A SURVEY TO DETERMINE THE OPERATIONAL READINESS TRAINING OF THE ARMY CERTIFIED REGISTERED NURSE ANESTHETIST

PATRICIA A. KIEBLER, LT, AN

APPROVED:

_____	_____
W. Patrick Monaghan, CLS, SBB, Ph.D., Committee Chair	Approval Date
_____	_____
Robert Halliburton, LTC, CRNA, MHS, AN, USA, Member	Approval Date
_____	_____
Kenneth P. Miller, Ph.D., RN, FAAN, Member	Approval Date
_____	_____
F. G. Abdellah, Ed., ScD., RN, FAAN, Dean	Approval Date

DISCLAIMER STATEMENT

Department of Defense

This work was supported by the Uniformed Services University of the Health Sciences Protocol No. T06167-01. The opinions or assertions contained herein are the private opinions of the author and are not to be construed as official or as a reflection of the views of the Department of Defense or the Uniformed Services University of the Health Sciences.

COPYRIGHT STATEMENT

The author hereby certifies that the use of any copyrighted material in the thesis entitled: A SURVEY TO DETERMINE THE OPERATIONAL READINESS TRAINING OF THE ARMY CERTIFIED REGISTERED NURSE ANESTHESIST , beyond brief excerpts is with the permission of the copyright owner, and will save and hold harmless the Uniformed Services University of the Health Sciences from any damage which may arise from such copyright violations.

ABSTRACT

The Army certified registered nurse anesthetist (CRNA) is an integral part of the health care team and offers a valuable service to the medical care of soldiers and their families. Delivering anesthesia on the battlefield will be vastly different from that of the technologically advanced military treatment facilities. The purpose of this study was to survey the type and amount of trauma education and experience received by Army CRNAs. Results of this analysis revealed a mean of 6.48± 4.6 years of military anesthesia experience. Annual anesthetics administered per Army medical facility ranged from 0-50,000. Trauma anesthesia is not included in 40% of current practice. Of particular interest, 71% percent of the respondents indicate that they did not have a trauma rotation in their clinical program. Fifty-three percent of respondents have been deployed. According to the questionnaire results, most respondents felt that vital training could be achieved through civilian trauma experience, attending the advanced trauma life support course, and participating in more deployment exercises.

Key words: anesthesia, certified registered nurse anesthetist, trauma, education, experience

A SURVEY TO DETERMINE THE OPERATIONAL READINESS TRAINING OF THE CERTIFIED REGISTERED NURSE ANESTHETIST

by

Patricia A. Kiebler, RN, BSN

THESIS

Presented to the Graduate School of Nursing Faculty of the Uniformed Services University of the Health Sciences in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES

October 1999

DEDICATION

This thesis is dedicated to my mother and sister who have had the energy to put up with me through it all. Without the two of them, I would not be where I am today both in my professional and personal lives. A special thank you goes to my friend Andrew for challenging me in my pursuit of higher education.

ACKNOWLEDGEMENTS

Sincere thanks and appreciation is extended to my committee members: Dr. Monaghan, Dr. Miller, and LtCol Halliburton for their direction, guidance, and support. They were there without fail to assist and guide me in this process, and without their help, this project would have never been completed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Background

The Army certified registered nurse anesthetist (CRNA) is an integral part of the health care team and provides a vital service to the medical care of soldiers and their families. The day-to-day operations and functions that the CRNA performs, however, are not their primary mission. The CRNA, as a member of the Army Medical Department, has a mission to maintain the fighting strength of the command (Office of the Surgeon General, 1991, p. 4). Administering anesthesia to soldiers on the battlefield constitutes the primary wartime mission of the Army CRNA.

The deliverance of anesthesia on the battlefield and in support of different contingency operations will be vastly different from that of the technologically advanced military peacetime facilities. No longer will the CRNA perform anesthesia in the protected environment of the operating room, assisted by operating room personnel with unlimited supplies and equipment, oxygen, and little danger of power failure. Under these ideal conditions, the provider can effectively manage a severe trauma patient; it is feasible to ventilate for extended periods of time, keep the temperature regulated, draw lab specimens, and be relieved by a competent colleague when needed.

This ideal situation will not be the case on the battlefield. According to Donchin, Wiener, Grande, and Cotev (1990) a likely scenario for the deliverance of battlefield anesthesia includes a small mobile hospital located about a kilometer from the front line and lacking basic equipment. Jowitt and Knight (1983) speak of the monitoring capabilities during the Falklands campaign as being limited to the thermometer, the sphygmomanometer, and the stethoscope.

The difference will not only be in the equipment and environment but also in the type of casualty seen. The typical casualty presenting on the battlefield will most likely be a trauma victim. According to Bellamy (1995) there is a 95% chance that the wound will be penetrating in nature. Casualties are very complicated, with massive hemorrhage, hypovolemic shock, hypo/hyperthermia, and require a difficult intubation. These conditions are not so common in the typical peacetime setting.

Purpose

The only way for a soldier in any branch of the Army to be ready to perform the wartime mission is to do realistic training during peacetime. Tsoulos (1992) states

> We have to set an ideal where our people are trained in peacetime so they can go to war and function as well on the

first casualty as they do on the last (p. 189). How does the Army CRNA get the appropriate training to be ready for the battlefield experience? The purpose of this study was to survey the type and amount of trauma education and experience received by the Army CRNA. These data can be used to determine if the peacetime experience and training is adequate for CRNAs to perform their primary mission.

Research Questions

1. What skills do the Army CRNAs perceive as being important for their wartime mission? (i.e. blood transfusion, difficult intubation, resuscitation)

2. What type of specialized trauma education do Army CRNAs receive? (i.e. Advanced Trauma Life Support, rotation through Level 1 trauma center, Combat Care Casualty Course)

3. What type of ongoing training do Army CRNAs receive to prepare for the administration of battlefield anesthesia? (i.e. field exercises, working at a civilian trauma center)

Conceptual Framework

This study was based on Roy s Theory of Adaptation (Meleis, 1991) and on McAuliffe s Theory of Nurse Anesthesia Education (McAuliffe, 1993). Roy s theory addresses the need to adapt to a changing environment, the battlefield. McAuliffe s theory emphasizes the need to

combine different types of knowledge and experience to become an effective CRNA.

Roy s Theory of Adaptation

According to Roy s Theory of Adaptation, an explicit assumption is that a person is in constant interaction with a changing environment (Meleis, 1991). In this case, it is the CRNA who is in constant interaction with the battlefield, which is much different from the hospital operating room. Another assumption is that a person must adapt to respond positively to change. If the CRNA fails to adapt positively, performance of duties will be hampered.

Adaptation as described in this theory occurs through the use of two subsystems: the regulator and the cognator mechanisms (Ingram, 1995). The regulator mechanism receives stimuli from the environment and sends them to the central nervous system for processing. Stimuli may come in various forms to the CRNA. Some examples of these stimuli include objective findings during an assessment, audible weapons firing, or visual stimuli from operating room monitors.

The cognator subsystem attaches symbolic meaning to the stimuli through learning, which is manifested through imitation and insight. Imitation of skills such as intubation would be expected of the CRNA on the battlefield. Ability to know what to expect can be

developed through experience in similar situations such as previous deployment, providing anesthesia to trauma victims, or realistic field training.

The cognator subsystem also includes judgment, which occurs through problem solving and decision-making. There will be many opportunities for the CRNA to utilize problem solving and decision-making skills on the battlefield. For example, during a mass casualty situation, the CRNA may be responsible for the triage of victims, making decisions regarding the victim s potential for life or death (Donchin et al., 1990). Due to logistics problems, equipment or supplies may not be available and the CRNA may need to problem solve by improvising and adapting.

McAuliffe s Conceptual Framework For Nurse Anesthesia Education

McAuliffe (1993) states that in order to become a proficient practitioner one must possess three different types of knowledge, the knowing what, the knowing how, and the knowing when. The knowing what is declarative knowledge, which includes propositions about task structure and task goals. Declarative knowledge is often presented in the form of didactic teaching or from textbooks. This knowledge alone is of limited use because it is knowledge of theory only without practice. The knowing how is

procedural knowledge, or how to perform a task and includes information about execution of various actions. Procedural knowledge is acquired from direct instruction or from repeated experiences.

These two types of knowledge need to be combined to become the knowing when , or conditional knowledge (McAuliffe, 1993). Conditional knowledge is knowing when and why to apply the knowledge. Conditional knowledge is necessary to be able to adjust behavior to the changing task demands. If cases come in many forms, one needs to see many cases. Undoubtedly, Army CRNAs must possess conditional knowledge to adapt to the variable battlefield environment.

McAuliffe s (1993) model illustrates how these three components of knowledge progressively overlap through the use of case-based clinical instruction, which are the crossed lines in the center of the circles. Only through the use of case-based instruction can nurse anesthesia students integrate the three knowledge bases required for effective anesthesia practice.

There are seven themes that McAullife s Conceptual Model (1993) incorporates:

Theme One: Avoidance of Oversimplification and Over Regularization-Instruction needs to demonstrate

complexities and irregularities, not pretending as if all knowledge is simple.

Theme Two: Multiple Representations-Knowledge that is to be used in many ways needs to be learned, represented, and tried out in many ways.

Theme Three: Centrality of Cases-In an ill-structured domain, there is great variability in cases and general principles will not capture the dynamics of the cases. Increased flexibility comes from reliance on reasoning from previous cases.

Theme Four: Conceptual Knowledge is Knowledge in Use- Pre-packaged prescriptions can not always be provided for concepts with complex and irregular distributions.

Theme Five: Schema Assembly-The use of rigid knowledge structures must be replaced by flexible recombinable knowledge structures.

Theme Six: Noncompartmentalization of Concepts (Multiple Interconnectedness)-Students must strive for multiple interconnectedness of cases and concepts along multiple conceptual and clinical dimensions.

Theme Seven: Active Participation-There must be active learner involvement in knowledge acquisition, accompanied by opportunistic guidance and commentary by expert mentors to derive maximum benefit.

There are five levels of progression in the model: novice, competent, proficient, expert, and master levels. Upon successful completion of an educational program, nurse anesthesia students will have completed stage three-proficiency. At this stage, after passing the national certification examination, they can administer anesthesia independently as an entry level nurse anesthetist. At this point, the nurse anesthetist can progress to the next stage or regress to the previous stage depending upon the desire to learn more about the field of nurse anesthesia. Those who progress will become expert nurse anesthetists (see Figure 1).

Expert nurse anesthetists possess excellent clinical and decision making skills. Through continued study in the field they maintain a current anesthesia knowledge base. Some will continue to the fifth stage of master.

Those anesthetists who achieve the stage of master have advanced their understanding of nurse anesthesia. This is usually done through intensive study in a specific area. The expert nurse anesthetist is the one who often advances the science of nurse anesthesia through teaching, writing, or conducting research.

Ideally, all CRNAs should perform at the level of proficiency, that is entry level practice. Many are at the

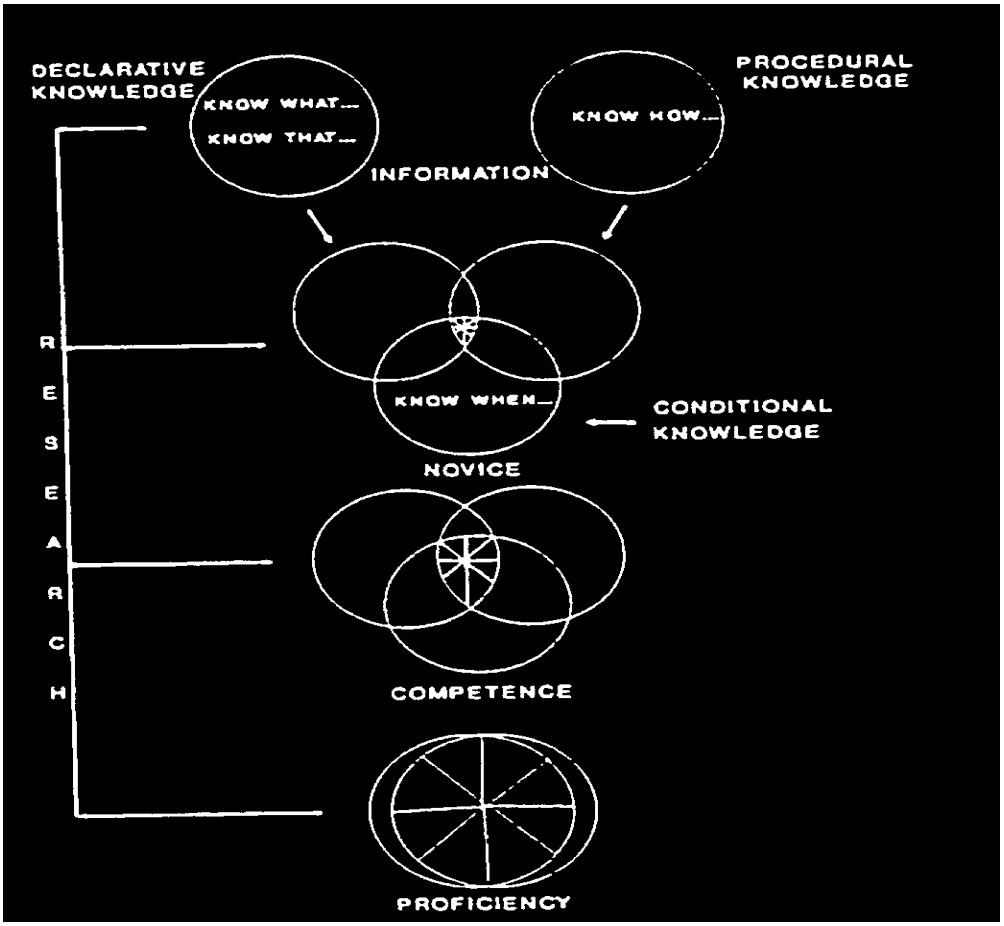

Figure 1.

McAuliffe s Conceptual Framework for Nurse Anesthesia Education

expert stage performing their peacetime duties. What about the primary mission? Would these CRNAs even be at the competent level performing battlefield anesthesia? An answer to this could only be based on educational level and previous experience, as McAuliffe s (1993) theory suggests.

Variables of Interest

The major variables identified in this study are based on the preparation of the Army CRNA. The independent variables are skills, education, and training, which all influence the dependent variable, performance of mission.

Definitions

The following terms have been conceptually and operationally defined for this study:

Skill The ability to use one s knowledge effectively and readily in execution or performance. Operational Definition: A skill is identified as one measured by competent administration of anesthesia and necessary to obtain certification.

Education Training by formalized instruction and supervised practice. Operational Definition: Formal teaching regarding trauma anesthesia or a hands-on, supervised clinical trauma rotation as evidenced by report of experience or certificate of completion.

Training Teaching so as to make fit, qualified, or proficient. Operational Definition: Formal anesthesia practice in a battlefield situation or an environment similar to one.

Mission A specific task with which a person is charged. Operational Definition: The administration of

anesthesia safely and effectively to casualties on the battlefield or in similar conditions.

Assumptions

The following assumptions are pertinent to this study:

1. All CRNAs are qualified practitioners.
2. All participants will answer the survey honestly and to the best of their ability.
3. The results from the randomized sample can be generalized to the population of Army CRNAs.
4. The amount of training and education in the field of trauma anesthesia directly correlates to the ability of the CRNA to perform in that situation.

Limitations

The following limitations are pertinent to this study:

1. It is probable that not all of the surveys will be returned.
2. Information gathered is based on self-report.

Summary

The Army CRNA is a valuable asset to the Army Medical Department. How CRNAs are trained during peacetime for their wartime mission is the determining factor of their performance. Through the use of Roy s Adaptation Model (1991)and McAullife s Model of Nurse Anesthesia

Education (1993), the aspect of CRNA readiness will be analyzed.

CHAPTER II: REVIEW OF THE LITERATURE

Introduction

The concept of battlefield anesthesia developed more than 150 years ago. With each military conflict, lessons were learned which provided the basis for training and change. A broad definition of battlefield anesthesia is anesthesia administration to trauma patients in situations where resources are limited and without the backing of generally available hospital services, such as sterile supply, a blood bank, and an intensive care facility (Donchin, Wiener, Grande, & Cotev, 1990). This chapter will provide a brief history of battlefield anesthesia and review relevant literature regarding the training and preparedness of CRNAs.

History of Army Anesthesia

A variety of archaic therapies was the treatment for trauma casualties before the mid-nineteenth century. Anesthetic techniques of that time included opium, cocaine, ethyl alcohol, and blood-letting to the point of unconsciousness. Some of the properties of ether and nitrous oxide were known, but neither was used widely at that time (Barton & Beeson, 1997).

The first anesthetic, ether, was administered officially during the Mexican War (Barton & Beeson, 1997).

Several things were learned about ether, such as evaporation as the temperature increased and different responses from victims in shock. Unfortunately, many military surgeons viewed anesthesia as misguided effeminate sentimentalism (Pernick, 1985, p.146). This limited the use of ether during the war and inhibited the progress of anesthesia as a science.

In 1849, the U.S. Army accepted ether as an anesthetic, and also added chloroform to its list of regular drugs. Still, selective anesthetization was performed. Surgical amputation received anesthetization most frequently.

Many lessons were learned from previous military conflicts, leading to a standardized and centralized anesthetization policy to limit extreme variations in military anesthetic use. During the Civil War, the use of anesthesia was demonstrated as a necessity. Its usefulness was made apparent and its safety was improved through the many thousands of anesthetics given. Surgical anesthesia was employed in at least 80,000 cases (Lichtmann, 1993). Anesthetic care was limited to the use of chloroform or ether alone or in combination usually with a sponge inside a cone or a draw-over vaporizer.

By the turn of the century, there was specialization in anesthesia, although no formal courses existed. Providers included medical students and interns, nurses, and family practitioners. The only way they learned anesthesia administration was through observation or from anesthesia machine manufacturers (Harsch, 1993).

World War I was the first time that the Army and Navy trained nurse anesthetists for war duty (Barton & Beeson, 1997). Sophie Gran Winston was a nurse anesthetist in a mobile army hospital in France. She gave as many as 30 anesthetics during one intense day of work (Olson, 1940). The U.S. Army sent its own nurses to anesthesia schools that had developed due to the demands of war. The nurses then returned to their base and instructed others. Dr. Guedel, who is known for developing the signs and stages of anesthesia, made rounds daily and instructed others in the art of anesthesia. Dr. Crile, an advocate of nurse anesthesia training, studied the anesthetic systems and techniques. He encouraged the use of nitrous oxide and regional techniques and helped establish a nitrous oxide plant in France. Spinal anesthesia was considered the most appropriate for casualties with combined lower extremity and pulmonary trauma (Grande, 1993). Intravenous fluids were not widely used. The anesthesia equipment that existed

was large and not easily transported. The equipment and the expertise to use it also was limited early in the war. During World War II (WWII), the demand for CRNAs still exceeded the supply. In response, the Army started military educational programs. In 1943, there were more than 400 CRNAs in the military hospitals in the U.S. and foreign countries. Between 1941 and 1945, the Army trained more than 600 CRNAs (Barton & Beeson, 1997). Reports from two nurse anesthetists, Elizabeth Boyer and Alice Amon, indicated that they gave diethyl ether and nitrous oxide/oxygen anesthesia with either a Forregger or McKesson machine (Barton & Beeson, 1997). This was done by mask induction, because endotracheal tubes were not available at their units.

Thiopental was introduced after the Pearl Harbor attack in WWII, but was associated with increased morbidity and mortality. When compared to civilian use, it was learned that doses needed to be decreased for hypotensive and hypovolemic patients. Problems still existed, however. Equipment was not universal and there was no equipment for infants and children. Medical departments in WWII finally recognized anesthesia as a highly skilled occupation and the anesthetist as a specialist (Barton & Beeson, 1997).

During the Korean War, consultants Dripps and Slocum generated a report on the use of narcotics, thiopental, and other anesthetics. Dripps advocated standardizing equipment and adding equipment for infants and children to the military anesthesia kits. They also recommended a system of surveillance that examined anesthesia-related deaths and injury so that the severity of injury, anesthetic techniques, and outcomes could be compared (Grande, 1993).

Male nurse anesthetists were commissioned in the Armed Forces in 1955. They were first drafted during the Vietnam War. Female CRNAs were not drafted, although many served in Vietnam. Certified registered nurse anesthetists played a vital role in Vietnam, which included the treatment of a large number of children and civilians. They also helped to develop new, more appropriate field equipment. Several lessons were learned from the Vietnam War, such as to include the effects of heat and humidity on the use of anesthetics. Ketamine was introduced. Halothane and methoxyflurane replaced diethyl ether because of its flammability. Between 1968-1969, approximately 65 CRNAs on average were deployed in 16 hospitals throughout Vietnam. The largest number deployed at any one given time was ninety-nine (Grande, 1993). Unfortunately, during this conflict, two male CRNAs lost their lives.

In 1967, the Army adopted the use of the Ohio Model 758 Field Anesthesia Machine which was less than 95 pounds, could be air-dropped, and could be transported by one person (Lichtmann, 1993). An anesthesia field chest was developed which contained over 100 items such as intravenous fluids and a three-day supply of drugs.

In the most recent conflict, Operation Desert Storm, CRNAs were incorporated into the Forward Surgical Team to provide care in the field in emergent situations. This required a fit CRNA, as well as easily portable anesthesia equipment. Some CRNAs were attached to major armored units that functioned under difficult conditions and moved frequently. The surgeries performed and anesthetics administered varied. Many enemy prisoners of war were treated with wounds that had occurred days or weeks earlier.

It is apparent through this history review that there is not just one battlefield: the battlefield changes from conflict to conflict. This requires adaptation on the part of the CRNA in order to remain an efficient part of the health care team. As explained by Roy s Adaptation Model, the regulator mechanism of the CRNA receives the stimulus of heat, lack of equipment, or fatigue. It is then sent to the cognator subsystem of the brain, where it is determined

if this is a familiar stimulus or not. The cognator subsystem uses judgment, problem solving, and decision-making abilities to determine the appropriate response (Meleis, 1991).

Experience and Training of Nurse Anesthetists

Many authors have identified the importance of experience and training in the performance of the CRNA, especially in a battlefield situation. The CRNA is part of a medical team whose success depends on the personnel comprising the team, their training, experience, and morale. Donchin et al.(1990) stated that the most central consideration in battlefield anesthesia is the selection, training, and experience of the provider. Experience is a basic requirement that can only be gained by regularly working in a situation similar to a combat zone. From the findings of his research, it is evident that the role of the CRNA is not restricted to the operating room during war, but included triaging in the admitting area, immediate resuscitation, airway management, and monitoring of the severely injured patient.

Wiener (1986) reviewed current training in military medicine, noting that it is primarily done by lecture format with skills stations. Another finding was that no advanced ongoing training in trauma was given on a

widespread basis. He believed that combat readiness could be maintained through refresher and ongoing training.

In 1980, a tri-service Combat Casualty Care Course (C4) was initiated. Approximately 2400 medical personnel take C4 each year. Two and one-half days are devoted to a standard Advanced Trauma Life Support Course (ATLS). Wiener (1986) points out problems with the current training: It deals only with very early trauma, it lasts only 2-3 days, there is no provision for review, and no advanced topics like anesthesia and massive blood transfusion are addressed. Hands-on training at a Level 1 trauma center is a recommended approach.

Perkins and Condon (1993) believe all CRNAs should have ATLS training. However, the effectiveness of ATLS training is not totally agreed upon. Vestrup, Stormaker, and Wood (1988) determined that some performance was improved, but their study failed to show an improvement in overall quality of care after ATLS training. On the other hand, it was found that medical staff was more effective in their management of simulated trauma cases after ATLS (Williams, Lockey, & Culshaw, 1997). Perhaps the standard ATLS format should be modified for combat casualty care to include primarily penetrating injuries, resource-limited environments, and the echelon-based system in the military.

Regarding military trauma anesthesia, much work has been done to improve the care of injured patients; however, little attention has been paid to the proficiency and suitability of those who protect patients against death and disablement (Kluger et al., 1991). These authors evaluated a modular teaching unit called the Combat Trauma Life Support Course. Seventy-seven physicians in Israel received a five-day course in trauma management. The post-course test scores demonstrated the value of this condensed trauma educational program.

Another suggestion for effective battlefield anesthesia has been training the CRNAs in a developing country environment. Olsen (1997) discussed the current situation facing Armed Forces anesthesia providers (AFAs), and believes that the current impressive medical technology has carried AFAs training farther from their operational environment. This was demonstrated during Desert Storm when AFAs attempted to use unfamiliar equipment and deal with field hospital limitations.

At the Seventh Conference on Military Medicine in 1992, Tsoulos stated:

> Training is a problem. Our medical people are not well trained for their wartime role They do not know how to function in the field. They do not

> know what to do with the equipment they find in deployable hospitals The point is we need additional training in peacetime [T]here needs to be a more optimum balance of being prepared to go to war next time (p. 186-189).

After Desert Storm, the U.S. Central Command s Staff Surgeon remarked that overwhelming emphasis on peacetime health care conflicted with the training and readiness of Army clinical personnel to provide the best medical care to large numbers of casualties in the combat zone (Olsen, 1997, p.76). Military interventions include rapid mobilization and deployment which requires preconflict exposure of CRNAs to the older equipment found in a field hospital. Colonel Ideus advises that training is the Army Medical Department s weak suit (Best & Tomich, 1995, p. 50). A report from the United States General Accounting Office (1992) revealed an embarrassing lack of field training as reported in a unit s after action report. Many personnel were found to lack field training and were not familiar with the unit s mission and equipment. Combat brings along with it new circumstances to work within and survive by, so basic anesthesia capabilities in a third echelon setting must be second nature.

As identified earlier, there are some definite gaps in appropriate training for CRNAs. The effects of various training programs have been analyzed. For example, after a training program for inflight, aircraft-related emergencies was implemented, the crew s confidence levels increased. This increase was maintained for at least six months (Wright, Campos, & Gordon, 1994).

Courington (1988) suggested that today s civilian and military operating rooms do not prepare staff for a battlefield encounter. He reported comments made by Dr. Paluel Joseph Flagg comparing military and civilian anesthesia:

> Military anesthesia resembles anesthesia in civil practice with the following exceptions-the patient is not prepared for operation; induction must be rapid and recovery must follow quickly; a large number of cases require treatment at one time, and, finally, the anesthetic is often administered under trying conditions with improved apparatus. If these difficulties are recognized and met, the well-trained anesthetist in civil life will not fail to render his country a great service when called to the battle line (p.31).

Anesthesia simulation could be an alternate form of training. Hoffer (1973) found that students who used medical simulations and computer-assisted instruction rather than conventional instruction, had enhanced receptiveness to instruction and better retention.

Since trauma intubations are usually difficult for several reasons, there are models that simulate various scenarios during intubation, such as vomitus, foreign bodies, and blood. Simulation is efficient because it allows clinical training without patient risk, and it compresses learning (Hoffer, 1973).

Another suggestion revealed in the literature was that of a Level 1 trauma center rotation. According to McAuliffe s (1993) theory of nurse anesthesia education, it is imperative that the CRNA receive training in an environment similar to that of the battlefield. This Level 1 rotation would be beneficial by placing the CRNA in the desired environment to gain the conditional knowledge needed for the battlefield. Procedural knowledge in a battlefield situation is much different than that in the civilian sector. This is because battlefield anesthesia is most often performed lacking familiar equipment and in austere environments, like chemical contamination or excessive heat. Once the procedural knowledge is gained, it

can be combined with that learned through textbooks and lecture to form conditional knowledge.

However, a Level 1 trauma center rotation alone would not fulfill the needed battlefield experience. First, there are considerable seasonal fluctuations in trauma admissions which may result in gaps in clinical experience from one trainee to another. Second, there is a relative lack of penetrating injuries (25-50%) in the civilian sector versus 90% of combat battlefield trauma. Another factor is that future warfare will probably result in an increased number of burn and blast injuries secondary to the use of armored fighting vehicles (Bellamy, 1995).

Summary

It is evident that the battlefield offers many challenges to the CRNA. Much of the literature suggests that the Army medical department, which includes the CRNA, is not prepared for war. Some of the deficiencies have been pointed out in this review, but the literature is limited in suggestions to resolve this problem. This study will attempt to identify training and experiences valuable in the preparation of the CRNA for battlefield anesthesia. As a result, targeted training can be performed, and lead to better trained CRNAs capable of performing their wartime mission.

CHAPTER III: METHODOLOGY

Introduction

This chapter outlines the methods used to answer the research questions regarding the skills, trauma education, and ongoing training of the Army CRNA as it relates to the preparedness of the Army CRNA for deployment. It will address the research design, procedures, sample, measurement, protection of human rights, and plans for data analysis.

Type of Study and Research Design

This research survey used a descriptive design. A descriptive research study attempts to portray the characteristics of persons and situations (Polit & Hungler, 1991). The person in this case was the CRNA who deployed to a variety of battlefield situations. This design was used to determine which experiences were of most value for deployment of the Army CRNA. A quantitative approach was utilized to emphasize the measurable attributes of the human experience (Polit & Hungler, 1991).

Time Frame and Setting

A list of all Army CRNAs currently on active duty was obtained in July 1998. The questionnaire was mailed to the home address of all Army CRNAs in the latter part of July 1998. To account for overseas mailing, all surveys were

returned by late August 1998. Once returned, the reading and recording of the survey was done at the Uniformed Services University of the Health Sciences (USUHS). Data input and analysis was performed during the next several months. Completion of data analysis occurred in December 1998.

Sample

The sample for this study included all Army CRNAs currently on active duty and who are members of the American Association of Nurse Anesthetists (AANA). The list was obtained from the AANA and consisted of 225 providers. The sample consisted of male and female respondents, with an age range of 27-60 years old.

Descriptive studies often require a large sample size because respondents are likely to be heterogeneous in terms of demographic variables. A large sample was efficacious in this study because some questionnaires were not returned. Dealing with a military population poses another problem with the rate of return. It is possible that several members of the sample were deployed, or currently displaced and did not receive the questionnaire in the time frame specified.

Measurement

As demonstrated in the review of literature, previous conflicts have revealed inadequate preparedness of medical professionals. This questionnaire was designed to prioritize the most effective means of preparing Army CRNAs for their combat mission. It was designed by determining what variables could affect the Army CRNA s performance during deployment. The variables under study were training, education, and skills.

The questionnaire consisted of fifteen questions regarding these three variables (see Appendix A). The questions addressed an underlying concern with trauma anesthesia and field experience/training since these correlated with the deployment scenario. All questions could be answered by checking yes or no, checking a line, or writing or circling a number.

Content Validity

Content validity examines the extent to which the method of measurement includes all relevant elements related to the construct being measured (Burns & Grove, 1997). Content validity of the questionnaire was obtained by having two Army nurse anesthesia experts review the questionnaire. A cover letter (see Appendix B), the questionnaire, and an evaluation form that rated the degree

of relevance of each question was sent to the anesthesia experts. Utilizing the evaluation sheet, the experts evaluated the relevance using a scale of one to four (1 = not relevant to the study, 2 = somewhat relevant, 3 = relevant, and number 4 = very relevant) (see Appendix C). A content validity score was calculated. An acceptable score will be 90% agreement. Adhering to these standards, no questions had to be removed from the questionnaire. After the content validity was obtained, the survey was mailed with a return self-addressed, stamped envelope to each CRNA with a cover letter (see Appendix D).

Protection of Human Rights

Approval for the study was obtained from the Institutional Review Board (IRB) at USUHS. In an attempt not to be too intrusive in the lives of the questionnaire recipients, privacy was maintained throughout the study. The cover letter contained assurances of confidentiality (see Appendix D). The return of the questionnaire served as informed consent. If a survey recipient wished not to participate, he/she simply did not return the questionnaire. The investigator was the only person to open the returned questionnaires and input the data.

Data Analysis

Data have been coded on the survey. Once the

questionnaires were received, all data were entered into the Statistical Package for the Social Sciences (SPSS) (Norusis, 1998).

Summary

This study utilized a descriptive research design to answer the three research questions posed earlier. Of 225 survey questionnaires mailed, 135 were returned yielding a return rate of 61%.

Chapter IV: DATA ANALYSIS

The purpose of this study was to survey the type and amount of trauma education and experience received by the Army CRNA. This was accomplished through the use of a 15-item questionnaire. The sample will be described first followed by a discussion of the results.

Description of Study Sample

The study sample consisted of 225 active duty Army CRNAs. One hundred thirty-eight surveys were returned. One was a returned to sender because there was no forwarding address, so this survey was eliminated. Two other surveys were eliminated because the CRNAs were no longer on active duty. Of the remaining 222 surveys, 135 were returned yielding a response rate of 61%.

All 135 respondents to this survey were Army Nurse Corps officers. The dates of CRNA certification range from December 1977 to January 1998. The range in years of military anesthesia practice was from 1.5 to 22 years. The mean for this question was 6.48– 4.6 years (see Figure 2). Evaluation of the practice of trauma anethesia demonstrated that 81 (60%) of the respondents currently practice trauma anesthesia, while 54 (40%) do not. Determination of annual

Figure 2.

Years in Military Anesthesia Practice

anesthetics administered showed that CRNAs are involved with medical treatment facilities that administer between 0 and 50,000 anesthetics per year. Seven respondents answered zero. Two respondents submitted that they currently do not administer anesthesia due to long-term schooling. The mean number of anesthetics administered per facilty was 4364-5694 (see Figure 3). This distribution is bimodal with a frequency of ten at 1,000 and 2,000 anesthetics per year.

Deployment Issues

Seven questions addressed the issue of deployment. Seventy-two (53.3%) of respondents have been deployed, while 63(46.7%) have not. Those who were deployed went to various areas of the world. Responses included Vietnam,

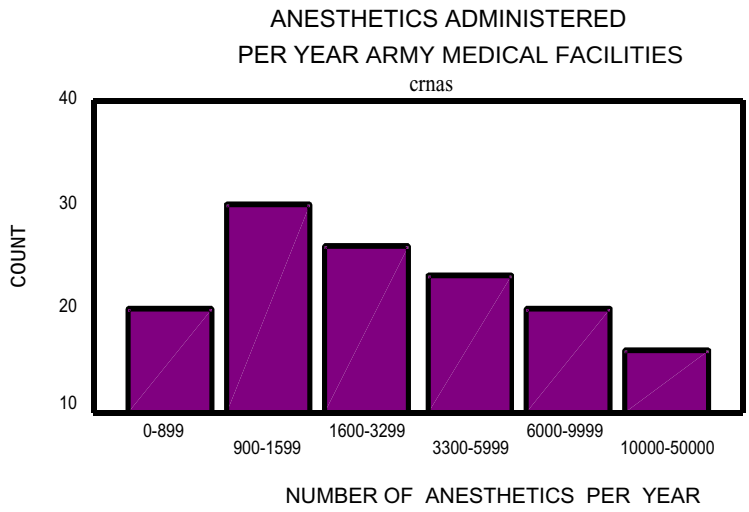

Figure 3.

Anesthetics administered per year

Croatia, Somalia, Bosnia, Honduras, Albania, Turkey, Haiti, Egypt, Hungary, Korea, Macedonia, Thailand, and Desert Shield/Desert Storm. Two respondents indicated that they had been deployed on classified missions as well. Forty-five respondents indicated what field equipment was used during deployment. Seventy-one percent (n=32) used the Model 885 field anesthesia machine while 21% (n=12)used the draw-over vaporizer and almost 7% (n=3) indicated use of other machines. This other equipment included the Heidbrink machine (n=1), the Excel 210 (n=1), a German made Drager field anesthesia machine (n=1), a Norwegian field anesthesia machine (n=1), and a Tri-Service vaporizer (n=1). Eighty-one percent of those respondents who had been

deployed indicated that they were adequately trained while 19% indicate that they were not. Of the 72 providers who had been deployed, however, 49% indicated shortfalls in their training. Twenty-five providers (35%) stated a lack of training on field equipment to include assembly and breakdown. Ten percent (n=7) indicated a lack of training in trauma anesthesia, while 4% (n=3) indicated they had never used the field equipment on real patients.

Twenty-five percent (34/135) of the respondents have been involved in humanitarian missions. Some of the locations include Honduras, Turkey, Ukraine, Haiti, Wake Island, Pacific Islands, Krygystan, Nairobi, Moscow, Kenya, and Central and South America. Seventy five percent (101/135) of the respondents had not been involved with a humanitarian mission. Twenty-seven respondents indicated the type of equipment utilized during their deployment. Fifteen (59%) used the Model 885 field anesthesia machine. The draw-over vaporizer was used by 30% (n=8) and other equipment was used by 22%. Other equipment included a Russian made field machine (n=1), the Ohio side-arm vernitrol (n=1), and British systems (n=1). Three respondents did not indicate what other equipment they used. Three respondents indicated that they were in a fixed facility and utilized Ohmeda machines.

Training and Trauma Experience

The data showed that almost 15% (20/135) of the respondents practiced trauma anesthesia outside the military. Fifty-five percent of those who practiced trauma (11/20) practiced at a Level 1 facility, while 35% (7/20) practiced at a Level 2 facility. It was not indicated where the two other respondents practiced trauma anesthesia.

Only 29% (39/135) of the respondents had a trauma clinical site rotation, while 71 (96/135) did not. Of the 39 that did, 66% (26/39) rotated through a Level 1 center, while 34% (13/39) rotated through a Level 2 center. Fifty-nine percent of the respondents receive trauma patients in their current anesthesia practice.

One question had the respondent rank order a variety of classes/experiences as to the value in preparation for trauma anesthesia. The scale was from 1-6, with 1 being no value and 6 very valuable, and a NA for not applicable. The data are shown in Table 1 below.

As is shown in Table 1, civilian experience and the ATLS course were the most valuable in preparing the Army CRNA for trauma anesthesia with a mean of 5.18 and 4.86 on a scale of 1-6 respectively. Of least value is the United States Air Force Combat Medicine Course with a mean of

3.75. It must be noted, however that this course has only been attended by four respondents.

Table 1.

Rank Order of Course/Experience

COURSE/EXP.	N	MEAN	STD. DEV.
CIVILIAN EXP.	45	5.18	0.98
ATLS	84	4.86	1.03
DEPLOYMENT	70	4.66	1.50
HUMANITARIAN MISSIONS	37	4.49	1.50
CONFERENCES	69	4.41	1.03
US ARMY C4	86	4.23	1.35
FIELD TRAINING	108	4.06	1.35
USAF COMBAT MEDICINE	4	3.75	1.26

In conclusion, these data display current Army CRNA demographics and professional experience. These results may be useful in preparing future CRNAs for battlefield anesthesia.

CHAPTER V: SUMMARY, CONCLUSIONS, RECOMMENDATIONS

This chapter focuses on the discussion and implications of the results. It begins with a summary of the study followed by a discussion of the findings and possible explanations. Finally, suggestions for further research will be discussed.

Summary

It cannot be disputed that CRNAs need certain training and experience to perform effectively in the battlefield environment. Bellamy (1995) alludes to the different type of casualty, while Donchin et al. (1990) elaborate on the different environment. Tsuolos (1992) believes medical people are not well trained for their wartime role This entails the need for specific training related to trauma anesthesia.

According to Roy s Theory of Adaptation (1991), the CRNA constantly needs to adapt to the battlefield environment, which is itself constantly changing. This, in and of itself, is reason enough for specific training. McAuliffe s Conceptual Framework for Nurse Anesthesia Education (1993) focuses on conditional knowledge, when and where to apply knowledge. Essentially, the CRNA needs to be faced with various trauma cases in order to gain this conditional knowledge. My study was performed in order to

determine the current level of trauma training and experience of the CRNA, essentially evaluating the conditional knowledge.

A descriptive survey design was used to evaluate the amount of trauma training and experience received by the Army CRNA. Validity was confirmed through the use of two Army CRNAs with anesthesia experience. The questionnaire was mailed with an introductory letter and self-addressed, stamped return envelope to 225 active duty Army CRNAs. This list was received from the AANA. The response rate was 61%, after excluding three surveys. Anonymity of the respondents was ensured by lack of any identification associated with any response.

Responses to the research questions were analyzed using SPSS (1998). Frequencies and percentages were reported along with the standard deviation. Figures and graphs were designed to display the results.

The major study findings are as follows. The mean number of years in military anesthesia practice is 6.48–4.6 years. Sixty percent of the respondents currently practice trauma anesthesia. Including these trauma cases, CRNAs are stationed at facilities that perform up to 50,000 cases per year. Fifty-three percent of the CRNAs have been deployed. Shortfalls included primarily a lack of training on the

anesthesia equipment and lack of trauma experience. Of interest is the value of particular courses and experiences as indicated by the CRNA. Civilian experience and the ATLS course were ranked as the most valuable.

Implications of the Findings

The data collected indicates a need for more trauma education and experience by the Army CRNA. This is identified by the responses indicating a lack of trauma experience and a lack of training on the field equipment. Forty percent of the CRNAs currently do not practice trauma anesthesia. With the current status of global unrest, it is very likely that the CRNA may be placed in an unfamiliar trauma environment. This is not fair to our soldiers who may require such service.

It is obvious that CRNAs as a whole would benefit from more frequent training and operation of the field equipment. This is something that requires performance on a regular basis to maintain proficiency.

Suggestions for Further Research

This study lends itself very well to further research. This survey could be sent to members of the other military services to compare operational readiness. The survey could be repeated to determine if there have been any changes in the training and experience of the Army CRNA.

The survey could also be modified to be used in the civilian setting for trauma anesthesia.

REFERENCES

Barton, C., & Beeson, M. (1997). Anesthesia for trauma during wartime. CRNA: The Clinical Forum for Nurse Anesthetists, 8, 2-12.

Bellamy, R. (1995). Combat trauma overview. In R. Zajtchuk, & C. Grande (Eds.), Anesthesia and perioperative care of the combat casualty (pp. 1-54). Washington, DC: Office of the Surgeon General.

Best, F. & Tomich, N. (1995). Medicine in the Gulf War. Washington, DC: U.S. Medicine, Inc.

Burns, N. & Grove, S. (1997). The practice of nursing research: Conduct, critique, and utilization. (3rd ed.) Philadelphia: W.B. Saunders Company.

Courington, F. (1988). Anesthesia at the battlefield: The present and the future. Seminars in Anesthesia, 7, 26-32.

Donchin, Y., Wiener, M., Grande, C., & Cotev, S. (1990). Military medicine: Trauma anesthesia and critical care on the battlefield. Critical Care Clinics, 6, 185-202.

Grande, C. (Eds.). (1993). Textbook of trauma anesthesia and critical care. St Louis: Mosby-Year Book.

Harsch, T.L. (1993). Nurse anesthetists in the United States Army Nurse Corp during World War II. Unpublished master s thesis, Bradley University, Illinois.

Hoffer, E. (1973). Experience with use of computer simulation models. Computers and Biological Medicine, 3, 269-279.

Ingram, L. (1995). Roy s Adaptation Model and accident and emergency nursing. Accident and Emergency Nursing, 3, 150-153.

Jowitt, M., & Knight, R. (1983). Anaesthesia during the Falklands campaign. Anaesthesia, 38, 776-783.

Kluger, Y., Rivkind, A., Donchin, Y., Notzer,N, Shushan, A., & Danon, Y. (1991). A novel approach to military combat trauma education. The Journal of Trauma, 31, 564-569.

Lichtmann, M. (1993). Military and battlefield anesthesia. In C. Grande (Eds.), Textbook of trauma anesthesia and critical care (pp. 1297-1306). St Louis: Mosby-Year Book.

McAuliffe, M. S. (1993). Case-based instruction: An analysis of clinical curricula in nurse anesthesiology. Dissertation Abstracts International. (University Microfilms No. 9400951)

Meleis, A. (Ed.). (1991). Theoretical nursing: Development and progress (2nd ed.). Philadelphia: J.B. Lippincott Company.

Norusis, M. (1998). SPSS 8.0 guide to data analysis. Upper Saddle River, N.J.: Prentice Hall.

Office of the Surgeon General. (1991). Combat casualty care guidelines: Operation Desert Storm. Washington, DC: TMM Publications.

Olsen, J. (1997). Are we dancing alone? Matching medical operational readiness training with potential future conflict. Military Medicine, 162, 75-78.

Perkins, D., & Condon, B. (1993). Post Vietnam conflicts: Grenada, Panama, and the Persian Gulf. In C. Grande (Eds.), Textbook of trauma and critical care. St. Louis: Mosby-Year Book.

Pernick, M. (1985). A calculus of suffering pain professionalism, and anesthesia in nineteenth-century America. New York: Columbia University Press.

Polit, D. & Hungler, B. (1991). Nursing research: Principles and methods (4^{th} ed.). Philadelphia: J.B. Lippincott Company.

Tsoulos, D. (1992, April). The Spectrum of Medical Support to Operation Desert Shield/Storm. Paper presented at the Seventh Conference on Military Medicine. Uniformed Services University of the Health Sciences, Bethesda, Maryland.

United States General Accounting Office. (1992). Operation Desert Storm: Full army medical capability not achieved: Report to the chairman, subcommittee on armed services, house of representatives. Washington DC: U.S. Government Printing Office.

Vestrup, J., Stormorken, A., & Wood, V. (1988). Impact of advanced trauma life support training on early trauma management. The American Journal of Surgery, 155, 704-707.

Wiener, S. (1986). Medical corps readiness for major conflict. Military Medicine, 151, 321-326.

Williams, M., Lockey, A., & Culshaw, M. (1997). Improved trauma management with advanced trauma life support (ATLS) training. Journal of Accident and Emergency Medicine, 14, 81-83.

Wright, A., Campos, J., & Gorder, T. (1994). The effect of an in-flight, emergency training program on crew confidence. Air Medical Journal, 13, 127-31.

Bibliography

Aprahamian, C., Nelson, K., Thompson, B., Malangoni, M., & Schneider, T. (1984). The relationship of training and area of medical specialization with registrant performance in an advanced trauma life-support course. The Journal of Emergency Medicine, 2, 137-140.

Blumenfield, A., Kluger, Y., & Abraham, R. (1997). Combat trauma life support training versus the original advanced trauma life support course: The impact of enhanced curriculum on final student scores. Military Medicine, 162, 463-467.

Carmichael, G.L. (1981). Anaesthesia under civil war conditions. Anaesthesia, 36, 1077-1088.

Courington, F. (1985). Anesthesia guidelines for the trauma patients. Seminars in Anesthesia, 4, 92-101.

Dalenius, E., & Asaker, B. (1989). Training for wartime anesthesia in Sweden. Journal of the American Association of Nurse Anesthetists, 57, 250-55.

Dreyfus, S. D. & Dreyfus, H. L. (1980). A five-stage model of mental activities involved in directed skill acquisition. Unpublished report supported by the Air Force Office of Scientific Research (AFSC), USAF (Contract F49620-79-0063), University of California at Berkely.

Flagg, P.J. (1919). The art of anesthesia (2nd ed.). Philadelphia: Lippincott.

Gerber, F. (1992). Employment of the 307th medical battalion (airborne) in Operations Desert Shield and Desert Storm: A personal experience monograph. U. S. Army War College. Carlisle Barracks, Pennsylvania.

Grande, C., Baskett, P., Donchin, Y., Wiener, M., & Bernhard, W. (1991). Trauma Anesthesia for Disasters: Anything, Anytime, Anywhere. Critical Care Clinics, 7, 339-361.

Heres, E. & Hetherington, R. (1992). Anesthesia in the Desert: Experiences with the U.S. Marines during the Persian Gulf Conflict. Journal of Clinical Anesthesia, 4, 351-354.

McGrath, L. (1997). Creating the casualty: Role of casualty simulation in accident and emergency training. Accident and Emergency Nursing, 5, 99-101.

Olson, G. (1940). The nurse anesthetist: Past, present and future. Bulletin of the American Association for Nurse Anesthetists (BAANA), 8, 298.

Paris, S. G., Lipson, M. Y., & Wixson, K. K. (1983). Becoming a strategic reader. Contemporary Educational Psychology, 8, 293-316.

Perel, A. (1987). Battlefield anesthesia. International Anesthesiology Clinics, 25, 175-189.

Phillips, W., Reynolds, P., Lenczyk, M., Walton, S., & Ciresi, S. (1997). Anesthesia during a mass casualty disaster: The Army s experience at Fort Bragg, North Carolina, March 23, 1994. Military Medicine, 162, 371-373.

Ryan, J., Cooper, G., Haywood, I., & Milner, S. (1991). Field surgery on a future conventional battlefield: Strategy and wound management. Annals of the Royal College of Surgeons of England, 73, 13-20.

APPENDICES

Appendix A

Survey Questionnaire

Operational Training and Experience in Trauma Questionnaire

The purpose of this study is to identify experiences of Active Duty Certified Registered Nurse Anesthetist in trauma anesthesia and to measure the value of their experience in preparation for deployment. Please answer all questions as completely as possible.

1. Branch of Service: Army(1) _____ Navy(2)_____ Air Force(3)_____
2. Date of CRNA certification: _____/_____
   month year
3. Years in military anesthesia practice: _____
4. Does your military practice include trauma anesthesia? Yes(1)_____ No(2)_____
5. How many anesthetics per year are administered at your facility? _____
6. Have you ever been deployed as an anesthesia provider? Yes (1)_____ No (2)
7. If you have been deployed as an anesthesia provider, please indicate where:
   - A. Viet Nam (1)_____
   - B. Grenada (2)_____
   - C. Bosnia (3)_____
   - D. Panama (4)_____
   - E. Desert Shield/Storm (5)_____
   - F. Somalia (6)_____
   - G. Other (7)_____
8. During your deployment, which field anesthesia equipment did you use?
   - A. Model 885 Field Anesthesia Machine (1)
   - B. Draw over anesthesia vaporizer (2)
   - C. Other (3)_____
9. Were you adequately trained on the above equipment prior to deployment?
   Y(1) _____ N(2)
10. Please indicate the shortfalls in your training:_____
_____

11. Have you participated in any humanitarian missions, providing anesthesia? Y(1)_____N(2)
    If yes, where and when?_____
12. During any humanitarian missions, which field anesthesia equipment did you use?
    - A. Model 885 Field anesthesia machine (1)_____
    - B. Draw over anesthesia vaporizer (2)_____
    - C. Other (3)_____
13. Do you practice trauma anesthesia outside the military? Yes(1)_____ No(2)_____
    - A. If yes, do you practice at a Level I trauma center? Yes(1)_____ No(2)_____
      Hours per month_____
    - B. or, a Level II trauma center? Yes(1)_____ No(2)_____
      Hours per month_____
14. Did your Nurse Anesthesia program include a clinical site rotation in trauma anesthesia?
    Yes(1)_____ No(2)_____
    - A. If yes, was this at a Level I trauma center? Yes(1)_____ No(2)_____
    - B. or at a Level II trauma center? Yes(1)_____ No(2)_____
15. Please rank order the following experiences or classes that you have participated in as to their value in preparing you to provide <u>trauma anesthesia</u> during deployment. Please circle the corresponding number with 1 being little or no value, 6 being extremely valuable. If you have not participated in a class or previous deployment, please circle NA.

	No value					Very valuable	
A. Advanced trauma life support:	1	2	3	4	5	6	NA
B. USAF Combat Medicine Course:	1	2	3	4	5	6	NA
C. USA Combat Care Casualty Course (C4):	1	2	3	4	5	6	NA
D. Field training exercise/Medical Red Flag:	1	2	3	4	5	6	NA
E. Civilian trauma care experience:	1	2	3	4	5	6	NA
F. Trauma anesthesia conferences:	1	2	3	4	5	6	NA
G. Previous deployment experience:	1	2	3	4	5	6	NA
H. Humanitarian mission:	1	2	3	4	5	6	NA

Appendix B

Cover Letter

20 April 1998

Dear _____,

Attached is a copy of a survey questionnaire and letter I have developed for my thesis entitled Operational Readiness of the Army CRNA. I request that you please evaluate the survey to determine content validity due to you vast experience in the field of anesthesia. Your comments and suggestions will important in determining the success of this survey.

Please direct any questions regarding this evaluation to Lieutenant Patricia A. Kiebler. I may be reached at (410) 663-9860. My mailing address is 2804 Willoughby Road, Parkville, Maryland 21234.

Thank you in advance for your time and effort regarding this evaluation. Your contributions are greatly appreciated.

Patricia A. Kiebler, LT, USA
Uniformed Services University of the Health Sciences
Graduate School of Nursing

Appendix C

Content Validity Tool

Validity Test

Please rate the relevance of each question pertaining to the operational readiness of the Army CRNA. Use the following scale.

1-not relevant

2-somewhat relevant

3-relevant

4-very relevant

Question Number	Degree of Relevance
1	1 2 3 4
2	1 2 3 4
3	1 2 3 4
4	1 2 3 4
5	1 2 3 4
6	1 2 3 4
7	1 2 3 4
a	1 2 3 4
b	1 2 3 4
c	1 2 3 4
d	1 2 3 4
e	1 2 3 4
f	1 2 3 4
g	1 2 3 4
8	1 2 3 4

	a	1	2	3	4
	b	1	2	3	4
	c	1	2	3	4
9		1	2	3	4
10		1	2	3	4
11		1	2	3	4
12		1	2	3	4
	a	1	2	3	4
	b	1	2	3	4
	c	1	2	3	4
13		1	2	3	4
	a	1	2	3	4
	b	1	2	3	4
14		1	2	3	4
	a	1	2	3	4
	b	1	2	3	4
15					
	a	1	2	3	4
	b	1	2	3	4
	c	1	2	3	4
	d	1	2	3	4
	e	1	2	3	4
	f	1	2	3	4
	g	1	2	3	4
	h	1	2	3	4

Please provide any comments or suggestions below.

Appendix D

CRNA Cover Letter

20 April 1998

Dear _____,

Attached is a copy of a survey questionnaire and letter I have developed for my thesis entitled Operational Readiness of the Army CRNA. I request that you please evaluate the survey to determine content validity due to you vast experience in the field of anesthesia. Your comments and suggestions will important in determining the success of this survey.

Please direct any questions regarding this evaluation to Lieutenant Patricia A. Kiebler. I may be reached at (410) 663-9860. My mailing address is 2804 Willoughby Road, Parkville, Maryland 21234.

Thank you in advance for your time and effort regarding this evaluation. Your contributions are greatly appreciated.

Patricia A. Kiebler, LT, USA
Uniformed Services University
of the Health Sciences
Graduate School of Nursing