THE USE OF CARDIOPULMONARY ASSESSMENT SKILLS IN THE CRITICAL CARE SETTING

by

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what the reverse - which are of importance..."
(Nightingale, 1860, p.105)

CHAPTER I

Introduction

Movements to expand the scope of nursing practice in primary care began in the early 1970's. Educational curricula were developed to prepare nurses who would assume greater responsibility in the physical assessment of patients. The rationale for increasing emphasis on physical assessment was, in part, the assumption that it would strengthen the first phase of the nursing process and subsequently improve clinical judgements. Since this role expansion was initiated, physical assessment has been considered a vital component of the nursing process and has been incorporated in both hospital and community health settings as an important nursing function.

Recognizing the need for nurses to attain physical assessment skills in nursing programs, educators have spent a great deal of time, energy and money publishing content and process information regarding instruction in physical assessment. There has been limited research however, evaluating the actual clinical use of assessment skills in nursing practice.

Carrieri, Stotts, Levinson, Murdaugh and Holzemer (1982) studied the use of cardiopulmonary assessment skills of nurses in various clinical settings. The frequency of use of assessment skills was gathered by a multiple choice and short-answer questionnaire distributed to nurses who had a high probability of having attended a cardiopulmonary assessment course. They reported that only 47 percent of the nurses who participated in the survey used cardiopulmonary assessment skills daily.

The results of this survey have great implications regarding the basic assumptions of the nursing process. Of greatest concern is that

nurses may not be systematically using assessment data for diagnostic purposes. Sample characteristics and return rate of the questionnaire (46 percent) however, limit the generalizability of the results.

There is also evidence that nurses have difficulty with the diagnostic phase of the nursing process (Aspinall, 1976; Castles, 1982). Clearly adequate assessment skills are a necessary, but not sufficient condition for competent clinical judgements. In order to ascertain ways to improve use of the nursing process, research must be directed toward evaluating whether assessment skills being taught in nursing programs are actually used in the clinical setting. This would include analysis of the obstacles preventing the registered nurse from using these skills, the appropriateness of teaching this content, and the type of setting in which these skills are most effectively being used.

The overall purpose of this descriptive study is to answer the following question: "Are registered nurses who have been taught cardiopulmonary assessment skills using these skills in the clinical setting?" The following specific questions will be addressed: 1) What is the frequency of cardiopulmonary assessment skill performance that is used on a regular basis in the critical care setting? 2) Is there a relationship between the use of these skills and the value that nurses assign to each specific skill in identifying patient problems? 3) What are the major obstacles perceived, and to what extent to these obstacles influence the practice of cardiopulmonary skills? and 4) Is there a relationship between frequency of skill performance and educational level, type of position, bed capacity of the employing agency, requirements for recording and assessment course preparation?

Review of the Literature

In the review of the literature to follow, a brief history of the preparation of nursing personnel for the assessment function will be explored. Literature will be summarized investigating the inferential task of the nurse and the role that the assessment phase has on diagnostic reasoning. Finally, research which examines the use of assessment skills in the clinical environment will be evaluated.

Historical Perspectives

There is an abundant amount of historical literature addressing the value of the observational function of the nurse. As early as 1860, Florence Nightingale emphasized the critical role of the nurse in astute observation. Nightingale's teachings centered on the use of natural senses, such as sight and touch in nursing care. Focusing on observational techniques, the nurse was to collect data and implement the patient's care according to the assessment. Nightingale stated, "The most important practical lesson that can be given to nurses is to teach them what to observe - how to observe - what symptoms indicate improvement - what the reverse - which are of importance..." (Nightingale, 1860, p.105).

In a historical review of the evolution of physical assessment skills in nursing, Fitzimons and Gallagher (1978) identified early contributions that rural public health nursing had on the expansion of these techniques. Urine testing, blood pressure measurements and abdominal examinations were all components of nursing care. In addition, the assessment capabilities of nurses in industry and various group practice organizations were described. Convinced that the primary focus of nursing has always been that of health maintenance, these authors concluded that physical

assessment skills have historically been used by nurses and are a necessary function for present and future practitioners.

In the past, the function of the nurse involved technically observing the patient and recording and reporting their findings, all action-oriented processes. Further analysis of specific observations were not required at that time. Today, as the data available becomes more complex, the nurse is required not only to master the observational task, but inferences and decisions must be made about the state of the patient (Kelly, 1966). All of these components involve cognitive processes and all provide parameters for a systematic approach to problem-solving (Lewis, 1973).

Physical assessment is no longer thought of as an option, but a necessity in giving quality nursing care. The Joint Commission on Accreditation of Hospitals (1982), has included as a standard of nursing care that, "Each patient's needs shall be assessed by a registered nurse at the time of admission..." (p.118).

Innovations in Nursing Curricula

Recognizing the need to improve decision-making processes of it's practitioners, nursing faculties attempted to revitalize assessment curricula. Changes in course content, instructional methods and duration of programs were implemented to strengthen the quality of nursing programs (Kelly, 1966).

Fagin and Goodwin (1972) provided an early descriptive article addressing teaching strategies at the baccalaureate level of preparation. The rationale for developing this curriculum was based on their evaluation of other programs finding insufficient preparation in the technical skills needed to perform and evaluate a physical examination. Maintaining faculty

assessment skills was thought at that time, to be the determining factor in predicting the success of their four-year program. Faculty were role models for students to explore their findings with instructors.

Realizing that the nursing profession was vulnerable and inexperienced in developing physical assessment curricula, Lynaugh and Bates (1974) expressed concern over the rapid developement of these courses. The authors warned that: 1) nurses may underestimate the required resources and time to develop the advanced expertise in assessment; 2) competence in the use of these skills may not be valued; and 3) that the diagnostic processes may not be reinforced adequately. A vital concern emphasized by these authors was the need to teach assessment skills on the basis of clinical use by the practicing nurse. If the skills were not used in the clinical setting, then the resources would be wasted.

In the last decade, numerous articles have been published describing strategies used in teaching assessment skills in nursing programs (Hagopian & Kilpack, 1974; Wong, 1975; Jackson & Mantel, 1977; Shortridge, Habit, Smith & Starke, 1977; Lincoln, Layton & Holdman, 1978; McLain, 1978; Leonard, 1979; Reese, Swanson & Cunning, 1979; Hill & Smith, 1981). However, limited research has been conducted evaluating these strategies, or in exploring the relationship between teaching approaches and subsequent use in clinical practice.

In one of the few published studies, Voight (1980) investigated the appropriate level at which physical assessment skills should be introduced in the baccalaureate curricula. During the spring semester, twenty-six sophomore students were involved in the project, practicing assessment skills in a nursing home setting. At the conclusion of the fall semester,

a follow-up survey was distributed to the original pilot project participants. Twenty-three of the twenty-six (88 percent) responded. Ninety-one percent of the participants believed that the second half of the sophomore year was an appropriate level to introduce assessment skills. Asked at what point after the introduction of these skills did the students feel comfortable with the techniques, the responses ranged from 32 percent being comfortable at the end of the junior year, to 36 percent who stated they continued to be uncomfortable with the skills. One reason stated for their inability to grasp these techniques was based on the lack of use of the skills in one clinical area as opposed to their use in other clinical rotations. Student responses supported the need for recurrent practice of assessment skills on a regular basis.

In another study of teaching approaches, Natapogg, Moetzinger and Quarto (1982) explored which assessment skills were being taught, at what level and the degree of faculty participation. A 48 percent response rate of the 143 baccalaureate nursing programs was obtained. Results of the survey indicated that 83.8 percent of the programs who responded taught physical assessment. Interestingly, there was diverse opinion regarding the time period necessary to teach the skills, ranging from 10-60 hours. Twenty-six percent of the responding schools provided time for faculty members to maintain skills and learn new ones.

Questions derived from this survey are noteworthy and can most probably be directed toward the use of assessment skills in the clinical setting. First, as the survey suggested, only twenty-six percent of the programs provided time for instructors to maintain assessment skills. Recognized by previous authors (Fagin et al. 1972; Voight, 1980) as a

key component to the success of an assessment program, questions arise regarding faculty's competence to teach these skills. Are there sufficient role models available in the health care setting for nursing students to emulate when developing preliminary assessment techniques? Secondly, of concern is the finding of the broad time span of 10-60 hours to teach assessment skills. As suggested in the Lynaugh et al. (1974) publication, can there be any uniform skill attainment for student nurses (and ultimately those in the clinical setting) when there is such a variety of time requirements in baccalaureate curricula to teach assessment techniques?

Inferential Task of the Nurse

Incorporating sophisticated physical assessment content in nursing curricula was initiated to strengthen the nursing process, which in turn would provide an effective framework for decision-making in the clinical setting. However, there is some evidence in the literature that there may be other major components necessary to improve the decision-making capabilities of nurses.

To analyze the thought process of nurses, Aspinall (1976) studied the responses of 187 hospital clinicians to a hypothetical case study. Each subject was presented with a written case study of a patient with a disorder in processing thoughts. The nurses were then asked to list the etiology of this specific impairment. Examination of the problems that the nurses listed however, revealed that not any of the participants were able to identify all 12 possibilities. A mean of 3.44 problems were listed. Both the groups with fewer than two years experience and the groups with two to ten years experience identified more problems than the

groups with ten or more years experience, a significant difference at the .01 level.

When the problems were analyzed further, the situation became even more disheartening. The identified problem that the particular patient was experiencing was of a respiratory etiology; however, 39 of the 187 participants failed to identify a respiratory problem. The second most likely problem of a fluid and electrolyte imbalance was not included by 72 nurses (39 percent). Recent experiences seemed to also affect the nurses perception of the overall clinical picture. Nurses working on the same unit wrote "gram-negative shock" even though there was no indication that this was the causative factor of the patient's distress.

The overall results of this study imply that the theoretical knowledge and strategies in evaluating assessment cues are lacking. Therefore, if the basic diagnostic processes are not accurately learned, then the teaching of advanced assessment techniques in and of themselves may not improve the decision-making capabilities of nurses.

Castles (1978) attempted to determine if an assessment of the same patient by more than one nurse would result in the same nursing diagnosis. A sample of 21 intensive care nurses were asked to participate in the study, with approximately 33 patients, during a one month period. The average range of years of work experience was 1-6 years ($\bar{x}$=4.5 years). No one nurse diagnosed more than 17 patients or fewer than 3. A range from 1-9 diagnoses per patient was estimated. A range of agreement on a given diagnosis across all patients receiving that diagnosis at least once, was from 67.5 to 10.5 percent. Examining the most frequently mentioned diagnosis of impaired ventilation, revealed that 55.5 percent

of 137 defining characteristics given for that diagnosis were mentioned by only 2 participants.

The conclusion drawn from this study was grave. Nurses who were making assessments on the same patient at the same time did not arrive at the same clinical diagnosis. Different signs and symptoms provided the basis for their conclusions, indicating that there are a wide range of assessment parameters being used in the practice setting.

In summary, the movement to expand the scope of nursing practice was primarily initiated to strengthen the nurse's role as a judgement maker. This has not proven however, to be an effective strategy in improving clinical judgement of practicing nurses. Furthermore, the revitalization of assessment curricula by nurse educators may have been too rapid and may have lacked the required resources to successfully teach assessment skills. Clearly, the data needed to analyze the effects of this professional renovation must come from the literature addressing the actual clinical application of these skills by practitioners.

Clinical Application of Assessment Techniques

There is some evidence that nurses do not systematically use sophisticated assessment techniques in the clinical setting. Perhaps this incomplete method of data collection provides an explanation for the faulty decision making processes of practicing nurses.

Gurney (1978) reviewed 89 patient charts evaluating the documented physical assessment data of coronary patients during the first 72 hours of admission. These data were then compared to a protocol consisting of 23 expected nurse behaviors. Pulse rate (95 percent), blood pressure (92 percent), pulmonary rate (84 percent) were the most frequently

documented behaviors. Critical indicators of cardiac and pulmonary complications such as peripheral edema, peripheral pulses, heart sounds and murmurs were documented less than 20 percent of the time. In this study, these findings confirm that nurses were recording only classical vital signs. If they were using data from a more comprehensive assessment, it was not recorded.

In a survey of Critical Care Nursing Practice (1979) conducted for the American Association of Critical Care Nurses, assessment activities of registered nurses were analyzed. This information was only one component of the lengthy study. Subjects were to rate nine critical care assessment activities with respect to the direction the activities provided in identifying normal and abnormal conditions, interpreting findings and determining interventions. The nine assessment categories included: pertinent lab data, breath sounds, peripheral pulses, neurological status, dysrhythmia identification, psycho-social status, bowel sounds, heart sounds and jugular venous pulses. In the vast majority of units, RN's were able to identify normal and abnormal conditions for nine of the ten assessment parameters. The exception was jugular venous pulses. Furthermore, RN's were more likely to interpret findings (81 percent) and determine interventions (69 percent) on dysrhythmia identification and less likely to do so for jugular venous pulses (40 percent and 19 percent respectively) than any other situation. In all situations, RN's in critical care units in the under 50 bed hospitals were less likely than other critical care RN's to interpret findings and determine interventions. Proportions identifying normal and abnormal situations were about the same

in different size hospitals. In this study it appears that critical care registered nurses were using sophisticated assessment skills to base their clinical interventions.

Holzemer, Barkauskas and Ohlson (1980) designed four workshops to prepare nurse faculty in health assessment skills. A six month follow-up questionnaire was mailed to the participants to evaluate the effectiveness of the workshop in retrospect. There was a 70 percent overall response rate. The data collected revealed that 79 percent of the 58 faculty members were still using the assessment skills taught. This was considered by the authors as "the most important finding of the evaluation" (p.18).

In an effort to determine whether nurses who had been taught cardiopulmonary assessment skills were using the skills in a clinical setting, Carrieri et al. (1982) found only 47 percent of the samples respondents used cardiopulmonary assessment skills daily. The questionnaire was sent to 2,000 practicing nurses with a return rate of only 46 percent. Unlike Gurney's findings, checking for peripheral edema (56 percent), assessing the presence/absence of breath sounds (58 percent) and listening for normal breath sounds (51 percent) were the three behaviors used more frequently. Although the participants in this survey were exposed to sophisticated cardiopulmonary assessment skills in the classroom, the majority of nurses were not using these skills as frequently as the basic assessment techniques nurses have used in the past, such as checking for peripheral edema or listening for heart rate. Obstacles perceived as preventing the use of assessment skills were insufficient time (46 percent), insufficient practice of skills during the course (41 percent), that assessment was not a priority (26 percent), and that cardiopulmonary

assessment was not appropriate for the particular patient population (24 percent). There was a highly significant correlation between the subject's perceptions of deterrants and the frequency of use of assessment skills ($p \leq .0001$).

The study by Carrieri et al. (1982) is an important analysis of what is practiced after the educational content is presumably learned. While the vast majority of subjects (70 percent) believed that their skills in assessment improved the quality of care, only one-fourth felt that the patient's regime was changed as a result of their assessment. These findings suggest that the nurse's lack of confidence and power in influencing patient care through decision-making processes seems to affect the use of these assessment skills in the clinical environment.

The limited research available concerning the clinical application of assessment skills, suggests that in most cases nurses are using classical vital signs, rather than advanced skills as a basis for their clinical decisions. It is therefore difficult to justify the need for sophisticated assessment programs currently available in nursing curricula. Research is needed that will further analyze the factors associated with use of physical assessment skills in practice.

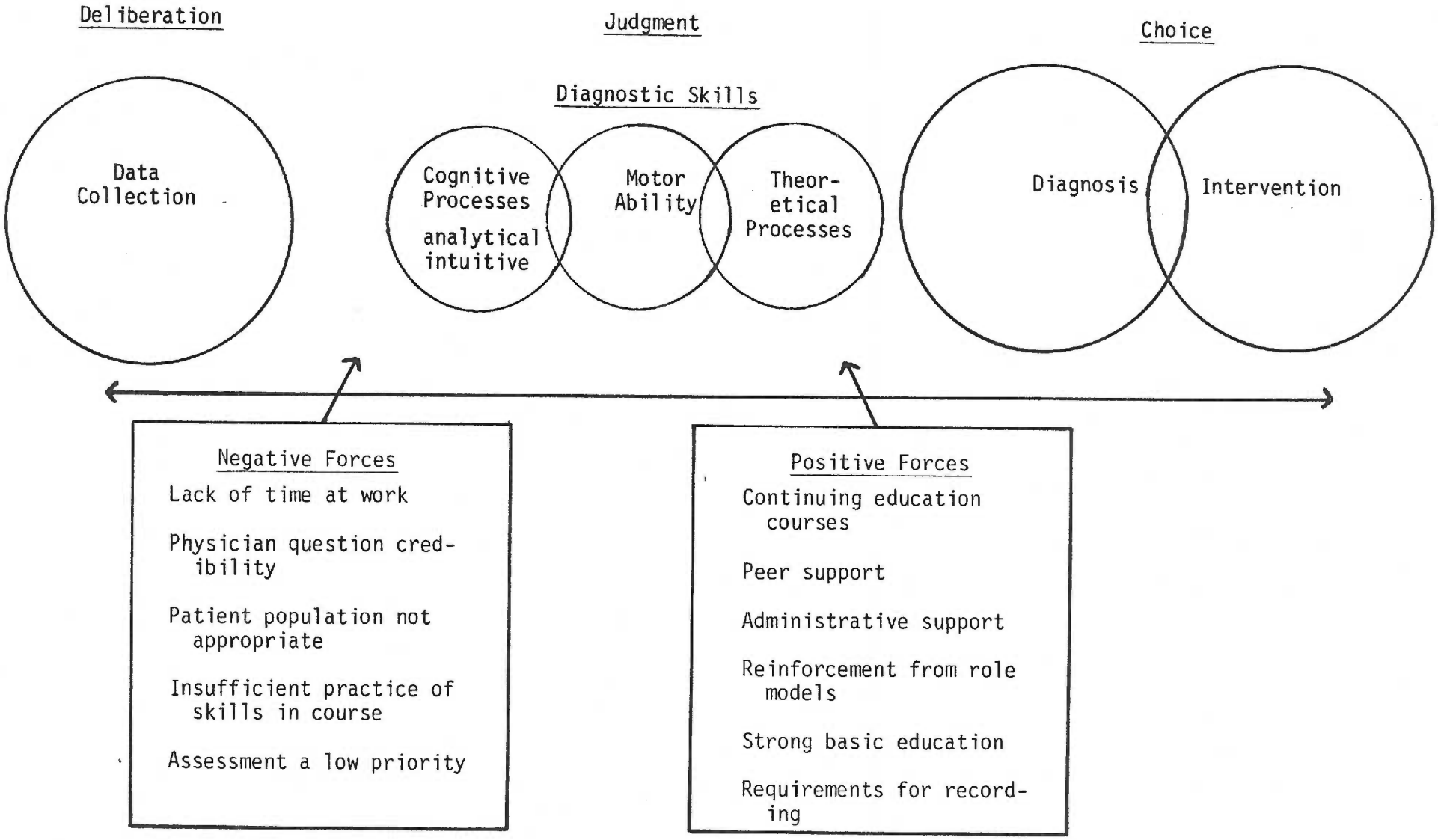
Conceptual Framework

Studies analyzing the use of assessment skills in the clinical setting are limited and largely descriptive. It is therefore difficult to identify key variables that would predict the clinical use of these techniques.

A conceptual framework designed by the investigator may be helpful in providing guidance relevant to this study (see Figure 1).

Figure 1

Conceptual Framework



The focus of this model is on the process of decision-making. The nursing process, which is the core of this framework, represents the current instructional model utilized by educators to reflect this cognitive task (Tanner, 1983). Assessment, diagnosis, intervention and evaluation all comprise this decision-making process which is on a horizontal continuum.

Schaeffer's (1974) efforts to delineate alternatives to the nursing process, have also been incorporated into this framework. She identified three phases of decision-making: the deliberation phase, the judgement phase and the choice phase. The deliberation phase, which is similar to the data collection phase, involves the process of compiling all available information on the state of the patient. The judgement phase, which is an extension of the assessment phase, is the process of organizing the data into a workable framework. Finally, the choice phase involves the selection of a problem or diagnosis.

The judgement phase includes the cognitive, theoretical and motor processes required to assimilate and interpret assessment data. The cognitive processes, as Hammond (1966) describes, includes both analytical and intuitive abilities. Theoretical knowledge and motor competency also provide a solid basis from which to conduct a physical examination. If these key processes are not learned, then the skills required to perform an assessment will be incomplete, resulting in an inaccurate nursing diagnosis.

There are both positive and negative forces which affect the use of these diagnostic skills in the clinical setting. Five major obstacles identified in the review of the literature were insufficient time at work,

insufficient practice of skills during the time of the course, patient population not appropriate, assessment a low priority for nurses and questioned validity of assessment by physicians. Positive forces affecting the successful use of assessment skills in practice included reinforcement from role models, administrative support, requirements for recording, strong basic education, peer support and continuing education skill courses.

According to this model, the assessment phase is only one component of the nursing process. However, analysis of the skills actually used in the clinical setting and the perceived obstacles in using these skills, may provide further insight to the relevance of that one component to the decision-making processes of practicing nurses.

CHAPTER II

Methodology

Design

Surveys were distributed to a random sample of critical care nurses in the Northwest to investigate the use of assessment skills in the clinical setting. A descriptive and correlational design was used. As stated in the review of the literature, many of the issues concerning the use of cardiopulmonary assessment skills in the critical care setting have not been explored. Therefore, a descriptive design was most appropriate to answer the research questions and identify further areas of exploration.

Subjects and Sampling

The subjects of this study included a random sample of 100 registered nurses who were active members of the American Association of Critical Care Nurses (AACN), drawn from the 450 registered nurse members of the regional Northwest AACN chapter. Criteria for entry into this study were the following: 1) must have been a practicing registered nurse who was a current member of AACN and 2) must have been on the AACN Northwest regional mailing list.

Variables

The following were the variables addressed in this study. The instrument used to measure these variables was developed, pilot tested and retested by the investigator after a complete literature review failed to disclose an appropriate tool.

Frequency of assessment skill performance. The number of times that a specific cardiac or pulmonary skill is used in the assessment of clients. A five-point Likert scale ranging from DAILY TO NEVER measured this

variable described in Question 20 of the survey (see Appendix D).

Value of each skill. The relative worth or importance of a particular cardiac or pulmonary skill in identifying patient problems. A five-point Likert scale ranging from EXTREMELY IMPORTANT to NOT AT ALL IMPORTANT was used to measure this variable in Question 20.

Obstacles. An interference or opposition of some nature which affects the use of cardiopulmonary skills in the clinical setting. Obstacles were measured in Question 19 by the total of scores of a series of five positive and five negative force statements. The respondent answered to what extent each statement was true in their nursing practice (Items 45-54) ranging from LARGE EXTENT to NOT AT ALL. To what extent each obstacle influenced their use of cardiopulmonary skills was also calculated by the total of scores of five positive and five negative statements measured by a five-point Likert scale rnaging from LARGE EXTENT to NOT AT ALL (Items 55-64).

Educational level. The highest level of completed nursing education of each participant and the level of basic nursing education were classified in Questions 1 and 2 as: diploma in nursing, associate degree in nursing, baccalaureate degree in nursing, masters or doctorate degree in nursing (see Appendix D).

Position. The placement of each subject in their area of nursing employment classified in Question 10 of the survey as: staff nurse, assistant head nurse, head nurse, clinical specialist and educator (see Appendix D).

Requirements for recording. Those policies or procedures established by a specific agency, requiring the subjects to document cardiopulmonary assessments in patient records. Question 10, Item 54, addressed recording

requirements and the extent that this requirement influenced the use of cardiopulmonary skills (Item 64).

Bed-capacity of institution. The total number of beds accommodated by the respondent's employing agency. Bed-capacity was classified in Question 8 as: under 50, 50-99, 100-199, 200-299, 300-399, 400-499, and 500 or MORE (see Appendix D).

Educational preparation in physical assessment. The area in which a formal course with specific cardiopulmonary content was taught. This component was classifed as: basic nursing education, graduate nursing education, hospital inservice, or AACN programs (Question 13). In addition, the number of formal cardiac and/or pulmonary courses taken (Questions 14 and 15), the date of the last cardiac and/or pulmonary course (Questions 16 and 17), the estimated college credit hours awarded, contact hours in the classroom and practicum hours required in the clinical setting were analyzed (Question 18).

Instrument

A questionnaire was developed to obtain the following information: 1) the frequency of cardiopulmonary skill performance used on a regular basis in the critical care setting 2) the perceived value of those skills in identifying patient problems, 3) obstacles that nurses perceived as deterrants in using cardiopulmonary skills and the extent that those obstacles influenced the use of the skills, and 4) other factors related to the frequency of use and value of each skill such as: educational level of the nurse, type of position, requirements for recording, bed-capacity of the employing agency, and type of educational preparation in cardiopulmonary assessment.

Pilot Study

The questionnaire was pilot tested prior to initiating the formal study. The pilot study was implemented to identify construction defects and determine the stability of the instrument (Dillman, 1978).

The questionnaire was mailed to a volunteer convenience sample of 20 critical care nurses employed at a Portland hospital. The nurses could not be members of AACN. Each participant was mailed an instrument with a cover letter explaining the pretest procedure and a stamped return envelope was enclosed (see Appendix A). Feedback was encouraged. One week following the return of the first mailing, the questionnaire was again sent to each subject for a retest to assess the stability of the instrument. A cover letter was included to give participants detailed instructions on the completion of the survey (see Appendix B).

Characteristics of Pilot Study Sample

Of the 20 questionnaires distributed to the sample in pretest and retest form, 85% (17) were returned. The majority of the sample was female (94%) with a mean age of 29.5 years. Forty-seven percent of the subjects had baccalaureate degrees in nursing and 88.2% worked as staff nurses in the medical/surgical intensive care unit. It was felt that this sample's response to the survey would be valuable due to their clinical expertise and daily assessment responsibilities. In addition, the demographic characteristics of the pretest sample matched closely to those in the target group, strengthening the content validity of the instrument.

Reliability Measurement of the Instrument

The reliability of the pretest tool was analyzed by the internal consistency of scales (Cronbach's alpha) and test-retest stability (Pearson's r).

The internal consistency of the scales that measured the perceived obstacles in skill performance and the perceived value of assessment skills is illustrated in Table 1. The obstacle and value scales both computed consistently low alpha scores in both test and retest measurements. Since the reliability measure is, in part, a function of the number of items, it would be expected that as the number of items increased, the reliability index would improve. In this case however, the opposite effect occurred. In fact, the cumulative reliability analysis of both scales computed a test alpha of -0.09 and a retest alpha of 0.37. Sample sizes were consistent. The low correlation of the scales can best be explained by the heterogeneous properties of each item analyzed. The scales were not measuring the same characteristic and therefore revealed an important source for measurement error in the final study. In hopes of improving the internal consistency of this scale for the final survey, the value scales were eliminated and the obstacle scales were clarified. To avoid response set bias, a series of 10 obstacle statements was revised, counterbalancing with positively and negatively worded statements.

The internal consistency of the scales which measured the frequency of cardiopulmonary skill performance and the reported importance of each skill is illustrated in Table 2. The coefficient alpha reflected a high degree of internal consistency with these scales. The correlation coefficient of the total frequency of cardiac and pulmonary skill use increased as the number of items increased, which was anticipated. A test/retest alpha of 0.90 and 0.91 respectively (for the cumulative score of the importance of each skill) reflected even a higher degree of internal consistency. It was felt that this thirty-six item instrument was internally

Table 1

Pretest Reliability of Obstacle/Value Scales

Scale	N of Items	Average Inter-item Correlation		Cronbach's Alpha		Sample Size	
		Test	Retest	Test	Retest	Test	Retest
Perceived Value of Assessment Skills	4	0.28	0.27	0.54	0.58	17	17
Obstacles Reported in Using Assessment Skills	8	0.10	0.08	0.40	0.30	17	17
Total Reliability of Obstacle/Value Scales	12	-0.005	0.03	-0.09	0.37	17	17

Table 2

Pretest Reliability of Cardiopulmonary Assessment Scales

Scale	N of Items	Average Inter-item Correlation		Cronbach's Alpha		Sample Size	
		Test	Retest	Test	Retest	Test	Retest
Frequency of Cardiac Skill Performance	7	0.38	0.40	0.74	0.77	15	17
Frequency of Pulmonary Skill Performance	11	0.36	0.26	0.82	0.80	17	17
Total Frequency of Cardiac/Pulmonary Skill Performance	18	0.35	0.30	0.87	0.86	15	17
Importance of Cardiac Skills in Identifying Patient Problems	7	0.49	0.28	0.85	0.78	17	17
Importance of Pulmonary Skills in Identifying Patient Problems	10[a]	0.35	0.46	0.85	0.89	16	17
Total Importance of Cardiac/Pulmonary Skills in Identifying Patient Problems	17[a]	0.35	0.37	0.90	0.91	16	17

[a]Presence/Absence of Breath Sounds Had No Variance

homogeneous and no revisions were made for the final tool.

Table 3 summarizes the test-retest correlation coefficients for each skill and the reported importance of each skill. A perfect correlation was estimated between test/retest frequency scores for the following four skills: S_1 and S_2, peripheral edema, presence/absence breath sounds and adventitious sounds. The lowest test/retest correlation coefficient for the skill frequency scales was 0.60 (use of accessory muscles). Although the majority of the coefficient scores measuring the importance of each skill was over 0.70, a negative correlation was documented between test/retest scores for the importance of peripheral edema. The negative correlation could possibly be explained by an actual change in the subjects value of that skill after the first administration or perhaps the responses were haphazard on the second testing which resulted in indiscriminate scoring. It would also be expected that memory recall would be more accurate with regards to the consistency of frequency scores rather than the value scores. Since the correlation coefficients were fairly consistent, it was felt that the scales were stable and appropriate for the final tool.

The internal consistency of the scales that measured perceived obstacles in skill performance for the final study is illustrated in Table 4. Since the correlation between the positive and negative force statements were low (Cronbach's alpha 0.39), they were analyzed separately. The positive force statements computed acceptable alpha scores of 0.84 and 0.81 respectively. The negative force statements however, calculated low alpha scores of 0.57 and 0.53. Since the inter-item correlation of the scale which measured negative force ran as low as

Table 3

Pretest Correlations Among Measures of Assessment Skill Performance

Variable	Frequency of Assessment Skill Performance	Importance of Each Skill in Identifying Patient Problems
Cardiac Skills		
PMI	0.79***	0.74**
Heaves/Thrills	0.65**	0.81***
S_1 and S_2	1.00***	0.80***
Gallops	0.70**	0.78***
Murmurs	0.64**	0.57**
JVD	0.70**	0.83***
Peripheral Edema	1.00***	-0.17
Pulmonary Skills		
A-P Diameter	0.72**	0.83***
Use of Accessory Muscles	0.60**	0.73***
Retraction	0.76***	0.85***
I/E Ratio	0.94***	0.76***
Lateral Expansion	0.93***	0.82***
Tracheal Alignment	0.79***	0.72***
Diaphragmatic Excursion	0.87***	0.74***
Percuss Air-Solid Abnormalities	0.73***	0.84***
Presence/Absence Breath Sounds	1.00***	[a]
Vesicular, Bronchovesicular, Bronchial	0.68**	0.46*
Adventitions Sounds	1.00***	0.43*

[a]Unable to compute coefficient

*p ≤ .05

**p ≤ .01

***p ≤ .001

Table 4

Reliability of Obstacle Scales - Final Tool

Scale	N of Items	Average Inter-item Correlation	Cronbach's Alpha	Sample Size
Positive Forces	5	0.52	0.84	75
Negative Forces	5	0.20	0.57	65
Influence of Positive Forces on Assessment Skill Use	5	0.46	0.81	71
Influence of Negative Forces on Assessment Skill Use	5	0.18	0.53	57

0.18, it was clear that it lacked the specificity needed to accurately measure the obstacle construct. The sample size decreased significantly with the negative force statements and this could possibly explain the discrepancies in the scales. Perhaps the negative force statements were not as clear and therefore were skipped by some respondents.

The internal consistency of scales which measured the frequency of cardiopulmonary skill performance and the reported importance of each skill for the final study is illustrated in Table 5. The coefficient alpha was high for all scales which was consistent with the pretest analysis of these specific scales.

Data Collection Procedures

A list of all AACN members was obtained from the AACN regional office. Of approximately 450 members, a random sample of 100 subjects was selected for the study. Each participant's confidentiality and anonymity was assured. The code number of each questionnaire was the only means of identifying each subject. Follow-up procedures (see Appendix E and F) were initiated by the investigator one week and three weeks following the initial mailing. Dillman (1978) specifies that response rates will be less than half those normally attained without follow-up mailing. The first follow-up was a reminder postcard sent to the entire sample. It served as a thank-you to those who had returned the survey and a reminder for those who had not. The second follow-up mailing consisted of a letter and a replacement questionnaire to those who had not responded to the initial mailing. This letter notified the recipients that the survey had not been returned and strongly reinforced the need for its immediate completion (Dillman, 1978). This follow-up procedure facilitated the

Table 5

Reliability of Cardiopulmonary Assessment Scales - Final Tool

Scale	N of Items	Average Inter-item Correlation	Cronbach's Alpha	Sample Size
Frequency of Cardiac Skill Performance	7	0.56	0.89	67
Frequency of Pulmonary Skill Performance	11	0.49	0.90	64
Total Frequency of Cardiac/Pulmonary Skill Performance	7	0.52	0.88	64
Importance of Cardiac Skills in Identifying Patient Problems	11	0.46	0.90	59
Importance of Pulmonary Skills in Identifying Patient Problems	18	0.49	0.94	59
Total Importance of Cardiac/Pulmonary Skills in Identifying Patient Problems	18	0.41	0.92	54

return rate of questionnaires and helped to convey to subjects the importance of the survey.

Analysis of the Data

Analysis of the data included the mean and standard deviation of the sample characteristics. Other descriptive statistical information included the percentage of nurses working full-time, part-time and on-call; the place of employment and area of practice; level of nursing education and percentage of subjects who had participated in formal cardiopulmonary courses.

Initially the perceived obstacle measurements were analyzed as a single response score. However, as stated previously, the correlations between the positive and negative force statements were low (Cronbach's alpha 0.39), and they were analyzed separately. Scores on the frequency of assessment skill performance and the importance of each skill were derived from totaling the subject's response to a five-point Likert scale of each item. The Pearson's r was then calculated to measure the association between the use of these skills and the value of each skill in identifying patient problems. In addition, relationships were examined between the use of assessment skills and area of employment, level of education, number of formal courses taken in cardiac and/or pulmonary assessment, agency requirements for recording and bed-capacity of employing institution, using the Chi Square analysis.

CHAPTER III

Results

In this section the results of the study are presented by describing (1) the study population in reference to demographic characteristics, (2) the frequency of cardiac and pulmonary skill use, (3) the major obstacles reported and (4) the intercorrelations between the frequency of skill use and educational level, type of position, bed capacity of employing agency, requirements for recording and assessment course preparation.

Description of Subjects

The subjects of this study were 100 randomly selected registered nurses who were active members of the American Association of Critical Care Nurses (AACN). Of the 100 possible subjects, 5 were eliminated; 3 were no longer in the nursing profession and 2 were never nurses, functioning as promotional agents for AACN sponsored programs. A total of 81 subjects responded to the survey. Refer to Tables 6 and 7 for a summary of demographic data.

There was a fairly even distribution between educational levels of the sample. Thirty-seven percent received an associate degree, 34.6 percent a baccalaureate degree and 27.2 percent a diploma certificate, as their first nursing degree. The highest nursing degree obtained was an associate (33.7%), baccalaureate (32.5%) and diploma (23.8%). Five percent of the population had a masters or doctorate in nursing.

Among the subjects, there were more females than males; ages ranged from 24-58 years, with a mean of 36.3 years. The majority of the subjects were employed full-time as staff nurses in medical/surgical/coronary intensive care units. The subjects were equally distributed in regard

Table 6

Demographic Characteristics of Sample
(Categorical Variables)

Characteristic	Percentage	Sample Size
First Nursing Degree Obtained		
Diploma	27.2	81
Associate	37.0	81
Baccalaureate	34.6	81
Other	1.2	81
Highest Nursing Degree Obtained		
Diploma	23.8	80
Associate	33.7	80
Baccalaureate	32.5	80
Master's	5.0	80
Doctorate	5.0	80
Sex		
Male	6.3	80
Female	93.8	80
Employment Status		
Employed	96.2	80
Unemployed	3.8	80
Employment Time		
Full-time	60.8	74
Part-time	36.5	74
On-call	2.7	74
Place of Employment		
Teaching hospital	52.1	73
Non-teaching hospital	45.2	73
School of nursing	1.4	73
Other	1.4	73
Bed Capacity of Employing Agency		
Under 50	6.9	72
50-99	5.6	72
100-199	33.3	72
200-299	11.1	72
300-399	9.7	72
400-499	22.2	72
500 or more	11.1	72
Area of Practice		
Surgical ICU	2.7	73
Medical/Surgical ICU	23.3	73
Coronary ICU	11.0	73
Medical/Coronary ICU	5.5	73
Medical/Surgical/Coronary ICU	34.2	73
Emergency Room	6.8	73
School of Nursing	1.4	73
Other	15.1	73
Position		
Staff Nurse	83.8	74
Assistant Head Nurse	2.7	74
Head Nurse	2.7	74
Clinical Specialist	2.7	74
Educator	5.4	74
Other	2.7	74
Formal Cardiac Course Preparation		
Yes	79.7	74
No	20.3	74
Formal Pulmonary Course Preparation		
Yes	75.7	74
No	24.3	74
Course Enrollment		
Basic Nursing Curricula	30.0[a]	60
Graduate Nursing Curricula	15.0[a]	60
Hospital Inservice	70.0[a]	60
AACN Programs	61.7[a]	60
Other	16.0[a]	60

[a]Percent of respondents who answered yes to this category regarding where the cardiac and/or pulmonary course was taken

Table 7

Demographic Characteristics of Sample
(Continuous Variables)

Characteristic	Range	Mean	Standard Dev.	Sample Size
Age	24-58	36.30	8.6	78
Number of Formal Cardiac Courses Taken	1-6	2.6	1.45	58
Number of Formal Pulmonary Courses Taken	1-9	2.4	1.6	55
Number of Months Since Last Cardiac Course	1-88	29.6	26.35	56
Number of Months Since Last Pulmonary Course	1-88	26.96	24.6	53
Credit Hours Awarded	0-30	2.04	5.09	47
Contact Hours Awarded	0-200	22.21	37.7	29
Practicum Hours Awarded	0-20	1.2	4.5	41

to their employment status at a teaching or non-teaching institution. Thirty-three percent worked at an agency with a bed capacity of 100-199, followed by 22 percent who worked in a 400-499 bed agency.

The majority of the sample had taken a formal cardiac and pulmonary assessment course offered by hospital inservices or AACN programs two to three years ago. There was a wide range of total number of cardiac and pulmonary courses taken, but the mean score of each category was approximately equal. Credit hours, contact hours and practicum hours awarded were diverse; however the number of subjects responding to these items was small (29 to 47).

Results of Major Variables

Frequency of cardiopulmonary skill performance. The first research question asked about the frequency of cardiopulmonary skill performance used on a regular basis in the critical care setting. The results of the study indicated that on a range of scores from 4 (USED DAILY) to 0 (NEVER USED), assessing for peripheral edema was the most frequency used cardiac skill. Means and standard deviations are presented in Table 8. Auscultating for normal and abnormal breath sounds was the pulmonary skills used daily on a regular basis. Assessing for heaves/thrills and percussing for air-solid abnormalities were the least used cardiopulmonary skills, practiced only on a weekly basis. Examination of these data indicated that all cardiac and pulmonary skills listed were used at least weekly according to the mean scores.

Value of cardiopulmonary skills. Means and standard deviations for the value of the cardiopulmonary assessment skills are presented in Table 9. The second research question asked if there was a relationship between

Table 8

Means and Standard Deviations for Frequency of Cardiopulmonary Assessment Skill Performance*

Skill	Mean	Standard Deviation	Sample Size
Cardiac			
PMI	2.11	1.69	73
Heaves/Thrills	1.88	1.71	74
S_1 and S_2	3.14	1.50	73
Gallops	2.99	1.48	73
Murmurs	3.18	1.33	74
JVD	2.80	1.60	69
Peripheral Edema	3.76	0.79	74
Pulmonary			
A-P Diameter	1.83	1.65	69
Use Accessory Muscles	3.19	1.18	75
Retraction	3.08	1.30	74
I/E Ratio	2.18	1.64	73
Lateral Expansion	1.83	1.67	71
Tracheal Alignment	2.38	1.62	74
Diaphragmatic Excursion	2.03	1.70	69
Percuss Air-Solid Abnormalities	1.78	1.68	71
Presence/Absence Breath Sounds	3.79	0.70	75
Vesicular, Bronchovesicular, Bronchial	3.56	0.98	72
Rales, Rhonchi, Rubs	3.81	0.68	74

*Based on a range of scores from 4 - Daily to 0 - Never.

Table 9

Means and Standard Deviations for Value of Cardiopulmonary Assessment Skills*

Skill	Mean	Standard Deviation	Sample Size
Cardiac			
PMI	1.94	1.23	69
Heaves/Thrills	2.21	1.25	70
S_1 and S_2	3.04	1.21	70
Gallops	3.16	1.06	70
Murmurs	3.06	1.07	70
JVD	3.03	1.25	68
Peripheral Edema	3.47	0.73	72
Pulmonary			
A-P Diameter	2.04	1.27	66
Use Accessory Muscles	3.19	0.97	72
Retraction	3.31	1.08	71
I/E Ratio	2.49	1.27	70
Lateral Expansion	2.17	1.51	66
Tracheal Alignment	2.85	1.36	69
Diaphragmatic Excursion	2.47	1.33	66
Percuss Air-Solid Abnormalities	2.43	1.35	67
Presence/Absence Breath Sounds	3.89	0.52	71
Vesicular, Bronchovesicular, Bronchial	3.56	0.74	68
Rales, Rhonchi, Rubs	3.80	0.58	71

*Based on range of scores from 4 - Extremely Important to 0 - Not At All Important

the use of cardiopulmonary skills and the value that nurses assign to each specific skill in identifying patient problems. A correlation matrix composed of Pearson's r was constructed. These data are presented in Table 10. There was a positive correlation between the frequency of skill use and the value of each skill in identifying patient problems ($p \leq .001$).

Major obstacles. The third question asked what were the major obstacles perceived by nurses as deterrents in using their assessment skills in the practice setting. A series of five positive and five negative force statements were developed. Means and standard deviations are presented in Table 11, based on a range of scores from 4 (STATEMENT IS TO A LARGE EXTENT TRUE) to 0 (STATEMENT IS NOT AT ALL TRUE). The results of the data revealed that not any of the ten statements were identified as significant obstacles.

Relationship between perceived obstacles and practice of skills. A correlation matrix was constructed to examine the relationship between perceived obstacles and the extent to which the obstacles influenced the practice of skills. The results may be seen in Table 12. There were significant correlations between the scores of both positive and negative force statements and the scores measuring the extent to which each factor influenced the use of cardiopulmonary skills.

Relationship between frequency of skill use and educational level. An analysis of variance was done in order to determine if there was a difference in frequency of skill use between respondents from differing educational backgrounds. The highest nursing degree attained by each respondent was used to compute this analysis. The educational degrees were divided into 3 categories: Diploma (D), Associate (A), and Baccalaureate or higher (B). The analysis revealed that there were

Table 10

Correlations Between Assessment Skill Performance and the Value of Skills

Skill	Pearson's r	Sample Size
Cardiac		
PMI	0.67***	69
Heaves/Thrills	0.56***	70
S_1 and S_2	0.63***	69
Gallops	0.64***	70
Murmurs	0.63***	70
JVD	0.81***	67
Peripheral Edema	0.47***	72
Pulmonary		
A-P Diameter	0.72***	64
Use of Accessory Muscles	0.67***	72
Retraction	0.71***	71
I/E Ratio	0.70***	69
Lateral Expansion	0.77***	64
Tracheal Alignment	0.67***	68
Diaphragmatic Excursion	0.74***	63
Percuss for Air-Solid Abnormalities	0.73***	66
Presence/Absence Breath Sounds	0.61***	71
Vesicular/Bronchovesicular/Bronchial	0.70***	68
Rales, Rhonchi, Rubs	0.62***	71

*p ≤.05
**p ≤.01
***p ≤.001

Table 11

Means and Standard Deviations
for Obstacle Measures*

Obstacle	Mean	Standard Deviation	Sample Size
Positive Forces			
Co-workers acknowledge necessity of skill use	3.31	0.99	75
Administration views assessment as vital function	3.35	0.95	75
Physicians value assessment by RNs	2.93	1.03	75
Patient population appropriate for assessment	3.39	0.99	75
Assessment increases quality of nursing care	3.60	0.84	75
Negative Forces			
Not enough time at work to practice skills	1.36	1.15	75
Course didn't allow enough time to practice skills	1.97	1.23	66
Too busy at work and assessment not priority	0.66	1.14	74
Medical regime not altered from findings	1.45	1.20	75
Hospital policy does not require assessment documentation	0.77	1.23	75

*Based on a range of scores from 4 - Large Extent to 0 - Not At All

Table 12

Correlations Between Obstacle Measures and Cardiopulmonary Skill Performance

Obstacles	Pearson's r	Sample Size
Positive Forces		
Co-workers acknowledge necessity of skill use	0.56***	74
Nursing administration values skills	0.52***	71
Physicians value credibility of assessment findings	0.56***	73
Patient population appropriate for skills	0.76***	72
Assessment skills increase quality of nursing care	0.90***	72
Negative Forces		
Not enough time at work to perform skills	0.53***	72
Not enough time to practice skills in course	0.36**	60
Assessment not a priority/Not enough time	0.61***	69
Medical regime is not altered by findings	0.31**	68
Hospital policy does not require reporting	0.56***	69

*p ≤.05
**p ≤.01
***p ≤.001

significant differences when comparing the three groups. Mean frequencies of both cardiac and pulmonary skill use for group A and B were greater than group D. These results may be seen in Table 13. There were no significant differences between the three educational groups and the reported importance of cardiac or pulmonary skills in identifying patient problems.

A chi-square analysis was then computed to determine if the difference in skill use between the Diploma and Associate/Baccalaureate groups could be explained by cardiopulmonary course preparation (See Appendix H). No significant differences in cardiac or pulmonary course preparation were found between the two educational categories.

Relationship between frequency of skill use and type of position. Since 83.8 percent of the sample reported their position as staff nurses, there was not enough variability to compute an analysis of variance comparing the frequency of skill performance and type of position.

Relationship between frequency of skill use and bed capacity of employing agency. An analysis of variance was computed to determine the relationship in cardiopulmonary skill performance between respondents who were employed in institutions with varying bed capacity. The bed capacity of the institution was divided into 3 categories: up to 99 (1), 100-399 (2), and 400+ (3). These results may be seen in Table 14. The data revealed that there were no significant differences in either the frequency or importance of cardiopulmonary skill performance between respondents employed in institutions of varied bed capacity.

Relationship between frequency of skill use and requirements for recording. A t-test comparing the relationship in skill performance between respondents with varied recording requirements is illustrated in

Table 13

Relationship Between Cardiopulmonary Skill Performance and Education Level

Scales	Means and Standard Deviations			F Statistic	A Posteriori[a] Comparisons
	Diploma (D)	Associate (A)	Baccalaureate (B)		
Frequency of Cardiac Skill Performance	2.31 (1.23) (N=20)	3.12 (1.00) (N=26)	2.97 (1.10) (N=27)	3.27*	A > D B > D
Frequency of Pulmonary Skill Performance	2.10 (1.00) (N=20)	2.93 (0.92) (N=24)	2.83 (0.91) (N=27)	4.99**	A > D B > D
Importance of Cardiac Skill Performance	2.51 (1.07) (N=18)	3.03 (0.80) (N=24)	2.88 (0.74) (N=27)	1.95	
Importance of Pulmonary Skill Performance	2.69 (0.99) (N=17)	3.09 (0.77) (N=24)	2.99 (0.66) (N=27)	1.03	

[a]The Student Newman-Keuls was used to test differences between the group means.

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

Note: The sum of squares, degrees of freedom and mean square values are presented in Appendix G.

Table 14

Relationship Between Cardiopulmonary Skill Performance and Bed Capacity of Employing Agency

Scales	Means and Standard Deviations			F Statistic
	① Up to 99	② 100-399	③ 400+	
Frequency of Cardiac Skill Performance	2.60 (1.13) (N=9)	2.83 (1.35) (N=38)	2.86 (0.084) (N=24)	0.17
Frequency of Pulmonary Skill Performance	1.99 (1.04) (N=8)	2.78 (1.07) (N=37)	2.76 (0.80) (N=24)	2.23
Importance of Cardiac Skill Performance	2.91 (0.63) (N=9)	2.87 (1.09) (N=35)	2.82 (0.57) (N=23)	0.04
Importance of Pulmonary Skill Performance	2.57 (0.85) (N=9)	3.03 (0.84) (N=35)	3.00 (0.65) (N=22)	1.28

Note: The sum of squares, degrees of freedom and mean square values are presented in Appendix H.

Table 15. Two categories were developed for the requirements for recording. Group 1 reported that hospital policy required them to chart assessment data and Group 2 were not required to document this information. The analysis revealed that there were no significant differences in frequency or importance of cardiopulmonary skill use between respondents with varied requirements for recording.

Relationship between frequency of skill use and cardiopulmonary course preparation. T-tests comparing the relationship in skill performance between respondents with cardiac and pulmonary course preparation are summarized in Table 16 and 17. Two groups were compared for each analysis; those who reported taking a formal cardiac or pulmonary course (C or P) and those who had no cardiac or pulmonary course preparation (NC or NP). There were significant differences reported in both the frequency and the value of skill performance between respondents who had formal cardiopulmonary course preparation and those who had no previous content exposure.

Table 15

Relationship Between Cardiopulmonary Skill Performance and Requirements for Recording

Scales	Means and Standard Deviations		Calculated t-Value
	Yes (1)	No (2)	
Frequency of Cardiac Skill Performance	2.52 (1.31) (N=16)	2.93 (1.07) (N=58)	-1.29
Frequency of Pulmonary Skill Performance	2.62 (1.02) (N=16)	2.69 (1.00) (N=56)	-.024
Importance of Cardiac Skill Performance	2.65 (1.04) (N=16)	2.90 (0.81) (N=54)	-1.01
Importance of Pulmonary Skill Performance	3.17 (0.73) (N=14)	2.87 (0.80) (N=55)	1.26

Table 16

Relationship Between Cardiopulmonary Skill Performance and Cardiac Course Preparation

Scales	Means and Standard Deviations		T-Value	Comparison
	Class (C)	No Class (NC)		
Frequency of Cardiac Skill Performance	2.99 (1.07) (N=15)	2.22 (1.21) (N=15)	2.41*	C > NC
Frequency of Pulmonary Skill Performance	2.91 (0.95) (N=56)	1.89 (0.75) (N=15)	3.81***	C > NC
Importance of Cardiac Skill Performance	2.97 (0.81) (N=56)	2.33 (0.96) (N=13)	2.45*	C > NC
Importance of Pulmonary Skill Performance	3.06 (0.76) (N=56)	2.43 (0.68) (N=12)	2.62*	C > NC

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

Table 17

Relationship Between Cardiopulmonary Skill Performance and Pulmonary Course Preparation

Scales	Means and Standard Deviations		T-Value	Comparison
	Class (P)	No Class (NP)		
Frequency of Cardiac Skill Performance	3.01 (1.01) (N=56)	2.26 (1.36) (N=17)	2.48*	P > NP
Frequency of Pulmonary Skill Performance	2.93 (0.92) (N=55)	1.87 (0.81) (N=16)	4.15***	P > NP
Importance of Cardiac Skill Performance	2.99 (0.73) (N=54)	2.34 (1.13) (N=15)	2.69*	P > NP
Importance of Pulmonary Skill Performance	3.06 (0.76) (N=55)	2.45 (0.66) (N=13)	2.69*	P > NP

*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

CHAPTER IV

Discussion

The purpose of this study was to determine whether registered nurses who had been taught cardiopulmonary assessment skills were using the skills in their clinical setting. One-hundred percent of the respondents were using their skills at least weekly, however only four of the eighteen designated skills were used on a daily basis. There were significant differences in frequency of skill use between respondents with varied educational experiences and assessment course preparation. No differences were reported for type of position, bed capacity of employing agency or recording requirements. Discussion of these results will be presented in regard to (1) factors influencing the use of cardiopulmonary assessment skills and (2) methodological issues.

Frequency and Value of Cardiopulmonary Skills

Since a large percent of the respondents were exposed to sophisticated cardiopulmonary assessment skills in the classroom, it was surprising to find that checking for peripheral edema and auscultating for normal and abnormal breath sounds were the only skills used on a regular basis in the critical care setting. These results however, were similar to those of Carrieri et al. (1982). All the skills were used at least weekly.

The skills that were used by the respondents most frequently were also valued for their importance in identifying patient problems. Therefore, even though the respondents were not comprehensively assessing their patients, the skills that were used regularly facilitated diagnostic processes. It is of concern however, that nurses reported that listening for rhythms, gallops, JVD, murmurs, S_1 and S_2 were important indicators of the clinical

status of the patient, but used only twice weekly. Auscultating for S_1 and S_2 is considered a basic assessment parameter of cardiac function (Bates, 1979). It was anticipated then, that this skill would be used at least daily.

Specific demographic characteristics of the sample could have affected the frequency of cardiopulmonary skills used in the practice setting. First, since 37 percent of the respondents worked as part-time employees, it is possible that these subjects scored the skills according to the number of days per week they worked. Therefore, even if the skills were used every day of work, a score of twice weekly or weekly could have been selected. If this is so, then the frequency of skills used would be lower than what would be expected. Secondly, respondents reported that an average of 2.5 years had passed since their last assessment course. It would be expected over this time span, that certain skills would be perfected while others forgotten, altering the frequency of skill use. Thirdly, 77 percent of the respondents worked in specialty intensive care units. Some of the cardiopulmonary skills listed in the questionnaire therefore, may not have been appropriate for their select patient population. Several nurses who worked in coronary recovery units stated that PMI was not routinely assessed due to bulky sternal dressings of the post-operative cardiac patient. In addition, some respondents who worked in medical intensive care units reported they were less likely to document I/E ratio parameters since most of the patients were mechanically ventilated. Since the majority of the sample worked in a combined medical/surgical/coronary unit, it was not possible to correlate separate work areas in regard to skill performance. It is reasonable however, to assume that nurses in

specialty units adapt their own assessment parameters according to individualized patient needs and illness states. Finally, the mean age of this sample was 36 years, which was more mature and possibly more experienced than expected. Age and experience may be indicators of assessment skill performance, however, this study did not attempt to statistically analyze these variables.

Computerized technology certainly has altered nursing care to a certain degree and therefore could be a possible explanation for the infrequent use of cardiopulmonary skills by this sample. Perhaps nurses are relying predominantly on cardiac monitors to assess their patients rather than observation and auscultation. In addition, most critical care units are staffed with expert respiratory therapists who assume responsibility for the respiratory status of the patient. Possibly nurses are not using advanced respiratory skills because these responsibilities have been delegated to the therapists.

Questions arise concerning the adequacy of this level of daily assessment by critical care nurses. Further research is warranted to examine the assessment parameters nurses use for more discrete diagnoses.

Major Obstacles

Obstacles were conceptualized for this study as an interference or opposition of some nature which affected the use of cardiopulmonary assessment skills. It was anticipated that obstacles would be reported by the respondents since only four cardiopulmonary skills were used on a daily basis. Insufficient practice of skills in the course was the only obstacle perceived as "somewhat" detrimental to the use of skills. Otherwise, no significant deterrents were identified, which was unexpected.

Carrieri et al. (1982) found that of the 53 percent of the nurses who identified obstacles, the most frequent obstacle was insufficient time at work, followed by lack of practice on normal and abnormal patients.

There are several possible explanations for the lack of signfficant data on the obstacle statements. First, the scale, as a whole, may have been of poor quality and did not accurately measure this variable. This possibility will be considered in the discussion of methodological issues. Second, there is also the possibility that the respondents did not truly feel there were any obstacles that altered the practice of these skills. If this is so, it would seem reasonable to conclude that the erratic use of sophisticated skills was a product of the nurse's individual discretion, not practice environment.

Variables Related to the Use of Assessment Skills

Educational level. It was anticipated that the baccalaureate group (which included both masters and doctorally prepared respondents) would have reported a higher frequency of skill use than the diploma or associate degree groups. Even though there was a significant difference between the baccalaureate group and the diploma group, the lack of difference between the baccalaureate and associate degree group was unexpected. These results could possibly support other findings that, indeed, there is no difference in patient care performance between the associate degree nurse and the baccalaureate degree nurse (Hogstel, 1977).

The majority of the respondents received their assessment content from hospital inservices or AACN programs. This would explain the lack of difference reported between the baccalaureate and associate degree groups but not the diploma group. Since there were no significant

differences in the number of course prepared respondents in the diploma group and the baccalaureate/associate degree group, this variable would not explain the discrepancy. Perhaps the diploma nursing programs do not focus on assessment curricula and therefore their graduates infrequently use sophisticated skills at the clinical level, even when they are later exposed to this content.

Bed capacity of employing agency. In a survey conducted by AACN (1979) examining critical care nursing practice, it was reported that RN's in under 50 bed hospitals were less likely to use their skills as a problem-solving measure. The actual frequency of skill use however, was about the same for different sized hospitals. In this study, no significant differences were found in frequency or value of skills by respondents according to bed capacity of the employing agency.

It was anticipated that the smaller hospitals, which are generally in more rural areas, would not have the sophisticated assessment programs and therefore, the frequency of skill use by staff would have been less. This was not found however. Perhaps, nurses in rural areas are taking an active role in their continuing education and are commuting to available resources for this assessment information.

Requirements for recording. There was no significant difference between the various requirements for recording and the frequency of skill use by respondents. These results differ from Carrieri et al. (1982), who concluded that when nurses were accountable for recording the skill, the skills were performed more frequently.

The scale used to measure this variable may have been responsible for the differing results. This variable was measured by a five-point

Likert scale. Respondents were asked to what extent hospital policy required the charting of a cardiopulmonary exam. Those who scored the statement from 2 (SOMEWHAT TRUE) to 4 (LARGE EXTENT TRUE) were placed in the "yes" category. Those who socred 1 or 0 (NOT AT ALL TRUE) were placed in the "no" category (see Table 14). The scale therefore, was not a specific measure for this variable and provided a source for misinterpretation. There was also an unequal distribution of respondents in both categories and therefore provided another source for statistical error. Difference-between-means tests are based on the assumption that the variable in question is normally distributed in the population and that the population variances are approximately equal.

It is possible that recording requirements indeed may not influence the use of cardiopulmonary skills. Further research analyzing this variable is needed.

Cardiopulmonary course preparation. A significant difference was reported in frequency and value of skill use between respondents who had taken a formal cardiopulmonary course and those who had not. These results support the concept that exposure to assessment content affects the use of these skills clinically. However, this does not explain why only a select few of these sophisticated skills were used on a regular basis. Gurney (1978) found that nurses were documenting only classical vital signs. Pulse rate, blood pressure and pulmonary rate were the more frequently documented parameters. Perhaps this is still the case. It would have been interesting to evaluate the position of those subjects who had never taken a formal assessment course. Perhaps they were in head nurse or educator positions and therefore, the frequency of skill use would have been reduced

regardless. Nevertheless, these results should be an important evaluatory measure for educators who are developing assessment course curricula.

Methodological Issues

Measurement of perceived obstacles. An important factor to consider is whether the obstacle scale adequately measured the deterrants to skill use in the practice setting. The scale was composed of ten statements which incorporated obstacles that were identified in the review of the literature. To avoid indiscriminate scoring, the investigator counter-balanced the statements so that they were worded in a positive or negative manner. Therefore, rather than using a checklist format, respondents scored each statement according to the extent that it was true and to the extent that it influenced the practice of skills. Several subjects reported that the statements were difficult to understand. One statement in particular, was misleading since two deterrants were actually included in one statement, "I am too busy with other nursing functions and assessment is not a priority".

The above factors and the reliability of scales (see Chapter II) were taken into account when the results were analyzed, and could possibly explain the lack of reported obstacles by this sample.

CHAPTER V

Summary, Conclusions and Recommendations

Summary

Nurse educators and hospital administrators have spent a great deal of time and money developing educational programs to prepare nurses to assume greater responsibility in the physical assessment of patients. It is not clear however, to what extent these skills are actually used in the clinical environment. This study evaluated the frequency of cardiopulmonary skill performance by registered nurses in the critical care setting.

Conceptually, physical assessment is one component of the decision-making model traditionally known as the nursing process. There is evidence however, that nurses have difficulty with this cognitive task. Clearly, adequate assessment skills are a necessary component of competent clinical judgements and their use can be influenced by obstacles in the environment. Thus, the purpose of this study was to assess the frequency of skill use by registered nurses in the critical care setting, and identify obstacles which prevented the use of these skills. In addition, relationships were examined between the frequency of skill use and educational level, type of position, bed capacity of employing agency, requirements for recording and assessment course preparation.

The subjects of this study were 100 randomly selected registered nurses who were members of the Northwest chapter of the American Association of Critical Care Nurses (AACN). The data were analyzed using the mean frequency scores of a five-point Likert scale on skill performance and perceived obstacles. Additional analysis included t-tests of groups means for course preparation and recording requirements, analysis of

variance for educational level and bed capacity of employing agency and Pearson's r for correlations between obstacle measures and between skill performance measures and other variables.

The results of the study were as follows. First, nurses in the critical care setting were using only four of the eighteen cardiopulmonary skills on a daily basis. Second, the frequency score of each skill correlated significantly with the perceived value score in terms of its ability to identify patient problems. Third, there were no significant obstacles identified as deterrants to skill use. Fourth, there was a significant difference in frequency of skill use between baccalaureate/ associate groups and the diploma group. Fifth, there was a significant difference in frequency of skill use between respondents who had taken a formal cardiopulmonary course and those who had not. Finally, there was no significant difference in frequency of skill use and bed capacity of employing agency, or recording requirements. The type of position could not be analyzed statistically due to lack of variation.

Conclusions

The lack of reported daily use of sophisticated cardiopulmonary skills in the clinical setting are consistent with those studies evaluating the same variables. Even though nurses believed that increasing their level of assessment in some way increased the quality of care, only basic assessment measures were valued as instrumental in identifying patient problems and therefore practiced in the clinical environment regularly. No obstacles interfered with the assessment performance. These findings suggest that nurses are not comprehensively assessing their patients and therefore may be gathering an incomplete data base from which to base

clinical decisions.

The significant difference between the group that was course prepared and the group that was not in regard to the frequency of skill use, contributes to a clearer understanding of the positive effect that educational reinforcement has on the practice setting. These results could be used as an evaluatory measure for those in the educational field. The significant difference in frequency of skill use by baccalaureate/associate degree groups and the diploma group are also of interest to those in the education profession. Lack of difference in performance between baccalaureate graduates and associate degree graduates are consistent with previous studies.

Implications for Nursing

This study contributes additional insight into the frequency of skill use in clinical practice. These results merit consideration since nurses are not truly using a systematic approach when assessing their patients. Certainly, these data emphasize the need for a careful examination of the reported belief that increased cardiopulmonary skill performance influences the quality of nursing care. In addition, this study supports the belief that nurses are using only basic assessment measures from which to competently base clinic decisions. Perhaps these results may be useful as a framework to analyze further the thought processes of nurses in the practice setting. Are nurses using these assessment parameters as a problem-solving measure? This question remains unanswered.

How can these results be used to help educators design assessment curricula? Clearly, according to these findings, course preparation does affect the frequency of skill use at the clinical level. It is therefore

important to continue with this educational pursuit. The content of these courses however, should be restructured if nurses are using only those skills they value and wasting the additional information. This would possibly generate a more effective expenditure of time, money and energy involved in constructing and participating in assessment courses.

Large numbers of nurses are actively seeking assessment content. It seems appropriate, particularly in the clinical setting where nurses are supposedly responsible for this information, that these findings be shared. Perhaps with this exposure, nurses will be forced to re-evaluate their assessment practices that ultimately affect patient progress.

Limitations of the Study

There are several limitations of this study. The first was the lack of specificity of the obstacle measures. For further study, a checklist should be designed that clearly itemizes each obstacle. Therefore, respondents could identify and score each deterrant as it would affect their practice. In addition, it would be important that the obstacles measure a homogeneous construct. This was not accomplished in the present study. Secondly, choosing a questionnaire as a research tool certainly has its limitations. A pretest was deliberately implemented to avoid construction defects however, misinterpretation of the questions by respondents can not be completely omitted. Thirdly, since the sample was selected from only a specific population, results could not be generalized to a larger proportion of nurses who worked in critical care settings. Finally, it was also not possible to effectively analyze differences between the frequency of skill use and the type of position of each respondent. There was no variance between these groups.

Recommendations for Further Research

The following recommendations for further research are suggested as a result of this study. Because it was not clear whether the obstacle scale adequately measured this variable, another study using a different scale may be of value. Further research could be conducted using a national sample of clinical nurses evaluating if regional differences do exist. It would also be most interesting to conduct an experimental study to determine whether the use of assessment skills by nurses actually increases the quality of care delivered to patients in both long-term and acute care settings. It is difficult however, to precisely measure "quality of care". Finally, the assessment component of the nursing process needs to be tested in order to adequately evaluate the decision-making processes of clinical nurses. This would involve a controlled examination of the assessment strategies employed by nurses with varied educational and clinical experience.

APPENDICES

APPENDIX A - PRETEST COVER LETTER

September 16, 1983

Dear

I am a graduate student in nursing at Oregon Health Science University and I am currently in the process of conducting a research project on the use of cardiopulmonary assessment skills in the critical care setting. In order to gather data for this study, I have developed a questionnaire that will be sent to a sample of AACN nurses in the nation.

Before a formal study can be initiated, pre-testing must be done on the questionnaire to guarantee that each subject in the study will receive a survey that is clear and concise.

Your name was selected from the volunteer list posted in your unit to participate in this pre-testing procedure. A pre-test is vital to a study's success. If the questionnaire is not understandable, then the return rate of the survey will be very minimal and the results will be insignificant. It is very important therefore, to receive your feedback on any of the questions that are not clear to you.

It will take you approximately 10 minutes to complete the questionnaire. Please answer all the questions as they pertain to your personal use of assessment skills in the work setting. Enclosed you will find a return, stamped envelope for your questionnaire. Please return it to me as soon as possible, preferably today.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so your name can be checked off the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire.

One week following the return of the initial survey, I will be mailing you the same questionnaire for a second re-test. This will provide information concerning the stability of the questionnaire. I must have 2 completed questionnaires from you for this pre-testing procedure to be successful.

Thank you so much for your assistance. If you have any questions feel free to call me at home (245-8039) or you may contact me in the PAR at St. Vincent's Hospital. I am working under the direction of Dr. Christine Tanner at OHSU School of Nursing. She may be reached at 225-7796.

Sincerely,

Cynthia Ensign, RN
Graduate Student
Primary Investigator

APPENDIX B - RETEST LETTER

September 23, 1983

Dear

Last week I mailed you a questionnaire seeking information about your use of assessment skills in the clinical setting. Thank you very much for returning it to me.

Enclosed you will find the same questionnaire that I need you to complete and return to me as soon as possible. This process aides in assessing the stability of the questionnaire.

Thank you so much for your assistance and time. With your help my research project will be successful.

If you have any questions feel free to contact me at home (245-8039) or in the PAR at St. Vincent's Hospital.

Thank you again.

Sincerely,

Cynthia Ensign, RN
Graduate Student
Primary Investigator

APPENDIX C - COVER LETTER FINAL STUDY

January 2, 1984

Dear Colleague:

A great deal of time, money and energy has been spent teaching nurses physical assessment skills. A question continually arises however, whether or not nurses like yourself are able to use these skills in the clinical work setting.

Your name was selected from the AACN membership list to give your opinion on this matter. It was drawn from a random sample of members in the Northwest. In order that the results truly represent the opinion of these AACN nurses, it is important that the questionnaire be completed and returned as soon as possible.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so that your name can be checked off the mailing list when your questionnaire is returned in the enclosed envelope. Your name will never be placed on the questionnaire.

The results of this research will be used for my thesis project and made available to officials of AACN. Due to excessive mailing costs, a summary of the results cannot be sent to you directly, however it is hoped that the information obtained will help evaluate the use of cardiopulmonary assessment skills in the critical care setting and assist in designing more effective courses for the practicing nurse.

I would be most happy to answer any questions you might have. Feel free to contact me collect at (503) 245-8039. I am working under the direction of Dr. Christine Tanner at the Oregon Health Sciences University School of Nursing. She may be reached at (503) 225-7796. Only through cooperation of practicing nurses can the profession of nursing be improved.

Thank you for your assistance.

Sincerely,

Cynthia Ensign, R.N.
OHSU Graduate Student
Primary Investigator

CE:ks
enclosure

APPENDIX D

Research Questionnaire

ARE YOU USING YOUR ASSESSMENT SKILLS?

AN EVALUATION OF THE USE OF CARDIOPULMONARY
ASSESSMENT SKILLS BY NURSES
IN A CRITICAL CARE SETTING

The purpose of this study is to evaluate whether critical care nurses who have been taught cardiopulmonary assessment skills have been able to use the skills in their clinical work setting. Please answer all of the questions. If you wish to comment on any questions or qualify your answers, please feel free to use the space in the margins. Your comments will be read and taken into account.

Thank you for your help.

School of Nursing
Oregon Health Sciences University
3181 SW Sam Jackson Park Road
Portland, Oregon 97201

I.D. _____
(1-3)

CARDIOPULMONARY ASSESSMENT SURVEY INSTRUMENT

(4) 1. What is the level of your basic nursing education? (CIRCLE ONE NUMBER)

1 DIPLOMA IN NURSING

2 ASSOCIATE DEGREE IN NURSING

3 BACCALAUREATE DEGREE IN NURSING

4 OTHER--SPECIFY _____

(5) 2. What is the highest degree that you have attained? (CIRCLE ONE NUMBER)

1 DIPLOMA IN NURSING

2 ASSOCIATE DEGREE IN NURSING

3 BACCALAUREATE DEGREE IN NURSING

4 MASTERS DEGREE IN NURSING

5 DOCTORATE DEGREE IN NURSING

6 OTHER--SPECIFY _____

(6-7) 3. Your present age: _____ years

(8) 4. Your sex: (CIRCLE ONE NUMBER)

1 MALE

2 FEMALE

(9) 5. Are you presently: (CIRCLE ONE NUMBER)

1 EMPLOYED

2 UNEMPLOYED

3 RETIRED

4 OTHER--SPECIFY _____

IF YOU CIRCLED NUMBER 2 OR 3, THE REMAINDER OF THE SURVEY IS NOT APPLICABLE TO YOU. THANK YOU FOR YOUR PARTICIPATION. IF YOU CIRCLED NUMBER 1, PLEASE PROCEED.

10) 6. Are you employed primarily: (CIRCLE ONE NUMBER)

1 FULL-TIME

2 PART-TIME

3 ON-CALL

11) 7. Place you are employed: (CIRCLE ONE NUMBER)

1 TEACHING HOSPITAL (GO TO QUESTION 8)

2 NON-TEACHING HOSPITAL (GO TO QUESTION 8)

3 UNIVERSITY SCHOOL OF NURSING (SKIP TO QUESTION 9)

4 CLINIC (SKIP TO QUESTION 9)

5 OTHER--SPECIFY _____ (SKIP TO QUESTION 9)

12) 8. What is the approximate bed-capacity of this institution? (CIRCLE ONE NUMBER)

1 UNDER 50

2 50-99

3 100-199

4 200-299

5 300-399

6 400-499

7 500 OR MORE

13-14) 9. Area of your practice: (CIRCLE ONE NUMBER)

1 MEDICAL ICU

2 SURGICAL ICU

3 MEDICAL/SURGICAL ICU

4 CORONARY ICU

5 MEDICAL/CORONARY ICU

6 MEDICAL/SURGICAL/CORONARY ICU

7 NEWBORN ICU

8 EMERGENCY ROOM

9 SCHOOL OF NURSING

10 OTHER--SPECIFY _____

15) 10. What is your position in the above area of practice? (CIRCLE ONE NUMBER)

1 STAFF NURSE

2 ASSISTANT HEAD NURSE

3 HEAD NURSE

4 CLINICAL SPECIALIST

5 EDUCATOR

6 OTHER--SPECIFY _____

(16) 11. Have you taken one or more formal courses in cardiac assessment? (CIRCLE ONE NUMBER)

1 YES

2 NO

(17) 12. Have you taken one or more formal courses in pulmonary assessment? (CIRCLE ONE NUMBER)

1 YES

2 NO

IF YOU ANSWERED NO TO BOTH QUESTIONS 11 AND 12, PLEASE SKIP TO QUESTION 19.
IF YOU ANSWERED YES TO QUESTION 11 AND/OR 12, PLEASE PROCEED.

13. If YES to any of the above, where did you take this course? (CIRCLE ALL THAT APPLY)

(18) 1 BASIC NURSING EDUCATION

(19) 2 GRADUATE NURSING EDUCATION

(20) 3 HOSPITAL IN-SERVICE

(21) 4 AACN PROGRAMS

(22) 5 OTHER--SPECIFY _____

(23-24) 14. How many formal courses in cardiac assessment have you taken? _____

(25-26) 15. How many formal courses in pulmonary assessment have you taken? _____

(27-30) 16. What is the approximate date of your last course in cardiac assessment?

___/___
(month/year)

(31-34) 17. What is the approximate date of your last course in pulmonary assessment?

___/___

(month/year)

18. If you have participated in a cardiopulmonary assessment course within the last 3 years, estimate as many of the following as possible, if they apply. (FILL IN THE BLANK)

(35-37) _____ NUMBER OF COLLEGE CREDIT HOURS AWARDED

(38-40) _____ NUMBER OF CONTACT HOURS IN THE CLASSROOM

(41-43) _____ NUMBER OF PRACTICUM HOURS REQUIRED IN A CLINICAL SETTING

(44) OTHER--SPECIFY _____

19. Another important purpose of this study is to learn more about how you feel generally regarding the use of physical assessment as a component of the nursing process. Below you will find 10 statements. First, rank to what extent each statement is true in your nursing practice. Then, rank to what extent each statement influences your use of these skills.

		TO WHAT EXTENT TRUE?					TO WHAT EXTENT INFLUENCES?				
		Large Extent		Somewhat		Not At All	Large Extent		Somewhat		Not At All
(45, 55)	THERE IS NOT ENOUGH TIME AT WORK TO PRACTICE MY ASSESSMENT SKILLS	4	3	2	1	0	4	3	2	1	0
(46, 56)	MY CO-WORKERS ACKNOWLEDGE THE NECESSITY OF PERFORMING A CARDIOPULMONARY ASSESSMENT	4	3	2	1	0	4	3	2	1	0
(47, 57)	MY ASSESSMENT COURSE DID NOT ALLOW ENOUGH TIME TO PRACTICE MY SKILLS	4	3	2	1	0	4	3	2	1	0
(48, 58)	I AM TOO BUSY WITH OTHER NURSING FUNCTIONS AND ASSESSMENT IS NOT A PRIORITY	4	3	2	1	0	4	3	2	1	0
(49, 59)	NURSING ADMINISTRATION IN THE AREA I PRACTICE VIEW PHYSICAL ASSESSMENT AS A VITAL NURSING FUNCTION	4	3	2	1	0	4	3	2	1	0
(50, 60)	PHYSICIANS VALUE THE CREDIBILITY OF NURSING ASSESSMENTS	4	3	2	1	0	4	3	2	1	0
(51, 61)	MY PATIENT POPULATION IS APPROPRIATE TO PERFORM CARDIOPULMONARY ASSESSMENTS	4	3	2	1	0	4	3	2	1	0
(52, 62)	THE MEDICAL REGIME IS NOT ALTERED AS A RESULT OF MY USE OF ASSESSMENT SKILLS WITH PATIENTS	4	3	2	1	0	4	3	2	1	0
(53, 63)	CARDIOPULMONARY ASSESSMENT INCREASES THE QUALITY OF MY NURSING CARE	4	3	2	1	0	4	3	2	1	0
(54, 64)	CURRENT HOSPITAL POLICY WHERE I WORK DOES NOT REQUIRE THAT I CHART A CARDIOPULMONARY ASSESSMENT	4	3	2	1	0	4	3	2	1	0

20. This question is divided into two sections. Below you will find a list of assessment skills you might use to assess your patients. First, circle the number that reflects how frequently you use each skill. Then, circle the number that reflects how important each skill is when identifying patient problems. (CIRCLE ONE NUMBER)

	Daily	Twice Weekly	Weekly	Monthly	Never	Extremely Important		Somewhat Important		Not At All
CARDIAC SKILLS:										
(65/83) PMI	4	3	2	1	0	4	3	2	1	0
(66/84) HEAVES/THRILLS	4	3	2	1	0	4	3	2	1	0
(67/85) S_1 AND S_2	4	3	2	1	0	4	3	2	1	0
(68/86) GALLOPS	4	3	2	1	0	4	3	2	1	0
(69/87) MURMURS	4	3	2	1	0	4	3	2	1	0
(70/88) JVD	4	3	2	1	0	4	3	2	1	0
(71/89) PERIPHERAL EDEMA	4	3	2	1	0	4	3	2	1	0
PULMONARY SKILLS:										
(72/90) A-P DIAMETER	4	3	2	1	0	4	3	2	1	0
(73/91) USE OF ACCESSORY MUSCLES	4	3	2	1	0	4	3	2	1	0
(74/92) RETRACTION	4	3	2	1	0	4	3	2	1	0
(75/93) I/E RATIO	4	3	2	1	0	4	3	2	1	0
(76/94) LATERAL EXPANSION	4	3	2	1	0	4	3	2	1	0
(77/95) TRACHEAL ALIGNMENT	4	3	2	1	0	4	3	2	1	0
(78/96) DIAPHRAGMATIC EXCURSION	4	3	2	1	0	4	3	2	1	0
(79/97) PERCUSS FOR AIR-SOLID ABNORMALITIES	4	3	2	1	0	4	3	2	1	0
(80/98) PRESENCE/ABSENCE OF BREATH SOUNDS	4	3	2	1	0	4	3	2	1	0
(81/99) VESICULAR, BRONCHOVESICULAR, BRONCHIAL	4	3	2	1	0	4	3	2	1	0
(82/100) RALES, RHONCHI, RUBS	4	3	2	1	0	4	3	2	1	0

21. Using the components listed in Question 20 as a reflection of a fairly complete cardiopulmonary exam, how often do you systematically carry out this exam with a patient in one sitting? (CIRCLE ONE NUMBER FOR CARDIAC AND ONE NUMBER FOR PULMONARY.)

(101) CARDIAC:

4	3	2	1	0
DAILY	SEVERAL TIMES A WEEK	WEEKLY	MONTHLY	NEVER

(102) PULMONARY:

4	3	2	1	0
DAILY	SEVERAL TIMES	WEEKLY	MONTHLY	NEVER

Is there anything else you would like to tell me concerning the use of assessment skills in the work setting? If so, please use this space. Also, any comments you think may help in future efforts to evaluate the use of these skills by practicing nurses will be appreciated.

****

THANK YOU VERY MUCH FOR THE TIME YOU HAVE TAKEN TO FILL OUT THE SURVEY. YOUR CONTRIBUTION TO THIS EFFORT IS VERY GREATLY APPRECIATED.

APPENDIX E - ONE WEEK FOLLOW-UP POSTCARD

January 9, 1984

Last week a questionnaire seeking information about your use of assessment skills in the clinical setting was mailed to you. Your name was drawn from a random sample of AACN members in the Northwest.

If you have already completed and returned it to me, please accept my sincere thanks. If not, please do so today. Because it has been sent to a representative sample of AACN members, it is extremely important that yours also be included in the study if results are to accurately represent the opinions of AACN members in the Northwest.

If by chance you did not receive the questionnaire or it got misplaced, please call me right now at (503) 245-8039 and I will get another one in the mail to you today.

Sincerely,

Cynthia Ensign, R.N.
OHSU Graduate Student
Primary Investigator

APPENDIX F - THREE WEEK FOLLOW-UP LETTER

January 30, 1984

Dear Colleague:

About three weeks ago, I wrote to you seeking your opinion on the use of cardiopulmonary assessment skills in the work setting. As of today, I have not yet received your completed questionnaire.

This research project has been undertaken because this information could be valuable in improving assessment courses taught and also provide a better understanding of current views regarding clinical use of these skills.

I am writing to you again because of the significance each questionnaire has to the usefulness of the study. Your name was drawn through a scientific sampling process in which every nurse member of AACN in the Northwest was asked to complete the questionnaire. In order for the results of the study to truly represent the opinions of AACN members in the Northwest, it is essential that each person in the sample return their questionnaire.

In the event that your questionnaire has been misplaced, a replacement is enclosed.

Your cooperation is greatly appreciated.

Sincerely,

Cynthia Ensign, R.N.
OHSU Graduate Student
Primary Investigator

CE:ks
enclosure

APPENDIX G

Chi Square Analysis
Differences in Course Preparation According to Educational Level

		Diploma	Associate/Baccalaureate and Higher
Cardiac Course Preparation			
	Yes	12 (17%)	45 (63%)
	No	7 (10%)	7 (10%)

Corrected $x^2 = 3.44$
df = 1
p = .06

Pulmonary Course Preparation			
	Yes	11 (15%)	43 (61%)
	No	8 (11%)	9 (13%)

Corrected $x^2 = 3.44$
df = 1
p = .06

APPENDIX H

Summary Table of One Way Analysis of Variance
Relationship Between Cardiopulmonary Skill Performance and Educational Level

Source		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Frequency of Cardiac Skill Use:	Between	7.96	2	3.98	3.27
	Within	85.28	70	1.22	
	Total	93.24	72		
Frequency of Pulmonary Skill Use:	Between	8.85	2	4.43	5.0
	Within	60.27	68	0.89	
	Total	69.12	70		
Importance of Cardiac Skill Use:	Between	2.87	2	1.44	1.95
	Within	48.65	66	0.74	
	Total	51.52	68		
Importance of Pulmonary Skill Use:	Between	1.29	2	0.65	1.03
	Within	40.63	65	0.62	
	Total	41.92	67		

APPENDIX I

Summary Table of One Way Analysis of Variance
Relationship Between Cardiopulmonary Skill Performance and Bed Capacity of Employing Agency

Source		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Frequency of Cardiac Skill Use:	Between	0.46	2	0.23	0.17
	Within	91.35	68	1.34	
	Total	91.82	70		
Frequency of Pulmonary Skill Use:	Between	4.33	2	2.16	2.23
	Within	63.94	66	0.97	
	Total	68.27	68		
Importance of Cardiac Skill Use:	Between	0.062	2	0.02	0.04
	Within	50.72	64	0.79	
	Total	50.78	66		
Importance of Pulmonary Skill Use:	Between	1.58	2	0.79	1.28
	Within	39.03	63	0.62	
	Total	40.62	65		

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AN ABSTRACT OF THE THESIS OF

Cynthia J. Ensign

For the Master of Nursing

Title: THE USE OF CARDIOPULMONARY ASSESSMENT SKILLS IN THE CRITICAL CARE SETTING

Approved:_____

A descriptive and correlational study was conducted to measure the frequency of cardiopulmonary skill performance by nurses in the critical care setting.

Subjects were one-hundred randomly selected registered nurses who were members of the Northwest chapter of the American Association of Critical Care Nurses (AACN). Selected demographic data included age, sex, area of employment, type of position and formal course preparation. Subjects who had taken a formal cardiopulmonary course significantly used skills more frequently than those who had not (in a t-test of groups means, significance $p \leq .05$). Baccalaureate and associate degree nurses used cardiopulmonary skills significantly more frequently than diploma degree nurses (in an analysis of variance, $p \leq .05$). There were no obstacles identified as deterrants to skill use.

Of eighteen skills tested only four, listening for adventitious breath sounds, assessing the presence/absence of breath sounds, listening for normal breath sounds and checking for peripheral edema, were used on a daily basis. The remainder of skills were used at least weekly. These results support previous studies demonstrating that nurses in the practice setting are not using sophisticated assessment skills on a regular basis in a systematic manner.