

FACULTY PERCEPTIONS OF CHARACTERISTICS NEEDED FOR CLINICAL
SUCCESS AT MILITARY NURSE ANESTHESIA PROGRAMS

19981009 067

By

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ABSTRACT:

In this exploratory descriptive study an investigator-developed survey tool was used to describe military clinical faculty's perception of characteristics nurse anesthesia students need for success at clinical training sites. Participants consisted of 29 clinical faculty from the Army, Air Force, and Navy clinical training sites. The survey tool consisted of a quantitative part with 35 characteristics divided into the four major categories: academic knowledge, nursing knowledge, clinical skills, and personal characteristics. Validity and reliability testing was performed on this part of the survey tool. The second part of the survey tool includes seven qualitative questions designed to help obtain a complete list of characteristics needed for success.

The literature was sparse regarding predictors of clinical success in post-graduate education. In the study by Hansen and Pozehl (1995) non-nursing grade point average (GPA) was the only significant predictor of clinical GPA. This gap in the literature regarding predictors of clinical success led the investigators to the first step, describe what expert faculty in the specialty thought were the characteristics needed for success.

The clinical faculty rated 28 of the 35 characteristics as *Essential* or *Important* for clinical success. All four categories had characteristics that were scored high. The highest scores were given to the personal characteristics category and clinical awareness. Qualitative analysis of the seven additional questions further supported the importance of personal characteristics.

The surveyed faculty described their perceptions of the characteristics a student needs to be successful in nurse anesthesia training. Knowing what the characteristics

are believed to be allows them to be studied to see if they have any statistical predictive ability. Given the emphasis that the faculty attached to personal characteristics, mechanisms to assess these difficult to measure traits need to be developed. One mechanism identified from the survey is to mail a questionnaire to students' last supervisor and have him/her rate the student's personal characteristics. Finally, a list of described characteristics thought to provide a pathway to success could be made available to prospective candidates to improve their chances for success.

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By

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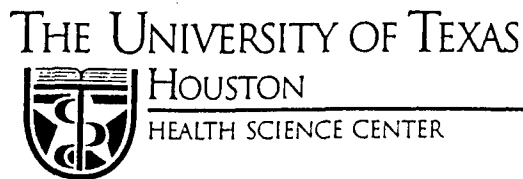
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Lynne M. Connelly

Harry E. Mays

Jeffrey A. Dile



The Committee for the
Protection of Human Subjects

NOTICE OF APPROVAL TO BEGIN RESEARCH

June 19, 1998

HSC-SN-98-016 - "Faculty Perceptions of Characteristics Needed for Clinical Success at Military Nurse Anesthesia Programs"

PI: Brian L. Clayton, Lt. Col., MSN Student; Chair - Dr. Connelly

PROVISIONS: Unless otherwise noted, this approval relates to the research to be conducted under the above referenced title and/or to any associated materials considered at this meeting, e.g. study documents, informed consents, etc.

APPROVED: At a Convened Meeting

APPROVAL DATE: June 19, 1998

EXPIRATION DATE: May 31, 1999

CHAIRPERSON: Anne Dougherty, MD

Subject to any provisions noted above, you may now begin this research.

CHANGES - The P.I. must receive approval from the CPHS before initiating any changes, including those required by the sponsor, which would affect human subjects, e.g. changes in methods or procedures, numbers or kinds of human subjects, or revisions to the informed consent document or procedures. The addition of co-investigators must also receive approval from the CPHS. **ALL PROTOCOL REVISIONS MUST BE SUBMITTED TO THE SPONSOR OF THE RESEARCH.**

INFORMED CONSENT - Informed consent must be obtained by the P.I. or designee using the format and procedures approved by the CPHS. The P.I. must instruct the designee in the methods approved by the CPHS for the consent process. The individual obtaining informed consent must also sign the consent document.

UNANTICIPATED RISK OR HARM, OR ADVERSE DRUG REACTIONS - The P.I. will immediately inform the CPHS of any unanticipated problems involving risks to subjects or others, of any serious harm to subjects, and of any adverse drug reactions.

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CHAPTER I

Introduction

Educating an advanced practice nurse such as a Certified Registered Nurse Anesthetist (CRNA) is expensive in terms of both time and resources to the student and the training program. Attrition from a training program therefore, can be costly. In addition, the impact of personal failure can possibly negatively affect a student's emotional well being.

Historically, the three branches of the military have not been able to train sufficient numbers of qualified nurses to meet their needs for CRNAs. Therefore, a nurse's failure in military anesthesia training contributes to the continuing shortfall in this critical field and is therefore costly for the military.

Whether a student succeeds or fails in anesthesia training may be due in part to the personal traits/variables present or lacking in their experience, education or personality. The personality variables of successful candidates may be characteristics such as commitment to excellence, integrity, stamina, judgement and leadership. Also a student's prior clinical nursing and academic experience may weigh heavily on their success in a training program. Failure to possess one or more of these variables may lead to failure.

Presently administrators at the U.S. Army Graduate Program in Anesthesia Nursing reviewed a candidate's Graduate Record Exam (GRE) score, undergraduate grade point average (GPA), GPA in hard sciences, years of critical care nursing experience, and letters of recommendation for selection to anesthesia school. Even using these admission criteria anesthesia programs still cannot predict a student's success during training.

Investigators have looked at entrance criteria to graduate schools (GPA and GRE scores) to predict success (GPA) in a particular field of graduate study (Willingham, 1974). These researchers found success in a particular graduate school and scores on the GRE or the GPA correlated at best modestly ($r = .02-.37$). However, they found a better correlation of performance with a weighted composite GRE and GPA ($r = .35-.56$). In other words, past performance in undergraduate education and standardized test scores will at best, moderately predict a candidate's performance at the graduate level.

Of particular importance in anesthesia education is the ability of students to integrate knowledge when in the practice setting to provide safe anesthesia. The faculty of the United States Army Graduate Program in Anesthesia Nursing has examined Phase I performance. Grades in the didactic portion of graduate nurse anesthesia training moderately correlated with outcome on the Certifying Examination for Nurse Anesthetists (CENA), ($r^2 = .47$). It is often difficult to predict whether students can integrate didactic knowledge into the clinical practice of anesthesia care. Success in the clinical phase (Phase II) of anesthesia training also is difficult to study or measure. At present, no one has looked into variables predicting success in the Phase II portion of anesthesia training in either a military or a civilian program. Since faculty are responsible for evaluating student performance, it is a logical first step to examine success in clinical education by surveying anesthesia educators as to their perceptions of attributes leading to success in Phase II training.

Statement of the Problem

The purpose of this study is to identify possible student variables/attributes

leading to student success in Phase II anesthesia training. Nurse Anesthetist (CRNA) training faculty will be surveyed using an investigator-developed questionnaire.

Directors rated the importance of each student variable/characteristic on the questionnaire as to its influence upon students' success in Phase II training. The faculty provided any additional comments or information they believed important to provide a complete description. From this information, we identified the level of importance of variables for student success in Phase II training and any additional characteristics that need to be added to the tool. We believe these variables include academic knowledge, nursing knowledge, clinical skills and personal characteristics.

Theoretical Conceptual Framework

Faculty of anesthesia programs review an applicant's graduate record examination (GRE) score, undergraduate grade point average (GPA), nursing experience, and letters of recommendation for selecting candidates to attend anesthesia school. Once accepted into a training program, the student must successfully complete the didactic portion of training, (Phase I), the clinical portion of training, (Phase II), and pass the CENA to become a fully qualified practitioner. (See page 4, figure 1)

Phase I consists of one year of didactic courses including biochemistry, chemistry, anatomy and physiology, pharmacology, and anesthesia. Graduate students must maintain a B average in every subject to proceed on to Phase II training. During this 18-month clinical training period, students take clinical practicums. Their clinical education includes pre-operative anesthesia evaluations, planning appropriate anesthesia care for the patient, and delivery of anesthesia. Success in Phase II anesthesia training is dependent upon the student providing appropriate and safe

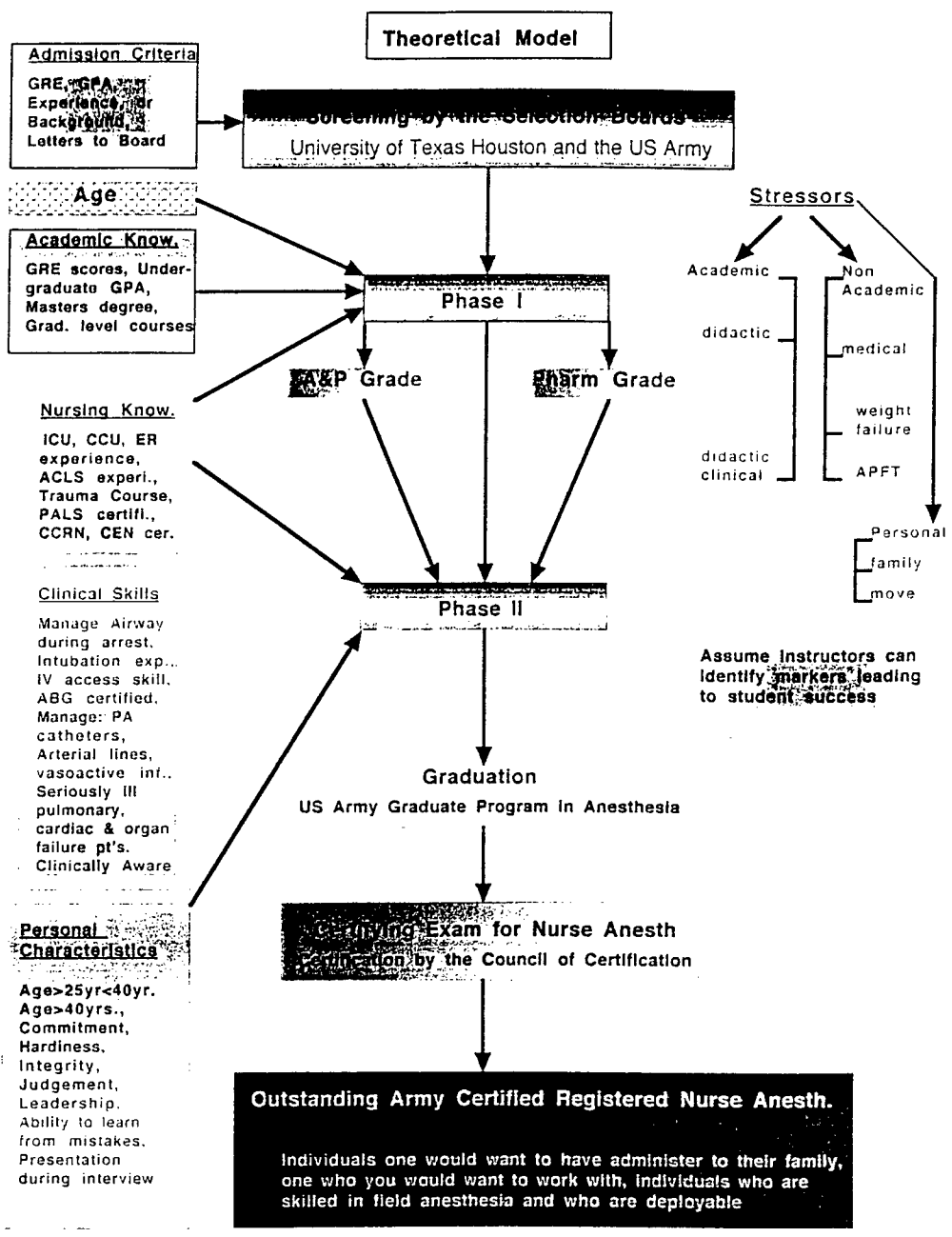


Figure 1. Theoretical Model

anesthesia as judged by the clinical instructor. The final hurdle for the student in the path towards becoming a fully qualified licensed practitioner is successful completion of the CENA.

Researchers reviewed admission criteria at 38 of 71 (54%) graduate nurse anesthesia education programs throughout the country, including the three military training programs, for the 1992-93 school year (Haritos, Shumway, Austin, & Ellis, 1995). They found generally accepted criteria for admission to anesthesia training was 5 years experience in an intensive care setting, a GPA greater than 3.32, a hard science GPA greater than 3.20, and a cumulative GRE score greater than 1552. The quantitative, analytical, and verbal scores of the GRE were 512, 533 and 510 respectively. The mean Miller's Analogy Test score was 47 (Haritos, et al., p.19)

Presently student variables predicting success in Phase II training have not been investigated. We believe certain identifiable student characteristics/variables will predict student success in Phase II training. We believe some of the student variables leading to success in Phase II fall into the following categories: academic knowledge, nursing knowledge, clinical skills, and personal characteristics. (See Page 6, figure 2)

Knowledge from Phase I, we feel, is best measured by grades in anatomy and physiology, and pharmacology classes. A student's ability to learn and test well in these areas during Phase I should reveal their ability to understand and retain concepts during Phase II. Conversely students who score low in these courses may display difficulty assimilating knowledge and retaining concepts.

Prior student nursing experience in areas such as critical care may be a necessary student pre-requisite for successful anesthesia training. Working in critical care areas the

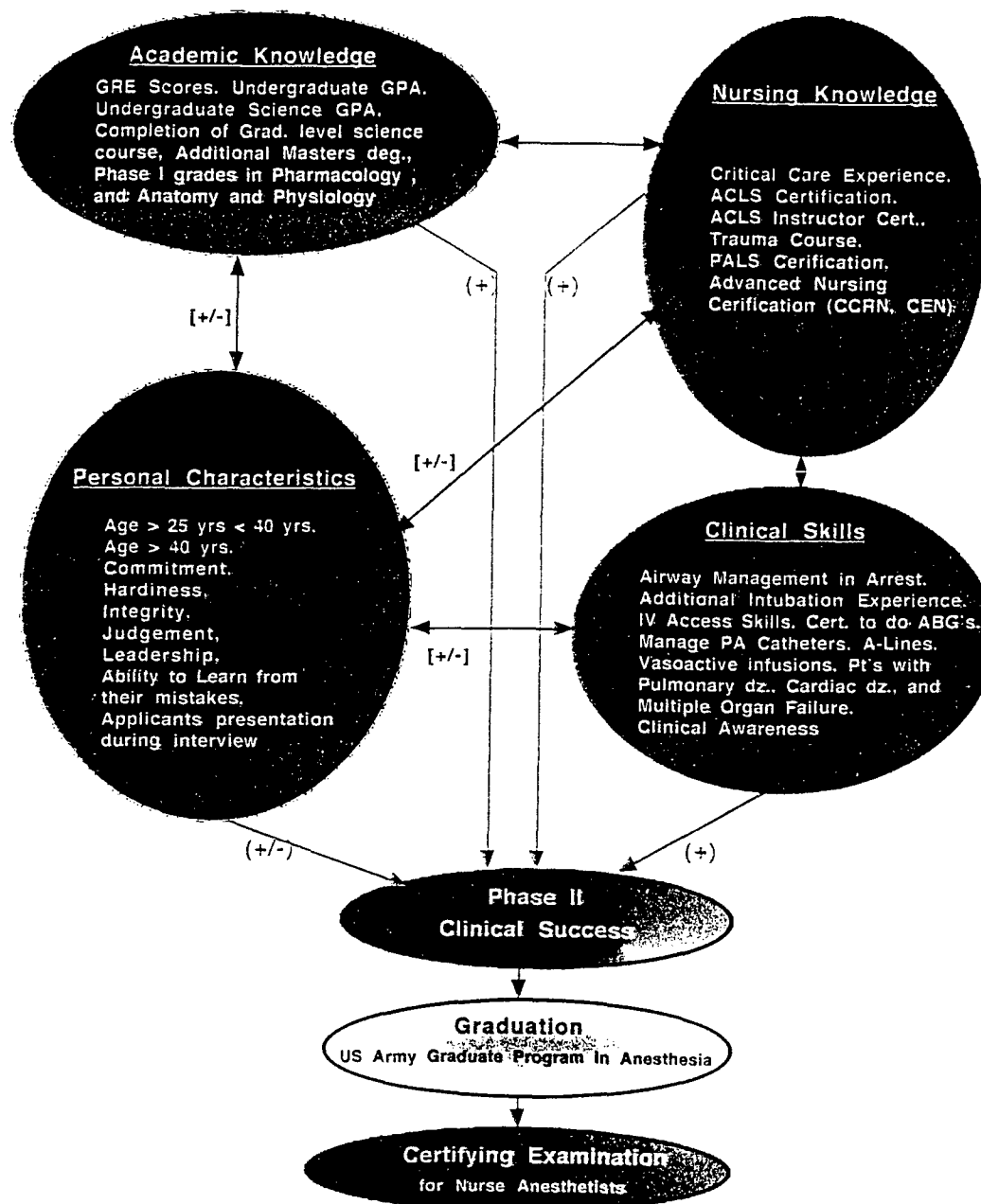


Figure 2. Collateral Theoretical Model

nurse gains expertise with pulmonary artery catheters, arterial lines, intubated patients on ventilators, and vasoactive infusions. Prior student experience leading to expertise in these areas decreases the amount of new clinical knowledge the nurse anesthesia student must assimilate in the operating room. This clinical experience enables the student to be more confident and perform with greater clinical awareness.

Personal characteristics of successful students are integrity, commitment, judgement, and confidence in their decision-making ability, and stamina. Commitment is a student's devotion to the work of the profession and the specialty. Committed students have a burning desire to be a CRNA, and they understand the sacrifice needed to complete their chosen field of study. They will internalize the role of CRNA. These individuals should have an easier time socializing into the profession, adopting the profession values, beliefs, and work ethic.

Judgement and decision making would entail understanding your limitations, knowing the right intervention for your patient, and when help should be requested. Judgement also entails clinical awareness. This is the ability the student has to understand the operating room surroundings, enabling him or her to respond to anesthesia events as they occur. Integrity could be the most important variable a student requires in that they must be honest and truthful with themselves and their colleagues. Finally hardiness provides the student with the mental and physical stamina needed to survive long hours of work, and brusque criticism sometimes encountered from instructors. All the above variables are believed by the authors to be critical variables possessed by successful Phase II students. Clinical directors should be able to recognize students possessing these qualities, and identify them as potential successful performers.

We understand there are other variables influencing student performance. Stressors such as relocation, family, illness, weight standards, Army personal fitness test, and frequent testing were not investigated in this study, but left for future research.

Purpose

The purpose of the study is to identify attributes that instructors perceive to be predictive of success in Phase II anesthesia training.

Definition of Terms (alphabetical order)

ACLS – advanced cardiac life support. A collection of psychomotor skills which includes studying airway management, pharmacology, cardiac arrhythmia recognition and treatment. A systematic approach to dealing with people experiencing a cardiopulmonary emergency or sudden death.

Certifying Exam for Nurse Anesthetists (CENA) - twice annual nation wide exam for graduate student nurse anesthetists, testing for minimal competency, and providing successful graduates the right to practice nurse anesthesia.

Certified Registered Nurse Anesthetist (CRNA) – a nurse educated to administer anesthesia who has passed the CENA.

Character – moral excellence and firmness.

Clinical Awareness – aware of a patient's clinical condition and being able to properly respond to their needs.

Clinical Skills – the physical and manipulative skills essential to the conduct of the profession.

Commitment – the state of being obligated or emotionally impelled.

Critical Care Experience – working with severely ill medical or surgical patients in a highly instrumented and specialized area of the hospital.

GPA - grade point average for course work for undergraduate or graduate work measured on a numerical scale from 0 (unsatisfactory) to 4 (superior achievement).

GRE - graduate record examination. A nationally administered test to screen applicants for admission to graduate education. It measures a student's quantitative math, analytical, and verbal ability.

Hardiness - stamina, physical, mental, and emotional toughness.

Hemodynamic Monitoring – instrumentation used to monitor a patient's blood pressure, central venous pressure, and pulmonary artery pressure, and proper interpretation of the numbers.

Integrity – honesty and sincerity.

Intubation – to secure and protect a patient's airway through placement of a hollow plastic breathing tube into the trachea through the mouth or nose.

Judgement – the process of forming an opinion or evaluation by discerning or comparing.

Leadership – the quality of leaders, the capacity to lead.

PALS – pediatric advanced life support. A systematic approach in dealing with emergency resuscitation of infants and neonates.

Phase I - the class room (didactic) portion of nurse anesthetist training. During this time students study physical sciences, research, and topics related to anesthesia.

Phase II - the clinical portion of anesthesia training. This portion applies principles learned in Phase I training to actual performance of anesthesia.

Success in anesthesia program – the ability to integrate knowledge from Phase I, prior clinical experience, and instruction in Phase II to successfully provide safe anesthesia care and pass the CENA exam.

Trauma Course – advanced trauma life support. A systematic approach to dealing with sudden death or profound cardiac and respiratory compromise due to trauma.

Undergraduate Science GPA – grade point average for course work encompassing the hard sciences, math, biology, chemistry, biochemistry, etc., measured on a numerical scale from 0 (unsatisfactory) to 4 (superior).

Vasoactive Infusions – drug infusions which rapidly effect systemic vascular resistance, blood pressure, and cardiac parameters, like preload and afterload.

Research Questions or Hypotheses

What do clinical site directors perceive to be important variables that predict success in Phase II training? How much importance do instructors attach to each variable?

Significance of the Problem

Nurse anesthesia, nursing, medical, and graduate schools have sought criteria predicting success in their respective programs (Zaglaniczny 1992; Fowles 1992; Mitchell 1990; & Munro 1985). Each has recognized that the cost of student failure is high. The institution incurs a financial cost for students' failure. The student incurs costs of lost time, personal failure, emotional upset, and money for unsuccessful Phase II performance.

To date no variables have been identified to adequately predict success in anesthesia programs, and no one has investigated variables predicting success during

Phase II clinical training. Therefore, investigating student variables leading to success in Phase II training may lead to improved screening of applicants. It also may be possible to develop guidelines steering future applicants towards experiences that might improve the chance of successful completion of anesthesia study.

Assumptions

Instructors can identify good students and define success. They are able to recognize characteristics/variables in students leading to success in Phase II training. Instructors have worked as anesthesia providers for a number of years before they are selected to teach. They have evaluated their own performance as well as that of fellow co-workers. Through self-evaluation and observing other anesthesiologists at work, clinical directors have gained insight into what makes a successful anesthesiologist. Through years of work and study they have internalized characteristics of superior performing anesthesiologists.

Through years of teaching, instructors have been exposed to a variety of students varying in ability and personality. This experience with students, along with their clinical experience, has given clinical directors insight to identify students who possess characteristics leading to strong performance early in Phase II training.

Limitations

We do not know all the predictors of success in Phase II training. There may be additional factors instructors are not aware of that influence clinical success. We do not propose to look at the effect of outside stress upon student performance.

The survey method we are using may introduce error. Low responses are typical of this type of research. We plan to contact each clinical director prior to mailing the surveys to explain the study and encourage maximum participation.

CHAPTER II

Review of the Literature

Certified registered nurse anesthetists (CRNAs) are in a position to play a critical role in health care as this country moves into the next century. Both the government and the private sector are continually looking for ways to control costs. CRNAs have historically provided an avenue for cost containment in the perioperative area. Jordan (1991) stated in a report that the Department of Health and Human Services estimated that health care costs per American will be \$5,115 per year by the year 2000. She claimed that an adequate number of trained CRNAs in the marketplace could save consumers \$1,000,000,000 dollars annually.

Providing adequate numbers of well trained anesthesia providers is key to this proposal. Jordan (1991) reported the Department of Health and Human Services quoted a shortage of 7000 CRNAs and a need for 35,433 by the year 2010. To meet this goal 1800 CRNAs must be trained each year between 1991 and 2000, and then 1500 per year. These numbers may be over inflated since job opportunities have been declining in the middle nineties. Regardless, the number of anesthesia providers does not begin to approach this. Haritos, et al. (1995) reported in 1991 there were 700 graduating nurse anesthesia residents.

What can we do as a specialty to fill this void and maintain our place in this country's health care system? Creating and filling slots to meet a projected number is not the answer. This would be expensive and would probably dilute the specialty with substandard clinicians. Our best approach is to accept qualified individuals and provide training that promotes success. As simple as this sounds, attrition from anesthesia

programs remains a problem. The answer could be identification of screening variables that predicts success. Furthermore research in this area could suggest pre-requisite experiences and courses that might improve a student's chances of success.

Predictors of Success in Undergraduate and Graduate Nursing Programs

Undergraduate Programs

Predictors of success in both undergraduate and graduate nursing programs have been investigated in the past. There have been many studies over the years that assessed success in baccalaureate nursing programs, graduate nursing programs, and various certification exams. The driving forces for these studies are patient care needs, economics, and a decreasing student selection pool. The goals are finding students who will succeed, and early detection with intervention for those at risk for failure.

The first step in having qualified candidates for graduate nurse anesthesia education is success at the undergraduate baccalaureate nursing level. Griffiths, Bevil, O'Connor, and Wieland (1995) stated that the quality and numbers of applicants to undergraduate nursing programs have declined, therefore making predictors of academic success and identification of failure risk a critical part of faculty assessment. They proposed success in anatomy and physiology would be their most reliable predictor of success in the undergraduate program. An anatomy and physiology screening test was used. The test included material needed to complete the first junior level nursing course dealing with the care of sick patients. Information was collected on students' prerequisite anatomy and physiology courses including grade, credit hours, focus, type of college, and years since course completion. The screening test accounted for only nine percent of the variance of the junior level nursing course. However, mean final anatomy and physiology grade, type

of college where the course was taken, and number of credits earned accounted for 39% of the variance on the junior level nursing course. Griffiths, et al. (1995) concluded that success in anatomy and physiology shows merit as a possible predictor of overall success in undergraduate nursing, and could be used to make admission decisions.

In conjunction with predicting outcome at the undergraduate level, researchers have examined predictors of success on the National Council Licensure Examination for Registered Nurses (NCLEX-RN). Heupel (1994) cautioned that success in a undergraduate nursing program did not guarantee passing the NCLEX-RN. This concern carries over to nurse anesthesia where passing a certification exam at the end of training is essential prior to obtaining permanent credentials. In her study, Heupel (1994) looked at prerequisite courses, sophomore, junior, and senior theory courses, and grade point averages (GPA) for each year. A positive correlation was found between scores in anatomy, physiology, microbiology, two medical-surgical nursing courses, one senior nursing course, and the junior year GPA. In a similar study by Fowles (1992), anatomy and physiology grades again had predictive ability in regard to success in an undergraduate nursing program and on the NCLEX-RN. Once again the goal was to identify those students who would succeed versus those who would need early intervention to improve their chances for success.

In an attempt to evaluate nonacademic factors, Arathuzik and Aber (1998) studied 79 demographically diverse senior nursing students at a public urban college of nursing. In addition to the usual academic variables of GPA, they looked at demographics, and nonacademic variables. The nonacademic variables consisted of internal blocks and external blocks to success, and the Study Skills Self-Efficacy Instrument (SSSE). The

internal blocks were multiple role strain, self-doubt, disorganization, lack of self-discipline, low motivation, emotions, fatigue, and stress. The external blocks measured were finances, family demands, family health, lack of support, demands of work, living arrangements, and strains of relationships. The nonacademic variables were measured on Likert scales. Point biserial correlation coefficients revealed a modest positive correlation ($r = .245-.275$) between undergraduate GPA, English as a primary language, Study Skills Self-Efficacy, and student's performance on the NCLEX-RN. There was a modest inverse relationship ($r = -.240$ to $-.293$) between the external blocker of family demands, and the internal blocker of emotions which consisted of anxiety, anger, guilt, and loneliness. This study points out the potential significance of these nonacademic factors on success when taking a certification exam. Interventions in their particular area of need for students at risk may improve their success rate.

There were no studies found at the undergraduate level that investigated predictors of clinical success. Research focused on didactic relationships and performance on the NCLEX-RN exam. This most likely is due to difficulty in establishing predictors of clinical success.

Graduate Programs

There are more studies evaluating predictors of success at the graduate level. Possibly because failure is perceived as more costly in terms of both financial expense and loss of needed practitioners. Like at undergraduate level, educators are interested in selecting the best candidate. This selection should be based not only on predicted success in completing the graduate program, but also should include such considerations as

whether or not the candidate will be a responsible advanced nurse practitioner, educator, and nursing leader.

One of the earlier, more frequently quoted studies assessing predictors of success at the graduate level (Ainslie, et al. 1976) retrospectively looked at 193 graduates who successfully completed a masters in nursing at a private eastern university. The authors examined the effect of nursing, non-nursing, and cumulative GPA; combined, verbal, and quantitative Graduate Record Examination (GRE) scores; age; number of years between bachelors and masters degree, and number of years between basic nursing education and completion of their masters degree on the outcome variable of final masters' GPA. Additionally, they examined the relationship of the independent variables with graduate subspecialties: psychiatric, community health, medical-surgical, and maternal child nursing. Their findings showed that the verbal GRE score was a moderately reliable predictor ($r = .60$) of masters' GPA in psychiatric and community health nursing. Psychiatric nursing as a subspecialty was moderately correlated ($r = .41-.60$) with several predictors including verbal GRE, GRE total score, and cumulative undergraduate GPA. The rest of the associations were weakly correlated ($r = .05-.38$) except for age which had a moderate inverse relationship ($r = -.51$) to success in maternal child nursing.

In a follow up study, Munro (1985) looked at the admissions criteria for graduate school at Yale School of Nursing. The criteria included undergraduate GPA, GRE scores, references, interview, and essay. The author was not only interested in predictive ability of the admissions process, but also wondered if there were any differences between clinical subspecialties and differences between theoretical and clinical GPA. The sample consisted of 453 students whose records were retrospectively reviewed. She found

significant positive correlations between GRE verbal and quantitative scores, undergraduate GPA, and essay scores on the total and theoretical masters' GPA. The stepwise regression showed, at best, the essay accounted for eight percent of the variance in overall masters GPA. There was no significant correlation between any of the predictors and clinical GPA.

The most recent study on predictors of success in graduate nursing programs was by Hansen and Pozehl (1995). They evaluated 59 students whose records were retrospectively reviewed. They examined the relationship of undergraduate GPA, aggregate GRE scores, GRE subscores, age, and clinical experience to masters GPA. Additionally, Hansen and Pozehl (1995) developed a Graduate Performance Rating Scale (GPRS) which was correlated to the same group of independent variables. The Graduate Performance Rating Scale was a survey/rating of a group of competencies, developed by psychologists and expert faculty, deemed necessary for success in graduate education. These competencies included things such as communication skills, creativity, motivation, professionalism, goal-directedness, synthesis/expertise, and explanatory/reasoning. Many of these competencies are subjective variables that are hard to measure in individuals prior to starting a program.

The results of the Hansen and Pozehl (1995) study were similar to past studies evaluating the predictive ability of admission criteria except the data analyzed showed stronger correlations. In regard to graduate GPA, both undergraduate GPA and GRE scores were predictive. However, non-nursing GPA and verbal GRE accounted for the majority of the variance in total graduate GPA. Non-nursing GPA was the only significant predictor of clinical GPA. When the predictors were correlated to the

competencies that made up the Graduate Performance Rating Scale, the undergraduate non-nursing GPA significantly predicted only two out of eight competencies, explanatory/reasoning ability and synthesis/attainment of expertise.

In only two studies, did researchers look at predictors of clinical success at the graduate level. Munro (1985) found no significant predictors of clinical success when examining admission criteria for the Yale graduate program. Hansen and Pozehl (1995) found the only significant predictor of clinical success was non-nursing GPA. These findings support the need for further research to identify the factors that influence clinical success.

Predictors of Success in Medical School.

Predictors of success in medical school show a similar trend to that already reported. Webb, et al. (1997) conducted a study examining non-academic predictors of success at two medical schools. They concluded that finding a set of nonacademic variables to predict success is difficult at best. Interestingly, a study by Mitchell (1990) reported Medical College Admission Test (MCAT) score, undergraduate GPA, and competitiveness of the undergraduate institution accounted for 49% of the variance in medical school grades and 58% of the variance on part I of the National Board of Medical Examiners scores. This seems to be a consistent theme that academic variables can predict academic success.

In another study that looked at medical school success, Scott and Markert (1994) looked at the relationship between critical thinking and preclinical courses. The Watson-Glaser Critical Thinking Appraisal (WGCTA) was administered to 92 medical students during their orientation. The WGCTA consists of five subtests and is used to evaluate

general critical thinking skills. The WGCTA test scores were correlated with students first and second year academic course scores, and their scores on the United States Medical Licensing Examination (USMLE) Step 1. Additionally they looked at the relationship between the WGCTA scores and the students MCAT scores, undergraduate science and cumulative GPA, age, gender, ethnicity, and length of time between graduation from undergraduate program to beginning medical school. Their results showed a moderate correlation ($r=.33-.36$) between WGCTA scores and student's first and second year academic performance, and their scores on the USMLE Step 1. Additionally they showed a weak negative correlation of WGCTA scores to age ($r = -.23$) and to those students who had a break between undergraduate school and medical school ($r = -.21$).

Predictors of Success in Postgraduate Clinical Residency Training Programs.

In looking for predictors of clinical success in residency training, the literature is inconsistent. Calhoun, Hokanson, and Bailey (1997) investigated Otolaryngology resident characteristics and found the only correlation to successful completion of the residency was excellent academic performance in medical school. In a review of surgical residency training, Papp, Polk, and Richardson (1997) examined the relationship between aspects of performance and ranking of the residents. The residents were ranked prior to entering the residency and upon completion according to knowledge, technical skills, maturity, judgement, and overall ability. No relationship was found between admission evaluation and final evaluation ($r_s = 0.27, p = .13$). Arnold and Willoughby (1993) reported a low but statistically significant correlation between medical school achievement and performance in a residency.

Predictors of Success in Nurse Anesthesia Programs.

The literature is sparse regarding predictors of success in nurse anesthesia programs. These studies have focused on outcome on the national certification exam (Carroll-Perez 1996 & Zaglaniczny 1992), learning styles and anxiety on clinical performance (Garcia-Otero & Teddlie 1992), and criteria being used for admission (Haritos et al, 1995).

In a more recent study of outcomes on the certification exam, Carroll-Perez (1996) looked more specifically at the type of anesthesia program. There are two educational philosophies evaluating clinical practicum in anesthesia programs. One philosophy espouses separate academic and clinical phases, and the other type of program has joint academics and clinical training from the outset. Carroll-Perez (1996) in addition to program structure looked at the effect of class size, rotation sites, program length, degree or certificate granted, and graduation date on passing rate at individual programs. The results showed no significant relationship existed between any of the variables and percent passing of the certification exam.

One of the earlier and larger studies that looked at predictors of success on the national certification exam was a retrospective review by Zaglaniczny (1992) looking at 1,690 first time candidates. The variables studied were age, gender, years of nursing experience, overall and science GPAs earned in the nurse anesthesia program, number of cases, case hours, and total number of science hours in the anesthesia curriculum. Additionally there were four categorical variables evaluated: type of nurse anesthesia program, clinical background, type of nursing preparation, and highest degree obtained prior to entering nurse anesthesia training. Zaglaniczny (1992) used stepwise regression

analysis of the independent variables on certification exam scores, and one-way analysis of variance (ANOVA) of the categorical variables. Her results showed that science GPA accounted for 24% of the variance in exam scores with the remaining variables contributing three percent. The one-way ANOVA of the categorical variables showed level of education to be a significant contributor to exam performance.

Another study investigated the influence of learning styles and anxiety on clinical performance using the Productivity Environmental Preference Survey and the State-Trait Anxiety Text from the Minnesota Multiphasic Personality Inventory (Garcia-Otero & Teddlie 1992). They found that students who received knowledge regarding their own learning style had a statistically significant decrease in anxiety and increase in their clinical performance scores.

Critique of the Literature

Many of these studies concerning predictors of success were ex post facto in nature. This design allows preconceived bias concerning what is anticipated as a successful predictor to be entered into the analysis. This is most evident in the study by Hansen and Pozehl (1995), where students were given a Graduate Performance Rating Scale (GPRS) by their prior faculty. The GPRS was a visual analogue scale that the faculty retrospectively scored the students on. Additionally with this type of design cause and effect relationships can not be concluded since the independent variable is examined after the fact.

Other significant flaws in many of the studies were lack of generalizability and restriction of range. The studies evaluated students from a specific program. The one instance where this did not apply was Zaglaniczny (1992). The sample consisted of the

entire population of nurse anesthesia candidates who took the certification exam over a specified period. The subjects in the graduate program studies were selected from a limited range of GRE and GPA scores. Those with low scores usually did not get into graduate school, therefore, the samples are not from a standard distribution. All of the studies analyzed revealed minimal to moderate degrees of correlation, and step-wise regression values that predicted on average about 20 to 30% of the variance in outcomes. Values that fall within these ranges are certainly suggestive, but are not strong enough to generate a list of criteria with strong predictive power.

There are some obvious gaps in the literature in this area. The most glaring is the absence of any prospective studies. In addition there has been limited success in finding predictors of clinical success. The only predictor of clinical success was undergraduate non-nursing GPA (Hansen & Pozehl 1995). More specifically, in the area of nurse anesthesia, no studies were found that examined predictors of academic or clinical success in the program itself. There were studies that looked at predictors of success on the certification exam.

Since graduate nurse anesthesia programs are expensive for students and educational institutions, a more comprehensive approach to identifying predictors needs to be undertaken. American Association of Nurse Anesthetist mandated that all nurse anesthesia programs be at the graduate level by 1998. Therefore the need to identify predictors of success that start with performance in the academic portion of the program, carry over to the clinical performance, and end with predicting success on the national certification exam has become increasingly important.

A good starting point in identifying predictors that need to be evaluated for success in a graduate nurse anesthesia program would be to look at what are being used as admission criteria. Haritos, et al. (1995) studied the qualifications of nurses accepted to anesthesia programs, and which of these factors influenced the selection process the most. A questionnaire was sent to all the graduate nurse anesthesia programs with a 54% response rate. The average GRE scores for students accepted into anesthesia programs were analytical 533, verbal 510, quantitative 512, and the total was 1552. A large percentage of programs do not require a Millers Analogy Test, but the average score for those that did was 47. The average GPA was 3.32 and the average science GPA was 3.2. The average nursing experience in critical care was five years, and 81% of applicants were Advanced Cardiac Life Support certified. Organic chemistry and biochemistry were the most frequently identified prerequisite courses. All programs required references, a majority required a personal interview, and over half mandated an essay. The program directors ranked the factors they considered most important, and the top factor was the interview, followed by overall GPA, and science GPA. The study by Haritos, et al. (1995) stopped short of addressing predictors of success.

Predicting clinical success seems to be more difficult than predicting academic success. This is supported by the lack of documented research looking at factors that influence clinical success. Based on literature and our personal experiences as a clinical nurse anesthesia instructors, certain factors seemed to make a difference in clinical success. There certainly is a need for a strong academic foundation, and we believe at least two years experience in critical care nursing. The critical care nursing experience needs to be in an area where there is exposure to hemodynamic monitoring and use of

vasoactive drugs. Nurse anesthesia residents need clinical awareness and the confidence to make clinical decisions. They need a high level of commitment, judgement, and integrity. In our opinion they must be willing to seize every learning opportunity and be willing to work long hours. The most crucial are the judgement and integrity issues. An effective, safe CRNA knows when to seek help and what their professional limitations are. If they make a mistake in the administration of anesthesia to their patient they admit it, correct it, and learn from it. Therefore, the critical attributes as we see them are academic and nursing knowledge, clinical skills and awareness, as well as commitment, judgement, and integrity.

Summary

In summary, the literature is scant concerning the predictive ability of factors used for admission into graduate school as determinants of success. There is a definite lack of research regarding whether or not the admission requirements for graduate nurse anesthesia programs makes any significant contribution to the future success of the nurse anesthesia student. This is especially true concerning clinical performance. The literature suggests that students who excel in undergraduate school and have high GRE scores will do well in the academic part of anesthesia school. One study by Garcia-Otero and Teddlie (1992) suggests that informing students about their particular learning style will reduce state anxiety and improve clinical performance. The next step is to develop criteria that can be used in conjunction with grades and GRE scores that will be predictive of clinical performance. However, before criteria can be developed we need to know what attributes nurse anesthesia faculty consider essential to success. As noted in a couple of studies these attributes may include other than nonacademic variables. Once the important

attributes have been determined then hopefully predictive criteria can be developed. This could significantly impact our future as the application pool dwindles, and the needs of society for qualified nurse anesthetists increase.

CHAPTER III

Methodology

The purpose of this study was to identify possible characteristics leading to student success in the clinical phase of anesthesia training. Program directors, associate directors, and senior clinical instructors from the military nurse anesthesia clinical training sites were surveyed to identify those characteristics they thought were important to success. There is a body of knowledge that can predict, to some degree, academic success in the didactic portion of graduate school based on GRE scores and undergraduate GPA. To our knowledge there are no studies looking at predictors of clinical success in nurse anesthesia training.

Before a study could be undertaken to evaluate predictors of clinical success we needed to describe what is thought to be important to a nurse anesthesia students' clinical success. Once the important characteristics have been described, an interview tool using the characteristics could be developed. With the interview tool in place a beginning class could be prospectively studied to evaluate the tool as to its predictive ability. The purpose of this study was to describe the important characteristics.

The study was an exploratory, descriptive study design. We used survey methodology to obtain data from military clinical anesthesia site directors, associate directors, and senior clinical instructors (Army only). The survey was in the form of a questionnaire asking the respondents to rate a group of characteristics for their importance to a nurse anesthesia student's clinical success (Appendix A). Additionally the respondents were queried on several questions to help ensure completeness in

identifying all pertinent characteristics. We also requested demographic data from the respondents.

The population, sample, setting, instrumentation, procedure for data collection, mechanisms for protection of human subjects (respondents), and study design are covered in this chapter. We will conclude with the data analysis used in this study.

Population, Sample, and Setting

The entire population of clinical site directors, associate directors, and senior clinical instructors of military anesthesia training programs were asked to be participants. This group of professionals is directly responsible for the training of military nurse anesthesia students in clinical anesthesia. The clinical faculty manages the assignments, evaluation, and progress of each student.

Before professional practitioners can evaluate a prospective candidate they must have first completed the training and gained experience in the field of practice. Each of these clinical site directors, associate directors, and senior clinical instructors completed this process. They have experienced the long difficult course of anesthesia training, and they know what it took for them to finish. Additionally, they have experience in the field, and experience working with students. Therefore, we feel this was our best source for information about characteristics that contribute to clinical success in nurse anesthesia training within a military anesthesia program.

Since this population represented a small group of respondents we achieved a 100% response rate. We accomplished this by communicating with the respondents prior to beginning the survey. Also, we believe faculty members recognized the importance of this study based on their current involvement in nurse anesthesia education.

Instrumentation

An investigator-developed survey was used for data collection (Appendix A). The first page consisted of 35 items each assigned to one of four major categories: academic knowledge, nursing knowledge, clinical skills, and personal characteristics. The respondents scored each item based on their perception of its importance to clinical success in nurse anesthesia training. Page two of the survey contained definitions of item 26, items 29 through 33 and seven questions. The questions were included to help ensure completeness in identifying what is important to clinical success.

A cover letter (Appendix B) explaining the two-page questionnaire and data analysis accompanied the survey. Following the cover letter was a demographic data sheet (Appendix C) to gather information on age, education, clinical experience, and teaching experience.

We incorporated several mechanisms into our design that helped us get a response rate of 100%. Our initial action was to communicate with each respondent personally, and explain the study. We then mailed out the survey. Our initial response was 25%. Follow on action was consistent with Dillman's (1978) recommendations for nonrespondents. Ten days after the initial mailing we sent a postcard reminder to all participants. This increased our response rate to 50%. Ten days after the postcard, we mailed another reminder along with a second survey and obtained our 100% response rate.

Content Validity

A content validity index study was conducted on the quantitative portion of the

survey prior to distributing the survey. This was done to evaluate the survey questionnaire, but was not used to change its content for this first exploratory study, because we wanted to examine all possible characteristics. According to Lynn (1986) the most widely used method for quantifying content validity is the Content Validity Index (CVI). Using this procedure, an expert panel rates each item on a four point ordinal system from not relevant to very relevant (Appendix D). The questions on page two were evaluated for completeness in helping us gather data which could be missed in the quantitative portion of the survey.

Six CRNA experts were selected to do the content validity ranking of the questionnaire. One research expert with expertise in developing surveys was asked to review the survey for appropriateness of format. A CVI of at least 0.8 is considered acceptable (Waltz, Strickland, and Lenz, 1991). With six experts, at least five must rate an item as three or four to provide a CVI of at least 0.83. This is a qualitative approach, but in terms of quantification of content validity, the retained items are considered to have achieved a CVI beyond the .05 level of significance (Lynn, 1986).

Internal Consistency

The quantitative portion of the survey questionnaire has four subparts. If the items within each subpart all represent characteristics needed for clinical success then the questionnaire has internal consistency and homogeneity. One of the most common means of measuring an instrument's internal consistency, Cronbach's alpha (Polit and Hungler 1995) was used to measure the internal consistency of the quantitative portion of the survey.

Instrument Scoring

Each respondent was asked to score the 35 items on page one of the survey using the following importance scale established by Goodrich (1981):

3-Essential, required for clinical success

2-Important, contributes to clinical success

1-Low Importance, minimal effect on clinical success

0-Unimportant, does not contribute to clinical success

The scores were based on respondents perception of the items importance to success in clinical anesthesia. Goodrich (1981) recommended the following ranges for ranking the importance of each item:

2.5-3.00 Essential

1.5-2.49 Important

0.5-1.49 Low Importance

0.0-0.49 Unimportant

The respondents then answered the qualitative questions to expand their perceptions of what is important for the nurse anesthesia student to succeed in the clinical phase of their training.

Procedure for Data Collection

The clinical anesthesia training sites for the United States Army, United States Air Force, and United States Navy were identified. A copy of the cover letter, demographic data sheet, survey questionnaire, and return envelope with postage paid was mailed to the clinical director and associate director for nurse anesthesia training. Additional

respondents at the Army clinical sites were the senior clinical instructors. The cover letter requested each person to rate the 35 items on page one and answer the questions on page two and three. The respondents were asked not to discuss the survey. Upon completion of the survey questionnaire the respondents returned it along with the demographic data sheet to us in the postage paid envelope.

Once we received the survey questionnaire and demographic data sheet, the data were evaluated. Page one and the demographics data sheet were loaded by an investigator into Statistical Package for the Social Sciences (SPSS), version 7.5 (1996) for data analysis using measures of central tendency and frequency distribution as well as Cronbach's alpha. A statistician reviewed our methodology for correctness and accuracy. Content analysis was used to identify common themes on the open-ended questions.

Protection of Human Subjects

The cover letter (Appendix B) stated that participating in the study by filling out the survey (Appendix A) and demographics data sheet (Appendix C) constituted consent. There was nothing to identify participants on the survey or demographic data sheet. Any respondent could have withdrawn from the study at any time. The following information was provided to the respondents:

This is a descriptive survey project. We are not testing any interventions, and there were no procedures that could have resulted in discomfort or risk. The mailed survey posed minimal risk since there was nothing of a personal nature in the survey or on the data sheet. We promised to protect anonymity and confidentiality. Therefore this project met the criteria for exempt review. Data have been reported in the aggregate. No one except the investigators or thesis advisor has had access to the completed survey. All forms are kept in a locked file in the investigator's home when not in the possession of a research team member. The completed surveys will be destroyed at the completion of the study.

One concern regarding anonymity was the fact that the investigators could potentially recognize the Air Force respondents since it is a small community. To address this concern the thesis advisor, who is in the Army and has no prior knowledge of the Air Force clinical site directors, entered the demographics data into the computer. The investigators who are both in the Air Force entered the data from the other service branches.

We received permission to conduct this study from combined Brooke Army Medical Center and Wilford Hall Medical Center Institutional Review Board (Appendix E). The study also was approved by the University of Texas Houston Health Science Center's Committee for the Protection of Human Subjects (page vi).

Study Design

The study was an exploratory descriptive study using survey techniques to gather the descriptive data. Using this type of design allowed the important characteristics, for clinical success in nurse anesthesia training, to be described by a group of experts in the field. Once the descriptive data were analyzed a list of potential predictors and characteristics were developed for future study.

Internal and External Validity

Internal validity is established when the outcome is due to the independent variable and not some other extraneous factor. In our type of design, the items on the survey questionnaire may not have reflected what is important for a nurse anesthesia student to succeed in clinical anesthesia training. Therefore, one potential threat to internal validity was the instrument. Other threats were history and low response rate. These had to do with the respondents. History reflects any concurrent events going on when the

respondents completed the survey that might bias their responses on certain items. For example their answers could have been affected by negative students' performance at the time they were completing the survey.

External validity is being able to generalize your results to other populations. Since we surveyed site directors, associate directors, and senior clinical instructors at military hospitals our results can only be generalized to that population. The only threat to external validity was our sample population limited generalizability to civilian anesthesia programs.

Data Analysis

The demographic data and page one of the survey questionnaire were entered into SPSS and statistical analysis was performed using measures of central tendency, frequency distribution, and Cronbach's alpha for internal consistency. Descriptive statistics were used on both sets of data. Qualitative questions were analyzed using content analysis, where we looked for themes, relationships, and insights provided by the respondents. All data were reported in the aggregate.

CHAPTER IV

Analysis of the Data

The purpose of this study was to identify possible characteristics leading to success in Phase II anesthesia training. This chapter covers sample, instrument, psychometrics and survey findings.

Sample and Setting

Our data were obtained from 28 military CRNA's and 1 civilian CRNA teaching at military Phase II anesthesia training sites. The participants in this study consist of the entire population of clinical anesthesia faculty in the Army, Air Force and Navy. They were clinical directors, associate directors, and senior clinical instructors (Army only). Surveys were mailed to 29 faculty (Air Force = 5, Navy = 8, Army = 16) participants. All were returned for a 100% response rate.

The sample included 23 males and six females ranging in age from 31-60 years. One respondent was Asian and the rest were Caucasian. The following tables outline the participants ages, military rank, education and number of years as nurses, as CRNAs and as faculty members.

Findings

Instrument Psychometrics

Content Validity. Six CRNA experts rated the content validity of each item on the questionnaire. Using a four-point scale from "very relevant" to "not relevant" (Appendix D). A content validity index of .80 or greater is required to establish content validity beyond .05 level of significance (Lynn, 1986). The open-ended questions were

Table 1

Demographic statistics

AGE(yrs)	Resp	Percent	Education	Resp	Percent
31-35	5	17.2	MSN	9	31
36-40	12	41.4	OtherMSN	17	58.6
41-45	7	24.1	Doctoral	3	10.3
46-50	0	0			
51-55	3	10.3			
56-60	2	6.9			
61-65	0	0			
> 66	0	0			

Rank	Resp	Percent
0-3	3	10.3
0-4	17	58.6
0-5	7	24.1
0-6	1	3.4
No Resp.	1	3.4

Number of Years in Nursing	Resp	Percent
1 to 5	1	3.4
6 to 10	1	3.4
11 to 15	12	41.4
16 to 20	7	24.1
21 to 25	5	17.2
26 to 30	3	10.3
> 30	0	0

Years as Site Director	Resp	Percent
1 to 3	19	65.5
4 to 6	2	6.9
7 to 10	0	0
11 to 14	0	0
> 14	0	0
No Report	8	27.6

Years as CRNA	Resp	Percent
1 to 3	3	10.3
4 to 6	5	17.2
7 to 10	10	34.5
11 to 14	8	27.6
15 to 18	1	3.4
18 to 21	1	3.4
> 21	1	3.4

Yrs as CRNA Instructor	Resp	Percent
1 to 3	18	62.1
4 to 6	6	20.7
7 to 10	2	6.9
11 to 14	2	6.9
15 to 18	1	3.4
18 to 21	0	0
> 21	0	0

evaluated for patterns to ensure completeness of the survey tool.

The characteristics: Additional Master's Degree, Pediatric Advanced Life Support Certification, Initial Airway Management in Cardiac Arrest, Sought Out Additional Intubation Experience, Certification to Draw Arterial Blood Gases, and Age < 40 all had CVI scores under .80. The CVI score for the remaining characteristics were greater than .80 establishing a content validity beyond the .05 level of significance. Table 2 shows the frequency of response and CVI score for each characteristic reviewed by the panel of experts.

Internal Consistency. Cronbach's Alpha's were calculated on the whole survey tool, and on each individual category for internal consistency or homogeneity. The Cronbach's alpha for the tool was (.9074). The Cronbach's Alpha for the individual categories were as follows: Academic Knowledge (.7133); Nursing Knowledge (.6839); Clinical Skills (.9253); and Personal Characteristics (.6552).

Levels of Importance

Although the four point rating scale used in this study is inherently ordinal in nature, traditional descriptive statistics were calculated on each item in an effort to provide (1.) a comprehensive review of similarities and differences among items, and (2.) to develop an overall order of merit. Levels of importance were assigned to each characteristic's mean using the importance scale established by Goodrich (1981) (*Essential* = 2.5 - 3.0; *Important* = 1.5 - 2.49; *Low Importance* = 0.5 - 1.49; and *Unimportant* = 0.0 - 0.49.). Table 3 outlines specific characteristics in each major

Table 2

Content Validity Index Score (CVI)

Academic Knowledge	1	2	3	4	CVI Score
GRE Scores			5	1	1
Undergraduate GPA		1	2	3	0.83
Undergraduate Science GPA			2	4	1
Success in grad. level science course			2	4	1
Additional Master's Degree		3	3		0.5
Phase I Pharmacology grade > 85%			1	5	1
Phase I Physiology grade > 85%			1	5	1
Nursing Knowledge	1	2	3	4	CVI Score
Critical Care Experience 1-2yrs			3	3	1
Critical Care Experience 3-5yrs			2	4	1
Critical Care Experience > 5yrs			3	3	1
ACLS Certification			3	3	1
ACLS Instructor Certification	1		2	3	0.83
Trauma Course			3	3	1
PALS Certification	1	1	2	2	0.67
Advanced Nursing Certification		1	3	2	0.83
Clinical Skills	1	2	3	4	CVI Score
Initial airway mgmt. in cardiac arrest		2	1	3	0.67
Sought added intubation experience		2	1	3	0.67
IV access skills		1	2	3	0.83
Certification to draw ABG's		3		3	0.5
Mgmt. of pulm. artery catheters		1	1	4	0.83
Mgmt. of art lines		1	1	4	0.83
Mgmt. of vasoactive infusions			2	4	1
Mgmt. of pt.'s - severe pulm. disease			2	4	1
Mgmt. of pt.'s - severe card. disease			2	4	1
Mgmt. of pt.'s - mult. organ failure			2	4	1
Clinical Awareness		1	4	1	0.83
Personal Characteristics	1	2	3	4	CVI Score
Age < 40	1	2	1	2	0.5
Age 40 or older		1	1	4	0.83
Commitment			1	5	1
Hardiness (Stamina)			3	3	1
Integrity			1	5	1
Judgement			2	4	1
Leadership		1	2	3	0.83
Ability to learn from mistakes				6	1
Presentation during interview		2	2	2	0.67

Mgmt. = Management

category. Table 4 shows characteristic *means, categories and importance*. Table 5 shows the characteristic statistics of *mean, median, mode, standard deviation, minimum, and maximum*.

Survey Results

Essential and Important Characteristics

Integrity ($\bar{x}$ = 2.97), Ability to Learn from Mistakes ($\bar{x}$ = 2.93), Judgement ($\bar{x}$ = 2.90), Clinical Awareness ($\bar{x}$ = 2.79), Commitment ($\bar{x}$ = 2.79), and Hardiness ($\bar{x}$ = 2.62) were all perceived by the participants as *Essential* student characteristics needed for success in Phase II training. Some of the student characteristics perceived as *Important* for clinical success with a mean falling between 1.50 - 2.49 were: Phase I Physiology Grade ($\bar{x}$ = 2.29); Phase I Pharmacology Grade ($\bar{x}$ = 2.29); Critical Care Experience of 1-2 Years, and Undergraduate Science GPA both scored ($\bar{x}$ = 2.28); Management of a Patient with Severe Cardiac Disease ($\bar{x}$ = 2.24); Student Age < 40 Years ($\bar{x}$ = 1.90); Management of a Pulmonary Artery Catheter ($\bar{x}$ = 1.83); Advanced Cardiac Life Support Certification ($\bar{x}$ = 1.79); and Student Age < 40 Years each scored ($\bar{x}$ = 1.80); Undergraduate GPA ($\bar{x}$ = 1.67); and Student GRE Score ($\bar{x}$ = 1.55).

Low Importance Characteristics

Finally 6 characteristics were scored *Low Importance* by the participants. The characteristics; Certification to Draw Arterial Blood Gases ($\bar{x}$ = 1.38), Pediatric Advanced Life Support Certification ($\bar{x}$ = 1.24), Trauma Course ($\bar{x}$ = 1.21), Advanced Nursing Certification ($\bar{x}$ = 1.21), ACLS Instructors Certification ($\bar{x}$ = 1.03), Master's

Table 3

Major Categories and Characteristics

1 to 7	Academic Knowledge
	1 GRE Scores
	2 Undergraduate GPA
	3 Undergraduate Science GPA
	4 Successful Completion of graduate level science course
	5 Additional Master's Degree
	6 Phase I Pharmacology grade > 85%
	7 Phase I Physiology grade > 85%
8 to 18	Nursing Knowledge
	8 Critical Care Experience (ICU, CCU, ER) 1-2yrs
	9 Critical Care Experience (ICU, CCU, ER) 3-5yrs
	10 Critical Care Experience (ICU, CCU, ER) > 5yrs
	11 ACLS Certification
	12 ACLS Instructor Certification
	13 Trauma Course
	14 PALS Certification
	15 Advanced Nursing Certification (CCRN, CEN, etc.)
16 to 26	Clinical Skills (Has Completed/Dev. Skills)
	16 Initial airway management in cardiac arrest
	17 Sought out additional intubation experience
	18 IV access skills
	19 Certification to draw ABG's
	20 Management of pulmonary artery catheters
	21 Management of arterial lines
	22 Management of vasoactive infusions
	23 Management of patients with severe pulmonary disease
	24 Management of patients with severe cardiac disease
	25 Management of patients with multiple organ failure
	26 Clinical Awareness
27 to 36	Personal Characteristics
	27 Age < 40
	28 Age 40 or older
	29 Commitment
	30 Hardiness (Stamina)
	31 Integrity
	32 Judgement
	33 Leadership
	34 Ability to learn from mistakes
	35 Applicants presentation during interview

Table 4

Characteristics According to Mean, Category and Importance

Essential: (2.5-3.0)	Major Category
1. Integrity - 2.97	Personal
2. Ability to Learn from Mistakes - 2.93	Personal
3. Judgement - 2.90	Personal
4. Clinical Awareness - 2.79	Clinical Skills
5. Commitment - 2.79	Personal
6. Hardiness - 2.62	Personal
Important: (1.5-2.49)	Major Category
7. Phase I Physiology Grade - 2.29	Academic
8. Phase I Pharmacology Grade - 2.29	Academic
9. Critical Care Experience, 1-2yrs. - 2.28	Nursing
10. Undergrad. Science Grade - 2.28	Academic
11. Mgmt. of Pt. - Severe Card. Disease - 2.24	Clinical Skills
12. Leadership - 2.21	Personal
13. Mgmt. of Pt. - Severe Pulm. Disease - 2.21	Clinical Skills
14. Mgmt. Vasoactive Infusions - 2.14	Clinical Skills
15. IV Access Skills - 2.10	Clinical Skills
16. Critical Care Experience, 3-5yrs. - 2.03	Nursing
17. Mgmt. of Pt. - Mult. Organ Failure - 2.03	Clinical Skills
18. Mgmt. Arterial Lines - 2.0	Clinical Skills
19. Age < 40yrs. - 1.90	Personal
20. Presentation During Interview - 1.89	Personal
21. Initial Airway Manage in Arrest - 1.86	Clinical Skills
22. Mgmt. Pulm. Artery Catheters - 1.83	Clinical Skills
23. Sought Out Added Intubation Exp. - 1.79	Clinical Skills
24. ACLS Certification - 1.79	Nursing
25. Success in Grad. Level Science Class - 1.76	Academic
26. Undergraduate GPA - 1.69	Academic
27. Critical Care Experience > 5yrs. - 1.62	Nursing
28. GRE Scores - 1.55	Academic
Low Importance (0.5-1.49)	Major Category
29. Certification to Draw ABG's - 1.38	Clinical Skills
30. PALS Certification - 1.24	Nursing
31. Advanced Nursing Certification - 1.21	Nursing
32. Trauma Course - 1.21	Nursing
33. ACLS Instructor Certification - 1.03	Nursing
34. Additional Master's Degree - .90	Academic
35. Age 40yrs. Or Older - .82	Personal

Mgmt. = Management

Table 5

Statistical data

Academic Knowledge	Mean	Median	Mode	St. Dev.	Min.	Max
1 GRE Scores	1.55	2	1	0.57	1	3
2 Undergraduate GPA	1.69	2	2	0.47	1	2
3 Undergraduate Science GPA	2.28	2	2	0.59	1	3
4 Successful Completion, grad level science course		2	2	0.74	0	3
5 Additional Master's Degree	0.9	1	1	0.72	0	2
6 Phase I Pharmacology grade > 85%	2.29	2	2	0.6	1	3
7 Phase I Physiology grade > 85%	2.29	2	2	0.53	1	3
<u>Nursing Knowledge</u>						
8 Critical Care Experience (ICU, CCU, ER) 1-2yrs		2	2	0.75	0	3
9 Critical Care Experience (ICU, CCU, ER) 3-5yrs		2	2	0.57	1	3
10 Critical Care Experience (ICU, CCU, ER) > 5yrs		2	2	0.73	0	3
11 ACLS Certification	1.79	2	1	0.96	0	3
12 ACLS Instructor Certification	1.03	1	1	0.68	0	2
13 Trauma Course	1.21	1	1	0.73	0	3
14 PALS Certification	1.24	1	1	0.79	0	3
15 Advanced Nursing Certification (CCRN, CEN, etc.)		1	1	0.62	0	2
<u>Clinical Skills</u>						
16 Initial airway management in cardiac arrest		2	2	0.95	0	3
17 Sought out additional intubation experience		2	2	1.01	0	3
18 IV access skills	2.1	2	2	0.72	1	3
19 Certification to draw ABG's	1.38	1	1	0.94	0	3
20 Mgmt. of pulmonary artery catheters	1.83	2	2	0.71	0	3
21 Mgmt. of arterial lines	2	2	2	0.65	1	3
22 Mgmt. of vasoactive infusions	2.14	2	2	0.69	1	3
23 Mgmt. of patients with severe pulmonary disease		2	2	0.68	1	3
24 Mgmt. of patients with severe cardiac disease		2	2	0.69	1	3
25 Mgmt. of patients with multiple organ failure		2	2	0.63	1	3
26 Clinical Awareness	2.79	3	3	0.49	1	3
<u>Personal Characteristics</u>						
27 Age < 40	1.9	2	2	0.77	0	3
28 Age 40 or older	0.82	1	0	0.77	0	2
29 Commitment	2.79	3	3	0.49	1	3
30 Hardiness (Stamina)	2.62	3	3	0.56	1	3
31 Integrity	2.97	3	3	0.19	2	3
32 Judgement	2.9	3	3	0.31	2	3
33 Leadership	2.21	2	2	0.56	1	3
34 Ability to learn from mistakes	2.93	3	3	0.26	2	3
35 Applicants presentation during interview	1.89	2	2	0.63	1	3

Mgmt. = Management

Degree ($\bar{x} = .90$) and Age Older > 40 Years ($\bar{x} = .820$) were all perceived as having minimal effect on clinical success during Phase II training.

Most characteristics studied were perceived as either *Essential*, required for clinical success, or *Important*, contributes to clinical success. However, the characteristics perceived as *Essential* for clinical success were student personal characteristics except Clinical Awareness, which was categorized under clinical skills. Looking at characteristics considered *Low Importance*, having minimal effect on clinical success; Additional Master's Degree, and Age > 40 Years were felt to have the least effect upon student performance.

Looking at the number of times each characteristic was considered either *Essential* (3) or *Important* (2), the order of the variables when compared to the mean remained essentially unchanged (see Table 6). Integrity was scored 29 times as *Essential* (28), or *Important* (1). Ability to Learn from Mistakes also was scored 29 times as *Essential* (27), or *Important* (2). In addition, Judgement was scored 29 times as *Essential* (26), or *Important* (3). Commitment, Clinical Awareness, and Hardiness followed as the student characteristics most often scored either *Essential*, or *Important* for clinical success.

Qualitative Data

In the following discussion we will summarize survey responses to our seven open ended questions.

1. In addition to the previous variables (items in the survey) what else do you consider essential for clinical success?

Table 6

Responses by Frequency and Percent of Scored Answers

Academic Knowledge	missed	0	1	2	3
1 GRE Scores	0/0%	0/0%	14/48.3%	14/48.3%	1/3.4%
2 Undergraduate GPA	0/0%	0/0%	9/31%	20/69%	0/0%
3 Undergraduate Science GPA	0/0%	0/0%	2/6.9%	17/58.6%	10/34.5%
4 Success in grad. level science course	0/0%	2/6.9%	6/20.7%	18/62.1%	3/10.3%
5 Additional Master's Degree	0/0%	9/31%	14/48.3%	6/20.7%	0/0%
6 Phase I Pharmacology grade > 85%	1/3.4%	0/0%	2/6.9%	16/55.2%	10/34.5%
7 Phase I Physiology grade > 85%	1/3.4%	0/0%	1/3.4%	18/62.1%	9/31%
Nursing Knowledge	missed	0	1	2	3
8 Critical Care Experience 1-2yrs	0/0%	1/3.4%	2/6.9%	14/48.3%	12/41.4%
9 Critical Care Experience 3-5yrs	0/0%	0/0%	4/13.8%	20/69%	5/17.2%
10 Critical Care Experience > 5yrs	0/0%	2/6.9%	9/31%	16/55.2%	2/6.9%
11 ACLS Certification	1/3.4%	2/6.9%	10/34.5%	8/27.6%	8/27.6%
12 ACLS Instructor Certification	0/0%	6/20.7%	16/55.2%	7/24.1%	0/0%
13 Trauma Course	0/0%	4/13.8%	16/55.2%	8/27.6%	1/3.4%
14 PALS Certification	0/0%	5/17.2%	13/44.8%	10/34.5%	1/3.4%
15 Advanced Nursing Certification	0/0%	3/10.3%	17/58.6%	9/31%	0/0%
Clinical Skills	missed	0	1	2	3
16 Initial airway mgmt. in cardiac arrest	0/0%	3/10.3%	6/20.7%	12/41.4%	8/27.6%
17 Sought added intubation experience	0/0%	4/13.8%	6/20.7%	11/37.9%	8/27.6%
18 IV access skills	0/0%	0/0%	6/20.7%	14/48.3%	9/31%
19 Certification to draw ABG's	0/0%	5/17.2%	12/41.4%	8/27.6%	4/13.8%
20 Mgmt. of pulm. artery catheters	0/0%	1/3.4%	7/24.1%	17/58.6%	4/13.8%
21 Mgmt. of art lines	0/0%	0/0%	6/20.7%	17/58.6%	6/20.7%
22 Mgmt. of vasoactive infusions	0/0%	0/0%	5/17.2%	15/51.7%	9/31%
23 Mgmt. of pt.'s - severe pulm. disease	0/0%	0/0%	4/13.8%	15/51.7%	10/34.5%
24 Mgmt. of pt.'s - severe card. disease	0/0%	0/0%	4/13.8%	14/48.3%	11/37.9%
25 Mgmt. of pt.'s - mult. organ failure	0/0%	0/0%	5/17.2%	18/62.1%	6/20.7%
26 Clinical Awareness	0/0%	0/0%	1/3.4%	4/13.8%	24/82.8%
Personal Characteristics	missed	0	1	2	3
27 Age < 40	0/0%	2/6.9%	4/13.8%	18/62.1%	5/17.2%
28 Age 40 or older	1/3.4%	11/37.9%	11/37.9%	6/20.7%	0/0%
29 Commitment	0/0%	0/0%	1/3.4%	4/13.8%	24/82.8%
30 Hardiness (Stamina)	0/0%	0/0%	1/3.4%	9/31%	19/65.5%
31 Integrity	0/0%	0/0%	0/0%	1/3.4%	28/96.6%
32 Judgement	0/0%	0/0%	0/0%	3/10.3%	26/89.7%
33 Leadership	0/0%	0/0%	2/6.9%	19/65.5%	8/27.6%
34 Ability to learn from mistakes	0/0%	0/0%	0/0%	2/6.9%	27/93.1%
35 Presentation during interview	1/3.4%	0/0%	7/24.1%	17/58.6%	4/13.8%

Mgmt. = Management

Twenty-two of the 29 respondents answered this question. The most frequently mentioned response was flexibility (6). The term flexibility was used often by clinical instructors to describe students. One respondent said flexibility was, "the ability to change a plan based on a fluid clinical situation." Another participant believed flexibility gave the student the "ability to set priorities of care." A third asserted flexibility was "being able to adjust personal and professional commitments."

Motivation was the second most frequently mentioned characteristic (4) considered essential for student success. Motivation was couched in terms such as "willingness to go the extra mile beyond expectations." One clinical site director instructs students, "if your instructors asks you for 130% performance, you give them 150%." Instructors looked positively upon students displaying motivation and an eagerness to do the work of the specialty.

Desire to be a CRNA, the ability to be a team player, and the ability for the student to accept criticism was mentioned equally as often (3) by respondents in our survey. One respondent defined desire in terms of being the best, while another respondent said desire was "they have to want it (anesthesia) bad." Team membership was said to be "the students ability to interact with various members of the health care team," and "the ability to communicate and get along with others."

Selflessness, maturity, determination, and the ability for the student to understand their limits by knowing when to summon help were each mentioned twice by respondents. Finally common sense, willingness to learn, learn from errors,

organization, commitment, humility, critical thinking skills, willingness to be taught, attitude and determination were each mentioned once by respondents.

2. Would you consider it appropriate to send a questionnaire to the nurse anesthesia candidate's last employer to obtain his/her feedback on the candidate's clinical knowledge, skills, and personal characteristics? Yes/No

In answer to this question 24 respondents said yes, 3 said no, and 2 individuals did not respond. Three individuals added comments. One thought a student evaluation form sent to a candidate's last employer "essential." A second respondent wrote "an honest assessment (of the individual) would be helpful, and a third respondent questioned the value of such evaluation. This respondent commented the evaluation would be "embellished just to get the candidate accepted" to anesthesia school.

3. Should pediatric ICU (Intensive Care Unit), NICU (Neonatal Intensive Care Unit), Operating Room (OR) and PACU (Post Anesthesia Care Unit) nursing be considered critical care nursing? Yes/No

If not, would you consider it appropriate to recommend a nurse anesthesia candidate working in one of the above areas to switch his/her specialty to either adult ICU, CCU (Coronary Care Unit), or ER (Emergency Room) prior to anesthesia training? Yes/No

The 29 responses to the two parts of this question varied. We received nine positive answers to the first part of question three. These respondents believed PICU, NICU, OR and PACU nursing all constituted critical care nursing. Eight respondents

answered negatively to this question, and 12 respondents split their answer between yes and no according to the care setting the nurse worked in.

Six respondents believed PICU and NICU, but not PACU and OR constituted critical care nursing experience. Four respondents believed all except OR nursing represented critical care nursing. Another respondent believed PICU, NICU and OR nursing critical care nursing, but not PACU were critical care nursing. Finally, one respondent believed the OR was critical care nursing provided the nurse was involved in neurological, cardiothoracic and cardiovascular cases. This respondent believed working in PICU was probably not critical care nursing experience. They further stated NICU and PACU were definitely not critical care areas.

One respondent, who believed PICU and NICU experience constituted critical care nursing but not OR and PACU, added the following. This person said, "the Council requires one year in acute care with advanced monitoring," and that "PACU, OR, Labor and Delivery and Telemetry Units fit that category."

The second part of question three asked if the candidate was working in an area they did not consider critical care experience would it be appropriate for the candidate to work in such an area to obtain critical care nursing experience. Three respondents said no, 17 yes, 1 respondent answered both yes and no, and 9 respondents did not answer this part of question three. Two respondents qualified their answers. One person stated, "an ICU in a small overseas hospital may not offer as much experience

as an OR at, say Walter Reed or San Diego.” Another respondent did not consider the ER was critical care nursing in a military setting.

4. In your opinion would it be possible to measure a candidate’s awareness by having them participate in a mock code as part of the interviewing process?

Yes/No

Overall, six respondents thought candidates performing a mock code during an interview would help the interviewer evaluate the candidate. Twenty-two respondents answered no to this question, and one person did not answer the question.

Only one respondent commented to this question. They understood the applicant would already be anxious during the interview. Adding a mock code scenario would only increase an applicant’s anxiety during the interview. This respondent did not see much benefit gained from candidates performing a mock code during the interview process.

5. How do you feel the interview process fits in when evaluating personal characteristics?

Twenty-three respondents commented on this question. Nine of the 23 respondents thought the interview to be of minimal or moderate importance in evaluating candidates for school. Three respondents believed the interview did not “assess a person’s true characteristics;” it had only a moderate importance in the evaluation process. One respondent commented letters of recommendation, and

evaluation were more appropriate for evaluating anesthesia candidates than the personal interview.

Six respondents thought the interview process subjective and offered minimal insight into student characteristics. One respondent commented, "I think the interview process is only a small tool for evaluating personal characteristics." "It presents only a snap shot" of the individual. Another respondent believed it was difficult to assess a candidate during a 30-minute interview. A final respondent believed the interview format was "fake to a large degree."

On the other hand, 14 respondents had positive comments about the use of the interview in the evaluation process. These individuals believed much information could be gained through a face to face meeting with candidates. They believed an astute interviewer could judge a candidate's motivation and desire to succeed as a student. Through the use of "real critical care content questions" they believed a candidate's "language ability, knowledge and thought process" could be assessed. One respondent stated "the interview is critical in evaluating the person's willingness to succeed. Ability can only be measured by past success, GRE scores, undergraduate grades, certifications obtained, etc. I get a feel for commitment, stamina, and integrity from the interview." Another respondent believed the interview process "helps evaluate the student's motivation and goal driven reasons to be a CRNA."

6. What were the missing characteristics of previous students who had difficulty during their clinical phase of training?

Question one asked respondents what other variables did they consider essential for clinical success? Question six was stated in the negative to question 1. It asked, "what were the missing characteristics of previous students who had difficulty in clinical training? The most commonly mentioned student characteristics leading to difficulty in Phase II training were lack of integrity (7), followed by lack of critical thinking skills (6). Lack of clinical awareness (5) was the third most frequently identified student characteristic leading to student difficulty during training.

Lack of honesty and lack of attention to detail were each cited twice by respondents as causes of student difficulty in Phase II training. Honesty and integrity could be considered synonymous and will be combined for analysis. A lack of attention to detail mentioned twice could be related to lack of clinical awareness because part of clinical awareness is attention to detail.

Respondents noted lack of commitment leading to clinical difficulty five times. More specifically, respondents mentioned lack of student commitment to studies (4) as a characteristic leading to student difficulty during Phase II. Poor didactic knowledge (3), was believed to be due to a students lack of commitment to their studies. One respondent defined poor didactic knowledge as a poor science background while another defined it as a poor understanding of pharmacology and physiology. Lack of motivation in students was mentioned twice, and lack of hard work once.

Flexibility (6) was the most frequently mentioned factor essential for clinical success mentioned in question one. However, the lack of student flexibility was only identified three times in response to question six as a student characteristic leading to difficulty during Phase II. It ranked fifth, behind integrity, critical thinking skills, clinical awareness, and commitment to studies as a characteristic lacking in students leading to difficulty during Phase II training.

Finally, lack of critical care nursing experience, lack of common sense, lack of humility, lack of interpersonal skills, lack of judgment, not learning from mistakes, not being able to work in teams, and age greater than 40 were each identified twice by respondents as causes of student difficulty during Phase II. Lack of desire, lack of personal insight, and not being able to accept personal failure were each mentioned once by respondents.

7. What are the negative attributes you have noted in previous students who did not succeed?

Respondents gave a wide range of answers to this question. The most frequently mentioned responses were the student's unwillingness to admit errors and take responsibility for their own actions (6), followed by cockiness/arrogance (5). Lack of commitment and lack of motivation leading to student failure in phase II were each mentioned four times by the respondents. Inability for the student to make a role transition to anesthesia provider, inability for the student to handle stress, inability of

the student to take criticism, lack of hardiness, and student dishonesty were mentioned three times by respondents as reasons for student failure.

Problems leading to failure mentioned by two people were inability to transfer theory to practice, lack of critical thinking skills, and lack of interpersonal communication skills. A long list of other reasons for failure were identified once. They were lack of respect, lack of insight, lack of team spirit, being inflexible, selfish, disinterested, displaying unprofessional behavior, decreased clinical awareness, poor judgement, age greater than 40, difficulty responding to crises, poor allocation of time, and rationalization.

Question six looked at missing characteristics of students who had difficulty in clinical training. The most frequently mentioned characteristic leading to clinical problems were integrity (7) and clinical awareness (5). Question seven identified a student's unwillingness to admit errors and take responsibility for their own action (6), and cockiness/arrogance (5) as the most frequently cited reasons for student failure in Phase II. Clinical awareness along with integrity was only mentioned once by respondents as cause for student failure. However, respondents did mention dishonest behavior twice as a reason for student disenrollment from anesthesia training.

CHAPTER V

Discussion, Conclusions, Implications, Recommendations

Understanding what a nurse anesthesia student needs for successful completion of their clinical training would be valuable knowledge. With attrition continuing to be a problem in many anesthesia programs a roadmap for success could save both student and institution time and money. However, though important, this roadmap remains elusive.

A successful nurse anesthesia training program requires the coalescence of several key items. To start with, students need a strong academic base grounded in the physiological sciences with courses in theory and research methods. They need diverse clinical training opportunities with experienced nurse anesthesia staff as instructors. To make all this work together, it is essential for the training program to have students with the right educational background, nursing experience, and personal traits.

The focus of our research has been on the student characteristics needed for success. Both the nursing literature (Hansen & Pozehl, 1995) and the medical literature (Mitchell, 1990) suggest that if students were successful at the undergraduate level and performed well on standardized entrance exams, they would be successful in the academic portion of graduate nursing or medical school. Academic success, though, does not always guarantee clinical success. This area of concern has been more problematic with little research that can demonstrate solid recommendations. Therefore, the focus of this study was on characteristics needed for clinical success. To identify characteristics for clinical success expert clinical faculty at military nurse anesthesia training programs were surveyed.

This chapter provides a discussion of the study results obtained from our survey questionnaire mailed to the clinical faculty of the Army, Air Force, and Navy nurse anesthesia clinical training sites. Conclusions that can be drawn from the data will be discussed. The chapter will be concluded with implications and recommendations for the nurse anesthesia specialty.

Discussion

The discussion will cover demographic features of our survey population, the importance of student characteristics to clinical success, themes developed from the qualitative part of the survey, instrument revision recommendations, and finally the relationships noted between the above areas.

Demographic Features of our Survey Population

We obtained a 100% response rate on our survey from the entire population of military CRNAs currently assigned as clinical faculty. Although there is no agreed upon minimum response rate 75% or higher response rate from a sample of 10% of the population is considered acceptable. In addition, the federal government's Office of Management and Budget requires contractors who use surveys as part of their bids to have a minimum response rate of 75% (Fowler, 1993). The higher the response rate the more your findings are truly representative of the population and those who are strongly biased to the point of not participating are reduced (Fowler, 1993). With our response rate of 100% of the entire survey population we certainly exceeded the 75% minimum of a sample used by some institutions. Therefore, the findings were a representative reflection of the faculty's perceptions of characteristics a student needs for clinical success at a military nurse anesthesia training program, given any instrumentation weaknesses.

There were some interesting themes noted from the demographics portion. The most significant finding is that 89.7% of the military clinical faculty have at least four years of experience. We believe this was a positive finding, because in order to be an effective clinical instructor you need to first have the skill and confidence to practice clinical anesthesia. With 89.7% of our respondents having at least four years experience, it can be safely assumed they will be able to articulate what it takes to be a successful and competent practitioner.

The last trend noted on the demographics data sheet that needs discussion is 65.5% of the clinical faculty were in their first assignment as faculty. This could be a result of military assignments changing about every three years. This potential lack of long term stability could affect responses compared to civilian anesthesia programs where mandatory rotation dates do not exist. Therefore it would be interesting to survey civilian faculty and compare their responses to their military counterparts.

Importance of Student Characteristics to Clinical Success

The respondents felt 28 of the 35 listed characteristics fell into the *Important* or *Essential* category as defined by Goodrich (1981). Of the 28 characteristics, six were deemed *Essential*. The characteristics clinical faculty felt were not of significant importance included certain criteria from each of the four major categories of academic knowledge, nursing knowledge, clinical skills, and personal characteristics. The category with the greatest number of characteristics marked in the *Low Importance* category was nursing knowledge. Nursing knowledge had four characteristics not considered important; being an ACLS instructor, attending a trauma course, and having advanced certifications in critical care or pediatric advanced life support. The lower scores for these

items could be related to the belief these characteristics were not as directly related to clinical anesthesia.

The categories of academic knowledge, clinical skills and personal characteristics each had one item that fell into the *Low Importance* category. These were certification to draw blood gases, age 40 or older, and an additional master's degree. This emphasizes the importance of personal characteristics, academic knowledge, and clinical skills over advanced degrees and certifications not related to anesthesia.

The characteristics from academic knowledge scored *Important* for clinical success had a science based theme. Undergraduate GPA was marked *Important*, but its *Importance* score was not as high as science GPA. Doing well in pharmacology and physiology were considered *Important*. This data is consistent with the belief that clinical anesthesia is grounded in the physical sciences and depends heavily on knowledge of applied pharmacology. GRE scores were considered *Important* but only by 51.7% of the respondents. This low ranking of GRE scores compared to other characteristics in academic knowledge is most likely related to the belief that GRE scores have low predictive ability for clinical performance. This is borne out by studies in other fields of nursing that showed GRE scores were not predictive of clinical nursing performance (Munro, 1985, Hansen & Pozehl, 1995). Additional master's degree was scored *Low Importance* by 79.3% of the respondents. Respondents may not consider this *Important* because the type of master's degree was not designated and the emphasis for nurse anesthesia academic knowledge is the physical sciences. Had the item been worded as masters of science in one of the physical sciences, we believe the response might have been different.

Obtaining critical care experience and being certified in ACLS were the criteria from nursing knowledge considered *Important*. Interestingly as the category for number of years experience in critical care increased its level of importance decreased. Clinical faculty felt critical care experience was *Important*, but it seems that one to two years provided students the skills needed for clinical success. It seem that more critical care experience does not necessarily lead to increased chance of success. ACLS certification was considered to provide the basis for mechanisms that can help maintain hemodynamic stability which is an important part of any anesthetic.

Ten out of the 11 criteria in clinical skills were deemed *Important*. This suggests that the more varied clinical skills, especially in the area of monitoring and managing difficult situations, a student brings to their clinical anesthesia training the greater the chance for success. The only clinical skill scored as *Low Importance* was certification to draw blood gases. Most likely the reason this was scored low was that this skill is or can be taught during the clinical anesthesia training.

The category of personal characteristics received high scores with the exception of Age 40 or older. Interesting was that Age less than 40 was marked *Important* or higher by 79.3% of the respondents, and 79.2% of the respondents said being 40 or older was *Low Importance*. It appeared the majority of the faculty were saying being younger is a factor important for success, but that age 40 or older may be problematic to success. We do not feel the faculty believes that at age 40 or above age is no longer a factor. The reason for the perceived ambiguity most likely rests with the way the question was worded with the available responses. The characteristics on our survey did not have a response to categorize an item as having a negative impact on success, which is what we believe

happens as a student gets beyond the age of 40. Therefore, the only way the respondents could score this item was that it was of *Low Importance* or *Unimportant* to success, and this does not give an accurate picture of the effect of age.

Only six of the 35 items were marked *Essential*. Of these six items, five were personal characteristics and the sixth was clinical awareness. The personal characteristics essential for clinical success were commitment, hardiness, integrity, judgement, and the ability to learn from mistakes. All of the personal characteristics considered *Essential* are those things that cannot be taught and are difficult to measure.

There are some important things to draw from the quantitative portion of the survey. The military's clinical faculty feel knowledge and nursing skills are important to a student's clinical success but not essential. The areas a student is deficient in can be taught during the long period of clinical training. What is essential for the student to have is what the faculty cannot teach them, it is those nonacademic variables that are innate to the student. We feel most faculty believe if a student successfully completed the academic portion of anesthesia school they will be successful in clinical anesthesia if they have the right personal traits. These traits include integrity, commitment, hardiness, judgement, ability to learn from mistakes, and clinical awareness. Of these personal characteristics integrity received the highest score with 96.6% of the respondents marking it as *Essential*.

Qualitative Results

For the qualitative portion of our survey we wanted to know what else the clinical faculty thought was important for clinical success in addition to our 35 items. We also wanted to know what things they felt were responsible for failure, and what was lacking

in those students who did not succeed. The faculty's input on what constitutes critical care also was queried along with the usefulness of a personal interview and having the student participate in a mock code as part of the interview. Lastly we wanted to know their views on the appropriateness of using the students most recent employer to evaluate those nonacademic attributes that were determined to be essential. These questions were evaluated for general themes.

With 82.7% of the respondents feeling it appropriate to mail a questionnaire to the student's last supervisor it demonstrates a strong case for doing this as part of the application process. This could be one approach to evaluating those nonacademic variables. One faculty felt this was an essential part of the application process. The potential negative side to this is that the supervisor may write an over-inflated evaluation, because they personally like the person and may want to assist them applying to anesthesia school.

There is no question the faculty view at least one to two years of critical care experience to be important. The question is what should be considered critical care experience. The faculty were split over whether post anesthesia care, operating room, neonatal intensive care, and pediatric intensive care were all adequate forms of critical care nursing. The authors believe post anesthesia care and operating room should not be considered critical care, because both areas lack direct nursing care of patients who are critically ill. What seems to be consistently important is not the type of unit a candidate works in, but what clinical skills have they developed over the years that will help with clinical nurse anesthesia.

Regarding the use of an interview for evaluating candidates the faculty was once again divided on their perspectives. Of those respondents who answered the interview question, 60.8% felt it was a critical part of the process, while the remaining faculty felt it was of minimal use. Those who felt the interview was useful felt it gave them some insight into a student's character, and provided a "snapshot" of what the student is like. The use of a mock code was felt to be of little use according to 78.5% of the respondents who answered this question. The prevailing thought was that the interview was already stressful for the candidate and that a mock code at that time would not be an accurate reflection of their clinical awareness.

There were two themes that emerged when evaluating the qualities needed in addition to our listed criteria. Foremost was flexibility. Several of the clinical faculty felt the ability to adjust to changes in anesthesia plans, changes in the operating room schedule, and changes in staff during the day required a lot of flexibility from the student. Flexibility can be considered as a personal characteristic needed for clinical success and should be added to the quantitative portion of the survey, if the study is repeated. A flexible student is one who adapts to changes in case plans, and it is a characteristic the student needs in the course of any day in a busy operating room. A few of the respondents mentioned motivation. We agree motivation is needed, however we feel motivation could be considered reflected in the personal characteristic--commitment.

Question six asked respondents what attributes were lacking in those students who had difficulty in their clinical phase of training. One might expect the answers to be the opposite of the answers from question one; lack of flexibility and motivation. However, the most frequent responses were lack of integrity and clinical awareness. Integrity

includes honesty, and respondents noted that selected students who had trouble in the past not only lacked honesty with others, but were not honest with themselves. This has to do with admitting to yourself that you are wrong or that you are having problems.

The final question in the qualitative portion was a slightly different look at the negative attribute theme. Instead of what attributes they were lacking that contributed to difficulty in clinical anesthesia the question asked for what negative behavior failing students demonstrated. Cockiness and/or arrogance were the most frequently reported negative attribute along with not admitting to mistakes and accepting responsibility. Not admitting to mistakes and accepting responsibility certainly could be viewed as an integrity issue. Other negative attributes mentioned were lack of commitment, not making the role transition to advanced practice, and problems in the student's personal life. All of which can lead to problems in a clinical component.

When taking these issues as a whole there is one consistent theme. They are all nonacademic variables and are therefore difficult to measure, and even more difficult to use as screening tools. The majority of the clinical faculty concurred with the one possible mechanism we suggested for evaluating these nonacademic personal characteristics, sending a questionnaire to the candidate's last supervisor to obtain feedback on personal characteristics. An evaluation by a supervisor may have a lower likelihood of bias than personal references.

Instrument Revision Recommendations

On the content validity index, raters scored 28 of the 35 items to be relevant for inclusion into the instrument. There were three characteristics that both the faculty rated *Low Importance* and the CRNA experts felt were not content relevant. The characteristics

that overlapped were additional masters degree, blood gas certification, and pediatric advanced life support certification.

The reason we did not change our survey questionnaire following the content validity index was the exploratory descriptive nature of our study. The more characteristics listed, the better the chances were of not leaving out something important. This belief was supported by the fact that there were four characteristics that each group felt differently about. The area of greatest discrepancy was nursing knowledge, the CRNAs who rated content validity thought items such as advanced nursing certifications, ACLS instructor certification, and attending a trauma course were relevant content for the instrument. The clinical faculty rated these items as *Low Importance*. The possible reason for this discrepancy is the clinical faculty's belief that knowledge not directly related to clinical anesthesia is not as important for clinical training as a strong background in the physical sciences and critical care experience. Whereas the faculty rating content validity thought it should be considered in the tool.

Age was the final point of disagreement between the content validity index and the survey responses. Each group rated the age items the opposite. As previously mentioned the item related to Age over 40 was included in the survey because of past problems students over 40 have had in the Army anesthesia program. Therefore, since four of the six CRNAs who rated the instruments content validity were the Army's didactic faculty they considered the item content relevant. However, the item (Age 40 or older) was written in such a way you could not get a negative response when participants were asked to judge importance if they thought that age 40 or greater is problematic. Perhaps only one item related to Age under 40 is needed on the survey or it could be addressed in the

qualitative portion of the survey. This would have made it possible to ask whether at a certain age or older clinical anesthesia training becomes more difficult and assess why.

Relationships Between Areas

One of the initial relationships noticed was the degree of agreement between the content validity index scores and the scores on the survey. Both portions of the survey and the content validity index stressed the importance of personal characteristics. Integrity was the highest item scored in both portions of the survey, and it had a content validity index score of one. The definition of integrity should be expanded to include other important ideas that respondents mentioned like honesty, willingness to admit mistakes, and taking responsibility for your actions. This just further reinforces the perception that this is the most important characteristic a student needs for clinical success.

Except for age and applicants' presentation during the interview, the entire category of personal characteristics was rated *Essential*. In addition to integrity, the characteristics essential for success were commitment, hardiness, judgement, and ability to learn from mistakes. Our CRNA expert panel gave all of the above characteristics a content validity index score of one. Additionally, clinical awareness was a characteristic consistently rated *Essential*, and it showed up in the qualitative part of the survey. There is a consensus from the data that these nonacademic variables are the most essential characteristics needed for success. The basis for these scores most likely reflects the belief that if a student has these personal characteristics and successfully completes the didactic portion of anesthesia school the faculty can teach them clinical anesthesia.

Strengths and Weaknesses of the Study

The strongest point of our study was the 100% response rate of the population of military clinical faculty. This response rate is indicative of the importance of this topic to the faculty we surveyed. The detailed responses on the qualitative portion also indicates the importance of the subject to the respondents. It also may be reflective of a military professional group who are used to responding to requests. With the scores on both the survey responses and the content validity index we can assume our survey tool consisted of the items considered important for success in clinical nurse anesthesia training. The qualitative responses aid in completing the picture.

An additional strength of the quantitative part of the survey was its internal consistency as measured by Cronbach's alpha. With a Cronbach's alpha of 0.91 we can safely conclude the quantitative part of the survey was made up of related items.

There are some noted weaknesses in our study. First our population was the military anesthesia clinical training sites. Therefore, we can not generalize our findings to civilian clinical training sites which might be interesting for comparison. The quantitative portion of the survey tool did not capture every item considered important to clinical success. Based on our qualitative findings we would add flexibility to the personal characteristics category. We should probably change the additional masters degree item to read additional degree in a physical science. Items to be deleted based on the content validity scores and the survey responses are certification to draw blood gases and pediatric advanced life support certification. The issue of age on the survey was confusing. It would have been better as previously mentioned to revise it or to add it as a question on the qualitative portion of the survey.

Conclusions

The four major categories of academic knowledge, nursing knowledge, clinical skills, and personal characteristics had items scored in the range of *Important* and *Essential* for clinical success. This supports the concept that to become a successful CRNA requires a foundation in many areas, and is consistent with our theoretical model. From our model, the student obtains their academic knowledge during their didactic phase with anatomy and physiology, and pharmacology having the greatest impact. A student's ability to learn and test well in these areas reveals their ability to understand and retain concepts that are applied in clinical training. Our model also posits that nursing experience in critical care provides the student with some important clinical skills and knowledge needed in anesthesia training, and helps develop clinical awareness. Finally in the model, the value of a student's personal make-up can not be overlooked and our colleagues from the clinical sites gave the items in this category a resounding endorsement as traits the student must possess.

Our theoretical model acknowledged other variables have a role in student outcome. These would include other stressors such as family, relocation, not meeting height and weight standards, military personal fitness requirements, and illness. These areas did not receive a lot of attention by the respondents in the qualitative portion of our survey, but logic tells us they have a possible role. If a student has a problem with one of the above stressors coupled with a deficiency in one of the four main categories their chance for failure could increase. Therefore, this area deserves study particularly in a military population.

The findings of the survey responses generally supports our theoretical framework, but suggest some changes are needed. We considered the four major categories equally important and interrelated. The survey responses provide a ranking of categories based on their perceived importance to clinical success. Clearly personal characteristics ranked the highest and were followed in order by academic knowledge, clinical skills, and nursing knowledge. A new theoretical framework based on the data would have the same four major categories, but arranged in a pyramid similar to Maslow's hierarchy of needs with personal characteristics as the foundation upon which everything else is built. We know from experience that academic knowledge and clinical skills can be taught. Faculty who have worked with both good and bad students know that the personal make-up of the student is crucial. If the student can not be trusted as an advanced practitioner then faculty can not in good conscience allow the person to graduate and practice clinical anesthesia.

We certainly feel age is an important factor, and that its importance may not have been truly borne out by this study. The Army graduate nurse anesthesia program has some unpublished data that supports the fact that some students 40 and older do not do as well as younger students. In the qualitative portion of our survey age greater than 40 was twice mentioned as a contributor to students' failure. The possible reasons age greater than 40 decreases a students chance for success may be lack of stamina or hardiness and fatigue. Another factor that may be unique to military anesthesia training programs are most students of this age are more advanced in their military careers, and may realize the amount of work necessary is more than they are willing to give. There is an additional concern that a negative evaluation from training could do harm to their careers. As

members of the armed services we can not discriminate based on age, but faculty can provide counseling to improve a candidate's success. This could include taking courses prior to matriculation in the program, getting recent critical care experience, and minimizing personal life distractions.

The fact that 28 of our 35 items were scored as *Important* or *Essential* by our survey population suggests that the overall survey tool was descriptive of the characteristics perceived necessary for clinical success in nurse anesthesia. This was further supported by our content validity index, where 28 of 35 items (although not all of the same items as the survey) were deemed relevant to the content of this tool by CRNA experts. Based on some of the answers we received on the qualitative portion of the survey, the one item that should be considered for addition to a revised tool is flexibility.

With the responses we received it is now possible to describe what the military anesthesia programs clinical faculty think is an excellent student. Foremost the student has integrity. They are honest with themselves and others. They are committed to becoming a CRNA, and have the desire and hardiness to give 110%. The student uses good judgement and can learn from their mistakes. The student will build on this essential foundation of personal characteristics during their didactic training by excelling in the academic portion of school, especially the physical sciences. When the student arrives at their clinical training site the foundation of personal characteristics plus their academic knowledge coupled with one to two years of critical care nursing experience should pave the way to clinical success.

Implications for Clinical Practice

The characteristics could be used as a guide for developing prerequisites for students interested in the specialty of nurse anesthesia. Clinical instructors could use the characteristics as part of their student evaluation. Furthermore an interview tool could be developed using the characteristics as a guide for evaluating candidates. If the study results were implemented the above uses might result in a lower attrition rate from clinical anesthesia training and promote development of excellent nurse anesthetists.

Recommendations for Further Research

First this study should be repeated using civilian nurse anesthesia schools clinical faculty as the study population. It is our opinion that civilian anesthesia schools would have instructors with more time in their current professional position since they are not subject to military rotation dates. This difference could affect some of the item scores and answers on the qualitative part of the survey. Once this study is completed a comparison of the two studies would further validate the characteristics considered essential and important for success in clinical nurse anesthesia training. The characteristics from both groups perceived as essential and important for a student to be successful in clinical nurse anesthesia could be further studied to see if they have any statistical predictive ability.

The findings from this study, and our own personal views are that a student's personal character is of such significance that we must find better ways to evaluate the nonacademic variables. The incorporation of a questionnaire to the candidate's last supervisor to evaluate their response to the character issues as part of the application process could be studied to evaluate its use. Some other possible areas to evaluate would be the criteria the service academies use to screen their applicants, and as a profession we

could look to our colleagues in the field of psychology for their input on ways to evaluate our students' personal character. The role of integrity, commitment, judgement, and ability to learn from mistakes are issues needing more attention in the application process.

Summary

As a professional specialty our need for qualified clinicians to enter the field of nurse anesthesia is increasing. Prior research has failed to provide direction for success. In order to reduce attrition in our training programs and provide the health care industry with qualified CRNAs research needs to address this issue. The first step in this process was to determine specific characteristics needed for clinical success at military nurse anesthesia training programs.

Data from clinical faculty suggest that faculty should continue to evaluate some of the characteristics already being looked at during the admission process such as overall GPA, science GPA, and critical care experience. However, the student's personal character is an equally essential part of the foundation needed for success. Having described *Essential* and *Important* characteristics for clinical success in military nurse anesthesia training allows us to make a list of the characteristics available to prospective candidates, and further evaluate the characteristics for completeness and statistical predictive ability.

APPENDIX A
Survey Questionnaire

PLEASE CHECK THE BOX NEXT TO EACH ITEM BASED ON YOUR PERCEPTION OF ITS SIGNIFICANCE TO A NURSE ANESTHESIA STUDENT'S CLINICAL SUCCESS

70

0-Unimportant, does not contribute to clinical success

1-Low Importance, minimal effect on clinical success

2-Important, contributes to clinical success

3-Essential, required for clinical success

1 to 7	Academic Knowledge	0	1	2	3
1	GRE Scores				
2	Undergraduate GPA				
3	Undergraduate science GPA				
4	Successful completion of graduate level science course				
5	Additional Masters degree				
6	Phase I Pharmacology grade > 85%				
7	Phase I Physiology grade > 85%				
8 to 15	Nursing Knowledge	0	1	2	3
8	Critical Care Experience (ICU, CCU, ER) 1-2yrs				
9	Critical Care Experience 3-5 yrs				
10	Critical Care Experience > 5 yrs				
11	ACLS Certification				
12	ACLS Instructor Certification				
13	Trauma Course				
14	PALS Certification				
15	Advanced Nursing Certification (CCRN, CEN, etc.)				
16 to 26	Clinical Skills (Has completed/Developed Skills)	0	1	2	3
16	Initial airway management in cardiac arrest				
17	Sought out additional intubation experience				
18	IV access skills				
19	Certification to draw ABG's				
20	Management of pulmonary artery catheters				
21	Management of arterial lines				
22	Management of vasoactive infusions				
23	Management of patients with severe pulmonary disease				
24	Management of patients with severe cardiac disease				
25	Management of patients with multiple organ failure				
26	Clinical Awareness*				
27 to 35	Personal Characteristics	0	1	2	3
27	Age < 40				
28	Age 40 or older				
29	Commitment*				
30	Hardiness (Stamina)*				
31	Integrity*				
32	Judgement*				
33	Leadership*				
34	Ability to learn from mistakes				
35	Applicants presentation during interview				

*See page 2 for definitions

DEFINITIONS

- #26. Clinical Awareness—Aware of patients clinical condition and being able to properly respond to their needs.
- #29. Commitment—Pledged, the state of being obligated or emotionally impelled
- #30. Stamina—Hardiness, physical, mental, and emotional toughness
- #31. Integrity—Honesty and sincerity
- #32. Judgement—Forming an opinion or evaluation by discerning or comparing
- #33. Leadership—Quality of leaders, the capacity to lead

ADDITIONAL COMMENTS ON CLINICAL SUCCESS (May use back of sheet for comments)

1. In addition to the previous variables what else do you consider essential for clinical success?
2. Would you consider it appropriate to send a questionnaire to the nurse anesthesia candidate's last employer to obtain his/her feedback on the candidate's clinical knowledge, skills, and personal characteristics? **Yes/No**
3. Should pediatric ICU, NICU, Operating Room, and PACU nursing be considered critical care nursing? **Yes/No**
If not, would you consider it appropriate to recommend a nurse anesthesia candidate working in one of the above areas to switch his/her specialty to either adult ICU, CCU, or ER prior to anesthesia training? **Yes/No**
4. In your opinion would it be possible to measure a candidate's clinical awareness by having them participate in a mock code as part of the interviewing process? **Yes/No**
5. How do you feel the interview process fits in when evaluating personal characteristics?
6. What were the missing characteristics of previous students who had difficulty during their clinical phase of training?
7. What are the negative attributes you have noted in previous students who did not succeed?

APPENDIX B

Cover Letter

Lt Col XXX XXXX
Director Phase II Faculty
Nurse Anesthesia Program
United States Air Force
Washington D.C., 20019

18 May 1998

Dear Lt Col XXX XXXX:

You are invited to participate in our study of students attending military nurse anesthesia training programs. Participation is voluntary and you may choose not to participate, but we encourage you to support our study. Every response we receive will be critical to our findings. We are collecting data from nurse anesthetist clinical directors to identify attributes of candidates leading to strong clinical performance.

Completing and returning the questionnaire and demographic data will indicate your consent. Included is a demographic form, which should be returned with this questionnaire. Please take time to complete both the questionnaire and demographic form. They are both very important to our study. The enclosed questionnaire and demographic form will take no longer than 30 minutes to complete. Return the questionnaire and demographic form in the enclosed stamped, self addressed envelope. Please complete and return the questionnaire by 22 July 1998. Your responses will be kept confidential. To make sure your privacy is always met, we ask that you do not put your name on the questionnaire nor demographic form. All returned questionnaires will be kept in a locked file and shredded after the study is completed.

This study has been approved by the University of Texas-Houston Health Science Center Committee for Protection of Human Subjects (713) 500-5827 as HSC-SN-XX-XXX. If you choose not to participate, please return the entire packet to us in the provided envelope. We ask that you return the completed or uncompleted questionnaire so we can account for all the packets sent out. If you have any questions about this study, please contact us at the phone numbers given below. Thank you for your participation and we look forward to including your responses in our study. Your response is valued!

BRIAN CLAYTON, Lt Col, USAF, NC
Master's Degree Candidate
(210) 509-3118

DOUGLAS LYPEK, Maj, USAF, NC
Master's Degree Candidate
(210) 675-1066

APPENDIX C

Demographic Data Sheet

Demographic Data Form

Please answer the items below and return it along with your completed questionnaire in the stamped, self-addressed envelope you received in your packet.

<u>Age</u>	<u>Years</u>	
Please Circle	31-35	51-55
The Appropriate	36-40	56-60
Age Group	41-45	61-65
	46-50	>66

<u>Gender Male / Female</u>	<u>Rank</u>		
Circle	Circle	0-3	0-5
Appropriate Gender	Apprp.	0-4	0-6

<u>Race:</u>	Caucasian	Black	Hispanic	Oriental	Other _____
Circle					Please State Other Above
Appropriate					
Category					

Education:

Fill in Areas _____ Nursing Certificate

As appropriate _____ BSN

_____ Other Undergraduate Degree and Type of Degree below

_____ MSN

_____ Master's Degree in other area (below list area in which you received your Master's degree)

_____ Doctoral Degree (Please list area of doctorate degree below)

Number of Years in Nursing: 1-5 6-10 11-15 16-20 21-25 26-30 >30

Circle appropriate age range

Number of years as CRNA: 1-3 4-6 7-10 11-14 15-18 18-21 >21

Circle appropriate range

Number of Years as CRNA Instructor: 1-3 4-6 7-10 11-14 15-18 18-21 >21

Circle appropriate range

Number of Years as CRNA Site Director: 1-3 4-6 7-10 11-14 >14

Circle appropriate range

APPENDIX D

Content Validity Index of Survey Questionnaire Form

APPENDIX E

Institutional Review Board Approval Form



REPLY TO
ATTENTION OF

MCHE-CI

DEPARTMENT OF THE ARMY
BROOKE ARMY MEDICAL CENTER
FORT SAM HOUSTON, TEXAS 78234-6200

18 MAY 1998

MEMORANDUM THRU

LTC Linda H. Yoder, AN, Department of Nursing, Brooke Army Medical Center,
Fort Sam Houston, Texas 78234
COL Lynne M. Connelly, AN, Chief, Department of Nursing Science, Course
Director, U.S. Army Graduate Program in Anesthesia Nursing, AMEDD Center and
School, Fort Sam Houston, Texas 78234

FOR LTC Brian Clayton, USAF, NC, and MAJ Douglas Lypek, USAF, NC

SUBJECT: Application for Clinical Investigation Project

1. Your application for the clinical investigation project "Faculty Perceptions of Characteristics Needed for Clinical Success in Military Nurse Anesthesia Programs" has been reviewed as an exempted, minimal risk study and is approved and assigned work unit number C-98-97e.
2. As the principal investigator your responsibilities are as follows:
 - a. A change in the research plan must be reported to the Brooke Army Medical Center Department of Clinical Investigation (DCI) for approval prior to implementation.
 - b. If transferred or released from active duty, submit to the DCI the name of the individual who will continue the study.
 - c. If the study is terminated, submit a report to the DCI stating the study is terminated and the reason for termination.
3. An annual research progress report must be submitted to my office nlt 1 April 1999 or upon completion, whichever comes first.

Jenice N. Longfield
JENICE N. LONGFIELD
Colonel, MC
Chief, Dept of Clinical Investigation

MCHE-CI

18 May 1998

MEMORANDUM FOR COL Lynne M. Connelly, Chief, Department of Nursing Science, US
Army Graduate Program in Anesthesia Nursing

SUBJECT: Study entitled: "Faculty perceptions of characteristics needed for clinical success in
military nurse anesthesia programs".

1. The aforementioned study proposal by LTC Brian Clayton and MAJ Douglas Lypek has been reviewed and granted **Exempted Research** status in accordance with AR 40-38, B-7 (Training). The study attempts to identify traits and qualities which predict proficiency in anesthesia.
2. The Institutional Review Board, BAMC, will be notified of this action. This Department extends its best wishes in this research endeavor.



Arnold A. Asp
COL, MC
AC, DCI

References

- Ainslie, B. S., Anderson, L. E., Colby, B. E., Hoffman, M. A., Meserve, K. P., O'Connor, C., & Quimet, K. M. (1976). Predictive value of selected admission criteria for graduate nursing education. Nursing Research, 25(4), 296-299.
- Arathuzik, D. & Aber, C. (1998). Factors associated with national council licensure examination-registered nurse success. Journal of Professional Nursing, 14(2), 119-126.
- Arnold, L., & Willoughby, T. L. (1993). The empirical association between student and resident physician performances. Academic Medicine, 68(2), 36-40.
- Calhoun, K. H., Hokanson, J. A., & Bailey, B. J. (1997). Predictors of residency performance: A follow-up study. Otolaryngology-Head and Neck Surgery, 116(6), 647-651.
- Carroll-Perez, I. (1996). A study comparing characteristics of nurse anesthesia programs with success rate on the certification exam. AANA Journal, 64(1), 76-80.
- Dillman, D. (1978). Mail and telephone surveys: The total design method. New York: John Wiley.
- Fowler, J. F. Jr. (1993). Survey Research Methods. Newbury Park. Sage Publications Inc.
- Fowles, E. R. (1992). Predictors of success on NCLEX-RN and within the nursing curriculum: Implications for early intervention. Journal of Nursing Education, 31(2), 53-57.
- Garcia-Otero, M. & Teddlie, C. (1992). The effect of knowledge of learning styles on anxiety and clinical performance of nurse anesthesiology students. AANA Journal, 60(3), 257-260.

Goodrich, N. J. M. (1981). A study of competencies needed for nursing administration (Doctoral dissertation, George Washington University, 1981). VMI Dissertation Service, 42/04B, 1394.

Griffiths, M. J., Bevil, C. A., O'Connor, P. C., & Wieland, D. M. (1995). Anatomy and physiology as a predictor of success in baccalaureate nursing students. Journal of Nursing Education, 34(2), 61-66.

Hansen, M. C. (1993). Perceptions of chief nurse executive competencies. (Dissertation, Iowa State University, 1993). UMI Dissertation Service, 0569.

Hansen, M. J. & Pozehl, B. J. (1995). The effectiveness of admission criteria in predicting achievement in a master's degree program in nursing. Journal of Nursing Education, 34(9), 433-437.

Haritos, G., Shumway, S. H., Austin, P. N., Ellis, W. E. (1995). Nurse anesthesia admission qualifications. AANA Journal, 63(3), 244-248.

Heupel, C. (1994). A model of intervention and predicting success on the national council licensure examination for registered nurses. Journal of Professional Nursing, 10(1), 54-57.

Jordan, L. M. (1991). The impact of the national nursing shortage on applicants for nurse anesthesia educational programs. AANA Journal, 59(6), 573-576.

Lynn, M. R. (1986). Determination and quantification of content validity. Nursing Research, 35(6), 382-385.

Mitchell, K. (1990). Traditional predictors of performance in medical school. Academic Medicine, 65, 149-158.

Munro, B. H. (1985). Predicting success in graduate clinical specialty programs. Nursing Research, 34(1), 54-57.

Papp, K. K., Polk, H. C., & Richardson, J. D. (1997). The relationship between criteria used to select residents and performance during residency. The American Journal Of Surgery, 173, 326-329.

Polit, D. F. & Hungler, B. P., (1995). Nursing Research Principles and Methods. Philadelphia, PA: J. B. Lippincott Company.

Scott, J. N. & Markert, R. J. (1994). Relationship between critical thinking skills and success in preclinical courses. Academic Medicine, 69(11), 920-924.

Statistical Package for the Social Sciences 7.5. [Computer Software]. (1996). Chicago: Statistical Package for the Social Sciences.

Waltz, C. F., Strickland, O. L., & Lenz, E. R. (1991). Measurement in Nursing Research. Philadelphia: F. A. Davis (Co.)

Webb, C. T., Sedlacek, W., Cohen, D., Shields, P., Gracely, E., Hawkins, M., & Nieman, L. (1997). The impact of nonacademic variables on performance at two medical schools. Journal Of The National Medical Association, 89(3), 173-180.

Willingham, W. (1974). Predicting success in graduate education. Science, 183, 273-278.

Zaglaniczny, K. L. (1992). Factors which predict performance on the national certification examination for nurse anesthetists. AANA Journal, 60(6), 533-540.