all times with one R.N. and one M.D.
- ☐ III. Emergency room staffed at all times with one R.N. and M.D. is "on call" from within the hospital.
- ☐ IV. Emergency room staffed at all times with one R.N. and M.D. is "on call" from outside the hospital.
- ☐ V. Other _____ specify.

ADDITIONAL QUESTIONS:

1. Does the State of Texas have a Good Samaritan law?
☐ Yes
☐ No
☐ Don't know.
2. Do you feel there is a need for continuing education among nurses for first aid?
☐ Yes
☐ No
☐ Don't know
3. Do you feel that your knowledge of first aid is adequate?
☐ Yes
☐ No
☐ Don't know.

Part 2

Instructions

The questions that follow are based on first aid. They are of the multiple choice type, each question having three possible answers. Read each question slowly and carefully and give careful consideration to each of the three answers. More than one of these answers may be partly correct, but for every question try to determine the ONE BEST answer. When you find this answer place a dark mark below the proper letter on the answer sheet. Be sure that the question number on your answer sheet corresponds with the question number in the exam. (See sample question on this page.) Give only ONE answer for each question. Answer all questions.

DO NOT SIGN YOUR NAME OR YOUR HOSPITAL NAME TO ANY
PART OF THIS EXAMINATION

SAMPLE QUESTION

75. The purpose of artificial ventilation is to:

- A. Return heart action
- B. Restore breathing that has stopped
- C. Remove water from lungs.

Answer Sheet

	a	b	c	d	e
74.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	a	b	c	d	e
75.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	a	b	c	d	e
76.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Examination Questions

1. A patient involved in a multiple vehicle accident has clear fluid draining from his nose. You suspect:
 - A. Foreign body of the nose
 - B. Concussion
 - C. Skull fracture
2. The following symptoms: severe shock; cyanosis of head, neck, and shoulders; protruding, bloodshot eyes; swollen and cyanotic tongue and lips indicate:
 - A. Cardiac tamponade
 - B. Traumatic asphyxia
 - C. Tension pneumothorax
3. Which diagnostic measure is useful in cases of suspected tension pneumothorax.
 - A. Hearing sharp, clear breath sounds
 - B. Obtaining dull percussion sounds
 - C. Aspiration of air under pressure
4. The skin color of a patient with the diagnosis of early carbon monoxide poisoning:
 - A. Cherry red
 - B. Deeply cyanotic
 - C. Mottled
5. Frothy blood from the nose and mouth, followed by coughing may indicate:
 - A. Acute respiratory acidosis
 - B. Lung damage from a puncture injury
 - C. Ruptured bronchus
6. Severe pain in an extremity with loss of sensation and pulse may indicate:
 - A. Occlusion of the main artery
 - B. Severe shock
 - C. Injury to spinal cord

7. The pupil of an unconscious patient does not react to light, but is of normal diameter. You suspect that the patient may have a:
 - A. Cerebral vascular accident
 - B. Glass eye
 - C. Concussion
8. The most serious threat to life from status epilepticus is:
 - A. Physical damage to the patient
 - B. The underlying abnormality
 - C. Hypoxia 2° to impaired respiration
9. The first step you should take in stopping hemorrhage would be:
 - A. Pressure to common pressure points
 - B. Pressure directly to the wound
 - C. A tourniquet proximal to wound
10. When it is necessary to apply a tourniquet to control hemorrhage, the tourniquet would be released:
 - A. Every 20 minutes
 - B. At intervals, if patient's blood pressure and pulse are stable
 - C. Only when a doctor is available to evaluate the patient.
11. The pressure point for stopping hemorrhage from the wrist is located:
 - A. Inner half of arm midway between elbow and axilla
 - B. Lateral forearm just below the elbow
 - C. Axilla
12. If a large vein is lacerated in the neck, pressure should be applied:
 - A. Above the point of bleeding
 - B. Above and below the point of bleeding
 - C. To the carotid artery

13. Which of the following has first priority for treatment:
- A. Shock due to hemorrhage
 - B. Sucking wound of the chest
 - C. Obstructed airway
14. A dinner guest chokes and suddenly stops breathing. The first action is to:
- A. Start mouth to mouth resuscitation
 - B. Probe for the foreign body with your fingers
 - C. Perform a cricothyroidotomy
15. A child has a foreign body obstructing his airway. The first action is to:
- A. Use mouth to mouth ventilation
 - B. Place patient in head-down position and attempt to dislodge the foreign body by concussion
 - C. Use your finger to attempt to dislodge the foreign body
16. The most likely etiology of airway obstruction is:
- A. Relaxed tongue
 - B. Broken teeth
 - C. Muscle spasm
17. A patient with severe dyspnea, cyanosis and a history of emphysema requires oxygen at _____ liters per minute, via nasal canula.
- A. 1-3
 - B. 3-6
 - C. 6-9
18. Where do you place the heels of your hands on the patient's chest when performing cardiopulmonary resuscitation?
- A. Xyphoid
 - B. Lower 1/2 of sternum
 - C. Upper 1/2 of sternum
19. Pupillary dilatation occurs within _____ seconds following a cardiac arrest.
- A. 5-15
 - B. 20-40
 - C. 90-180

20. Which of the following best describes the effectiveness of cardiopulmonary resuscitation.
- A. Dilated pupils constrict
 - B. Spontaneous movement may occur
 - C. Spontaneous gasping respirations may occur
21. On an adult the rate of cardiac compression during cardiopulmonary resuscitation is:
- A. 60-80
 - B. 80-90
 - C. 90-100
22. The sternum should be depressed _____ inches during cardiopulmonary resuscitation on an adult.
- A. 1-2
 - B. 2-3
 - C. 3-4
23. When two persons are performing cardiopulmonary resuscitation, which procedure should be followed.
- A. 5 cardiac compressions, stop, ventilate
 - B. 10 cardiac compressions, stop, ventilate
 - C. 5 cardiac compressions, interpose ventilation without stopping compressions
24. One person must alternate ventilations with heart compressions at the ratio of _____ ventilations to _____ compressions during cardiopulmonary resuscitation.
- A. 1:5
 - B. 1:10
 - C. 2:15
25. A patient in hemorrhagic shock with dyspnea and cyanosis should be placed in _____ position for transportation.
- A. Supine
 - B. Trendelenburg
 - C. Semi fowlers

26. A patient with a deformed neck and an open airway should have the neck:
- A. Splinted in the position of deformity
 - B. Straightened prior to splinting
 - C. Splinted after moving onto stretcher
27. A patient with a lumbar spinal cord injury may develop _____ shock.
- A. Psychogenic
 - B. Neurogenic
 - C. Hemorrhagic
28. After receiving an injection of penicillin, a patient developed generalized edema, cyanosis, a choking cough, and violent asthma. You suspect the patient is in _____ shock.
- A. Metabolic
 - B. Anaphylatic
 - C. Respiratory
29. The treatment for the answer in question 28 is:
- A. Epinephrine, 1:1000, 0.5 ml.
 - B. Hydrocortisone, 200 mgm
 - C. Sodium bicarbonate, 1.5% solution
30. An impaled carpenter's nail in the eye should be:
- A. Removed before transporting patient
 - B. Covered with paper cup, dressed and other eye also covered
 - C. Covered with paper cup, dressed and other eye left uncovered so patient can see
31. A picket fence post was impaled through a man's chest. The length of the post is hindering transporting him to the hospital. You should:
- A. Remove the fence post
 - B. Bend it out of the way
 - C. Saw it off about 12 inches from the body

32. The preferred treatment of chemical burns is:
- A. Neutralize acid burns with mild alkali
 - B. Rinse alkaline burns with weak acids
 - C. Wash burned areas with generous amounts of water
33. An alkali burn of the eye should be irrigated _____ minutes.
- A. 5
 - B. 15
 - C. 30
34. The treatment for a foreign body in the eye is:
- A. Flush the eye with saline
 - B. Turn the lid and try to remove the object with the corner of a clean handkerchief
 - C. If found on the cornea, remove with anything at hand
35. A patient with a sucking wound of the chest should have a pressure dressing applied while he is:
- A. Exhaling
 - B. Inhaling
 - C. Holding his breath
36. The treatment for spontaneous pneumothorax is:
- A. Positive pressure therapy
 - B. Aspiration of pleural cavity air
 - C. Negative pressure therapy
37. The following symptoms: severe blunt chest trauma; immediate lower chest pain; dyspnea; narrowing pulse pressure; paradoxical pulse; distant, muffled heart sounds; elevated venous pressure indicates:
- A. Hemothorax
 - B. Flail chest
 - C. Pericardial tamponade
38. The most likely cause of rapid death after rib fracture is:
- A. Hemothorax
 - B. Tension pneumothorax
 - C. Cardiac tamponade

39. A 55-year-old man suddenly clutches his chest, is diaphoretic, dyspneic, and his pain is steady without relief. You suspect:
- A. Coronary thrombosis
 - B. Heart failure
 - C. Atrial fibrillation
40. Which of the following could indicate an acute abdomen?
- A. Abdominal pain, tachycardia, hypotension
 - B. Abdominal tenderness, bradycardia, hypertension
 - C. Diffuse pain, hyperventilation, hypervolemia
41. A patient, a first conscious, becomes progressively more drowsy and confused. You suspect:
- A. Hemorrhage within the cranium
 - B. Skull fracture
 - C. Concussion
42. The first aid treatment for a patient with a 50% total body surface area burned is:
- A. Cover with clean sheet
 - B. Pack in ice
 - C. Cover with vaseline
43. In the burn casualty, the loss of fluids results in:
- A. Hemodilution
 - B. Hypervolemia
 - C. Hemoconcentration
44. A patient has a flushed face, hot dry skin, dizziness, nausea, rapid pulse and exceedingly high temperature. You suspect:
- A. Radiation sickness
 - B. Heat exhaustion
 - C. Heat stroke

45. What is the best indicator of the patient's progress in the treatment of heat stroke when a thermometer is not available.
- A. State of consciousness
 - B. Pulse rate
 - C. Amount of sweating
46. The treatment of choice in patients with frostbite injuries is:
- A. Apply vigorous massage
 - B. Rapid rewarming
 - C. Soaking the affected extremity in cold water
47. A 16-month-old was found with an open half empty aspirin bottle. Aspirin tablets were found in the child's mouth. Immediate treatment consists of:
- A. Inducing vomiting
 - B. Giving egg-white in water
 - C. Giving burnt toast, tea and milk of magnesia
48. Vomiting is indicated when a patient has swallowed:
- A. Kerosene
 - B. Antifreeze
 - C. Household bleach
49. The first step you would take in the first aid treatment for a poisonous snake bite.
- A. Apply suction
 - B. Incise wound
 - C. Application of constricting band proximal to wound
50. After emergency deliver, the baby is breathing satisfactorily, but the placenta does not deliver. You would:
- A. Leave the cord alone
 - B. Cut the cord right at the baby's abdomen
 - C. Tie the cord long and cut it

51. Immediately after delivery of a baby, focus your attention on:
- A. Stopping the mother's bleeding
 - B. The placenta
 - C. Getting the baby to breathe
52. The first step you would take with a drowning victim with a suspected cervical fracture, in the shallow end of a swimming pool, would be:
- A. Float firm object under victim
 - B. Start mouth to mouth ventilation
 - C. Get victim out of swimming pool
53. A common cause of convulsions in children is:
- A. High fever
 - B. Soap ingestion
 - C. Hepatitis
54. Signs of diabetic coma include:
- A. Elevated blood sugar, glycosuria, acetonuria
 - B. Bounding pulse, headache, dry skin
 - C. Acetone breath, moist skin, headache
55. Symptoms of insulin shock experienced by the patient will likely include:
- A. Thirst and flushing of the face
 - B. Headache and weakness
 - C. Urinary frequency and vomiting
56. Which of the following is more likely to cause brain damage.
- A. Diabetic coma
 - B. Insulin shock
 - C. Convulsions
57. Treatment for severe hypoglycemia is _____% glucose.
- A. 10
 - B. 50
 - C. 50

58. Tourniquets should be rotated every _____ minutes during treatment of pulmonary edema.
- A. 15
 - B. 30
 - C. 45
59. To remove a tick from the skin:
- A. Burn it with a cigarette
 - B. Cover it with a thick oil
 - C. Touch it with alcohol
60. Which of the following positions would not facilitate an open natural airway:
- A. Draw chin forward
 - B. Extension of the neck
 - C. Flexion of the neck
61. A patient who is not adequately ventilating would show:
- A. Slow breathing
 - B. Flat neck veins
 - C. Passive expiration
62. Arterial pressure points that are most commonly used to control hemorrhage include all except:
- A. Femoral artery
 - B. Common carotid artery
 - C. Subclavian artery
63. Which of the following should not be used to remove a victim from contact with electric current?
- A. Moist stick
 - B. Dry rope
 - C. Leather belt
64. A 2-year-old child has swallowed a strong lye solution. His mouth and lips are burned. You should not:
- A. Give a glass of water
 - B. Give olive oil or egg white
 - C. Try to cause vomiting

65. Of the following fractures which one should not be straightened prior to splinting and transporting patient to the hospital.
- A. Shaft of humerus
 - B. Shaft of femur
 - C. Elbow
66. Which is not characteristic of poison ivy:
- A. Severe itching
 - B. Involvement spreads from blister fluid
 - C. Immunization is "good" protection
67. Which of the following is not a characteristic of a poisonous snake bite.
- A. Horseshoe shaped mark
 - B. Burning pain
 - C. Spreading edema
68. Reactions to insulin include all except:
- A. Hyperglycemia
 - B. Allergic reaction
 - C. Skin reaction
69. Which one of the following statements is incorrect concerning chemical burns of the eye:
- A. Acid burns should be flushed with large amounts of water
 - B. Alkali burns are more serious because the burn is progressive
 - C. Alkali burns should be washed with baking soda
70. During an emergency breech delivery the head does not deliver. What can you do so that the baby will not suffocate?
- A. Keep the fetal back in the posterior position
 - B. Insert fingers into vagina to make an airway
 - C. Pull the trunk of body in straight direction

APPENDIX C

PRELIMINARY TESTING--NUMBER CORRECT RESPONSES

FROM THREE GROUPS

No. of People	Emergency Room Nurse's Scores X	Master's Level Nursing Students X	Lay Group's Scores X
1	58	54	47
2	54	54	43
3	52	54	42
4	52	52	42
5	50	52	41
6	50	52	40
7	49	51	39
8	48	51	38
9	48	50	38
10	48	50	37
11	48	50	37
12	45	50	37
13	45	49	36
14	45	49	35
15	45	48	34
16	44	48	33
17	44	47	33
18	44	45	33
19	42	45	33
20	42	45	32
21	41	43	32
22	41	42	32
23	41	42	29
24	41	42	28
25	41	40	28
26	39	40	27
27	39	39	27
28	39	39	27
29	38	38	25

No. of People	Emergency Room Nurse's Scores X	Master's Level Nursing Students X	Lay Group's Scores X
30	38	37	23
31	37		
32	37		
33	34		
	$\Sigma X = 1459$ M = 44.21	$\Sigma X = 1398$ M = 46.60	$\Sigma X = 1028$ M = 34.26

APPENDIX D

STATISTICAL DATA

PROPORTION CORRECT FROM THREE GROUPS-- PRELIMINARY TESTING

Score	Emergency Room Nurses			Master's Level Nursing Students			Lay Group		
	f	cf	c%	f	cf	c%	f	cf	c%
23							1	1	3.3
24									
25							1	2	6.7
26									
27							3	5	16.7
28							2	7	23.4
29							1	8	26.7
30									
31									
32							3	11	36.7
33							4	15	50.0
34	1	1	3.0				1	16	53.5
35							1	17	56.6
36							1	18	60.0
37	2	3	9.0	1	1	3.3	3	21	70.0
38	2	5	15.0	1	2	6.7	2	23	76.6
39	3	8	24.2	2	4	13.3	1	24	80.0
40				2	6	20.0	1	25	83.4
41	5	13	39.4				1	26	86.6
42	2	15	45.5	3	9	30.0	2	28	93.5
43				1	10	33.3	1	29	96.5
44	3	18	54.6						
45	4	22	66.6	3	13	43.4			
46							1	30	100.0
47				1	14	46.6			
48	4	26	78.8	2	16	53.5			
49	1	27	82.0	2	18	60.0			
50	2	29	85.0	4	22	73.3			
51				2	24	80.0			
52	2	31	94.0	3	27	90.0			
53									

Score	Emergency Room Nurses			Master's Level Nursing Students			Lay Group		
	f	cf	c%	f	cf	c%	f	cf	c%
54	1	32	97.0	3	30	100.0			
55									
56									
57									
58	1	33	100.0						

f = Frequency
 cf = Cumulative frequency
 c% = Cumulative per cent

APPENDIX E

COMPUTATIONAL FORMULAS

Pearson Product-Moment Correlation

$$r = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}}$$

where:

N = number of pairs of scores

$\sum xy$ = sum of the products of the paired scores

$\sum x$ = sum of scores on one variable

$\sum y$ = sum of scores on the other variable

$\sum x^2$ = sum of the squared scores on the x variable

$\sum y^2$ = sum of the squared scores on the y variable

Spearman-Brown Formula

$$r_n = \frac{n r}{1 + (n - 1) r}$$

where:

r = the original reliability

r_n = the reliability of the test n times as long

APPENDIX F

AGENCY PERMISSION FOR CONDUCTING STUDY

The following are the permission slips from the various hospitals in which the study was conducted.

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Tx. 75235

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

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _____
GRANTS TO Collette P. Keyser

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 Emergency Room Nurse's Knowledge of First Aid" utilizing a 70 item multiple choice questionnaire. The test to be administered to emergency room nurses in your hospital who volunteer to participate in this study.

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) ^{a Copy of Study} (~~does not want~~) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date Oct 15-73

Signature of Agency Personnel

Collette P. Keyser
Signature of Student

Bette Henderson
Signature of Faculty Advisor

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

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Tx. 75235

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3. The agency (wants) ^{Summary} (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date Oct. 16, 1973

Signature of Agency Personnel

Collette P. Keyser
Signature of Student

Betty Henderson
Signature of Faculty Advisor

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

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
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HOUSTON CENTER
1130 M.D. Anderson Blvd.
Houston, Tx. 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _____
GRANTS TO Collette P. Keyser

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:

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3. The agency (wants) (~~does not want~~) ^{of this study} a conference with the student when the report is completed.
4. The agency is (willing) (~~unwilling~~) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date October 17, 1973

Signature of Agency Personnel _____

Collette P. Keyser
Signature of Student

Betty Henderson
Signature of Faculty Advisor

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

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Tx. 75235

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

AGENCY PERMISSION FOR CONDUCTING STUDY*

TWE _____

GRANTS TO Collette P. Keyser

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 Emergency Room Nurse's Knowledge of First Aid" utilizing a 70 item multiple choice questionnaire. The test to be administered to emergency room nurses in your hospital who volunteer to participate in this study.

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

Date 10-18-73

Signature of Agency Personnel

Collette P. Keyser
Signature of Student

Betty Henderson
Signature of Faculty Advisor

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

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Tx. 75235

HOUSTON CENTER
1130 M.O. Anderson Blvd.
Houston, Tx. 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Parkland Memorial Hospital

GRANTS TO Collette P. Keyser

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 Emergency Room Nurse's Knowledge of First Aid" utilizing a 70 item multiple choice questionnaire. The test to be administered to emergency room nurses in your hospital who volunteer to participate in this study.

The conditions mutually agreed upon are as follows:

1. The agency (may) ~~(must)~~ be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) ~~(must)~~ be identified in the final report.
3. The agency (wants) ~~(must)~~ a conference with the student when the report is completed.
4. The agency is (willing) ~~(must)~~ to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date October 18, 1973

E. J. Smith, M.D., D.P.S.
Signature of Agency Personnel

Collette P. Keyser
Signature of Student

Betty Henderson
Signature of Faculty Advisor

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

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Tx. 75235

HOUSTON CENTER
1130 H.D. Anderson Blvd.
Houston, Tx. 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE _____

GRANTS TO Collette P. Keyser

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 Emergency Room Nurse's Knowledge of First Aid" utilizing a 70 item multiple choice questionnaire. The test to be administered to emergency room nurses in your hospital who volunteer to participate in this study.

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3. The agency (wants) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other _____

Date 10-26-73

Signature of Agency Personnel

Collette P. Keyser
Signature of Student

Betty Henderson
Signature of Faculty Advisor

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

APPENDIX G

NUMBER CORRECT RESPONSES FROM THREE GROUPS

No. of People	Emergency Room Nurse's Scores-- Sample Population X_1	Master's Level Nursing Students-- Preliminary Testing X_2	Lay Group's Scores-- Preliminary Testing X_3
1	56	54	47
2	53	54	43
3	53	54	42
4	52	52	42
5	52	52	41
6	51	52	40
7	51	51	39
8	50	51	38
9	50	50	38
10	49	50	37
11	49	50	37
12	49	50	37
13	49	49	36
14	48	49	35
15	48	48	34
16	47	48	33
17	47	47	33
18	47	45	33
19	47	45	33
20	46	45	32
21	46	43	32
22	46	42	32
23	46	42	29
24	45	42	28
25	45	40	28
26	45	40	27
27	45	39	27
28	44	39	27
29	44	38	25

No. of People	Emergency Room Nurse's Scores-- Sample Population X_1	Master's Level Nursing Students-- Preliminary Testing X_2	Lay Group's Scores-- Preliminary Testing X_3
30	44	37	23
31	43		
32	43		
33	42		
34	42		
35	40		
36	39		
37	39		
38	37		
39	35		
40	32		

$\Sigma X = 1836$
 $M = 45.90$

$\Sigma X = 1389$
 $M = 46.60$

$\Sigma X = 1028$
 $M = 34.26$

APPENDIX H

STATISTICAL DATA

PROPORTION CORRECT FROM THREE GROUPS

Score	Emergency Room Nurses			Master's Level Nursing Students			Lay Group		
	f	cf	c%	f	cf	c%	f	cf	c%
23							1	1	3.3
24									
25							1	2	6.7
26									
27							3	5	16.7
28							2	7	23.4
29							1	8	26.7
30									
31									
32	1	1	2.5				3	11	36.7
33							4	15	50.0
34							1	16	53.5
35	1	2	5.0				1	17	56.6
36							1	18	60.0
37	1	3	7.5	1	1	3.3	3	21	70.0
38				1	2	6.7	2	23	76.6
39	2	5	12.5	2	4	13.3	1	24	80.0
40	1	6	15.0	2	6	20.0	1	25	83.4
41							1	26	86.6
42	2	8	20.0	3	9	30.0	2	28	93.5
43	2	10	25.0	1	10	33.3	1	29	96.5
44	3	13	32.5						
45	4	17	42.5	3	13	43.4			
46	4	21	52.5				1	30	100.0
47	4	25	62.5	1	14	46.6			
48	2	27	67.5	2	16	53.5			
49	4	31	77.5	2	18	60.0			
50	2	33	82.5	4	22	73.3			
51	2	35	87.5	2	24	80.0			

Score	Emergency Room Nurses			Master's Level Nursing Students			Lay Group		
	f	cf	c%	f	cf	c%	f	cf	c%
52	2	37	92.5	3	27	90.0			
53	2	39	97.5						
54				3	30	100.0			
55									
56	1	40	100.0						
57									
58									

f = Frequency
 cf = Cumulative frequency
 c% = Cumulative per cent

APPENDIX I

CRITICAL CARE NURSING EXPERIENCE--

SAMPLE POPULATION

Months of Experience	Number in Each Group	Per Cent of Total	Average Score ^a
None	24	60.0	46.08
1-6	3	7.5	41.66
7-12	5	12.5	46.80
13-18	2	5.0	43.50
19-24	1	2.5	43.00
25-30	1	2.5	46.00
31-36	2	5.0	46.00
37-42	0	0.0	00.00
43-48	0	0.0	00.00
49-54	0	0.0	00.00
55-60	1	2.5	51.00
61-66	0	0.0	00.00
67-72	1	2.5	52.00
Total	40	100.0	46.22

^aAverage score = number of correct responses out of seventy questions.

APPENDIX J

THREE ADDITIONAL QUESTIONS--SAMPLE POPULATION

Question Number	Response					
	Yes		No		Don't Know	
	Number of Nurses	Per Cent of Total	Number of Nurses	Per Cent of Total	Number of Nurses	Per Cent of Total
1	33	82.5	0	0.0	7	17.5
2	40	100.0	0	0.0		0.0
3	20	50.0	17	42.5	3	7.5
					40	100
					40	100
					40	100

APPENDIX K

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY I IMMOBILIZATION, TRANSPORTATION, FRACTURES

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses
26	38 ^a	95.0	2	5.0	0	0.0
30	1	2.5	2	5.0	37 ^a	92.5
31	5	12.5	0	0.0	35 ^a	87.5
65	1	2.5	6	15.0	33 ^a	82.5
Average Per Cent Correct for Category I						89.37

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY II
HEART ATTACK, CONVULSIONS

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses
8	1	2.5	0	0.0	39 ^a	97.5
17	29 ^a	72.5	9	22.5	2	5.0
39	37 ^a	92.5	2	5.0	1	2.5
53	40 ^a	100.0	0	0.0	0	0.0
Average Per Cent Correct for Category II						90.62

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY III
FOREIGN OBJECTS: EYE; AIR AND FOOD PASSAGES

Question Number	Responses						
	A		B		C		Per Cent Correct
	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	
14	2	5.0	36 ^a	90.0	2	5.0	90.0
15	0	0.0	33	82.5	7 ^a	17.5	17.5
16	31 ^a	77.5	4	10.0	5	12.5	77.5
34	37	92.5	3 ^a	7.5	0	0.0	7.5
Average Per Cent Correct for Category III							48.12

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY IV
DIABETIC SHOCK, COMA, REACTIONS TO INSULIN

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses
54	27 ^a	67.5	0	0.0	13	32.5
55	17	42.5	20 ^a	50.0	3	7.5
56	12	30.0	9 ^a	22.5	19	47.5
57	1	2.5	39 ^a	97.5	0	0.0
68 ^b	24 ^a	60.0	7	17.5	8	20.0
Average Per Cent Correct for Category IV						59.5

^aCorrect response.

^bNo response--1, 2.5 per cent of total.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY V
OBSTETRICS AND EMERGENCY DELIVERY

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses
50	15 ^a	37.5	0	0.0	25	62.5
51	0	0.0	0	0.0	40 ^a	100.0
70	3	7.5	26 ^a	65.0	11	27.5
Average Per Cent Correct for Category V						67.5

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY VI
WOUNDS--DIAGNOSIS AND TREATMENT

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses
2	8	20.0	30 ^a	75.0	2 ^a	5.0
3 ^b	4	10.0	15	37.5	21 ^a	52.5
5	0	0.0	18	45.0	21 ^a	52.5
6	38 ^a	95.0	0	0.0	2	5.0
9	4	10.0	36 ^a	90.0	0 ^a	0.0
10	24	60.0	10	25.0	6 ^a	15.0
11	15 ^a	37.5	16 ^a	40.0	9	22.5
12	18	45.0	13 ^a	32.5	9	22.5
35	17 ^a	42.5	13 ^a	32.5	10	25.0
36	5	12.5	20 ^a	50.0	15 ^a	37.5
37	4	10.0	7 ^a	17.5	29 ^a	72.5
38 ^c	16 ^a	40.0	6 ^a	15.0	18	45.0
58	38	95.0	1	2.5	0 ^a	0.0
62	2	5.0	11	27.5	27 ^a	67.5
Average Per Cent Correct for Category VI						56.60

^aCorrect response.
^bNo response--1, 2.5 per cent of total.
^cNo response--1, 2.5 per cent of total.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY VII
SHOCK

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Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total
25	13	32.5	17	42.5	10 ^a	25.0
27	0	0.0	39 ^a	97.5	1	2.5
28	0	0.0	40 ^a	100.0	0	0.0
29	39 ^a	97.5	1	2.5	0	0.0
Average Per Cent Correct for Category VII						80.0

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY VIII
CARDIOPULMONARY RESUSCITATION

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total
13	0	0.0	0	0.0	40 ^a	100.0
18	10	25.0	26 ^a	65.0	4	10.0
19	12 ^a	30.0	12 ^a	30.0	16	40.0
20	24 ^a	60.0	3	7.5	13	32.5
21	34 ^a	85.0	6	15.0	0	0.0
22	5	12.5	27	67.5	8	20.0
23	8	20.0	2	5.0	30 ^a	75.0
24	23	57.5	3	7.5	14 ^a	35.0
52	20	50.0	16 ^a	40.0	4	10.0
60	9	22.5	5	12.5	26 ^a	65.0
61	66 ^a	15.0	4	10.0	30	75.0
Average Per Cent Correct for Category VIII						52.95

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY IX
POISONING

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Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total
4	21 ^a	52.5	3	7.5	16	40.0
47	36 ^a	90.0	1	2.5	3	7.5
48	3	7.5	19 ^a	47.5	18	45.0
64	2	5.0	1	2.5	37 ^a	92.5
66	0	0.0	3	7.5	37 ^a	92.5
Average Per Cent Correct for Category IX						75.0

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY X
BURNS

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total
32	5	12.5	0	0.0	35 ^a	87.5
33	6	15.0	17	42.5	17 ^a	42.5
42	34 ^a	85.0	5	12.5	1	2.5
43	3	7.5	1	2.5	36 ^a	90.0
69	1	2.5	11	27.5	28 ^a	70.0
Average Per Cent Correct for Category X						75.0

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY XI
ILL EFFECTS OF HEAT AND COLD

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total
44	1	2.5	8	20.0	31 ^a	77.5
45	11	27.5	18 ^a	45.0	11	27.5
46 ^b	5	12.5	9 ^a	22.5	25	62.5
63	37 ^a	92.5	1	2.5	2	5.0
Average Per Cent Correct for Category XI						59.37

^aCorrect response.

^bNo response--1, 2.5 per cent of total.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY XII
HEAD AND INTERNAL INJURY

Question Number	Response					
	A		B		C	
	Number Of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses	Number of Responses	Per Cent of Total Responses
1	2	5.0	1	2.5	37 ^a	92.5
7	14	35.0	21 ^a	52.5	5	12.5
40	34 ^a	85.0	2	5.0	4	10.0
41	29 ^a	72.5	5	12.5	6	15.0
Average Per Cent Correct for Category XII						75.62

^aCorrect response.

SAMPLE POPULATION ITEM ANALYSIS--CATEGORY XIII
ANIMAL BITES--INSECTS

Question Number	Response					
	A		B		C	
	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total	Number of Responses	Per Cent of Total
49	7	17.5	4	10.0	29 ^a	72.5
67	32 ^a	80.0	5	12.5	3	7.5
59	8	20.0	18 ^a	45.0	14	35.0
Average Per Cent Correct for Category XIII						65.83

^aCorrect response.

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Pamphlet

Commission on Emergency Medical Services of the American Medical Association. "Categorization of Hospital Emergency Capabilities." Chicago: American Medical Association, 1971.

ABSTRACT

THE EMERGENCY ROOM NURSE'S KNOWLEDGE OF FIRST AID

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

BY

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DENTON, TEXAS

MAY, 1974

This study was concerned with measuring the emergency room nurses' knowledge of first aid as compared with that of lay persons and beginning Master's level nursing students. It further attempted to determine if the emergency room nurses' test scores were influenced by their months of emergency room experience or their educational background. Additional demographic data (previous first aid course, age, critical care nursing experience) from the sample population were analyzed to determine if this data influenced the emergency room nurses' test scores. Three additional questions concerning the emergency room nurses' awareness of and attitude toward continuing education were asked. And finally an item analysis was made of the responses to the

test and the percentages of the correct responses were determined for each of the thirteen categories of first aid content.

Eighty-three multiple choice questions, divided into thirteen categories, were developed from a review of first aid textbooks and interviews among nurses, physicians and instructors involved in emergency care. The eighty-three items were given to ten Master's level, medical-surgical, nursing students to determine weaknesses in each item. Seventy items remained after analysis of their responses. These seventy items were given to a panel of judges with expertise in the areas of first aid to establish content validity.

Preliminary testing was conducted on three groups (thirty-three emergency room nurses; thirty beginning Master's level, medical-surgical, nursing students; and thirty people without degrees in nursing) to determine if the method of data collection was feasible and to examine the validity of the tool. The results of the preliminary testing intuitively suggested that the test was valid and there was a difference between the groups. A 0.63 reliability coefficient was calculated from the test scores (number of correct responses) of the emergency room nurses.

The sample population was composed of forty emergency room nurses, all female, who: (1) were assigned to an

emergency room department on a full-time basis, (2) received their education in a United States school of nursing, (3) volunteered to participate in the study, and (4) had not participated in the preliminary testing. The nurses were employed in general hospitals located within a large metropolitan city and belong to the local hospital council.

The tests were scored to determine the number of correct responses. Analysis of Variance was used to determine if there was a significant difference between the emergency room nurses' test scores and those of the lay group and beginning Master's level nursing students. The Scheffé test of contrasts was utilized when the F-ratio from the Analysis of Variance was significant. Analysis of Variance was used to determine if the educational background of the emergency room nurse influenced their test scores. The Pearson Product-Moment Correlation was used to determine if months of emergency room experience influenced the test scores.

It was determined that there was a significant difference between the test scores of the nurses (emergency room nurses and beginning Master's level nursing students) and those of lay persons and within the nursing field there was no significant difference. It was also determined that the emergency room nurses' test scores were not influenced by

their educational background or their months of emergency room experience. It was further found that there was not a significant difference between the emergency room nurses' test scores and (1) previous first aid course, (2) months of critical care nursing experience, or (3) age of the nurse.