

CRITICAL CARE NURSE EDUCATION AND CRITICAL THINKING SKILLS

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ABSTRACT

RESEARCH SUBJECT: Critical Care Nurse Education and Critical Thinking Skills

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Nurses require well developed critical thinking skills to form clinical judgments. The expanding autonomy of nurses further necessitates the use of critical thinking abilities. This is especially true for critical care nurses. In the critical care setting, the nurse receives and must process large amounts of information to make decisions quickly. The purpose of this study is to determine if critical thinking skills of new registered nurses who complete a hospital based critical care course will be improved. A posttest design will be used. The study is a modified replication of the Rogal and Young (2008) study conducted in Australia. A purposive sample of 15 registered nurses who graduated from a baccalaureate nursing program within the last year and who have enrolled in a six month critical care course will be recruited for the study. The course consists of both didactic classroom component and supervised clinical practice rotations in the critical care areas of the hospital. Participants will complete the California Critical Thinking Skills Test (CCTST) prior to the start of the course and again at the completion of the course. Study results will provide information about changes in critical thinking skills of new registered nurses after completing a critical care course. Nurse educators may be able to use the information in the development and evaluation of on the job education programs that have an objective of improving critical thinking skills.

Chapter 1

Introduction

According to the National League of Nursing (NLN), “critical thinking in nursing practice is a discipline specific, reflective reasoning process that guides a nurse in generating, implementing, and evaluating approaches for dealing with client care and professional concerns” (Benner, Hughes, & Sutphen, 2012, p. 2). The NLN has established developing critical thinking skills as a criterion for all accredited nursing education programs and requires they define critical thinking in terms of their program objectives and that they demonstrate student development of critical thinking skills using outcome measures that matched the definition (O'Sullivan, Blevins-Stevens, Smith, & Vaughan-Wrobel, 1997). Critical thinking is an essential part of a nurse’s education and is a needed skill in every functional aspect of nursing care.

Background and Significance

Nurse educators recognize the importance of fostering critical thinking skills and evaluating improvements as a part of course outcomes. The importance of critical thinking skills does not stop when a nurse leaves the classroom. In fact, the ability to think critically becomes even more important when faced with clinical problems that require high levels of evaluation and problem solving on an everyday basis. This is

especially true for nurses in a critical care setting. These nurses must be prepared and able to process large amounts of information quickly and make sound clinical decisions.

Critical thinking skills are essential for nurses to be able to function in the increasingly complex and technology laden healthcare environments of today (Rogal & Young, 2008). Nurses are experiencing an increase in autonomy when making clinical judgments and implementing nursing interventions. Current literature describes an emphasis on the development and assessment of critical thinking skills in baccalaureate programs in nursing, but little is discussed about a similar emphasis when transitioning into a workplace environment. Newly graduated nurses may find the healthcare environments they are entering are challenging in terms of the high level of critical thinking skills it takes to make sound clinical judgments. There has been limited study of the further development of critical thinking skills beyond graduation and in specific nursing care settings.

Problem Statement

While a baccalaureate program sets a solid foundation for critical thinking skills it may not be enough in some nursing environments such as critical care. These nurses may benefit from further development of critical thinking skills through a focused course in critical care nursing.

Purpose Statement

The purpose of this study is to determine if nurses who participate in a course in critical care nursing will demonstrate an improvement in critical thinking skills over time. This study is a replication of a pilot study conducted by Rogel and Young (2008) that took place in Australia. It included 31 registered nurse participants enrolled in a 12 month

critical care nursing course to specialize in critical care nursing. This study will focus on the effects of expanding the clinical knowledge base of 15 nurses on their critical thinking skills. Using a pretest, posttest design the study will seek to determine if there is an improvement in critical thinking scores as measured by the California Critical Thinking Skills Test (CCTST) after completion of a six month critical care nursing course. It is assumed that there will be some, if even marginal, benefit gained from completing the course. The Rogel and Young study showed a slight improvement in scores over time but no significant increase was established. It was discussed in the study that motivation during the posttest may have been decreased due to the length of the course (12 months). This purposive study will be using a shorter class (6 months) and meet weekly to focus on a specific system. While the purposive sample size of 15 is much smaller than that of the study conducted by Rogel and Young (31 participants) the inclusion criteria of currently working in a critical care environment may also affect the outcomes positively. While the end result of the proposed study may not show a statistically significant increase in CCTST scores, any improvement in critical thinking skills would be significant to those participating in the course.

Research Question

Can a critical care nursing course with theory presented in classroom and simulation enhance critical thinking ability of newly graduated nurses?

Conceptual Framework

The conceptual framework for this study is the California Critical Thinking Skills Test (CCTST). The CCTST is a multiple choice educational assess selected core thinking skills. It was based on the consensus conceptualization of critical thinking that was developed from a two-year research project conducted by the American Philosophical Association (APA). The Delphi panel for the APA project included 46 experts active in critical thinking education, research, and assessment (Facione, 1990).

Definition of Terms

Conceptual.

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, synthesizing and/or evaluating information gathered from, or generated by, observation, experience as a guide to belief and action. (Scriven & Paul, 2009).

Operational.

The CCTST will be used to measure critical thinking. The CCTST consists of thirty four questions covering five subscales: analysis, evaluation, inference, inductive reasoning and deductive reasoning. The total score range possibility ranges from 0-34 (Rogal & Young, 2008).

Limitations.

The participants may come from different nursing programs. Since they are all new graduate nurses, their learning styles may vary. Some participants may have increased anxiety, which can influence their performance of scenario-based training.

Although there are different types of participants, the sample size is small and limits the ability to generalize results.

Assumptions

It is assumed that the participants will have had similar baccalaureate degree nursing curriculum. It is also assumed that the participants will be at approximately the same level in critical thinking skills prior to taking the course.

Summary

Innovative teaching and evaluation methods including classroom theory with hands on simulations with preceptors may support the development of critical thinking skills, thus improving outcomes for patients.

Chapter 2

Review of Literature

Introduction

Critical thinking is a rich concept that has been developing for centuries. This chapter is a literature review of research studies in the importance of critical thinking skills. The chapter is organized into two sections: learning styles and teaching strategies of critical thinking.

Conceptual Framework

The conceptual framework is based on the California Critical Thinking Skills Test. It is a standardized, 34-item multiple choice test that targets five core critical thinking skills: analysis, evaluation, inference, deductive reasoning, and inductive reasoning. Items on the CCTST are scored dichotomously: a correct answer is scored 1; otherwise the score is 0. The sum of the correct items out of 34 is the overall CCTST score (Beckie, Lowry, Barnett, 2001).

Learning Styles and Critical Thinking

No one style is better than another when it comes to learning styles of nursing students. Learning styles are believed to influence students' ability to learn. It is important for nurse educators to understand the different styles of learning so they can adapt teaching methods to meet the needs of the students. It is also important to

understand critical thinking dispositions as nurses today are responsible for making judgments about patients' complex health problems. Zhang and Lambert (2008) conducted a study to assess the learning styles and critical thinking dispositions of Chinese baccalaureate nursing students. The purpose of the study was to identify the relationships among the learning styles, critical thinking dispositions and demographics of the participants.

The study used a convenience sample ($n=100$) of students from two four-year baccalaureate nursing programs located in central China. The participants were all female and ranged in age from 18-23 years, with an average age of 20.42 years. Inclusion criteria included that students were in their fourth year of study and had 3 months of clinical practice experience. The study was briefly explained to the participants and they were informed that involvement was voluntary and they could withdraw at anytime. Permission to conduct the study was collected from the researchers' academic institution. All students were given a packet of three questionnaires to complete. The questionnaires were not to be disclosed and examined only by the investigators. The questionnaires were placed in a locked cabinet for security. To assure anonymity, code numbers were assigned to students (Zhang & Lambert, 2008).

The study was carried out using three questionnaires. The researchers designed a questionnaire titled Demographic Data to gather information regarding name, nursing school, age, gender, academic year and amount of clinical experience completed (Zhang & Lambert, 2008).

The next questionnaire, Index of Learning Style (ILS), was used to assess the students' preferences on four dimensions of learning, including sensing-intuitive, visual-

verbal, active-reflective, and sequential-global. Each learning style dimension had 11 associated forced choice items that consisted of two possible responses. For each dimension, scoring consisted of summing the number of items answered in each of the two response categories and subtracting the smaller response from the larger one. The resulting score indicated preference strength. The test-retest reliability coefficients have ranged from 0.6484-0.856. For this study reliability was found to be 0.48 (Zhang & Lambert, 2008).

The third questionnaire was the Chinese version of the California Critical Thinking Disposition Inventory (CCTDI). It was used to measure the dispositions toward critical thinking. It consists of 75 items with seven subscales, which have both positive and negative statements. The seven subscales include open-mindedness, inquisitiveness, truth-seeking, analyticity, systematicity, self-confidence, and maturity. Scoring items range from 1 = strongly agree to 6 = strongly disagree. The overall Cronbach's alpha of the Chinese version of the CCTDI has been found to be 0.71, while the subscale alphas range between 0.34 and 0.73. The alpha coefficient for this study was 0.71 (Zhang & Lambert, 2008).

The four learning styles that were the most common were reflective, sensing, visual, and global. The findings indicated participants were most likely to learn by thinking things through and working alone using concrete information towards facts and procedures. Unexpectedly, most of the students were found to be global learners, rather than sequential learners. Most schools in China tend to teach content in a manner helpful to sequential learners, which is linear in fashion. The average total CCTDI score was 272.82, which was lower than the established mean score of 280 set by Facione (1997).

By comparison, the scores were lower than those reported in prior research conducted in Western cultures. The participants failed to show a positive disposition towards critical thinking. Truth seeking scored the lowest. This might be a result of didactic oriented teaching, in which the students are expected to learn volumes of information presented in lectures instead of seeking information on their own. High scores on inquisitiveness indicated a potential for the development of critical thinking and clinical practice abilities. The clinical practice experience was negatively correlated with both the total CCTDI scores and most of the instrument subscales. The authors felt this was a result of the short amount of time the students had spent in clinical practice when the data were gathered and the traditional nursing practice emphasis on psychomotor skills rather than critical thinking skills (Zhang & Lambert, 2008).

The findings have implications for nursing curriculum development, as well as the use of various teaching/learning strategies. Because students have various types of learning styles, the authors described the importance of implementing a variety of teaching/learning strategies (e.g., case studies, clinical practice integrating with classroom experiences, role-playing, games, simulations, and problem based learning), rather than solely relying on lectures. Lectures have been the traditional way of teaching in China. It would be desirable to integrate other teaching strategies that could best serve Chinese nursing students to gain critical thinking skills (Zhang & Lambert, 2008).

Zhang and Lambert (2008) identified the ILS had a low reliability possibly because the instrument was developed in a Western culture and was not culturally sensitive to Chinese subjects. Further research is needed to identify and use instruments for measuring learning styles that are culturally appropriate for Chinese students. The

authors also recognized that they needed a more diverse sample. The sample was only taken from one city in China. Addressing both of these items could help determine what methods are best serving for Chinese nursing students in gaining skills in critical thinking.

One of the goals in nursing education is to generate nurses who think critically and are able to provide safe nursing care. The critical thinking dispositions (CTD) and learning styles of student nurses are of major concern to educators because they affect the teaching methods used in their development of critical thinking skills (Suliman, 2006). The purpose of a descriptive correlational study by Suliman was to examine the differences between critical thinking dispositions and learning styles of conventional Stream I nursing students and accelerated Stream II nursing students. The conceptual framework of the study was inferred to include the concepts in the study: critical thinking dispositions, learning styles, and conventional and accelerated baccalaureate nursing programs.

The study was conducted in Saudi Arabia at the College of Nursing and Allied Medical Sciences. The School of Nursing had two programs: Stream I conventional Bachelor of Science 4-year degree beginning with high school students, and Stream II accelerated program to students already with a Bachelor of Science degree. The difference between the two groups prompted the researcher to consider whether cognitive maturity may influence critical thinking (CT) abilities and learning styles (Suliman, 2006). Students who volunteered to be study participants were approached by the researcher and the nursing instructors, at which time consent was obtained and they were requested to complete a self administered questionnaire which included: demographic

data, Learning Styles Inventory (LSI), and the California Critical Thinking Disposition Inventory (CCTDI).

The LSI was developed to measure the participant's relative emphasis on four learning abilities. The questionnaire is set to assign ranking scores from 4 to 1 for each statement. The LSI has undergone evaluation by Kolb and was found to be reliable; however, it has received criticism from researchers (Kolb, 1984). The CCTDI consists of 75 statements that express familiar opinions, values and expectations toward seven dispositions intended to measure participants' critical thinking ability, open mindedness, analyticity, systematicity, self-confidence, inquisitiveness and maturity. The alpha Cronbach reliability for the CCTDI overall was 0.85 and 0.74-0.86 for the subscales. No reliability or validity was reported for the Kolb LSI instrument. Data collected were analyzed using SPSSX. Descriptive statistics (mean scores) and inferential statistics (i.e. MANOVA, ANOVA, and Pearson's correlation) were used (Kolb).

A total of 130 (65%) nursing students participated in the study (Stream I, $n=80$; Stream II, $n=50$). Analysis of the demographic data revealed the majority of Stream II students were biology graduates (60%), chemistry graduates (30%), with the remainder physics (6%) and math (4%) graduates. In previous baccalaureate education only 18% scored above 90% on their High School National Examination. The majority of Stream II students (62%) scored between 80-90%. The remaining 20% scored between 70-80%. The majority (58.2%) of Stream I students scored more than 90%, 40.5% scored 80-90% and 1.3% scored between 70-80%. With respect to learning styles, the four subscales of LSI (concrete experience, reflective observation, abstract conceptualization and active experimentation), MANOVA test revealed no significant difference between Stream I

and Stream II ($F=1.58, p=0.1836$). Univariate F test did show the two Streams were significantly different on the concrete experience subscale ($F=5.797, p=0.017$).

According to Suliman (2006), the failure to find a significant difference between the learning styles of Streams I and II was expected because they both represent the same population, i.e. primarily graduates of high school scientific stream. The significant difference in the Critical Thinking (CT) of the two streams may be attributed to the demographic difference of the students entering the nursing program at an older age bringing with them previous academic education experiences and independent learning styles (Sulliman).

The researcher expressed the opinion that assessment of learning styles and critical thinking should be given more attention by nursing education. Assessment of learning styles will help identify appropriate teaching methods, which will enable learners to achieve success. Teaching students with their learning style in mind will nurture their critical thinking skills and increase their capability to process information and enhance academic ability. The study sets the stage for ongoing research in the area of critical thinking and learning styles.

The expectations of newly graduated nurses are higher than they have ever been, given the complexity of today's patients. The preparation of students to think critically has been the goal of educators for the information age. Critical thinking is a large component of nurses' professional judgment that has the potential to affect patients in their care. The purpose of a descriptive correlational study by Gyeong and Myung (2008) was to examine students' critical thinking and learning styles and to investigate the relationship between learning styles and critical thinking among students in a Korean

baccalaureate nursing program. Understanding the link between learning style and critical thinking would enable the improvement of a curriculum that will help all styles of learners develop critical thinking skills.

Students were chosen from five different universities that were in a full time four-year baccalaureate nursing programs to be the convenience sample ($n=742$) in the study. The participants were primarily female (97%) and were between 17-35 years of age. Of the sample, 19.4% ($n=144$) were in their first year, 29.6% ($n=220$) were in second year, 24.7% ($n=183$) were in third year, and 23.8% ($n=177$) were in the fourth year. Questionnaire packets were distributed to the students in class. The packets contained a consent form, a participant information sheet, Learning Style Inventory (LSI) and Critical Thinking Disposition Inventory (CTDI). The only specific inclusion criterion was full time student status. The LSI is a self-descriptive inventory designed to measure learning style constructs. There are nine sets of four adjectives that participants are asked to rank from being the most characteristic (4) to the least characteristic (1) of their learning style. Learning styles are categorized as accommodating, assimilating, converging and diverging. The CTDI is made up of 26 items. The 26 items represent three constructs: engagement, cognitive maturity and innovativeness (Gyeong & Myung, 2008).

The instruments were translated and re-translated by the two nursing professors involved in the study. One translated forward and the other translated back to ensure that the words were as precise as possible. To identify the differences in learning styles and critical thinking one-way ANOVA with the Scheffe post hoc analysis for assessing group differences was used. The Spearman rank difference correlation measurement was used

to analyze relationships between critical thinking disposition and learning style (Gyeong & Myung, 2008).

The diverging style was the most common learning style for all but the fourth year students, who most commonly used an accommodating style. The level of critical thinking differed among learning styles and grades in the program. The diverging (75.11) group in a post hoc test had significantly lower overall critical thinking scores than the assimilating group scores (80.11) and converging (82.76) groups ($p=0.001$, $p=0.002$, $p=0.001$ respectively). The overall critical thinking scores for the converging learners group were significantly higher than the accommodating (77.89, $p=.001$) group. Critical thinking and engagement among fourth year students (78.75, 33.28) were higher than that of first year students (75.89, 31.65, $p=0.045$). (Gyeong & Myung, 2008)

The outcomes of this study by Gyeong and Myung (2008) have been helpful in understanding that there are different ranges of learning styles that exist within Korean nursing students. Results in the study showed that there was a lower number of students utilizing the assimilation or converging styles of learning. The students predominantly utilized accommodating and diverging learning styles. The authors recognized that nursing programs in Korea should focus on enhancing education programs to motivate learners in problem solving situations with their own unique style of learning. There were limitations of this study due to the students participating from five different universities. The curriculums from the different schools varied and provided different learning environments. This information could exert an influence on how the students utilized teaching styles. Nursing educators need to take into consideration when developing

curriculum that a variety of different learning styles may be needed to influence critical thinking.

Teaching Strategies and Critical Thinking

According to Jones (2008), faculty at a nursing program in a New York City community college found that nursing students were lacking critical analysis, problem solving and decision-making skills, and the ability to apply theory into practice. The faculty agreed to institute problem-based learning (PBL) as a teaching strategy in the clinical area and explore its impact on the development of critical thinking and communication skills. The purpose of this study was to answer two research questions. First, does the use of PBL as a teaching strategy in the clinical area in an associate degree nursing education program result in the development of higher levels of critical thinking? Second, does the use of PBL result in the development of improved communication skills in nursing students?

The sample for this study conducted by Jones (2008) consisted of 60 second-year nursing students enrolled in the maternal-newborn nursing course at an associate degree community college in New York. A quasi-experimental, posttest design with control and intervention groups was used. Participants were all on a volunteer basis and were asked to keep a reflective journal through the experience. A coin was flipped as to who was doing clinical time on Mondays and Tuesdays versus Thursdays and Fridays. This group was assigned as the control group. Participants who had clinical time on Thursdays and Fridays were assigned to the PBL experimental group. Each group had 30 participants.

Three instruments were utilized in the study. One instrument used was care plans (including data collection, nursing diagnosis, assessment, planning, implementation, and

evaluation) graded to assess critical thinking using the six levels of Bloom's taxonomy of the cognitive learning domain. A second instrument evaluated participants' communication interactions with staff, fellow students and faculty including both written and oral observed by the facilitator. Interactions were scored using Bloom's taxonomy. The third instrument was the participants' reflective journals of experiences and perceptions regarding critical analysis of their self-awareness utilizing the PBL process viewed by the facilitator. For both groups, care plans and communication interactions were evaluated at the beginning of the semester and at the end of the semester for comparison using Bloom's cognitive and affective learning domains. Only students in the experimental groups were asked to journal experiences and thoughts (Jones, 2008).

During week three, the experimental group had a preconference with the facilitator explaining the PBL process and strategies. At the end of each session, the participants were asked to clarify plans by (a) identifying all the issues arising from the hypothesis, (b) creating a list of tasks for the next session, and (c) prioritizing issues all students should tackle. Each participant had to decide how to critically think about his/her learning needs (Jones, 2008).

Descriptive and inferential statistical analysis was carried out using the Statistical Package for Social Science (SPSS), version 11. Reflective journal entries were categorized by common themes amongst the students. The PBL research had 100 percent participation (Jones, 2008).

The control group and PBL group did not differ significantly by gender or age. Critical thinking and communication scores also did not differ significantly. Both groups showed improvement over the semester. The intervention group demonstrated a highly

significant increase in critical thinking and communication levels compared with the control group ($p < 0.000$) at the end of the semester. Twenty-eight students (93.33%) in the intervention group found the journal entries were useful. Twenty-nine participants in the same group felt the PBL teaching strategy was more relaxing and intimate than lectures in a large class setting. The intervention group participants felt less embarrassed about asking questions or giving personal opinions. Most agreed that PBL assisted learning. Seventy percent of the group felt they had learned more from a group experience rather than an individualized study plan (Jones, 2008).

Generalizations of findings were limited. The study by Jones (2008) took place in one community college with one facilitator who was not blinded to the intervention. The researcher recommended that further research be conducted over several semesters with several colleges. Problem based learning appears to offer a way to encourage and support the students' efforts for developing critical thinking skills and improvement of communication skills. The PBL teaching strategy appears to be an alternate way of preparing nursing students to meet the needs of patients in a complex healthcare environment.

Meaningful learning involves the assimilation of new concepts and ideas with a learner's previous experience (Wheeler & Collins, 2003). This type of learning is necessary for the development of problem solving and critical thinking. Nurse educators seek teaching strategies, such as concept mapping, to facilitate meaningful learning. The purpose of this study was to examine the effectiveness of concept mapping as a strategy to help students develop critical thinking skills. The framework was based on the assimilation theory outlined in Ausubel (1968). Ausubel differentiated between

knowledge acquisition through reception and discovery learning, and knowledge acquisition through rote and meaningful learning.

The study by Wheeler and Collins (2003) used a quasi-experimental, posttest design. The participants were nursing students in the first semester of their junior year of school. The experimental group utilized concept mapping to prepare for clinical experiences and the control group did not. All sophomore nursing students were eligible and invited to participate for the following year. The concept mapping procedure was introduced as part of the orientation process for the junior-level Adult Health course and one section of the Pediatric Nursing course. Ages of subjects ranged from 20-44 with almost two thirds of the sample under 22 years old. Female participants accounted for 95% of the sample. All students had completed enough courses to begin the junior year of the nursing program. Thirty-two students who had no experience with concept mapping served as the control group out of the total 76 students.

A demographic questionnaire developed for the study was used to determine age, sex, level of education and previous use of concept mapping. The California Critical Thinking Skills Test (CCTST) was used to measure critical thinking skills for both the control and experimental groups. Internal consistencies were computed for the CCTST using the Kuder-Richardson 20 (KR-20) and determined acceptable for an instrument of this type (Form A=.70; Form B=.71). Face validity of the CCTST has been established through comments of test takers and by assessing the questions. Construct validity was supported by inclusion of test items that reflected the definition of critical thinking by the Delphi study. Construct validity has also been confirmed by and posttest experiments, which showed improved critical thinking skills in individuals who completed a critical

thinking course compared to those who had never taken a CT course (Wheeler & Collins, 2003).

With respect to the CCTST, a significant difference ($p < .05$) was found between the mean and posttest scores and each subscale between the two groups. Post hoc tests found differences between the groups to be insignificant. The experimental group scores improved significantly ($p < .05$) on the CCTST overall score and the analysis and evaluation subscales while the control group score improved significantly only on the evaluation subscale and declined significantly on the inference subscale (Wheeler & Collins, 2003).

The findings of Wheeler and Collin's (2003) study suggested that concept mapping was an effective means of promoting meaningful learning and improving critical thinking skills in nursing students. The authors suggested concept mapping should be considered an effective strategy to develop and measure critical thinking skills of students. Because there has been little research to examine the use of concept mapping as a means to assist students to develop critical thinking skills, the authors recommended further study.

There are many platforms of learning through reflection that suggest group discussion will assist in the development of the higher levels of reflective activity. The methods for promoting reflection at different stages of learning are discussed but there is less detail given on how the process is facilitated as students progress to a higher level of thinking. Platzer, Blake, and Ashford (2000) wanted to identify how reflective thinking is developed. The purpose of their study was to determine if critical thinking skills could increase through use of discussions in a reflective group process. According to the

authors, students are to learn more than empirical knowledge and technical aspects of their work. This is where most professional teaching and assessment is focused. The descriptive study design using phenomenological interviews was based on Mezirow's transformative learning theory. The transformative theory describes a learning process of becoming critically aware of one's own tacit assumptions and expectations of those of others and assessing their relevance for making an interpretation.

Two cohorts of a total of 30 students were followed through their second year of study in a part-time Diploma Program for Professional Studies in Nursing in a college of higher education in the south of England. There were four groups over the two years of study with between 6 and 10 members and one or two facilitators. The authors did not identify how the four groups were decided. The attendance at the group sessions was voluntary as was any participation in the research interviews, which were carried out when the students had completed their program. The groups were not forced to have a specific agenda when they met. The purpose was to share and explore their own practice. All four groups participated in the sessions. In the group session, students provided personal views and experiences of their practice to give support and validation. Each of the students participated in an in-depth qualitative interview about his/her experience. Individual interviews and group sessions were audio recorded and transcribed. They were then analyzed using a qualitative software analysis package (QSR NUD-IST version 3). The data were then coded and categorized as themes emerged. The main issues to emerge were barriers to reflective learning and factors, which facilitated learning and changes in attitudes and practice (Platzer, et al., 2000).

The ability to tolerate the perspectives of others demonstrated critical reflection, which enabled students to undergo the perspective transformation that is required to deal with others in a fair and equitable manner. The program of study within a culture of higher education enabled some of the students to develop their critical thinking and professionalism. The observational data suggested that the true potential of such learning was not always met. There were barriers and great resistance amongst many of the students. Examples of these barriers included stalling, backsliding, self-deception and failure. The researchers suggested nurse educators meet to find ways of overcoming all of the barriers. It would seem that the whole program of study within a culture of higher education enabled some of the students to develop their critical thinking and professionalism, and that the reflective practice groups made a powerful contribution to this process. Despite the barriers, Platzer, et al. (2000) found the information to be encouraging. They were able to identify radical developments for some students within the constraints. The challenge for future research is to identify ways of overcoming the barriers so that more students can benefit from reflective groups.

Many authors have underscored the need for nurses to be able to think critically in order to use appropriate knowledge and skilled judgments in delivering patient care (Khosravani, Manoochehri, & Memarian, 2005). The importance of critical thinking skills has driven educational programs to be evaluated on the development of skills related to this sort of thinking. The purpose of a study by Khosravani, et al. was to determine the effects of group dynamic sessions on critical thinking skills of baccalaureate nursing students. The research was to identify whether students could develop critical thinking abilities after participating in these types of sessions as a

teaching strategy. The conceptual framework was based on definitions of critical thinking and group dynamics.

The participants of the study consisted of 60 senior nursing students in midwifery programs that were randomly divided into two equal control and experimental groups. The participants in the study were between 22 and 24 years of age with similar educational records and were matched according to age and gender. The majority of the students were female and unmarried with no occupation or experience at group work. They mostly lived with their parents. No students were excluded from the experiment. It was not identified in the research article the type of learning method for the control group (Khorsravani, et al., 2005).

A questionnaire consisting of 12 questions and four clinical report forms to evaluate critical thinking skills were used for data collection. The clinical forms used were designed around the nursing process (assessment, diagnosis, planning, and evaluation). Validity of the questionnaire was determined by content validity and internal reliability was measured by internal consistency (internal consistency: 99.95). To identify reliability in rating, an inter rater reliability was measure (inter rater reliability: 0.88) (Khosravani, et.al., 2005).

The groups were further divided into subgroups who attended discussion and training sessions on concepts two days a week. A leader proposed a topic of discussion related to the roles of the community health nurse in which the students (experimental group) were to identify the likely problems and appropriate solutions. They were to also support their reasons or arguments. The control group completed their forms without discussion in a group setting. A Chi square and Mann-Whitney test revealed no

significant difference between the two groups with respect to the aforementioned variables as well as age and academic standing ($p < .05$). The total scores of critical thinking between the two groups, experimental and control showed significant differences verified by a paired t -test ($p = 0.0001$) (Khosravani, et al., 2005).

Khosravani, et al. (2005) concluded that the more educators provide scenes such as group dynamic sessions for better and deeper thinking, the better learners can understand and analyze phenomena in the surrounding world to be better critical thinkers. New methods should be applied to nursing education to generate nurses with powerful judgment and, therefore, skillful practice. Students in nursing programs are challenged to think in ways that will prepare them to work in the world of health care that is complex and ever-changing. One aim of nursing education is to enable students to develop critical thinking skills. Clinical practice increases nursing students' knowledge and nursing skills. The clinical experience is a significant part of the nursing students' education. Clinical teaching as well as classroom teaching can affect students' outcomes in the post-school work environment.

The aim of the study by Hsu (2007) was to explore nurse educators' perceptions regarding clinical post-conferences. Additional aims included the exploration of interaction characteristics between faculty and students. A qualitative study design that adopted participant observation, taped transcripts and field notes was applied with the aid of faculty members and students. Open ended questionnaires were created to trigger critical reflection on the clinical environment.

The sample for this study consisted of 10 nurse educators with Master's degrees that were instructors in a nursing program at a college in Taiwan. The school was a two-

year program for students with a high school diploma seeking to become a Licensed Practical Nurse (LPN) before attending nursing college. Students had to participate in 20 credits of clinical practice experiences. The students were required to take 12 credits of nursing practicum. The practicum was divided into three parts. In this study, nurse educators taught 10 students enrolled in nursing Practicum 1 in the med-surgical ward of a hospital for about four weeks. Each educator was observed by the researcher and one other observer twice during regularly scheduled clinical teaching times. A total of 20 clinical post-conferences, two conferences per teacher were observed. The post-conference was at the end of the student nurse shift to share experiences, debrief and ask questions. The post-conference usually lasted for about one hour. The only stated inclusion criterion was being a nursing instructor in the Practicum 1 course (Hsu, 2007).

The Non-Numerical Unstructured Data Indexing Searching and Theory-building (NUDIST) qualitative software was utilized for data analysis. This software is designed for the storage, coding, analysis and retrieval of text. Searching and Theory building also provided each item to be coded to a number of nodes that provided flexibility to construct categories. To strengthen the validity of the study, the researcher and additional observer worked together in open discussion through the whole research process. Inter-rater reliability was calculated to estimate the degree of agreement between the two raters on four page transcript segments. Inter-rater reliability was established at 85-93% by comparing data, data reduction products and process notes (Hsu, 2007).

The first goal was to investigate what the ideal clinical post-conference looked like in the nurse educator's mind. Seven of the instructors believed effective learning and discussion surrounding the topic of the day were vital for an ideal clinical conference.

The study found that the nurse educators tended to emphasize discussion of clinical experiences as well as assignments most often. An influencing factor was that the instructors did not understand the patient's condition well and only asked theoretical questions, not practical ones. Only a few educators led discussions in which theory was applied to practice. When they became more familiar with clinical situations, they were able to reflect on their experiences in a more effective way and make direct connections between theory and practice. Findings indicated that lower-level questions (knowledge and comprehensive questions) were mostly asked by faculty members during post clinical conferences. The most frequently used guideline was task orientation, which was related to practice goal and was found in discussions of assignments, reading reports, role plays and student evaluations (Hsu, 2007).

Hsu (2007) suggested that educators should receive regular training to improve professional expertise and to help find better ways of motivating students during the learning process. Clinical conferences have been found to include cognitive, affective and behavioral learning. A conference session provides a time in which a student can exercise reflective skills. Post conferences may be used to assess critical thinking abilities and skills in analyzing significant incidents in practice in a group format. It is essential for nurse educators to promote post conferences to assist students in applying theoretical knowledge in to practical situations enhance problem solving abilities.

Critical thinking skills are essential for nurses to function in increasingly complex and technology laden health care environments. Nursing education must prepare nurses to possess critical thinking skills necessary for effective critical judgment (Beckie, et al., 2001). Revision of nursing curriculum may assist educators to better prepare nurses.

Research is limited with respect to the effects of curriculum revision and whether or not it has an impact on critical thinking skills of nursing students. The purpose of a study by Beckie, et al. was to evaluate whether critical thinking skills were attained by nursing students as measured by the California Critical Thinking Skills Test (CCTST) before and after revision of the curriculum. The conceptual framework of this study was inferred to include the concept of critical thinking skills as measured by the CCTST.

The study utilized a posttest, nonequivalent control group longitudinal design. Groups consisted of naturally assembled classes of nursing students. The control group completed the baccalaureate curriculum before revision. The experimental groups were the first two classes to complete the revised baccalaureate curriculum. The study was completed at a central Florida college. The students were non-licensed baccalaureate nursing students in their junior year. Students who were participants in the study completed a test booklet and demographic questionnaire that indicated consent. Participation was on a volunteer basis and all information was confidential. Codes were given to the students to provide anonymity. Cohorts 1, 2, and 3 were largely female and with average ages of 24.6, 25.8 and 26.4 respectively. The majority of participants in all cohorts were single (66.3%) and Caucasian (72%) (Beckie, et al., 2001).

With a longitudinal design, students entering the basic baccalaureate nursing program were given the CCTST at three different times. The participants initially took the CCTST at the beginning of the program (beginning of the junior year), midpoint (beginning of senior year) and at exit (graduation). Internal consistency reliability estimates (Kuder Richardson-20) computed separately by and posttest for the 34 item instrument ranges from 0.68-0.70. A demographic data form developed for the study, was

used to collect information related to gender, race, marital status, employment status, and prior instruction related to critical thinking (Beckie, et al., 2001).

A repeated measures ANOVA was used to analyze the data for differences in critical thinking skills between students of the former curriculum and the revised curriculum emphasizing critical thinking as measured by the CCTST. Cronbach alpha internal consistency reliabilities on the CCTST total scores for each test and each cohort ranged from 0.55 to 0.83. Cohorts 1, 2, and 3 had statistically significant differences on the total CCTST score ($F=10.04$, $p<.001$). After removing the effects of repeated testing, Cohort 2 demonstrated statistically higher scores compared with Cohort 1 on the total CCTST. As Cohort 2 improved dramatically on both total CCTST scores and all subscale scores, there did appear to be a correlation between the changes in curriculum and improved critical thinking skills in the students. Cohort 3, the second class to experience the revised curriculum, failed to demonstrate improved critical thinking skills over time. The authors considered that significant life transitions unique to Cohort 3 may have affected this outcome. The students in Cohort 3 knew there was no direct impact on their grades after completing these tests. The students in this group found the CCTST to be cognitively challenging, and some tended to have little motivation to complete the test within the time allotted. In general, the authors found that the test was taken more seriously by juniors than seniors due to the fact they had other areas of focus. Seniors were distracted by graduation, work and preparing for the NCLEX (Beckie et al., 2001).

Changes in instruction and education are necessary to move from rote memorization to effective critical thinking (Beckie et al., 2001). Research is limited with respect to the effects of curriculum revision and whether or not it has an impact on

critical thinking skills in nursing students. Standardized testing is best if it is supplemented with other evaluation methods to assess critical thinking ability. The use of the CCTST may need to be supplemented with other tools, perhaps more nursing focused (Beckie, et al., 2001).

Ongoing Critical Thinking Development

Critical thinking dispositions and skills are essential to new graduate nurses. The nursing field has required nurses to be more efficient and faster thinkers. Nursing education has taken a closer look at the relationship of critical thinking skills (CTS) and critical thinking dispositions (CTD) as part of their curriculum. The purpose of this study by Profetto-McGrath (2003) was to look further into the CTS and CTD of students enrolled in a four-year baccalaureate program. The study utilized a non-experimental cross-sectional design. This type of study allowed for simultaneous collection and examination of data from four cohorts of students enrolled in a baccalaureate program. Students involved in the study were in various years of study from the first to the fourth year in the program.

Students participated on a volunteer position. Participants in the study totaled 228 (35%) of the 649 full time undergraduate students at a university in Western Canada. Inclusion criteria for the students involved age, gender and level of academic preparation. There were no specific exclusion criteria noted. Signed, informed consent was obtained from each student prior to the administration of the tests. The mean age of participants was 22.6 years. One hundred and three nursing students (45%) reported only high school education prior to the baccalaureate program. Sixty-five (29%) reported they had

completed university level, and the remainder of the sample ($n=60$, 26%) reported completion of some college courses (Profetto-McGrath, 2003).

The author posed three questions for the study: “What are the CTS and CTD of baccalaureate students? Do baccalaureate nursing students’ CTS and CTD scores differ according to the number of years in the program? Is there a relationship between baccalaureate nursing students CTS and CTD scores?” (Profetto-McGrath, 2003, p. 571). Instruments utilized in this study were the California Critical Thinking Skills Test (CCTST), the California Critical Thinking Disposition Inventory (CCTDI) and a background/demographic questionnaire. The CCTST has five subscales including: analysis, evaluation, inference, deductive reasoning, and inductive reasoning. The CCTDI consists of 75 statements with 9-12 attributed to each of the subscales. The CCTDI uses a six point Likert scale in which 1 = strongly agree and 6 = strongly disagree. The respondent’s answers are given a score 1-6. Standardized scores are then calculated for each subscale. The reliability of the CCTST and CCTDI were established using the Kuder Richardson 20 and Cronbach Alpha respectively.

Data were analyzed using both inferential statistics and descriptive statistics. The descriptive figures included calculations of means, standard deviations, modes, minimum and maximum scores, percentages, and confidence intervals. The inferential statistical tests were ANOVA and the chi-squared test. The CCTST mean scores for each year were 16.7-17.9, out of a maximum of 34. The mean scores increased from years one through four with the exception of year three. There was no significant difference among the groups. The norms for undergraduate nursing students taking the CCTST range from 10-20. In Profetto-McGrath’s (2003) study, six students (2.6%) scored below ten and 87

(38.1%) scored above 20 indicating adequate level of critical thinking skills. The mean CCTDI scores for the four cohort groups ranged from 136 to 392. Four of the students scored below 280 while 29 students scored greater than 350. Thirteen of the year four students achieved scores greater than 350, whereas only one first year student achieved this. There was no statistically significant difference among the four years of students within the program. The CCTST and the CCTDI both showed that scores did not increase with each academic year in the program. Both the CCTST and CCTDI scores may be related to cognitive development.

The findings in this study indicated that most students have adequate levels of CTS and CTD and that these relate positively and extensively to one another. The findings also suggest that cognitive development requires more time than the four years required to complete a baccalaureate program. Profetto-McGrath (2003) concluded from the study results that students need continued development in these areas. The author also recommended nurse educators should be knowledgeable about critical thinking skills and critical thinking dispositions and strategies best suited for students' development in these areas. There is need for further cognitive growth and development beyond basic nursing school to be able to engage in critical thinking.

Zygmunt and Schaefer (2006) conducted a study to assess three areas: (a) critical thinking (CT) skills of nurse faculty, (b) a benchmark of performance for CT skills in nursing students, and (c) the relationship between epistemological position and critical thinking skills of faculty. The purpose of this study was twofold to determine the CT skills of nurse faculty and to examine the relationship between epistemological position and critical thinking. The conceptual framework of this study was based on the definition

of the concept of critical thinking. The measurement of this concept was the California Critical Thinking Skills Test (CCTST) completed by the educators in the study. The faculty varied on their ability to critically think themselves.

A randomized national sample of 300 full-time nursing faculties from National League for Nursing (NLN) member schools was targeted. All types of programs were included except doctorate programs. Five packets were sent to the director of a random sample of 60 schools of nursing. Each packet contained the CCTST, the Learning Environment Preference (LEP), demographic questionnaire, a return envelope and a response card indicating a willingness to be interviewed. The packets were also mailed to a convenience sample of 50 schools; these were not restricted to NLN member schools. The mean age of respondents for the study was 50.66 years ($SD=6.61$); 75% were female. The majority (78.4%) reported having no formal critical thinking education. Respondents reported teaching in different types of programs representing 32.4% diploma/associate degree, 43.2% Bachelors of Science in Nursing and 21.6% Masters of Science in Nursing (Zygmont & Schaefer, 2006).

The California Critical Thinking Skills Test (CCTST) was chosen to measure the CT skills of faculty because it is nationally accepted (Zygmont & Schaefer, 2006). This test is a 34 multiple choice instrument that measures critical thinking ability. Reliability was established with a Kuder-Richardson value of 0.68-0.75. The CCTST reliability coefficient for this study was 0.86. The Learning Environment Preference (LEP) assesses an individual's learning environment preference as an indication of epistemological position. The LEP has 65 items categorized into five domains: course content/view of learning, role of the instructor, role of the students/peers, classroom

atmosphere/activities, and evaluation procedures. The reliability coefficient for each domain instrument ranged from 0.64 to 0.84. Overall reliability for this study was 0.79. A demographic questionnaire was developed by the researchers. In addition to items including age, gender, and years of experience, each respondent was asked to identify whether or not he/she had any formal or informal education in CT.

The CCTST indicated some variability of CT of the faculty. The mean total score of 19.14 ($SD=6.76$) was compared with the mean total scores of two norm groups of students. Study data were examined for existing correlations among scores for the total CCTST and the subscales. In the study sample there was no correlation between the analysis score and the remaining subscale scores. Strong positive correlations were found between the total score and the inference, evaluation, induction, and deduction subscales. The LEP analysis indicated that no faculty viewed knowledge as absolute or dualistic, as indicated by positions one through three. However, no faculty achieved position five, which is indicative of critical thinking. The CCI (total LEP) mean score for the entire sample was 395.41 ($SD=28.70$), indicating Position 4 (Zygmot & Schaefer, 2006). Interviews were conducted with 12 faculty respondents who provided a clinical or classroom example of a student's use of critical thinking. The mean score on the CCTST indicated that the majority of faculty respondents were considerably more skilled at CT than the typical senior nursing student. The CCTST scores demonstrated that all faculty respondents were not equally skilled at critically thinking and findings from the LEP indicated that faculty respondents had not fully developed critically thinking skills (Zygmot & Schaefer, 2006).

Zygmunt and Schaefer (2006) concluded that the study was limited by the small convenience sample and by the LEP design, which weighted in favor of classroom teaching. The design of the LEP is particularly important because all but three examples of student critical thinking ability provided by faculty members were clinical. The prevalence of clinical examples, and perhaps LEP results, suggested that faculty had not made the switch to teaching critical thinking skills in the classroom. There is no trouble in the clinical setting to show these skills. However the faculty could not cite classroom examples of CT, suggesting that the blending of classroom theory and clinical had not occurred. The relationship between theory and practice suggests that it is important to repeat the study using a larger sample. The authors of the study recommended the instructors look introspectively to their classroom content. The practice has always been to teach the theory and make it applicable into the clinical setting. It is time the clinical experience should be more prevalent in the classroom to teach the skills needed for critical thinking. Ongoing development for instructors to teach critical thinking to students is needed to prepare for the clinical environment.

Critical care nurses process vast amounts of information and require well-developed critical thinking skills to make clinical decisions. Nursing education should address the need to develop critical thinking skills. It has not been well studied to know if continuing education after becoming a registered nurse may further enhance critical thinking skills. Rogal and Young (2008) conducted a study to explore if clinical judgment could be taught in education provided in a post graduate setting. The purpose of the study was to determine if critical thinking skills improved over time after nursing school. The

conceptual framework of this study was inferred to include the concept of critical thinking skills as measured by the CCTST.

A purposive sample consisted of 31 nurses enrolled in the 2004 (15 nurses) and 2005 (16 nurses) course for critical care. The course was a 12 month full-time program accredited with the School of Nursing and Midwifery at Curtin University of Technology in Australia. It was offered only to registered nurses seeking to specialize in the area of critical care nursing. The majority of participants were female (83.9%). The nurses had an average of 5.5 years ($SD=4.0$) of general nursing experience and an average of 2.3 years ($SD=2.8$) of critical care nursing experience. Participants were advised that the study was completely voluntary and that they could withdraw at any time throughout the study. Consent was obtained before the self-administered questionnaire. Numeric codes were utilized instead of names for confidentiality purposes (Rogal & Young, 2008).

The California Critical Thinking Skills Test (CCTST) was used to measure critical thinking skills at the beginning of a 12 month course and at the end of the course. The 34 multiple choice questions in the CCTST cover five subscales: analysis, evaluation, inference inductive reasoning, and deductive reasoning. The possible range of score is from 0-34. The CCTST is a reliable psychometric instrument internal consistency as demonstrated by the Kuder-Richardson 2- that ranges from .78-.84 (Rogal & Young, 2008).

The CCTST revealed a mean total score of 18.5 at the beginning of the course and a mean total score of 19.7 at the end of the course (posttest). The posttest scores ranged from 7-32. There was no significant difference observed between the pretest and posttest scores of the nurses in the critical care nursing course. Comparison with a normative

group of fourth year college students showed that critical thinking means scores were higher for the study participants than for the college students. It was not possible to perform analysis between the participant mean scores and those for the normative group. At posttest, 16 participants (31%) demonstrated improvement regarding critical thinking skills. A slight improvement in mean critical thinking scores was seen in over half of the group (58%, $n=16$) between and posttest of the participants (Rogal & Young, 2008).

This was a small pilot study therefore findings could not be generalized. There was no control group included in the study therefore validity was at risk. The course assessors stated that they observed the development of critical thinking skills even though the improvement was slight (Rogal & Young, 2008). The authors suggested that nurses who are efficient critical thinkers are more prepared to provide advanced nursing care to their patients. Educators are encouraged to develop and implement better ways to prepare their students for improvements in advanced nursing. The authors suggested that educators utilize a reliable instrument along with their clinical assessment to objectively measure the critical thinking skills of students. This can allow educators to address more specific areas in a critical care course. The ongoing development of critical thinking skills can be a challenge and should be addressed in a variety of both classroom and clinical settings.

Summary

This chapter described a literature review of different learning styles and teaching strategies for critical thinking. The findings have shown implications that further development of nursing curricula is needed due to the various types of learning styles.

Each study discussed in the literature review showed that teaching strategies can be influential for the ongoing need to make decisions in a complex diverse healthcare future.

Chapter 3:

Research Methodology

Conducting the Research

Critical thinking can be characterized as a method of analyzing and evaluating information collected through observation, reflection, experience or communication that can lead people to a belief or action. The American Philosophical Association concluded that interpretation, analysis evaluation, inference, explanation and self regulation are all components of critical thinking. Critical thinking dispositions and skills are essential to new graduate nurses. The nursing field has required nurses to be more efficient and faster thinkers. Nursing education has taken a closer look at the relationship of critical thinking skills (CTS) and critical thinking dispositions (CTD) as part of their curriculum (Profetto-McGrath, 2003). Nursing care plans have long been the tool of choice for developing students' abilities to use the nursing process as framework for learning problem solving. However, nursing care plans are linear and conceptually flat and have limited effectiveness in developing critical thinking skills (Wheeler & Collins, 2003).

The purpose of this study is to determine if critical thinking skills of new registered nurses who complete a hospital-based critical care course will be improved. This study is a replication of the Rogal and Young (2008) study conducted in Australia.

Research questions

1. Will new nurses gain critical thinking skills after enrollment in a hospital-based critical care course?
2. Can didactic/scenario based training increase critical thinking ability?
3. Can reflective learning sessions better prepare new nurses when faced with having to make quick clinical judgments?

Research Population, Sample and Setting

The purposive study will be focusing on critical care nursing at a hospital location that has an active critical care program with a relatively large pool of critical care nurses from which to gather a sample of at least 15. The nurses will be new graduates nurses from a Baccalaureate nursing program within the past year. All of the nurses hired for the critical care units will be required to be in the 6 month orientation program. They will all be invited to participate in the study but will not be required to do so.

The hospital is located in the Midwest and is a large level-one trauma facility with approximately 860 beds. The five critical care units at this hospital include: Neurological ICU, Surgical ICU, Cardiac ICU, Trauma ICU, and Emergency Department.

Protection of Study Participants

This study will be submitted for approval to the institutional review boards of Ball State University Institutional Review Board (IRB) and Methodist Hospital. The ethical principles for research will be followed. Participation in the study will be voluntary and participants will be informed that they may discontinue participation at any time without penalty. No risks have been identified with participating in the study. Pre and post course

surveys will be coded for comparison. No names will be used on surveys or any other data.

Procedure

After receiving IRB approval, the research project will be introduced to the hospital unit managers and education department. The researcher will give the potential participants full explanation of the study. If participants are willing to proceed, a written consent form will be signed. The participants will take a pretest CCTST exam before beginning the educational course. Participants will be given a number for anonymity. Scores will be stored for future comparison. Educational courses will be separated by subjects and will meet on a weekly basis. The participants will meet every Monday for six months. The researcher conducting the study will utilize educators in the respective critical care fields to teach the courses. The course will include both theoretical content as well as clinical practice with preceptors. This information will be conveyed to the participants. At the conclusion of the six month educational course, the participants will take a post-test CCTST exam.

Research Design

This study will utilize a one-group posttest design. The purpose of this design is to measure the degree of change occurring as a result of treatments or interventions. This is one of the more frequently used designs. The events between the and posttest have the ability of manipulation of the independent variable called the treatment thus altering the results of the posttest (Burns & Grove, 2005)

Data Analysis

The critical thinking scores will be derived using the scoring protocol for the CCTST. The normative scores for the CCTST will be derived from a sample of college students prior to graduation. Descriptive and inferential statistics (paired t tests) will be used to analyze the data.

Expected Outcomes

The participants will show a significant increase in the posttest CCTST. When the course is completed the participants will have gained an increased ability to recognize changes in a patient, anticipate potential risks and interpret data to facilitate decisions.

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