BASIC KNOWLEDGE IN CRITICAL CARE: A COMPARISON OF EXPERIENCED

AND NEWLY GRADUATED NURSES AUGMENTED WITH AN EXAMINATION

OF NEWLY GRADUATED NURSES' EXPERIENCE MAKING CLINICAL

JUDGMENTS

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By

Lynn L. Wiles

December 2010

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ABSTRACT

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Dissertation supervised by: Lynn C. Simko, PhD

Newly graduated nurses (NGNs) are thrust into roles that some purport they are inadequately prepared to handle. Studies found that 4% of NGNs were comfortable with their skills, it took up to one year to feel competent and confident, and NGNs feel shocked, unprepared, and overwhelmed.

The purpose of this mixed method study was to investigate the basic knowledge (BK) of NGNs working in the critical care (CC) setting and compare it to the BK of experienced nurses and to understand the experience of NGNs as they made clinical judgments. Triangulation linked the experiences of NGNs as they made clinical judgments and their BK scores. The Novice to Competent Nurse Process Model by Schoessler and Waldo provided the theoretical framework for this study.

The Basic Knowledge Assessment Test (BKAT-7) and demographic tool were completed by 26 NGNs and 147experienced nurses on 14 adult CC units in 9 hospitals. Five NGN volunteers participated in interviews where they related challenging patient scenarios and shared their decision making experiences related to planning and providing care.

A t-test was used to determine the hypothesis of difference of mean BKAT scores between the NGN and experienced nurses. ANOVA was used to analyze the NGNs' scores within the three stages as well as entry degree levels and other demographic variables. A regression analysis was completed to determine the relationship between experience and CC BK.

The researcher was not surprised to find a statistical difference between NGN and experienced nurses' BKAT scores however the fact that nearly 40% of the experienced nurses did not reach the threshold of 82-84 set by Toth was astonishing. Therefore one focus of the research changed from determining when NGNs reach the BKAT score of experienced nurses to determining when CC nurses reach the BKAT threshold. Three themes emerged from the NGN interviews: Developing confidence in practice; Seeking assistance; and Decision making. Triangulation showed that NGNs' lack of experience, in-depth knowledge, and confidence coupled with low BKAT scores hinders their ability to make decisions as evidenced by NGN reliance on experienced nurses to guide them in crisis situations.

DEDICATION

This dissertation is dedicated with gratitude, love, and thanks for your endless support, patience and encouragement. I couldn't have finished this without all you!

To **Eric and Courtney**- thanks for being the world's best son and daughter while Mom pursued this dream! I love you as much as a mother can love!!

To my mom **Barbara**, sister **Kristy** and her family **Steve, Josie and Allison**, and in-laws **VerDell and Bob** thanks for your patience, support, and confidence in me.

To **Kim, John, Andrei and Zhenja**- thanks for blending with our family- you are a special part of our lives! Hey Kim- maybe someday we'll tell the hubbies and kids that the Sunday afternoon play and dinner dates were really mom school dates!

To my **friends, fellow faculty, and entire family** who put up with me always needing internet access wherever we were- thanks for being tolerant and supportive while I studied, wrote papers & pondered. You can still just call me Lynn- Dr. Wiles will be reserved for my students!

This dissertation is also dedicated in memory of my father, **Al Lundeman**, and grandparents **Fia and Walt Haun**- 3 more people who taught me that I could accomplish any dream that I had & provided me with the resources by which to do it.

And last, but certainly not least, my husband **Chris**, thanks for everything for the last 25years. Without your love, support, & commitment to us as a family, these 6 years of doctoral study wouldn't have been possible. I love you. Now fire up that blender- it's time for margaritas! Mission accomplished!

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Introduction

The Joint Commission for the Accreditation of Healthcare Organizations states that there were 126,000 unfilled hospital nursing positions in 2002, a number expected to reach 400,000 by 2020 (Joint Commission for the Accreditation of Healthcare Organizations, 2002; Santucci, 2004). The American Association of Colleges of Nursing (AACN) (2005) paints a bleaker picture stating that the United States will need one million more nurses by 2010. The cause of the shortage is multi-faceted and includes an aging workforce, increased employment opportunities within and outside of nursing, and a rapidly aging baby boomer population that fuels a growing demand for nurses.

Although the AACN (2005) reports a 13% increase in entry level baccalaureate nursing enrollments between 2004 and 2005 they report that 41,683 qualified applicants were turned away from schools of nursing in 2005 due to faculty shortages, lack of clinical sites and preceptors, and funding (2006). Consequently, the nursing job market was anticipated to rise by approximately 23% between 2000 and 2005 and is expected to increase by an additional 37% by 2020 (Zimmerman, 2000) requiring 1.2 million additional nurses by 2014 (American Association of Colleges of Nursing, 2005). Additionally, the average age of working nurses increased from 45.2 years on 2000 to 46.8 years in 2004 and75% of the nursing workforce is 40 or older and the number of NGNs entering practice does not cover the number of nurses who are retiring (Duvall, 2009).

In 2004 the Health Resources and Service Administration used current nursing supply and demand data to predict similar future nursing shortages (Table 1) (U.S. Department of Health and Human Services, 2004). The widening gap between supply and demand must be filled. Therefore, the newly graduated nurse (NGN) becomes a precious commodity sought to fill positions, even in health care areas traditionally opposed to hiring inexperienced nurses.

Table 1. Projected Supply, Demand, and Shortages of Full Time Registered Nurses

	2000	2005	2010	2015	2020
RN Supply	1,890,700	1,942,500	1,941,200	1,886,100	1,808,000
RN Demand	2,001,500	2,161,300	2,347,000	2,569,800	2,824,900
RN Shortage	(110,800)	(218,800)	(405,800)	(683,700)	(1,016,900)
Supply ÷ Demand	94%	90%	83%	73%	64%
Demand Shortfall	6%	10%	17%	27%	36%

Source: U.S. Department of Health and Human Services, 2004

There is a growing concern about new graduates' readiness to enter the field of nursing including claims that nurses from all types of programs are inadequately prepared to care for the high acuity patients found in the acute care setting. Casey, Fink, Krugman, and Propst (2004) found that only 4% of NGNs were comfortable with their skills and that it took up to one year of full time practice for them to feel competent and confident in their ability to provide care. Cantrell, Browne and Lupinacci (2005) report that NGNs

feel shocked, unprepared, and overwhelmed with the responsibility of the professional role. Coupled with the report that first time NCLEX pass rates decreased by 23% between 1996 and 2000 concerns about NGN clinical competence are corroborated (Blanzola, Lindeman, & King, 2004). del Bueno (1994) reported that only 38% of new graduates met expectation levels for recognizing acute changes in patient health status; initiating and understanding the relevance of independent and collaborative interventions, and differentiating between emergent, urgent, and non-urgent situations. Marcum and West (2004) found that only 11 out of 20 NGNs met entry level critical thinking expectations at the end of their eighth week of orientation. The National Council for State Boards of Nursing reported that NGNs were unprepared to recognize abnormal symptoms, lacked the ability to supervise unlicensed personnel, required assistance performing basic psychomotor skills, and were unable to intervene in emergent situations (Casey et al., 2004). Alarmingly, although 57% of chief nurse executives deemed NGNs were unsafe for practice, 38% of those nurses were assigned to care for six to seven patients and 11% cared for more than seven patients per shift (Casey et al.). NGNs may not be sufficiently prepared to deliver patient care safely and effectively; meanwhile hospitals are shortening orientation programs for fiscal reasons (Institute Of Medicine, 2003). Competence is linked to patient safety, so this is a priority concern for all health care providers and consumers.

Background

Upon graduation and securing employment, NGNs are thrust into a role that some purport they are inadequately prepared to handle (Carlisle, Luker, Davies, Stilwell, & Wilson, 1999; Morolong & Chabeli, 2005; Murphy, Andersen, & Ebelin, 2002). The

hospital must assure that the NGNs are ready to practice nursing, an assessment that evaluates a skill set including critical thinking and prioritization, communication, application of the nursing process, performance of technical procedures, and medication administration (Joint Commission on Accreditation of Healthcare Organizations, 2004). Clinical competence is the ability to demonstrate the knowledge and skills required to meet professional nursing expectations (American Nurses Association, 1994) which includes a blend of procedural skills and cognitive knowledge that varies based on context (Reddish & Kaplan, 2007). Competence must be linked to outcomes that reflect the dynamic roles and expectations of nurses, and safety is a common denominator by which readiness to practice is assessed (Schroeder, 1997). However, there is no required standard that must be reached by NGNs before completing an orientation period and practicing without the supervision of another nurse.

Effective transition has been identified as an integral component in NGN retention. The cost of filling a nursing vacancy and orienting a new nurse accounts for a substantial portion of hospital budgets and can be as high as 150% of the employee's annual compensation (Contino, 2002). While it takes 60 days to fill a vacancy with an experienced nurse, the search to fill the same position with a NGN only takes 20 days (Loiseau, Kitchen, & Edgar, 2003) and the cost of refilling a single position and orienting a new employee can reach $ 81,000 (Casey et al., 2004). Although more difficult to quantify, staff morale is impacted by unfilled positions and high turnover rates resulting in decreased productivity, increased errors, preceptor exhaustion, and manager time filling positions (Casey et al., 2004; Contino). Structuring transition programs that provide the NGN the opportunity to become confident prior to independence increases

the likelihood of the NGN remaining with the unit, thus benefiting the graduate nurse, other nurses on the unit, patients, and the hospital.

Certifying that new nurses are ready to practice independently is a challenge faced on units where novice nurses are hired. An Institute of Medicine (IOM) report (1999) declares that up to 98,000 people die annually in US hospitals due to preventable errors. Additionally, the IOM (2003) recognized that NGNs may not be sufficiently prepared to deliver patient care safely and effectively and that hospitals are shortening orientation programs due to financial considerations. The coupling of that data stresses the importance of assuring that the NGN is ready to practice independently when leaving the transition program.

Utley-Smith (2004) asserts that "competence for professional practice is not static" (p. 166) and that NGNs assume significant responsibility when providing patient care. Staff nurses surveyed by Blanzola, Lindeman, and King (2004) assert that NGNs are being placed in patient care situations that they are not prepared to manage. The transition of the NGN provides an orientation period before decisions with life-threatening implications are made independently, however more research aimed at identifying the needs and supporting the transition of the NGN is needed (Ebright, Urden, Patterson, & Chalko, 2004).

Purpose of the Study

The purpose of the quantitative portion of this dissertation study was to investigate the level of basic knowledge of NGNs working in the critical care setting and compare it to the level of basic knowledge of their experienced counterparts. The researcher aimed to determine at what point in time the NGNs attain similar basic

knowledge scores as the experienced nurses. The purpose of the qualitative portion of this dissertation study was to understand and interpret the experience of NGNs as they make clinical judgments in the critical care setting.

This study was a mixed methodology design and include quantitative data obtained by administering the critical care Basic Knowledge Assessment Tool, version 7 (BKAT-7) coupled with a qualitative hermeneutic phenomenological design to explore the pedagogically grounded concept of NGNs making clinical judgments. The goal of triangulating the data was to understand the experience of NGNs as they make clinical judgments and compare it to their level of basic knowledge throughout their first 18 months after graduation. When converging the two types of data the researcher hoped to neutralize the bias inherent in each research methodology and strengthen the quantitative results by incorporating examples of NGNs' experience making clinical judgments with their level of the basic knowledge needed to care for critical care patients.

Research Questions

The research questions and hypotheses were derived based on a review of current research examining NGN readiness to practice and clinical judgment. Numerous studies exist regarding clinical readiness or competence, but no studies were found that identified when NGNs reach the competence level of experienced nurses. Likewise, there is a paucity of research examining the clinical judgment and decision making skills of NGNs. Research questions for this study follow:

1. What level of basic knowledge and skills, as measured by the critical care BKAT-7, do NGNs have to prepare them to work in critical care compared to experienced nurses?

2. What demographic variables relate to basic knowledge of NGNs in critical care compared to experienced critical care nurses?

3. At what point after graduation does the basic knowledge of NGNs in critical care reach the level of basic knowledge of experienced critical care nurses as measured by the critical care BKAT-7?

4. As identified by the critical care BKAT-7, are there specific basic knowledge content areas that are consistently not met by newly graduated nurses?

5. What is the experience of NGNs as they make clinical judgments during their first 18 months of employment in critical care?

6. Do the experiences differ based on the length of time that the NGN has worked in critical care?

Hypotheses

1. New Graduate Nurses in critical care will have less basic knowledge as measured by the BKAT than experienced critical care nurses.

2. There will be a difference in basic knowledge scores between nurses with associates degrees, diplomas, and baccalaureate degrees.

3. New graduate nurses will attain similar BKAT scores as experienced critical care nurses within 18 months of graduation.

4. There will be specific basic knowledge content areas that are consistently not met by newly graduated nurses as identified by the BKAT.

Operational Definitions

Robust research requires that the concepts being studied be defined in order to be operationalized. In nursing many terms have been used interchangeably to describe

concepts, therefore it is paramount to clearly define the concepts being studied. Based on a comprehensive review of the literature, these operational definitions have been developed for the following conceptual variables presented in the study.

- Nurse- The nurse is defined as a registered nurse (RN) who has passed the national licensure exam and does not differentiate between entry level or current nursing education level or degree.

- Critical Care Nurse- Critical care nurses are defined as those RNs working in intensive care units and does not include intermediate care or step down units or the emergency department.

- Newly graduated nurse- Based on the New Graduate Transition Process Model being used as the framework for this study, NGNs are defined as licensed registered nurses who have been working as RNs for less than eighteen months (Schoessler & Waldo, 2006).

- Experienced nurse- Based on the New Graduate Transition Process Model experienced nurses are defined as licensed registered nurses with 19 or more months of nursing experience (Schoessler & Waldo, 2006). If a nurse has 19 or more months experience but less than 19 months of critical care experience, that nurse will be considered an experienced nurse.

- Basic Knowledge- Toth (2006b) uses the term basic knowledge to describe the concept measured by the Basic Knowledge Assessment Tool (BKAT). Basic knowledge is "the body of knowledge used by critical care nurses to provide safe nursing care to patients hospitalized in critical care units" (p. 49) which is more in-depth knowledge than what is needed to become a registered nurse. The

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evaluation of this basic knowledge incorporates critical thinking, psychomotor and psychosocial skills. Basic knowledge will be measured using the Critical Care Basic Knowledge Assessment Test, version 7 (BKAT-7).

- Clinical Competence- The definition of clinical competence expands upon Toth's definition of basic knowledge. Clinical competence is the consistent and thoughtful application of basic knowledge, clinical skills, and problem solving ability integrated with effective communication and commitment to the care of a patient. It is the mastery of the basic knowledge necessary to provide safe care for critically ill patients. This definition encompasses the cognitive, psychomotor, and affective domains of care and reaches beyond the minimum standards of practice. The clinically competent caregiver should provide holistic care that incorporates the patient's physical, psychosocial, emotional, and spiritual needs. .

- Clinical Decision Making or Judgment- Clinical decision making or judgment is a deliberate problem solving activity or process where conclusions are developed based on an actual or perceived patient needs or responses. Based on these conclusions plans about which actions, if any, are required are developed and implemented. These plans of care can be developed based on didactic knowledge, previous clinical encounters, collaboration with the health care team, intuition, weighing options, or other reasoning processes.

Assumptions

The following assumptions were made in relation to this study.

1. The nurses in this sample are representative of nurses in these hospitals and region therefore the data collected will be generalizable.

2. Directions for completion and return of the tools are clear to minimize misunderstanding.

3. The nurses take the BKAT-7 independently and without the use of reference materials.

4. The nurses accurately portray themselves in their demographic data questionnaire.

5. Nurses who participate in the interviews provide honest, thoughtful reflection on their practice

Limitations

Despite attempts for a rigorous study, limitations are inherent in all projects. Anticipated limitations relative to this study included the following.

1. The relatively small sample size compared to the number of critical care nurses regionally and nationally may limit the ability to generalize the results of this study.

2. The ability to generalize from the results of this study may be limited to the regional geographical location in which the study took place.

3. Although participation in the study will not be limited to NGNs from local nursing programs, it is anticipated that the sample may include relatively few NGNs who completed nursing programs outside of the region. Therefore the basic knowledge and decision making processes may not be generalizable outside of the region.

4. The length, depth and breadth orientation programs provided in the different critical care units and hospitals may account for differences in NGNs' BKAT scores.

Significance of the Study

There has been a simultaneous increase in the age of our population, patient acuity, the age of nurses, and demand for critical care nurses (Nibert, 2003). Maiocco (2003) reports a 45% increase in staffing needs for adult critical care nurses and 2006 survey results showed that 80% of critical care units reported hiring NGNs (Duvall, 2009) . When NGNs are hired into critical care units rather than general medicine and surgical units, the expectations and requirements of these novice nurses have grown exponentially. Etheridge claims that didactic knowledge, length of clinical experience, and entry level degree are not reliable factors for judging the NGN's ability to make clinical nursing decisions (2007). Bourgault and Smith (2004) report that NGNs are often overwhelmed by the scope of required knowledge and skills. Etheridge (2007) reports that NGNs do not have the background knowledge necessary to make sound clinical judgments. Floyd, Kreetschmann and Young (2003) estimate that NGNs require a year of clinical practice to attain the knowledge and skills that render them truly independent within the scope of nursing practice. However, evidence of this supposition has not been located in the research literature to date.

Research studies have documented that experienced nurses are more clinically competent and function at a higher level than do NGNs. However, no studies have been found that identify when the gap is bridged. By identifying when NGNs attain basic knowledge scores that equal their experienced peers, this study begins to fill that deficit in the literature. Identifying when the NGN reaches a level of clinical maturity that characterizes the NGN as experienced would be useful to hospital educators as they structure orientation programs, support the NGN beyond the formal orientation, and

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select future preceptors. Additionally, nurse managers could use the data when scheduling the unit to assure that an appropriate mix of experienced nurses and NGNs staff the unit. The ability to make effective clinical decisions relies on accurately assessing the patient and properly interpreting that information prior to initiating action. Itano (1989) purports that it is important for educators to study the judgment processes, methods, and procedures of students in order to be able to teach students how to make valid patient care decisions. This can be extrapolated to newly graduated nurses who, like students, have a limited scope of knowledge on which to base their decisions (Westfall, Tanner, Putzier, & Padrick, 1986). Knowing the basic knowledge level or clinical competence of a NGN coupled with the examination of the experience of NGNs as they make clinical judgments puts managers, educators, and preceptors in a better position to teach NGNs how to make decisions until each nurse reaches a level of clinical maturity where those decisions stem from a holistic understanding of the patients' needs.

Recruitment, orientation, and retention of qualified nurses have direct effects on patient safety and all affect the bottom line in hospital budgets. Every patient who enters the hospital has a right to competent care. Therefore, hospitals are responsible for assuring that the NGN is ready to give the care that patients deserve before permitting the NGN to practice independently. The primary outcome measure for transition programs should be attainment of competence and the ability to make sound clinical judgments. Currently, the concepts of job satisfaction and retention comprise a majority of the existing body of knowledge about NGNs. The current gap in the literature supports the importance of examining the readiness of NGNs to practice independently from a competency-based perspective and thus drives the focus of this research endeavor.

Chapter 2

Theoretical Framework

When designing a program of research, it is imperative that consideration be given to the conceptual framework or theoretical foundation that will guide the study. A framework links related concepts to describe a particular phenomenon thus directing the researcher to organize thinking, focus the study, and interpret the results (Morse & Richards, 2002). By using a theoretical framework relevant to the area of interest and selecting an appropriate scientific method the researcher can expand the knowledge of the nursing. Then New Graduate Transition Process Model (Schoessler & Waldo, 2006) was selected as the framework for this dissertation study.

New Graduate Transition Process Model

Based on a phenomenological study of newly graduated nurses (NGNs), Schoessler and Waldo (2006) developed a transitional model specifically targeting NGNs by intertwining the theories of Kolb (1984), Bridges (1980), and Benner (2001). Prior to examining the integration of the three supporting theories in the process model, each theory will be individually reviewed.

Transition theory. Bridges (1980) states that each transition has three processes: Saying Goodbye, Shifting into Neutral; and Moving Forward. In the first step, the person must let go of the identity that has been held or the comforts of the way things were done. Supports that were previously available are no longer accessible and strategies with which the person has found success may no longer be effective or applicable. During this phase the person may feel "disengaged, disidentified, disenchanted and disoriented" (p.

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92) since the way that things have been done in the past and the successes the person has experienced are being left behind. It is important to understand that there may be a grief period as a person lets go of the past and begins to look forward, yet one must let go to be able to move forward.

The shift into neutral is often the most difficult phase, as well as the longest. It is during this time-period that many people decide that they cannot make the change so they leave the situation or attempt to rush through this phase thus not completing the mental processing required (Bridges, 1980). Bridges and Bridges (2000) emphasize the need to follow 4 steps known as the 4Ps to facilitate the journey through the neutral zone. People who are in transition must understand the purpose of the transition, need a mental picture of what it will be like to reach the goal, require a plan of how to get to the goal, and must understand the part that they must play to reach the goal. During this period a new reality is created and the person develops a tool box of skills that are necessary to function in a new role.

When a person finally begins to move forward they appreciate the new opportunities that lie ahead of them and display behaviors that are expected in this new role (Bridges, 1980). The person can connect with the newly developed identity and function independently. Some people fall short of this phase because they are unable to let go of the past and others are not willing to work through the processes required to successfully navigate the neutral phase. Those who are successful arrive at this phase competent and confident.

Experiential learning. Kolb (1984) describes experiential learning as a four staged process by which a learner grasps information and transforms it so that it is

meaningful to that individual. A complete learning cycle requires that all four stages: concrete experiences, abstract conceptualization, reflective observation, and active experimentation be completed, preferably in order, although there are two possible starting points. Information can be obtained from concrete experiences (CE) such as witnessing an event directly or abstract conceptualization (AC) where information is theorized or comprehended based on past experiences. Reflective observation (RO) which includes information processing follows CE and leads to AC when the observation is blended with prior knowledge. At this point the learner begins active experimentation (AE) to test the situation in a real world situation. The result of the AE is a new observation which leads the learner to repeat the cycle and determine if interventions have been effective or if new interventions are required. Atherton (2005) notes that this process may occur instantaneously or may take days, weeks, or even months depending upon the subject matter.

Kolb's four stage cycle can be extrapolated to define learning styles identified by Kolb based upon which styles the learner prefers (Chapman, 2006). Diverging learners prefer concrete experiences followed by reflective observation whereas accommodating learners follow concrete experience with active experimentation and bypass reflection. Similarly, assimilating learners use reflective observation to follow abstract conceptualization whereas converging learners follow abstract conceptualization with active experimentation. Therefore accommodating learners "feel and do", diverging learners "feel and watch", converging learners "think and do", and assimilating learners "think and watch" (Figure 1). A learner's preferred patterns can be used to tailor experiences to best match the style of the learner.

Figure 1. Kolb's Learning Styles

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http://www.businessballs.com/kolblearningstyles.htm
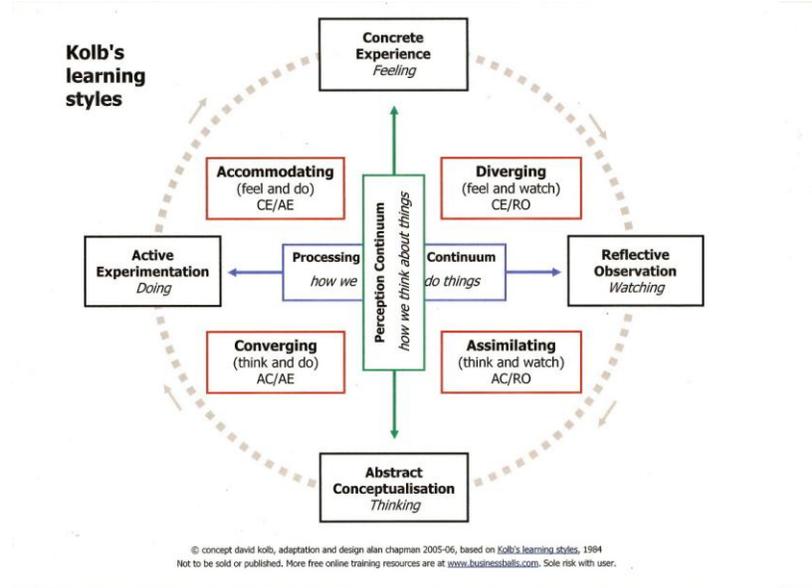
Kolb's (1984) experiential learning can be easily applied to nursing. During shift change the oncoming nurse receives report from the previous shift, thus providing a concrete experience based on assessment findings shared by the previous nurse. During the reflective observation, the nurse assesses the patient and compares those findings with those that were shared in report. Based on this and combined with other's knowledge of the patient and previous learning experiences, an abstract conceptualization is used to determine the patient's greatest needs. At that point active experimentation in the form of nursing care is implemented and the entire situation is evaluated. The evaluation data forms the next concrete experiences and the process continues. Ideally in the health care setting the learner demonstrates both psychomotor responses and reasoning processes when applying observations or abstractions to the clinical setting thus producing nurses

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who display critical thinking and problem solving skills as well as being technically competent. All these factors combine in the provision of holistic, competent care.

Novice to expert. Benner's From Novice to Expert theory (2001) applies the Dreyfus Model of Skill Acquisition (1980) to nursing. The Dreyfus model focuses on experiential learning by a professional and involves gaining knowledge, the application of that knowledge, and the decision tree by which the knowledge is applied (Galloway, 2005). During this process, the experiential learner passes through five different skill levels that are dependent upon three aspects of skill performance (Benner, 2001). The first aspect of skill performance phase is "a movement from reliance on abstract principles to the use of past concrete experience as paradigms" (p. 13). Secondly, the learner's perception changes from looking at multiple, equally weighted parts of a situation to perceiving the situation as a whole in which some parts have more importance than others. Finally, there is a metamorphosis from a detached observer to that of an involved performer where the doer is finally a participant rather than a bystander.

Incorporating an assumption from Dreyfus' model, Benner also believed that nursing skills are transformed and mastered through experience (2001). Supported by a two-year federally funded grant, Benner's Novice to Expert Model was based on research conducted by interviewing over 1200 nurses. Benner based her methodology on her assumption that clinical practice cases have a complexity that cannot adequately be illustrated by other theories or textbooks. As a framework for defining the novice to expert concepts, Benner's theory identified 31 nursing competencies based on nurses' descriptions of patient care episodes. Benner classified these nursing roles in the

following domains: the helping role; teaching and coaching; diagnosis and patient monitoring; effective management of rapidly changing situations; administering and monitoring of therapeutic interventions and regimens; monitoring and ensuring quality health care practice; and organizing work role competencies. Her theory is designed to discover and describe the body of knowledge embedded in nursing practice. The degree of mastery of each of these domains differs based on the level at which the nurse practices. Nurses increase in level of performance as they gain experience, however aptitude levels can fluctuate depending on the circumstances of any particular situation. Determination of performance levels can only be made by consensual validation of expert judges based on an assessment of the outcomes of the situation. Benner's Novice to Expert Theory aims to uncover and explain the practical and theoretical knowledge that is embedded in nursing practice (Chinn & Kramer, 2004) as well as promote life-long learning.

According to Benner (2001), initially the student nurse or new graduate must pass through the Novice stage. Beginners have no or minimal life experience in the clinical situations to which they are exposed. At this level, concrete rules are required to guide clinical practice. Typical of this level of practice, the student wishes to be told what needs to be done and will then carry out the tasks. Although Benner primarily reserves this role for students, any nurse who is placed into unknown surroundings may revert to the level of a Novice.

Advanced Beginners are those nurses who demonstrate marginally acceptable performance based on the experiences gained as a Novice (Benner, 2001). At this level, the clinical situation is more of a test of the nurses' abilities than patient needs (Tomey &

Alligood, 1998). Nursing action remains guided by rules and there is trouble comprehending the needs explicit to the clinical situation. However, at this stage the development of principles to guide future actions begins. Newly graduated nurses generally function at this level.

When the nurse has worked in the same unit for two to three years and consciously sees interventions as a way to achieve long term goals, the level of a competent nurse has been reached (Benner, 2001). Competent nurses are able to establish which characteristics of clinical situations are paramount and which can be disregarded. At this level the nurse begins to reach efficiency and organization, but lacks the tempo and flexibility of the proficient nurse. Although at this level the nurse may believe that mastery has been achieved, the nurse does not yet have the required experience to recognize the complete patient scenario rating individual pieces from important to unimportant. During this pivotal stage of nursing, based on reasoning processes, the clinician begins to devise new strategies specific to the situation rather than solely relying on previously learned rules.

Understanding the meaning of long term goals, the proficient nurse is able to see the clinical condition as whole rather than individual parts (Benner, 2001). Rather than relying on preset goals, the proficient nurse becomes very involved with the patient and family, demonstrates recognition of their needs and implements care as the situation evolves. Typically, it takes three to five years in the same clinical setting to reach this level. Here, the nurse is aware of what to expect from a given situation and remains attuned when this does not materialize, thus plans can be modified "on the fly".

The uppermost echelon of Benner's (2001) model is that of the expert. Because of the breadth and depth of background experience, this nurse has an intuitive grasp of patient care situations and accurately zeros in on the needs of the patient and family. At this point, the nurse no longer consciously applies rules but bases care on the understanding of what is required by the patient. The key aspects of the expert nurse's practice include "a clinical grasp of resource-based practice, embodied know-how, seeing the big picture, and seeing the unexpected" (Tomey & Alligood, 1998, p. 163).

Tomey and Alligood (1998) explain that when explicating the Dreyfus model, Benner identified two interconnected features that make a distinction between the practice levels. First, the nurses in the different levels practice in "different worlds" (p. 159) and recognize and respond to similar situations differently. Secondly, as the clinician progresses through the hierarchy, the nurse becomes an integral part of the health care team and an increased sense of responsibility toward the patient develops. While this theoretical framework provides a firm foundation for describing the growth of the professional nurse, the use of this theory exclusively does not provide the breadth and depth of understanding that can be found when this theory is blended with others.

From Novice to Competent Nurse: A Process Model

Schoessler and Waldo's (2006) process model describes the process of NGNs' transition from Benner's advanced beginner level to that of a competent nurse during the NGNs first 18 months after graduation (Figure 2). In this model transition is defined as "the psychological reorientation needed to adapt successfully to change" (p. 48). Based on Bridges Transition Theory (1980), the model describes three phases of transition: the ending (the first 3 months after graduation), neutral zone (4-9 months after graduation),

and new beginning (10-18 months after graduation). During the ending phase the NGN

acknowledges and grieves the losses of the previous phase, for example school friends,

faculty support, or familiarity with expected roles. During the neutral phase NGNs often

experience frustration because they know that the old rules don't apply and they are not

aware of all of the new rules. During this period the NGN may become disillusioned with

nursing, which contributes to a NGN turnover rate of 35-60% during their first year

(Godinez, Schweiger, Gruver, & Ryan, 1999). Finally, as NGNs reach the new

beginning, they realize that they are able to care for patients in an organized manner,

answer questions about patient care and treatments, and feel like they have "made it" as a

nurse.

Figure 2. Novice to Competent Nurse: A Process Model
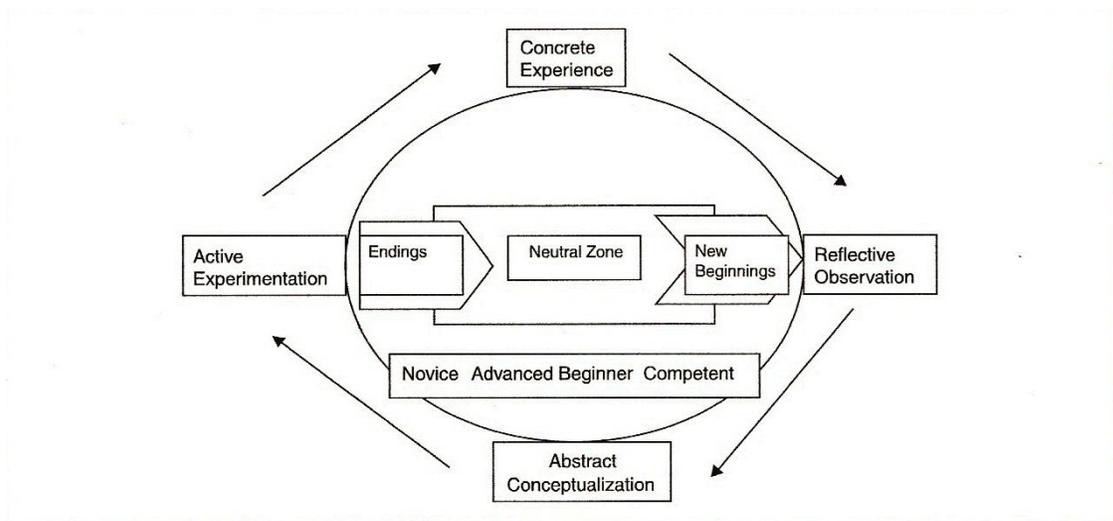
Used with Permission

Schoessler & Waldo, 2006

This transition is facilitated by Kolb's (1984) four phased experiential learning process which guides the NGN to integrate knowledge learned in school with knowledge gained in practice. The integration of this knowledge requires observation, reflection and active experimentation as NGNs gain knowledge by concrete experiences as well as abstract conceptualizations. Much like the cyclical nursing process, the learning process continues as new information is grasped and applied to patient care. With each clinical experience the cycle is repeated and knowledge is gained and reinforced, bringing the NGN closer to practicing competently without preceptor supervision.

Benner's (2001) Novice to Expert theory is also woven through this theory since during the orientation period the NGNs are transitioning from an advanced beginner where patient care situations challenge their skill, knowledge, and organization to competent nurses who no longer focus only on tasks and are able to provide multi-dimensional patient care. Passage through this process requires energy, courage, and time- often up to 12-18 months according to Schoessler and Waldo (2006). Based on their phenomenological study with NGNs, they identified four themes: patient and family, organization, team, and marker events as well as linked milestones and approximate time frames/stages related to the four themes. Each NGN reaches each of the milestones, however there is often fluctuation between stages and milestones that appear in each theme.

As the NGN transitions through the patient/family and organization foci there is a change from patient conditions being challenges that require the NGN to learn new tasks to someone who is organized and comfortable with direct patient care. The NGN shifts from a person who is struggling to be organized and worried about procedures to a nurse

who can plan and implement care. During the transition the NGN also develops independence from the preceptor, becomes a member of the team and feels at home on the unit. Although the NGN becomes more integrated as a team member, relationships with physicians are often intimidating to the new nurse and the NGN begins to view nursing as a team effort and questions staffing levels and safety implications. Finally, marker events such as the first patient death, first error, the first time someone asks the NGN how to do something, the first time in charge of the shift and the first time precepting were identified as important landmarks in a nurse's career during their first 18 months after graduation.

Summary

From Novice to Competent Nurse: A Process Model (Schoessler & Waldo, 2006) provides a comprehensive theoretical underpinning upon which to base a dissertation. This theory blends experiential learning and transition theory with the nursing theory of Benner to provide an interdisciplinary framework that encompasses the proposed dissertation topic of new graduates' basic knowledge and clinical judgment in the critical care setting. Each new graduate makes a transition from school to employment. Preceptorships are examples of acquiring knowledge using experiential learning with the goal of increasing competence. The Novice to Competence Nurse Process Model intertwines relevant concepts faced by new graduates: transition, learning, and competence and asserts that this process takes up to 18 months, requiring that the new graduate be supported throughout that entire period. During this evolution, the integration of the three theories into the process model can be used to help guide NGNs

through this transition period by sharing with them what to expect and giving them the resources and experiences necessary to achieve competence.

This process model is new in the literature, and to date, no evidence of further use has been located. It was selected for this study because the researcher aims to determine when the NGN reaches the level of clinical maturity that will characterize that nurse as experienced. Based on Schoessler and Waldo's (2006) model, NGNs reach the new beginning stage and feel like they have "made it" as nurses between 12 and 18 months after graduation. Although NGNs feel like they have "made it" as nurses, there is a lack of quantitative evidence to sustain that supposition. Data obtained in the quantitative portion of this study will provide a concrete measure of basic knowledge required of newly graduated and experienced critical care nurses. Analysis of the NGN data will be conducted by subdividing the NGNs into three NGN stages to determine if NGNs are able to reach the milestone of clinical maturity during the 12-18 month transition period.

The qualitative portion of this dissertation study, examination of NGN clinical decision making, is also supported by this process model. A review of the clinical judgment literature purports that nurses make decisions based on clinical experiences, something that NGNs lack. The acquisition of that nursing knowledge is threaded throughout this process model and includes Kolb's (1984) four stages learning process and Benner's Novice to Expert theory (2001), both of which assert that nurses learn by experience and make judgments based on those experiences.

Chapter 3

Review of Literature

Introduction

Nurse managers and educators must assure that newly graduated nurses (NGNs) are ready to practice nursing, an assessment that includes a varied skill set including critical thinking and prioritization, communication, application of the nursing process, performance of technical procedures, and medication administration (2004). Clinical competence is the ability to demonstrate knowledge and skills that are required to meet professional nursing expectations (American Nurses Association, 1994). NGNs are licensed based solely on a cognitive examination without any assessment of the psychomotor or affective domains. Reddish and Kaplan (2007) question the ability to assess competence using only the cognitive domain since nursing encompasses procedural skills and cognitive domains that differ based on context. In a synthesis of 35 nationally published reports about NGN transition, Hoffler (2008) purports that, although NGNs have the required competence to begin clinical practice, they are not ready to deliver patient care and NGNs need to be supported until they are able to sustain competence and suggests that this is completed using standardized orientation programs and formal residency programs. Romyn et al. (2009) describe practice readiness from the perspective of NGNs' deficits since a clearly articulated set of attributes has not been identified. Schroeder (1997) asserts that competence must be linked to outcomes that reflect the dynamic roles and expectations of nurses, and that safety is a common denominator by which readiness to practice is assessed. Etheridge (2007) states that

didactic knowledge, length of clinical experience, and entry level degree are not reliable factors to be used to predict a person's ability to make clinical nursing judgments.

For this study, a comprehensive review of the literature will be presented covering the key concepts of new graduate transition, clinical competence or readiness to practice, and clinical decision making or clinical judgment. Truncated versions of those concepts were used singly and in phrases when conducting the review. Additionally, the reference lists of identified articles were scanned to capture additional studies.

New Graduate Transition

Known as orientation, preceptorships, internships, and residencies, this period of time "[starts] with an ending, followed by a period of confusion and distress, and leading to a new beginning" (Delaney, 2003, p. 437). The most common themes that emerged upon reviewing the studies were program variability, NGN stress, recruitment and retention of NGNs, and clinical readiness to practice.

Program variability. While the quality of an NGN transition program is emphasized in the literature, it is evident by examining the plethora of programs that there is no consistency in what is offered (Clare & van Loon, 2003). For example, four studies were conducted to evaluate nurse residency programs (Altier & Krsek, 2006; Beecroft, Kunzman, & Krozek, 2001; Goode & Williams, 2004; Rosenfeld, Smith, Iervolino, & Bowar-Ferres, 2004). Although all identified the programs as one year residencies, the formats significantly varied. Duchsher (2001) described one as a 6-8 week clinical unit orientation followed by a mentorship for the remainder of the NGN's first year. The participants in this residency noted that there was little or no contact between the NGN and mentor after the NGN began independent practice. NGNs in this

study reported that they lacked self confidence, didn't feel like they had enough knowledge to be safe. In contrast, Krugman et al. (2004) evaluated a more structured residency program where the NGN worked with a preceptor and attended classes for six months prior to caring for patients independently. During the second six months of that residency, the NGN participated in weekly off-unit educational offerings as well as meet weekly with their mentor to discuss progress and concerns. The NGN nurses who participated in that residency felt comfortable organizing and prioritizing care and low levels of stress.

NGN Stress. Data from multiple studies state that the first three to six months of employment as a nurse represent the most stressful period of the nursing career (Duchscher, 2001; Ferguson & Day, 2004; Godinez et al., 1999; Oermann & Moffitt-Wolf, 1997) and that it can take as long as one year for nurses to feel comfortable in their new role (Casey et al., 2004; Chang, 2002; Clare & van Loon, 2003). Kelly (1996) reported that NGNs feel a responsibility to their profession and to be able to maintain professional standards and that living up to those standards increased their stress. These studies are of tremendous value to those who plan orientation programs since they identify the stressors most commonly felt by NGN. Stressors included adjusting to rotating shifts (Clare & van Loon, 2003), inconsistent preceptors (Smith, 1999), role ambiguity (Chang, 2002), a sudden increase in responsibility and accountability (Gerrish, 2000; Maben & Clark, 1998; Whitehead, 2001), lack of confidence (Boswell, Lowry, & Wihoit, 2004; Duchscher, 2001; Oermann & Moffitt-Wolf, 1997), and staffing shortages leading to limited availability of seasoned nurses as preceptors (Ross & Clifford, 2002; Wheeler, Cross, & Anthony, 2000; Whitehead, 2001)

Over the course of a year Boswell, Lowry, and Wilhoit (2004) used a researcher designed instrument (Cronbach's alpha 0.79) to assess 67 newly graduated registered nurses and licensed practical nurses perceptions of nursing practice and expectations for meeting personal goals. They found that 35% of NGNs had moderate or significant anxiety about accidentally harming patients and that those NGNs who lacked confidence were more likely to commit errors resulting in adverse outcomes, however no statistics were provided to support that finding. Using a Kendall's Tau correlation to determine the relationship between the length of time a NGN has practiced and the NGNs desired level of satisfaction, as expected the researchers found a negative correlation ($r = 0.24$, $P < 0.05$) meaning that as NGNs gained experience they wished less direct supervision. Although individual results will vary based on learning and orientation styles, the researchers found that NGNs often feel inadequate and the researchers believe that it takes one year for NGNs to feel that they have progressed from a novice to a staff nurse.

Casey, Fink, Krugman, and Propst (2004) used the Casey-Fink Graduate Nurse Experience Nurse survey (Cronbach's alpha 0.78) to study 270 NGNs to determine the stresses and challenges experienced by new nurses. Up to ninety-six percent of the NGNs identified that they were uncomfortable with clinical skills and priority setting and that they had deficits in critical thinking because of a lack of knowledge. They also reported that relationships with peers and preceptors and communication with physicians were difficult. They struggled with being independent while still needing to rely on others. When asked to rate their confidence in their role on a 100 point scale, NGNs scored themselves higher initially (mean 55, range 44-69) than at 3 months (mean 54.28, range 24-68). NGNs were least confident between six and 12 months after beginning practice

(mean 53.68, range 41-71) and only after one year did confidence scores exceed the original levels (mean 57.92, range 49-72). These scores were statistically significant using ANOVA with Scheffie post hoc comparison [F (3, 270)= 4.029, p=0.008]. This study presents gaps in NGN confidence and shows that supports need to be in place for the entire graduate year rather than only during orientation.

Recruitment and retention. The cost to recruit a newly graduated nurse reaches nearly $82,000 or 150% of a NGN first year salary (Contino, 2002), so it is not surprising that recruitment and retention of NGN was the primary focus of 11 of the studies(Altier & Krsek, 2006; Beecroft et al., 2001; Cantrell & Browne, 2006; Casey et al., 2004; Collins, 1991; Currie, 1994; Duchscher, 2001; Marcum & West, 2004; Owens, Turjanica, Scanlon, Williamson, & Facteau, 2001; Rosenfeld et al., 2004; Smith, 1999). Additionally, NGNs have a turn-over rate that hovers around 36% within the first year of practice (Casey et al., 2004). High turnover rates were attributed to preceptorships that inadequately prepared the nurse to function and feelings that support was not available after orientation ended (Loiseau et al., 2003). Smith and Chalker (1999) and Rosenfeld, Smith, Iervolino, and Bowar-Ferres (2004) reported that single preceptors boosted the confidence levels of NGN, a key in retaining nurses. Brasler (1993) counters reporting that nurses who had more than one preceptor felt that experience increased their ability to plan and evaluate care. Nurses who have realistic views of the profession (Beecroft et al., 2001), high job satisfaction (Altier & Krsek, 2006; Beecroft et al., 2001; Casey et al., 2004; Collins, 1991; Currie, 1994) and low levels of stress (Casey et al., 2004) are those who are most likely to remain employed in their initial position after graduation. Same

unit externships between the junior and senior year also significantly increased the likelihood of NGN retention (Cantrell & Browne, 2006; Collins, 1991).

The focus of Collins' (1991) doctoral dissertation was to determine the effects of internship and externship programs related to attrition, job satisfaction, competency, and attitudes toward nursing. The Fingerhut's Nurses' Professional Attitude Scale (Cronbach Alpha 0.64) and Nelson's Nurse Competency Inventory (Cronbach alpha 0.96) were completed by 238 NGNs between 1987 and 1989. The participants were divided into four groups based on who had participated in externships and /or internship and those who had not. Collins found that there were no statistical differences in attrition rate between the groups [$F(3, 125)=0.90, p<0.05$], job satisfaction [$F(1,80)= 1.15, p<0.05$], perceived competency [$F (1,96)=2.15, p<0.05$], or attitude toward nursing [$F(1,113)= 0.20, p<0.05$]. NGNs did not feel that they had adequate knowledge to be competent regardless of educational experience and all experienced a degree of reality shock as they began their careers.

In a phenomenological study by Duchscher (2001), five Canadian NGNs participated in semi-structured interviews in order to identify recruitment and retention issues faced by these nurses. Thematic analysis was used to review NGN interviews at two and six months after being hired as well as review the reflective journals kept by each NGN. Three themes were identified: doing nursing, the meaning of nursing, and being a nurse. The NGNs reported that transition was very stressful and that they did not feel that they were really nurses for 20 weeks. Until that time they were more focused on themselves than the patients because they felt that they lacked the knowledge needed to provide safe care and that they did not have adequate preceptor support. Initially they

were doing nursing while remaining dependent on others and fearing interactions with physicians. Often they felt unwelcome on the units. As they transitioned to the meaning of nursing theme, the NGNs became more comfortable with fallibility and began to deliver patient centered care. Finally when they were being a nurse they were able to incorporate critical thinking into patient care, although they still often felt like puppets on a string. A lack of self confidence in the ability to perform care was extremely stressful to these NGNs.

Krugman et al. (2004) completed a descriptive-comparative study of baccalaureate prepared NGNs who participated in a structured national residency program that was offered in 6 pilot hospitals across the US. The program included a six month orientation followed by a six month mentorship including support groups and educational classes. At baseline, six months and 12 months after being hired, an undisclosed number of NGNs completed a series of instruments that measured satisfaction (McCloskey Muller Satisfaction Scale, Cronbach's alpha 0.82) autonomy (Gerber Control over Practice Scale, Cronbach's alpha 0.96), their NGN experience (Casey-Fink Graduate Nurse Experience Survey, Cronbach's alpha 0.89), and program satisfaction (investigator developed tool, no reliability given). Individual statistics were not provided for the results obtained using each tool. Overall the NGNs who participated in the program had a first year turnover rate of only eight percent which was mainly attributed to NCLEX failure and marriage with relocation. Although a control group that completed all of the tools was not used, the authors claim that the NGNs who participated in the residency program had improved organization and prioritization skills, increased

satisfaction and retention levels, and decreased stress compared to literature reports of other NGNs who completed the tools singly or in groups.

Transition and clinical readiness. Although studies about the clinical competence or readiness of NGNs to practice are found in the literature (Boswell et al., 2004; Currie, 1994) only Messmer, Jones, and Taylor (2004), Ellerton and McGregor (2003), and Romyn et al. (2009) directly linked competence, performance, or readiness to practice with transition. The readiness of NGN to practice in neonatal intensive care unit was assessed using established assessment tools and found that NGNs significantly improved in all areas measured between the baseline score and the score at the end of orientation. However, the authors did not address whether the increase in score was adequate to allow the NGN to practice independently (Messmer et al., 2004). Ellerton and McGregor (2003) found that although NGN followed rules and routines, they were unable to interpret the results of their actions. Likewise, Currie's (1994) nursing competency assessment found that NGN's clinical competency improves with time, Boswell, Lowrey, and Wilhoit (2004) found that 35% of NGN have moderate or significant anxiety about accidentally harming patient. Furthermore, they report that nurses who lack confidence are more likely to commit errors resulting in adverse outcomes than those who are confident in their ability to provide care. These studies will be discussed in greater depth in the clinical readiness portion of this literature review.

Theory development. A review of the research literature yielded four studies aimed at NGN transition theory development. Schoessler and Waldo's From Novice to Competent Nurse: A Process Model (2006) was discussed in detail in the previous chapter.

Godinez, Schweiger, Gruver, and Ryan (1999) conducted a qualitative study of 27 NGNs during their first three weeks of orientation. The 13 BSN prepared and 14 Diploma prepared nurses completed daily written feedback sheets detailing the day's activities. This tool was used to promote communication between the NGN and preceptor and identify early markers of NGN frustration. Five themes emerged when the logs were coded: real nurse work, guidance, transitional processes, institutional context, and interpersonal dynamics. A majority of the log entries were placed in the real nurse work category and contained facets of technical and physical skills required for patient care. NGNs identified that they needed additional help with computer documentation, priority setting and patient education. By and large, researchers found that better communication between the preceptor and the NGN resulted in more successful function of the NGN and positive interpersonal dynamics. Based on the five themes identified in this study, the authors developed a theoretical framework that represents the process by which NGNs transition from student to independent nurse.

Duchscher (2008) utilized a grounded theory approach to provide yet another view of NGN transition. Over an 18 month period, the researcher studied 18 baccalaureate prepared NGNs by conducting face to face interviews at 1, 3, 6, 9, 12, and 18 months after graduation, in addition to conducting focus groups at 1 and 3 months, reading monthly journals written by the NGNs, and remaining in contact with the NGNs via e-mail. These NGNs graduated from the same nursing program but held their first job in one of 2 major Canadian cities. In this theory Duchscher divided the NGN transition into three phases: doing, being, and knowing. The doing phase encompasses the first three to four months after graduation during which the NGN faces reality shock of the

work environment and is intent on learning and performing care, concealing their fears, adjusting to new routines, and accommodating needs. When asked, the NGNs believed that the source of their overwhelming stress was a lack of educational preparation and no one considered that the hospital might have unrealistic expectations of a NGN. During the being stage, approximately four to eight or nine months into their first year, the nurses reach crisis mode because they continuously feel inadequate in their efforts as nurses, powerless and frustrated with the role of nursing, and exhausted. The final stage of NGN transition, knowing, generally occurs between the ninth and twelfth month after graduation. At this point the NGNs are generally comfortable with their ability to provide care and begin to see themselves in the role of question answerer rather than questioner. As the NGNs progressed through this stage their stress level remained constant, however the source of their stress shifted from the lack of their own abilities to provide care to frustrations about the health care system as a whole. Duchscher recommends that NGNs be given consistent support for the entire year after graduation and that preceptors and mentors be educated how to provide this support and be compensated for providing it.

Most recently, as part of an effort to increase NGN retention, Zinsmeister and Schafer (2009) conducted a phenomenological study with 9 NGNs during their first 6-12 months of clinical practice to gain insight of helpful and challenging aspects of their transition. Thematic analysis yielded five indicators of positive transitions including a supportive work environment, positive preceptor experience, comprehensive orientation program, sense of professionalism, and clarity of role experience. The researchers also found a large variance self confidence among the NGNs. They stress that health care institutions must be committed to support NGNs throughout their graduate year in order

to allow for professional growth and a sense of autonomy if hospitals hope to achieve recruitment and retention goals.

Summary. While the quality of an NGN transition program is emphasized in the literature, it is evident by examining the plethora of programs that there is no consistency in what types of programs are offered to NGNs nor consistency between the structure or length of preceptorships or residencies (Clare & van Loon, 2003). These studies are of tremendous value to those who plan orientation programs since they identify the stressors most commonly felt by NGN which affects retention rates of these nurses. Based on these studies, it is important for orientation programs to have a plan in place to assist NGN throughout the entire first year after graduation.

Clinical Competence and Readiness to Practice

An integrative review of the literature was conducted and studies were divided into eight categories which included: theory development, NGN perception of their competence, experienced nurses perception of NGN competence, a comparison of NGN and experienced nurses perception of NGN competence, testing of basic knowledge in critical care, identification of critical skills required of NGNs, orientation programs, and a potpourri of articles not fitting those categories. Studies that are applicable to all newly graduated nurses as well as those in a critical care setting are included.

Theory development. Two international and one domestic study with the aim to further nursing theory about new graduate nurses were identified (Baramee & Blegen, 2003; Ferguson & Day, 2004; Reddish & Kaplan, 2007). Using a grounded theory approach to study NGNs' journey toward competence, Ferguson and Day (2004) explored the process by which clinical judgment skills are developed by newly graduated

baccalaureate prepared nurses during their first two to three years of practice. Twenty-five Canadian registered nurses participated in a series of interviews over a 16 month period. Using constant comparative analysis, Ferguson developed the Theory of Developing Clinical Judgment in Practice which is based upon 5 stages which must be accomplished by new nurses. These phases are orienting to the practice environment, learning practice norms, developing confidence, consolidating relationships, and seeking challenges. The information gleaned from this theory can enable nurse leaders and educators to provide a supportive environment for NGNs based on their individual needs as they pass through these distinct stages.

In the US, Reddish and Kaplan (2007) sought to determine when NGNs were competent in the critical care unit as a means to develop a framework that adequately explains the transition of NGNs in critical care. They felt that Benner was inadequate in this setting and hoped to expand upon her early stages. Thirteen NGNs completed an un-described tool. Researchers identified five stages that are required in the novice to competence practitioner transition: data overload and prioritization, protocol and policy integration, initial team integration, independent exploration and transition, and competent practitioner versus rule adherence. The authors assert that their tool can be used to coordinate critical care transition for NGNs and that educational and task goals should be linked together as criteria for advancement through orientation.

Critical skills. The identification of critical skills required of newly graduated nurses has been the frequent focus of research articles both internationally and within the United States (Kayser-Jones, 2002; King & MacLeod, 2002; Marshall, 1999; Porte-Gendron, Simpson, Carlson, & Van de Kamp, 1997; Utley-Smith, 2004). Internationally,

studies have been conducted in Canada (Bourgault & Smith, 2004), Australia (Boxer, Fallon, & Samuelson, 2001), and Taiwan (Lee, Chen, & Wang, 2002).

Internationally, Bourgault and Smith (2004) developed a competency check list to guide personal learning needs of NGNs, but noted that experienced nurses expressed their concern that the NGNs will not be able to meet the identified basic requirements of practice within the allotted three month orientation period. Boxer, Fallon, and Samuelson (2001) also identified the skills needed by critical care nurses within one year of graduation and sought to determine whether these skills should be taught in school or obtained in the clinical setting. Although there was a consensus between the groups about which skills were critical, with 52 of 60 skills being judged as critical by both groups, there were differences in perception about where the skills should be learned. The NGNs felt that the skills were best learned and practiced on the clinical unit while the experienced nurses felt that the NGNs should have learned more of the skills in school. Additionally Lee, Chen, and Wang (2002) conducted a descriptive study to compare the difference between head nurses' expectations of competence and NGNs' perceptions of competence with entry level skills and found that of the 153 skills regarded as essential by the head nurses, the NGNs were only comfortable completing 82 of them. The common theme in these studies is that NGNs do not begin their careers feeling confident in their ability to provide patient care.

In the US, five studies identifying the skills needed by NGNs as perceived by the service sector were located during this literature search (Kayser-Jones, 2002; King & MacLeod, 2002; Marshall, 1999; Porte-Gendron et al., 1997; Utley-Smith, 2004) some of which showed that there is a disconnect between the skills desired by the service sector

and the skills deemed necessary by nursing educators. King (2002) reported that although both the service sector and educators believed that critical thinking, patient assessment and responsibility/accountability were of paramount importance, there was a statistically significant difference between the service and education sectors as to which other skills were important. Care plans, bed making and bed baths were identified by the service sector as competencies that remain in education but are deemed as no longer necessary in practice. Technical skills and legal and ethical decision making processes were identified by service and education as additionally needed competencies. Marshall (1999) surveyed 749 nurse executives and educators who completed a tool identifying critical skills needed by NGNs and found the most highly rated competencies being critical thinking, problem solving, and psychosocial skills. In 2004, Utley-Smith (2004) addressed the importance of establishing nursing practice competencies stating that they should be re-evaluated every three to five years to examine their continued relevance in nursing practice. As the competencies are updated they should cross the boundaries from the service sector and be incorporated in school curriculums.

A questionnaire developed by a national panel of experts was mailed to critical care educators and managers across the US in a study determining needed competencies of NGNs in critical care. Forty-two educators and 45 managers responded to Porte-Gendron, Simpson, Carlson, and VandeKamp's (1997) study. Using chi squared analysis the authors concluded that the nurses agreed on 100 of the 105 suggested competencies as critical skills for critical care NGNs, supporting their belief that a competency skill list can be developed and used to measure the readiness of newly graduated nurses across the US. While the development of a skills checklist for new graduates is an important piece

of the orientation process, judging a NGN's readiness to provide care based solely on the ability to perform psychomotor tasks negates the importance of critical thinking and clinical judgment during patient care.

Orientation programs. Three studies examined the clinical competence of the NGNs in adult health settings as an outcome measure of orientation programs(Blanzola et al., 2004). They will be discussed individually since they align with the primary focus of this project.

Blanzola, Lindeman, and King (2004) conducted a quasi-experimental study to determine whether a new internship program strengthened the clinical and leadership skills of new Navy nurses. Data was collected using a researcher developed tool (Cronbach's alpha 0.84) and the Naval Officer annual evaluation tool (FITREP). Eight NGNs who participated in the pilot internship were compared to 10 NGNs who comprised the previous cohort of new nurses. Although the small sample size generally dictates using non-parametric tests, the researchers used paired t-tests to evaluate 6 relationships measured by the FITREP. The nurses who participated in the pilot internship scored significantly higher than the control group on self evaluation at baseline (t= -4.61, p=0.002) and peer evaluation at six months (t= - 4.08, p= 0.005). Based on competency evaluation, organizational core competencies and leadership/management roles evaluated on the FITREP, and a first time NCLEX success rate of 84%passing, the new orientation program was regarded as a success.

In a descriptive study, Brasler (1993) used the Schwirian's 6D Scale of Nursing Performance and Preceptor Characteristic Evaluation tool to evaluate the performance of 118 NGNs who had completed internship programs at six hospitals. Data analysis

conducted using multiple regressions demonstrated that the most useful predictor of NGN

clinical performance was the support provided by the other nurse friends

(r=0.37,p=0.001), preceptor skill level (r=0.47, p=0.001), and preceptor support (r=0.45,

p=0.011). NGNs with more than one preceptor rated themselves higher in planning and

evaluation than did NGNs with a single preceptor (r=0.29, p=0.047) and BSN prepared

nurses rated themselves better communicators than did not BSN prepared NGNs (r= 0.26,

p= 0.033). Based on a relatively large sample size, results from this study could be

generalized to other NGN groups thus is helpful for those who plan orientation programs.

Miller (1990) utilized the Clinical Competence Rating Scale (CCRS) and

Motivator-Hygiene Tool to Measure Job Satisfaction to conduct a quasi-experimental

study with 29 NGNs and 132 staff RNs to examine the effect of an internship program on

NGN and experienced nurse job satisfaction and development of clinical competence of

the NGNs. An assistant head nurse completed the CCRS evaluating the skills of each

NGN at 2 weeks and 8 months of employment. Data was analyzed using Spearman rho

and, surprisingly, there was not a statistical increase in problem solving (r=0.84,

p>0.005), application of theory to practice (r=0.84, p>0.005), or psychomotor skill

performance scores (r=0.66, p>0.005). Since the results of this study did not answer

whether internships improve NGN competence and retention, Miller suggested further

research, stating that qualitative comments combined with quantitative data should be

used to study this population.

NGN perception of readiness. Research studies examining graduates perception of

their competence exist, however, the focus has been mainly on international nurses

(DeBellis, Longson, Glover, & Hutton, 2001; Ellerton & Gregor, 2003; Greenberger,

Reches, & Riba, 2005; Ramritu & Barnard, 2001; Walker & Avant, 2005) and only a quarter of the studies found were investigated NGNs in the US. (Boswell et al., 2004; Candela & Bowles, 2008; Etheridge, 2007). Results of international studies were similar to that of domestic ones including NGNs completing skills and performing tasks without being able to interpret results (DeBellis et al., 2001; Ellerton & Gregor, 2003; Ramritu & Barnard, 2001), and a lack of self-confidence (Greenberger et al., 2005) and requiring significant amounts of direction for at least seven months after graduation (Walker & Avant, 2005). Although themes cross international boundaries, due to differences in nursing practice in the US and abroad, only those studies pertinent to NGNs in the US will be presented in detail.

In the United States, Boswell, Lowry, and Wilhoit (2004) used an unnamed researcher developed tool (Cronbach's alpha 0.70) to assess 65 new nurses' perceptions of nursing practice and their expectations of meeting professional goals. Thirty-five percent of the NGNs had moderate or severe anxiety about accidentally harming patients. The NGNs valued comprehensive orientation programs and felt that it took a full year to feel that they have progressed from novices to staff nurses. The researchers concluded that NGNs who lack confidence may commit errors that result in adverse outcomes and encouraged that the length of orientation programs to be tailored to the individual's learning needs rather than a predetermined length of time.

More recently Candela and Bowles (2008) conducted a descriptive study in which 352 nurses who graduated within the previous five years rated how well their educational program prepared them for nursing practice. The Survey of Nurses' Perceptions of Educational Preparation was designed by the researchers and divided preparation into

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three categories. Seventy-six percent of the respondents believed that they had the necessary skills required for practice. Between 55% and 61% of the nurses felt that they were given adequate time to practice medication administration, assessment skills, and sterile procedures, however only one-third of the nurses believed that they were provided with an adequate number of overall clinical hours while in school. Sixty-eight percent of the nurses believed that they had been adequately prepared in professional development however this average was skewed downward since only 23% of the nurses believed that they were prepared to access electronic medical records, one of the subcomponents of this area. Overall 51% of the nurses believed that their education was targeted at passing the NCLEX rather than preparing them for clinical performance. There was no statistical difference in the nurses' perceptions based on the type of degree program from which they graduated.

Experienced nurses' perception of NGN readiness. Several of the research articles located examined NGN clinical competence from the perspective of experienced nurses including domestic (Diede, McNish, & Coose, 2000; Lowry, Timms, & Underwood, 2000; Murphy et al., 2002; Ryan & Hodson, 1992) and international studies (Carlisle et al., 1999; Clinton, Murrells, & Robinson, 2005; Khoza & Elhers, 1998; Morolong & Chabeli, 2005; Ogunsola & Williams, 1998; Wolff, Regan, Pesut, & Black, 2010). Results were similar including NGNs lack of basic knowledge and skills deemed necessary (Carlisle et al., 1999; Lowry et al., 2000; Morolong & Chabeli, 2005; Murphy et al., 2002; Wolff et al., 2010). Wolff, Regan, Pesut, and Black (2010) suggest a paradigm shift from NGNs being "ready to hit the floor running" (p.9) to NGNs being generalists who have some job specific capabilities, a balance of doing, knowing, and

thinking, and the ability to provide safe patient care. Since the scope of nursing practice and methods of education in the United Kingdom and South Africa vary from that in the US, only domestic studies will be reviewed.

Murphy (2002) examined the readiness of NGNs from ADN, Diploma, and BSN programs to enter hospital practice including measuring clinical competence and the ability to meet patients' needs. The author interviewed 20 nurse managers, preceptors, and staff nurses from university affiliated hospitals, medical centers, and community hospitals and found that NGNs from all three entry levels required extensive support during orientation. The BSN graduates were noted to have the best critical thinking skills and theoretical knowledge. They were deemed to become the most competent nurses over time. The Diploma graduates had the best clinical skills. ADN nurses lacked both clinical skills and theoretical knowledge. The author recommends that clinical components be strengthened in all programs and that the professional role of nursing and the importance of competence and caring be reinforced in curricula.

Ryan & Hodson (1992) conducted a longitudinal descriptive study to establish a database of employers' perceptions of NGNs functioning over a five year period. The Employer Survey Tool developed by the authors was used to evaluate NGNs who graduated from one BSN program between 1983 and 1987. One hundred sixty NGNs provided the name of their immediate supervisor and that person was then mailed the survey tool and 77 supervisors responded. Descriptive statistics showed that 88% of the nurses functioned at the expected level or higher as NGNs therefore the researcher deemed the nursing program successful in producing NGNs who are clinically prepared

to provide patient care. It should be noted, however, that expected is not defined therefore that level may or may not equate to safety.

Diede, McNish, and Coose (2000) conducted research to determine the role of the ADN nurse within the evolving health care system in the US. A survey tool developed by the Oklahoma Associate Degree Director's Council Taskforce was completed by 174 employers and supervisors in OK and its bordering states. NGNs were rated on a scale of zero (low) to four (high). Results showed that during the first six months, ADN graduates were rated higher in the communication (3.49), collaboration (3.48), and technical skills (3.41) categories than they were in the leadership and management (2.35), time management (3.15) and nursing process (3.3) categories. Employers stated that this is what they expected of ADN graduates, but not what they desired as competencies of NGNs.

Lowry, Timms, and Underwood (2000) conducted a descriptive study to determine whether NGNs graduating from a specific university met the expected competencies of new nurses. A questionnaire containing open and closed ended questions was developed by the researchers and hospital administrators. The tool measured clinical skills, organizational skills, interpersonal skills, professionalism, and general knowledge and was found to have a Cronbach's alpha of 0.99. Sixty-eight nurses completed evaluation of NGNs from the university. NGNs were rated on a 1(highest)-5(lowest) scale. Data analysis identified areas of concern including a basic lack of ability in the following areas: general knowledge (2.43), clinical skills (2.49), professionalism (2.47) interpersonal skills (2.71) and organizational skills (2.75). Respondents with less nursing experience rated the NGNs higher than did those with more experience, possibly related

to their personal level of knowledge and nursing practice. Similarly, respondents who had been exposed to more NGNs while acting in a preceptor position scored the NGNs lower than did new preceptors who often had less personal nursing experience.

Comparison of NG and experienced nurses' perceptions. Direct comparisons of NGNs' clinical performance matched with experienced nurses' perception of NGN performance were found in six nursing studies, three of which occurred in the US. In all cases, the NGNs rated themselves higher than did others completing their evaluations (Bork, 2003; Failla, Maher, & Duffy, 1999; Lofmark, Smide, & Wikblad; Roberts & Garrell, 2003; Romyn et al., 2009; Vanetzain & Higgins, 1990).

In the US Vanetzian and Higgins (1990) used Schwirian's Six-D Scale of Nursing Performance (1978) to measure clinical performance of NGNs from the perspective of the NGN and preceptor. Both the NGNs and the preceptors evaluated the NGNs skills higher at one year than they did at six months. The NGNs rated themselves higher than their evaluators in all subscales except critical care skills at both 6-month and 12-month intervals.

Failia, Maher, and Duffy (1999) used a modified version of the Schwirian 6-D scale (Cronbach's alpha ranged from 0.64- 0.96) to have 77 NGNs, 18 faculty members, and 7 employers rate performance for ADN nurses from a specific nursing program. Data analysis was conducted using descriptive statistics and t-tests for independent related samples and identified that graduates rated themselves significantly higher than did the employers in all six categories. The categories measured were leadership (t=2.83, p=0.025), interpersonal relations (t=3.83, p<0.001), professional development (t=2.33, p=0.05), critical care (t= 2.61, p=0.01), planning and evaluation (t=2.31, p=0.03), and

teaching and collaboration (t=2.26, p=0.03). There was not a significant difference in evaluations of NGN skills conducted by the faculty and employers in any of the categories.

More recently, Bork (2003) used a survey tool developed by the Kansas City Colleagues in Caring Project (no validity or reliability reported) to determine if there were significant differences between the NGN competency scores from the perception of NGNs and supervisors. Fifty-nine nursing faculty and 51 BSN graduates participated in the study which concluded that there were statistically significant differences between the perceptions of NGNs and faculty about the competencies required of NGNs. The graduates rated themselves higher than the educators in the areas of prioritization (t=26.422, p< 0.001), advocacy (t=11.447, p= 0.001), incorporating standards of care (t= 0.062, p= 0.037) and teamwork (t=4.069, p 0.047). Of these, the NGNs overrated self-assessment of ability to prioritize.

Romyn et al. (2009) conducted a qualitative descriptive study of 14 NGNs and 133 experienced nurses to gain a deeper understanding of the transition from student to NGN. Using 15 discussion groups , six of which included NGNs, they validated that a experienced nurses perceive a gap between what the level of readiness that they expect from NGNs and the level of care provided by NGNs. The experienced nurses prefer that NGNs would be able to "hit the ground running" (p.2) and acknowledge that the issue of NGNs not meeting practice needs has always existed. The experienced nurses commented that the workplace was better prepared to close the gap in the past than it is now. The authors recommend that hospitals conduct a systematic evaluation and identify best practices to be used to recruit, train, and retain NGNs. They also suggest that nursing

programs conduct curricular reviews to ensure that the content being taught is relevant in today's workplace.

Critical care focus using the BKAT. Basic knowledge in critical care is the body of knowledge required to provide safe and competent care to critically ill patients which requires knowledge beyond that which is required to pass licensure exams. While discernment of basic knowledge does not guarantee safe nursing practice in the critical care setting, safe practice certainly cannot occur without the acquisition of basic knowledge (Toth & Ritchey, 1984). The Basic Knowledge Assessment Test (BKAT) (Toth & Ritchey, 1984) evaluates the basic knowledge within in a clinical area and has been used in several studies in the US and abroad (Aari, Ritmala-Castren, Leino-Kilpi, & Suominen, 2004; Boyle, Kenney, & Butcher, 1995; Lanford, 1989; Michard & Henry, 1998).

Two studies using the BKAT to directly evaluate the performance of NGNs were found in the literature. Aari, Ritmala-Castren, and Suominen (2004) completed a descriptive study with 130 Finnish NGNs to describe the knowledge of those graduates and match it to the requirements needed of critical care nurses. The sample included a cross section of NGNs with and without hospital experience and with and without the desire to pursue critical care nursing. Data analysis using a Mann-Whitley U test found statistically significant scores in several areas, however the U value was not reported, only the significance level. Those scoring highest on the BKAT were male nurses over females ($p=0.16$), nurses with a background as a paramedic ($p=0.095$), nurses who had critical care courses ($p=0.41$) and nurses who wished to be employed in critical care scored statistically higher than those who did not have similar experiences ($p=0.003$).

BKAT scores ranged from 4 to 76 points with a mean of 40 and median of 42. Overall, all NGNs scored poorly in the cardiovascular and pulmonary sections suggesting the need for increased content in those areas if NGNs are going to be permitted to enter the critical care area as new graduates. These scores are of great concern since Toth (Toth, 2006a) expects that at the end or orientation critical care nurses score between 82 and 84.

Lanford (1989) conducted a similar study with NGNs in the US. This descriptive correlational study included 40 nurses from 5 hospitals and used the BKAT, version3, to assess the level of knowledge of NGNs within 1 year of their graduation. The mean score of the NGNs was an 65.3 as compared to Toth's prediction of mid-80's for experienced nurses (Toth & Ritchey, 1984). NGNs who took a critical care course as part of their orientation scored significantly higher than those who did not (F=7.595, p<0.0001). Length of critical care experience was the next highest significant factor (F= 3.760, p=0.033), with improvement shown at each 3 month testing interval. This study supports the proposed dissertation in that the basic knowledge of NGNs, as measured by the BKAT, has not yet reached the level of experienced nurses at the one year mark. It also reiterates previously documented concerns that NGNs may not be ready to practice at the end of their orientation periods.

Miscellaneous studies. During the review of research, four studies that cannot be placed in the previous categories were identified. Two of the studies were focused reviews of the clinical competence literature. Cowan, Norman, and Coopmah (2005) reviewed 42 journal articles, books, and abstracts of conference presentations dating back to 1995. Watson, Stimpson, Toppping, and Porock (2002) reviewed 41 journal articles found between 1980 and 2000. Researchers conducting both studies lamented that

clinical competence has yet to be adequately defined and the terms competence and competency are often used interchangeably. Additionally they suggest that the tools used to measure competence often are not adequately tested for validity and reliability. Further, Cowan, Norman, and Coopmah raise doubts as to whether nursing should even establish competencies since that would reduce nursing practice to technical skills without incorporating the science and art of nursing.

The link between nursing competence and actual errors as well as near misses made by NGNs was reported in a study of 650 NGNs where data identified six key competencies directly related to errors or near misses (Smith, 1999). Newly graduated nurses who identified themselves as "less than definitely comfortable" on a competencies list were significantly more likely to make errors than those who rated themselves as comfortable. The key areas linked to errors included difficulties in the following areas: making decisions; performing psychomotor skills; supervising LPNs or assistive personnel; calling physicians; working in an interdisciplinary health care team; and understanding pharmacological implications. NGNs stated that they felt comfortable with medication administration and caring for two patients, with BSN students claiming more comfort with cultural implications than their peers.

Ebright, Urden, Patterson, and Chalko (2004) carried out a retrospective review studying eight novice nurses who, after completing their orientation, had near miss or adverse events occur. Their goal was to identify human performance factors that contributed to the events. Nine themes that contributed to the near-misses and adverse events were identified by the novices: decisions requiring clinically focused critical thinking; the need to seek assistance from experienced nurses; knowledge of unit and

workflow patterns; first time experience with a procedure or situation; time constraints; lack of communications; influence or peer pressure; losing sight of the big picture; and novices assisting novices. These findings suggest that nurses need to provide ongoing support for NGNs for one year after orientation especially during high risk situations.

Summary. When examining NGN readiness to practice, NGNs consistently perceive that they function at a higher level than do experienced nurses who work with or mentor them perceive the NGN to function. While NGNs perceive themselves to be functioning at a higher level of readiness than do experienced nurses who evaluate them, they express fear and concern about the ability to perform patient care and the potential to cause injury to patients. Likewise, experienced nurses are concerned that NGNs are not adequately prepared to provide patient care and that the formal orientation program at the hospital does not provide enough time for them to obtain an ideal knowledge base and skill set.

Clinical Judgment and Decision Making

Clinical judgment or decision making is a deliberate problem solving activity or process. Conclusions are developed based on actual or perceived patient needs or responses and form the basis of the care provided to patients. A review of the literature yielded multiple studies about nursing students and nurses' clinical decision making, however only five articles studied NGNs specifically, and of those studying NGNs only two were conducted domestically.

Nurses and student nurses. Three studies comparing the clinical judgments of students with nurses were located however each study was conducted over 20 years ago. Using an exploratory design Westfall, Tanner, Putzier, and Padrick (1986) studied 15

junior year and 13 senior year BSN students and 15 staff nurses deemed by their supervisors to be experts in clinical judgment to determine the number of hypotheses each group would make based on a patient scenario. The researchers anticipated that the experienced nurses would develop more accurate or plausible hypotheses and more nursing action inferences than the students, but that was not the case. Each group routinely identified seven items, which the authors attributed to the "chunking theory" of cognitive psychology, which posits that humans can only attend to seven things at a time.

In a follow-up study the researchers exposed the same subjects to three additional patient case studies and taped shift reports to determine the cognitive strategies used by the students and nurses and to determine if they varied based on length of experience (C. A. Tanner, Padrick, Westfall, & Putzier, 1987). The researchers determined that both the students and nurses used the same diagnostic reasoning patterns as physicians which included making hypotheses early in the presentation and then ruling them in or out based on additional data. The findings replicated the prior study in number of hypotheses developed, however the length of time it took to develop the hypotheses varied inversely with experience and the nurses' hypotheses were more accurate than were the students'. The researchers attributed this to more systematic data collection and recommended extending the study by observing all groups as they performed clinical care, but no such article was located.

Itano (1989) compared the clinical judgment processes of 13 staff nurses identified as highly skilled judgment makers (HSJMs) to those of 13 student nurses just prior to graduation from a BSN program. After reviewing the Kardex and receiving report, the students and nurses conducted their initial assessment while observed by the

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researcher. The nurse-patient assessment was tape-recorded. Non-verbal actions, such as visual inspection of drains or oxygen, and touching the patient, were noted. Each participant was asked to state conclusions based on the assessment, followed by hearing excerpts of the assessment recording and being asked to review their initial thoughts. The HSJMs identified significantly more cues than did the students accounting for 63% of the total cues collected. Both groups cued in on the patient's current state rather than the patient's history when identifying cues. The researcher suggests that the development of students' judgment can be measured and the number of cues elicited should increase with experience.

Experienced and inexperienced nurses. Tanner, Benner, Chelsea, and Gordon (1993) conducted a phenomenological study to analyze knowing the patient as it related to everyday nursing practice. Using group interviews in which nurses discussed examples of patient encounters, 130 nurses working in adult, pediatric and neo-natal critical care units were interviewed. Additionally the practice of 48 of the nurses was observed. Nurses believed that knowing the patient allowed them to make clinical judgments, meet cultural expectations and advocate for the patient, which is integral to making skilled judgments about clinical care. Nurses also identified that it is often difficult to know the patient based on financial constraints, organizational practice arrangements and fear that nursing often is reduced to technology focused care, and that patients don't receive as much of the caring aspect of nursing when they are not known.

In a longitudinal study evaluating critical thinking and clinical judgment, del Bueno (2005) reported the mean scores of experienced and inexperienced nurses who completed the Performance Based Development System (PBDS) assessment program.

Nurses with one or more year of experience answer correctly 66.2% of the time, but NGNs respond correctly to test items only 31.8 percent of the time, meaning that approximately 70% of the NGNs were unable to recognize and synthesize patient problems and needs and provide safe nursing care. del Bueno believes that the solution to this problem is not more didactic content in schools. She asserts that group participation in questioning activities where participants work through problems to apply and synthesize knowledge is a more effective learning strategy than didactic content alone. This statement is backed by scores from two groups of nurses who received remediation after their first assessment. The mean scores for the group that received traditional didactic review increased from 29.6% to 42% compared with those who used the application strategy where mean scores increased from 27% to 75.2%. This study underscores the importance of real life practice scenarios as a tool to increase nurses' critical thinking and clinical judgment skills.

Newly graduated nurses. Studies examining the clinical decision making and judgments of newly graduated nurses specifically are new in the nursing literature. The four studies that were located in the last five years include a series looking at Australian NGNs and one domestic study.

McKenna and Green (2004) conducted a qualitative study to explore the learning experiences of NGNs during their first year of practice. Seven NGNs participated in focus groups six and 12 months after graduation. The participants were asked to describe their areas of learning during the prior three months and the source of that knowledge. At the six-month point the focus of the NGNs was on self and learning constituted mainly strategies to survive and clinical skills tasks. At the end of their first year of practice the

NGNs were able to focus on the patient and apply their assessment skills rather than worrying about performing the skills. The NGNs believed that they had better critical thinking skills, were more assertive and had increased self-esteem related to their value as part of the health care team.

In the second portion of the study Newton and McKenna (2007) conducted a focus group study to explore how NGNs developed their knowledge and skill during their first year of practice. Twenty-five NGNs participated in the focus groups between four and six months and then again 11 and 12 months after graduation. Six themes emerged; feelings by the NGNs that they "glided through" school and were unprepared for practice; surviving their early shifts as nurses; beginning to understand their role as members of the health care team; finding shelter in the safety of the graduate program umbrella until the point where the NGN feels comfortable about the care they provide; knowing how to respond to unexpected situations, which didn't occur until 11-12 months after graduation; and feeling like the NGN has come a long way and made it as a nurse but still has much to learn. Although six phases of the transition year were identified in this study, again there was no discussion about the actual process by which the NGNs made clinical judgments as they progressed through their initial year.

Finally, McKenna and Newton (2008) conducted a phenomenological study to explore how Australian NGNs developed their knowledge and skill during their first 18 months after graduation. Twenty-five nurses began the series of interviews (results in the prior study) and nine were still participating at the final interview. Data analysis of the interviews yielded three themes after the NGNs completed their 12 month formal residency program: a sense of belonging in the unit, independence providing care, and

moving on to help new nurses. Multiple anecdotal comments from the nurses who participated were included in the article, but as with the other two studies, the process by which these NGNs made clinical decisions was not addressed.

Etheridge (2007) conducted a phenomenological study to uncover NGNs perceptions about their clinical judgments and to ascertain what experiences were most helpful in learning to make judgments. Six BSN prepared NGNs participated in three individual interviews during their first year of practice. The participants identified nursing judgment as learning to think like a nurse, a process that required moving through a series of four steps. In order to think like nurses NGNS had to develop confidence, learn responsibility, form relationships with other members of the health care team, and think critically. NGNs found that clinical experiences and discussion with their peers to be the most beneficial learning strategies. Furthermore the NGNs saw faculty and their preceptors as role models and wished to be challenged to discover their knowledge by working through problems rather than being told the solutions.

Experienced nurses. A majority of the studies located examined the clinical judgment of experienced nurses, and only two occurred within the last six years. The studies focused on the use of intuition in clinical judgment and decision making (Benner & Tanner, 1987; King & MacLeod, 2002; Ramezani-Badr, Nasrabdi, Yekta, & Taleghani, 2009; Rew, 1988), clinical reasoning and cognitive processes (Ebright, Patterson, Chalko, & Render, 2003; Grobe, Drew, & Fonteyn, 1991; Higuchi & Donald, 2002; Lauri et al., 2001; Simmons, Lanuza, Fonteyn, Hicks, & Holm, 2003) and personal knowing (Ebright et al., 2003; Jenks, 1993; Rew, 1988; Simmons et al., 2003). Since

experienced nurses are not the focus of this study, these studies will not be reviewed

individually.

Theory building. Using a grounded theory approach, Ferguson and Day (2004)

explored the process by which clinical judgment skills are developed by newly graduated

baccalaureate prepared nurses during their first two to three years of practice. Twenty-

five registered nurses participated in a series of interviews over a 16 month period. Using

constant comparative analysis, Ferguson and Day developed the Theory of Developing

Clinical Judgment in Practice which is based upon 5 stages which must be accomplished

by new nurses. These phases are orienting to the practice environment, learning practice

norms, developing confidence, consolidating relationships, and seeking challenges. The

information gleaned from this theory can enable nurse leaders and educators to provide a

supportive environment for NGNs based on their individual needs as they pass through

these distinct stages.

Tanner (2006) furthered prior work in the clinical judgment and decision making

field by reviewing 191 articles published in the nursing literature and presenting a

Clinical Judgment Model based on five conclusions drawn from the research. First,

Tanner states that nursing judgments are impacted on the nurse's prior experience and

knowledge base more so than on the objective data that the nurse gains for any particular

situation. Experienced nurses rely on practical knowledge intuition gained over time,

often responding to patient scenarios without explicit thoughts. On the other hand, NGNs

must be able to reason analytically, learn to recognize similarities in patient conditions,

and then apply the theoretical knowledge in order to develop practical knowledge and

make clinical judgments. Secondly, Tanner found that making clinical judgments is

linked with knowing the patient, the patient's patterns of responses, and the patient's concerns. This tacit knowing allows nurses to make judgments and provide individualized care based on the patient's preferences. Next Tanner claims that clinical judgments are influenced by situational occurrences in the workplace. These include knowledge of the unit and workflow, relationships within the health care team, social and moral beliefs, and hospital politics. Tanner hypothesizes that nurses use a combination of at least three reasoning patterns when making judgments. An analytical process is used when the nurse lacks knowledge, there is incongruence in that is expected and what occurs, and when making a conscious choice between multiple options. Decisions are also made based on intuition. Narrative thinking is used to make sense of a situation and reflect upon it which leads to Tanner's final tenant: reflection. Tanner states that reflection is used to evaluated clinical judgments and is required to improve a nurse's clinical reasoning. Tanner purports that the nursing process that is the basis of most nursing programs does not adequately describe the decision making processes of nurses, and that relying solely on that framework for teaching students may be a disservice to them. Therefore the proposed model is presented to educators in order to expand the mechanisms by which students are guided to make sound clinical judgments.

Summary. The ability to make effective clinical decisions relies on accurately assessing the patient and properly interpreting that information prior to initiating action. A majority of the studies located focus on experienced nurses. Since judgments are partially based upon didactic knowledge and previous clinical experience, NGNs' lack of experience affects the processes by which those judgments are made.

Summary of Research Gaps

The need for NGN transition programs is highlighted in the nursing research literature, but there is little consistency in what types of programs are offered to NGNs nor consistency between the structure or length of preceptorships or residencies (Clare & van Loon, 2003). Furthermore nursing lacks a consistent accepted definition of clinical competence. Few nursing studies measure the cognitive, psychomotor, and affective domains that are integral to nursing and the tools that are used to measure clinical competence vary based on the author's definition of clinical competence. In order for any study to produce valid, reliable, and generalizable results, the data collection tools must tested for validity, reliability, and applicability to current nursing practice prior to use.

It is not disputed that, in general, experienced nurses have more experience and function at a higher level than do NGNs. Studies show that nurses, educators, and managers in the service sector expect more from NGNs that the NGNs feel prepared to deliver. Studies conducted in the US and internationally identified that NGNs rate themselves as more competent to practice than do their preceptors or supervisors (Bork, 2003; Failla et al., 1999; Vanetzain & Higgins, 1990). In the only two studies found that use the BKAT to note level of readiness at the end of orientation, NGNs do not reach the expected scores needed to provide care in the critical care setting (Aari et al., 2004; Lanford, 1989). To date, no studies have been found that identify when then the gap is bridged.

Likewise there is a paucity of research examining the clinical judgment and decision making skills of NGNs in the US. More studies have been conducted internationally than domestically. The importance for educators to study the judgment processes, methods, and procedures of inexperienced nurses and nursing students was

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identified 20 years ago (Itano, 1989), but only two studies of NGNs in the US have been located to date. Filling this gap is important in order to be able to teach students how to make valid patient care decisions. This can be extrapolated to newly graduated nurses who, like students, have a limited scope of knowledge on which to base their decisions (Etheridge, 2007; Westfall et al., 1986).

Furthermore, Miller (1990) suggested that NGNs' clinical readiness be studied using mixed methods in order to ascertain NGN requirements for clinical competency and to promote retention of novice nurses. No studies that combine the quantitative comparison of NGNs and experienced nurses with the qualitative portion examining the decision making skills of NGNs have been located to date. Knowing the basic knowledge level or clinical competence of a NGN coupled with knowledge about how the NGN makes clinical judgments puts managers, educators, and preceptors in a better position to teach NGNs how to make decisions until each nurse reaches a level of clinical maturity where those decisions stem from a holistic understanding of the patients' needs.

The proposed dissertation study using a mixed methodology design aims to provide data to begin to fill those deficits in the US nursing literature. Quantitative data will be collected using the critical care BKAT-7, a tool that has repeatedly updated for relevance and currency to critical care nursing practice and been proven valid and reliable over its 25 year history. Additionally the BKAT-7 measures nursing readiness to practice in the critical care setting across all domains rather than focusing solely on critical thinking or psychomotor tasks. By having both NGNs and experienced working on the same units take the BKAT, the researcher should be able to identify at what point the

NGN reaches the expected score as predicted by Toth and identify when the NGNs' scores reach the mean scores of nurses working on the same unit.

Qualitative data about NGN's clinical judgment will be elicited by asking them to relate their lived experience as they provided care in an actual challenging patient care situation. Presumably the qualitative data obtained will provide a rich balance and further insight to the quantitative data gathered with the BKAT-7.

Identifying when the NGN reaches a level of clinical maturity that characterizes the NGN as experienced would be useful to hospital educators as they structure orientation programs and support NGNs beyond the formal orientation period. Knowing the basic knowledge level or clinical competence of a NGN coupled with knowledge about how the NGN makes clinical judgments puts managers, educators, and preceptors in a better position to teach NGNs how to make decisions until each nurse reaches a level of clinical maturity where those decisions stem from a holistic understanding of the patients' needs.

Since the scope of practice of nurses domestically and internationally varies, results found in international studies may not be able to be generalized to nursing in the US. It is imperative that US researchers begin to fill that void in the literature. This dissertation aims to begin to bridge that gap in the clinical competence and clinical judgment literature for NGNs in the US.

Chapter 4

Pilot Study

Prior to dissertation, a pilot study assessing NGN and experienced nurses knowledge as measured by the BKAT was conducted to determine if the methodology of administering and returning the research packet was feasible to obtain an adequate number of nurses required to complete a robust study. Additionally the pilot offered the opportunity to determine if the demographic tools provided the researcher with the information necessary to draw comparisons between the newly graduated and experienced nurse cohorts.

Research Design

This descriptive pilot study used a between groups non-experimental design. The critical care Basic Knowledge Assessment Test, version seven (BKAT-7) was used as a quantitative measure of nursing basic knowledge in NGNs and their experienced counterparts. Nurses were recruited during monthly staff meetings on all three shifts and by posting flyers throughout the unit and in staff mailboxes. Study packets were available in crates located next to staff mailboxes in the staff break room on both units. Nurses who consented to participate in the study received a study packet and completed the 100 question BKAT-7 and a demographic tool in a single unsupervised sitting. Participants were asked not to refer to colleagues or outside sources. The participants mailed both tools, a signed copy of the informed consent, and a participant-addressed envelope to the researcher in a postage paid envelope provided in the study packet. Participants received

a $25 gift card as compensation for their time (approximately 1 hour) as well as the answer key to the BKAT.

Research Questions

This research project investigated the basic knowledge of NGNs working in the adult critical care (CC) setting by examining NGN basic knowledge compared with their experienced counterparts. Research questions for this study were:

1. Is the recruitment methodology feasible to obtain an adequate number of nurses required to complete a robust study?

2. Is the methodology of administering and returning the critical care Basic Knowledge Assessment Tool, Version 7 (BKAT-7) and Demographic Tools practical for those participating in the study?

3. Do the demographic tools provide the researcher with the information necessary to draw comparisons between the newly graduated and experienced nurse cohorts?

4. What level of basic knowledge and skills, as measured by the BKAT-7, do NGNs have to prepare them to work in the adult critical care setting compared to experienced nurses?

5. What demographic variables relate to basic knowledge of NGNs in the adult critical care setting compared to experienced critical care nurses?

Human Protection

Institutional review board approval was obtained from Duquesne University and Sentara Virginia Beach General Hospital (SVBGH) prior to initiating the study.

Participation in this study posed no risks greater than those encountered in daily life. Participants received written explanation of the study and a copy of the informed consent. Participants' names did not appear on either tool, no individual identity was made in the data analysis, and responses only appear as aggregate data in statistical summaries. Participants were informed that they may withdraw from the study at any time and without providing any reason and the decision to not participate or to withdraw from the study would not negatively impact the nurse. Individual results were not shared with the unit manager or educator and therefore, there is no impact on the nurses' employment. Written materials and consent forms are kept separately and stored in a locked file in the researcher's office. Data analysis was conducted on a password protected laptop computer that is stored in the researcher's locked office.

Sample

Newly graduated and experienced nurses on the general intensive care units at SVBGH comprised the convenience sample for this pilot study. All forty-nine staff nurses on the units were invited to participate. Based on the New Graduate Transition Process Model (Schoessler & Waldo, 2006) NGNs are defined as licensed registered nurses who have been working for eighteen months or less. Experienced nurses are defined as licensed registered nurses with 19 or more months of nursing experience. In this study critical care nurses were defined as those RNs working in intensive care units and did not include intermediate care or step down units or the emergency department.

Data Collection Tools

Participants completed one of the two researcher developed demographic tools, one of which was for NGNs and one for experienced nurses. The Basic Knowledge Assessment Test (BKAT) is a copyrighted tool designed by Toth and Ritchey (1984). Permission to use and photocopy the tool was obtained by Dr. Toth, with the stipulation that the tool may not be converted to an electronic format.

Although the BKAT is a cognitive written examination, the test questions range in difficulty from recall of basic information to the application of basic knowledge in practice scenarios, and cover the cognitive, psychomotor and affective domains of learning. The BKAT was developed over a two-year period and released in 1984 as a criterion referenced measure to determine attainment of minimal requirements to safely work in the critical care setting. The goal of the original BKAT was to ascertain what comprises basic critical care knowledge and to develop a tool to quantify that knowledge (Toth & Ritchey, 1984). The researchers based their tool on the standards of care developed by the American Association of Critical Care Nurses (AACN). Those standards were designed to define safe clinical practice and to guide critical care orientation programs. However, Toth and Richie (1984) reported a dichotomy between what educators and employers expected as minimal competencies. Therefore the tool was developed based on a thorough review of the literature as well as input from staff and head nurses working in critical care units, critical care physicians, and a panel of critical care education experts.

The BKAT has been updated to reflect current practice in critical care nursing and in 2006 the BKAT 7th version was released. It is a 100 question multiple-choice and fill-

in-the-blank pencil and paper test that measures basic critical care nursing knowledge. Assessment areas include the following body systems: cardiovascular, pulmonary, neurological, gastrointestinal, endocrine, and renal. Two additional categories include hemodynamic monitoring lines as well as infection control, burn care, hypothermia, and spiritual care. Psychosocial aspects of care are infused throughout the test.

BKAT -7 validity and reliability. Construct validity was supported through the use of pre-established group differences comparing scores between newly graduated nurses and experienced critical nurses. The experienced nurses had a mean score of 82.3 and reliability of 0.90 while the newly graduated nurses mean score was 74.8 with a reliability of 0.89. Reliability for BKAT- 7 was established by testing 298 critical care experienced nurses from 26 states and was found to range from 0.88 – 0.90. Repeat reliability testing has not been reported however throughout the previous six versions of the tool reliability is consistently reported above 0.80.

Data Analysis

Data was entered in the statistical software package SPSS. Staff nurses were divided into new graduate and experienced cohorts based on the number of months that they have worked as indicated on the demographic tool. Data analysis occurred with experienced nurses grouped in a single cohort and the newly graduated nurse cohort subdivided into three groups as described by the Transition Process Model (0-3 months, 4-9 months, 10-18 months). Additional analysis was done dividing the experienced nurses into three cohorts: those with up to two years of experience, those with two to five years of experience, and those with more than five years of experience. Demographics and BKAT scores were reported using descriptive statistics and a frequency distribution

was developed and approximated a normal distribution (Figure 3). The calculated left

skew (-0.237) is consistent with expected results obtained when using criterion

referenced tools (Waltz, Strickland, & Lenz, 2005) since the tool measures whether the

participant has achieved a specific set of targeted knowledge.

Figure 3. Frequency Distribution of BKAT Scores

Histogram

Mean =83
Std. Dev. =6.64
N =23

BKAT_Score
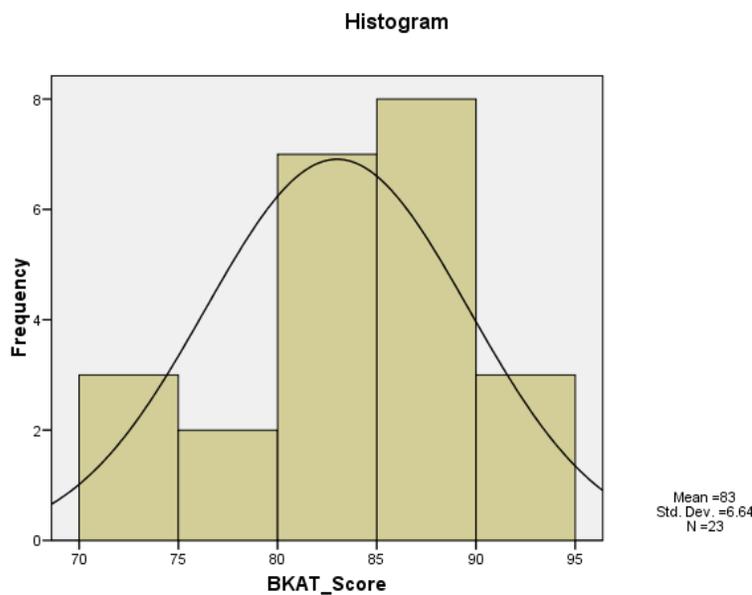
Results. Twenty-three of the forty-nine staff nurses on the general critical care

units participated in the pilot study (47%). Thirty-nine percent of experienced nurses

returned the research packet (16 of 41), although NGNs responded at a higher rate, 87.5%

(7 out of 8) than did the experienced nurses. All of the sample nurses were female nurses

with an age range from 22 to 61. Critical care experience ranged from new graduates with

one month of experience to a nurse with 32 years of experience. The mean experience of

the pilot study group is 4.34 years with a median and mode of 2 years (Figures 4 and 5).

Four of the nurses were certified in critical care (17%). Nearly 22% of the nurses were

Associates Degree prepared, 30.4% had a Diploma in nursing, and 47.8% had a

Bachelor's Degree in Nursing (Figure 6).

Figure 4. Nursing Experience
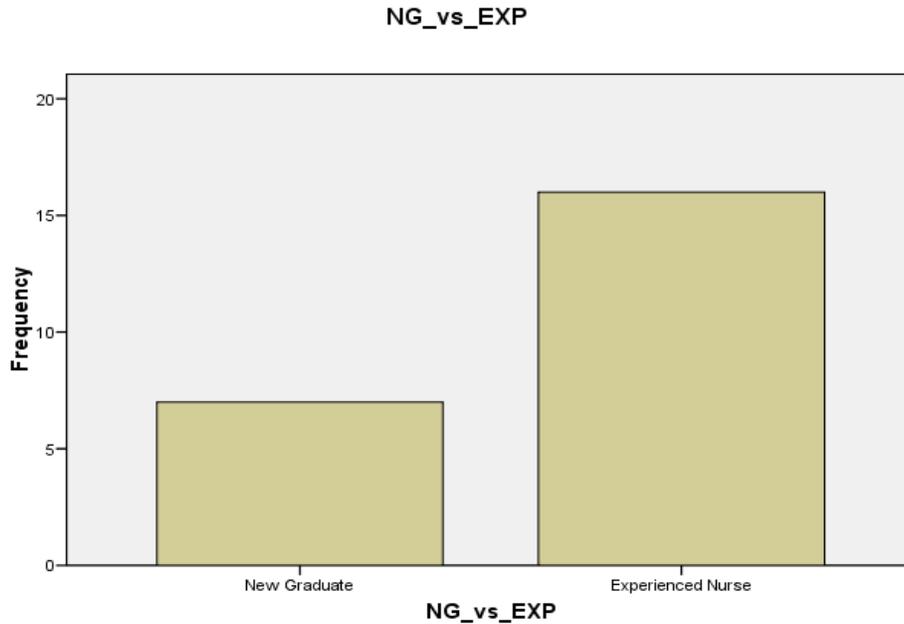
Figure 5. Critical Care Experience
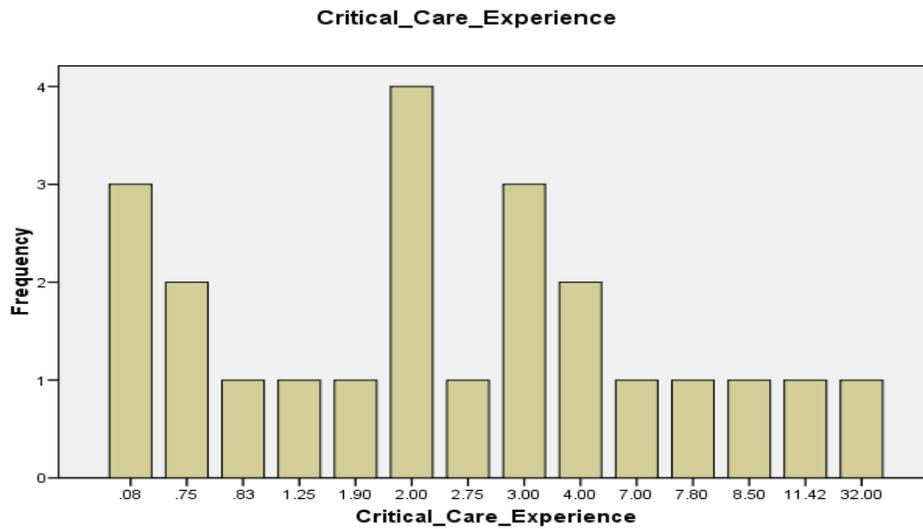
Figure 6. Nursing Degree by Category

Current_Degree
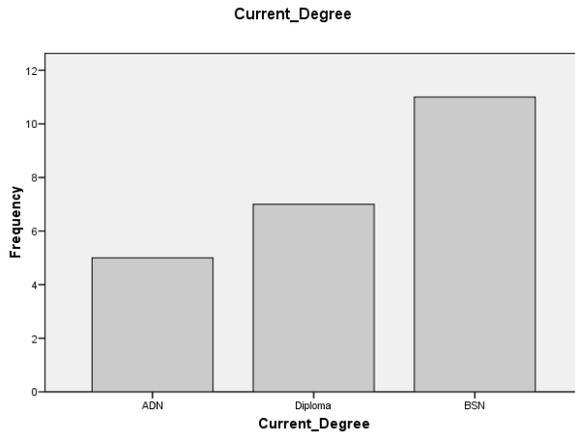
The overall mean score on the BKAT was 83 with a SD of 6.64, the NGN mean score was 80.43 with a SD of 8.22, and the experienced nurse mean score was 84.13 with a SD of 5.760 (Figure 7). BKAT scores ranged from 71 to 95. Mean scores for each BKAT subcategory were calculated and ranged from 77% for the endocrine content to a high of 86.6% pulmonary content.

Figure 7. BKAT Scores and Experience
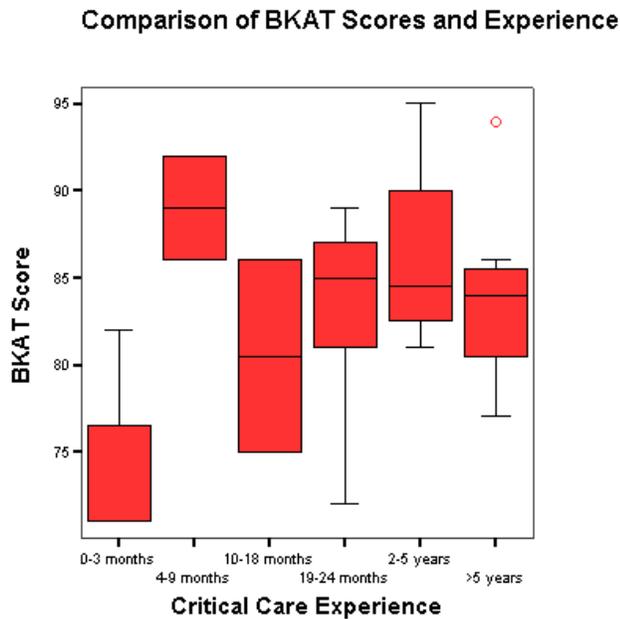
Comparison of BKAT Scores and Experience

An independent samples t-test was conducted to determine significance between the two cohorts and was found to be non-significant at the 0.05 level; (t(21df)=-1.244, P>0.05). A one-way analysis of variance (ANOVA) was conducted to evaluated the relationship between BKAT score (dependent variable) and the nurses' levels of education (independent variables). The ANOVA was significant between groups, [F(2,20) = 4.483, p = 0.025]. Tukey's HSD was conducted as a post-hoc test to evaluate the pairwise differences among the means based upon Levine's Test of Equality estimate of homogenous variances. There was a significant relationship between the BSN and Diploma graduates at p= 0.019, but not the other dyads (Figure 8). Furthermore, ANOVA examining the relationship between all three levels of NGN was not found to be significant at the 95% confidence level, nor was there a significant relationship between the BKAT scores of experienced nurses subdivided into cohorts of two years or less experience, two years to five years, or greater than five years of critical care experience. An ANOVA was conducted to evaluate the relationship between NGN BKAT scores and NGN degree levels and was found to be significant [F 2,6= 11.230, p= 0.023]. Post hoc testing to evaluate where the pairwise significance occurred could not be conducted since there were not at least two participants at each degree level. However, when pairs were examined individually using an independent t-test, there is a statistical significance between the scores of NGNs from diploma programs and ADN programs [t(2)= 5.125, p= 0.036] with ADN nurses scoring higher as well as with BSN and Diploma grads with BSN grads scoring statistically higher [t(2)=4.483, p=0-011]. There was not a statistically significant difference between ADN and BSN NGNs [t (2) = -0.115, p. > 0.05].

Figure 8. BKAT Scores by Current Nursing Degree

Comparison of BKAT Score and Nursing Degree
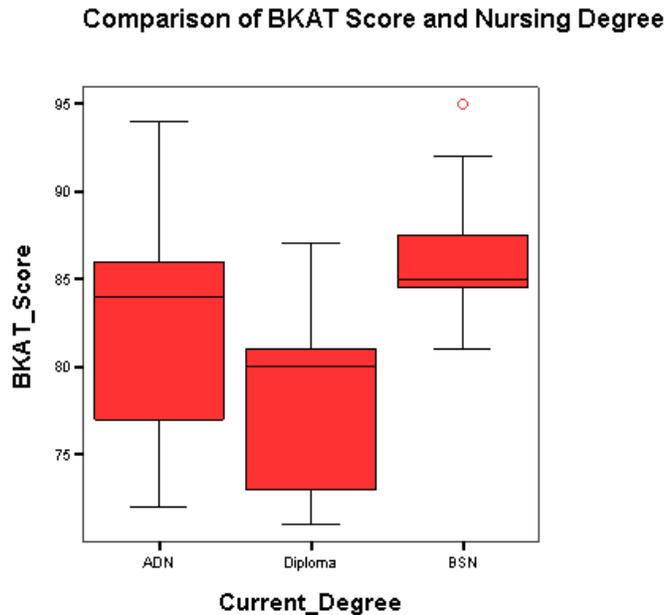
Correlation coefficients were computed to determine the degree to which the variables of BKAT score and amount of experience in critical care were related. When controlling for the independent variable of current degree earned, there was a statistically significant relationship between length of time employed in critical care and score on the BKAT [r=0.876, p.= 0.022]. This indicates that when controlling for degree earned, experienced nurses scored higher than did NGNs who earned the same type nursing degree.

Discussion

Feasibility of methodology was a focus of this pilot study in preparation for dissertation. The overall return rate of 47%, while not ideal, is not unexpected when collecting data by survey. For dissertation the researcher will need a longer data collection period in order to increase sample size to accrue the numbers needed for a

robust study. In addition to face to face unit contact and flyers/reminders posted on the unit, the researcher hopes to establish e-mail contact with the critical care nurses by forwarding reminders through the nurse manager / educator via the unit list serve. Based on anecdotal comments from the nurses who participated in the staff meetings describing the study, the methodology of administering and returning the research project was convenient to the staff nurse.

Knowledge assessment and the incorporation of BKAT scores with demographic variables was also an aim of this pilot study. Based on the results found in this study, 68% of the nurses in the critical care units meet the criterion identified by Toth as basic knowledge required of critical care nurses. The demographic tools combined with the BKAT provided the researcher with adequate data to draw comparisons between the NGNs and experienced nurses. Since this study only contained a sample from one institution, several of the demographic tool items on which data was collected were not factored into this project. When this project is extrapolated to multiple critical care units in several hospitals, the researcher will also consider length of orientation as well as orientation format (classroom versus web-based versus clinical only) when analyzing data.

Research studies have documented that experienced nurses have more clinical competence and function at a higher level than do NGNs. Results of this pilot study do not support that supposition. That being said, one of the limitations of this study is the small sample size both overall and within each NGN and experienced cohort, thus the results are likely not generalizable to the critical care nursing population especially since the sample was only drawn from one hospital. Furthermore, those completing the study

represented a relatively inexperienced sample of critical care nurses averaging only 4.34 years of nursing experience. When recalculating experience factoring out one nurse with 32 years experience, the average amount of critical care experience drops to 3.1 years, thus potentially explaining why there was not a statistically significant difference in score between experienced nurses and NGNs. In future studies it is imperative to recruit a sample that includes a wider and more representative range of experienced critical nurses in addition to the three groups of NGNs.

Although there is not an identified passing score, based on prior studies Toth expects that nurses will achieve a score of 82-84% by the time that they have completed a critical care orientation (BKAT administration guidelines, ND). It is of concern that one out of three (33.3%) NGNs who have completed orientation as well as six out of 16 (37.5%) of experienced nurses did not meet this threshold. An item analysis of each test question was used to determine deficiencies of knowledge as identified by the BKAT. Using the expected threshold of 82-84% competency, educational opportunities should be focused on cardiovascular and monitoring lines, endocrine, and GI/parenteral content. Cardiovascular content could be tailored to the population specific to the general critical care units since this study did not include nurses from the coronary care unit.

The only statistically significant findings in this pilot study were the relationship between BKAT score and current nursing degree overall and within the NGN groupings. Although results were statistically significant for ADN and BSNs scoring higher that their Diploma prepared counterparts when conducting analysis with ANOVA, a Pearson's r correlation failed to yield a linear relationship between the variables. However, when conducting a partial correlation while controlling for degree earned, there

was a significant correlation between length of time in critical care and score on the BKAT. The coefficient of determination ($r2$) finds that 76% of the variation in BKAT scores can be accounted for by experience when controlling for degree obtained.

Summary

The data from this pilot study did not support prior research studies demonstrating that experienced nurses have more clinical competence and function at a higher level than do NGNs, therefore one of the researcher's goals to identify when then the gap between NGN and experienced nurses is bridged was not met. However, the pilot study was a valuable exercise for a beginning researcher to undertake in preparation for dissertation. The methodology was convenient for the participants and the demographic tools in conjunction with the BKAT tool provided the researcher with the information necessary to conduct statistical analysis.

Chapter 5

Methodology

Introduction

Research studies have documented that experienced nurses have more clinical competence and function at a higher level than do NGNs. However, no studies have been found that identify when then the gap is bridged. In addition to conducting a quantitative assessment comparing NGNs' and experienced nurses' basic knowledge in critical care, an aim of this study was to explore and understand and interpret the experiences of NGNs regarding their clinical judgments.

Design of the Study

This descriptive study used a between group non-experimental design augmented with qualitative accounts provided by NGNs. The critical care Basic Knowledge Assessment Test, version seven (BKAT-7) was used as a quantitative measure of nursing basic knowledge in NGNs and their experienced counterparts. Qualitative data was obtained using a hermeneutic phenomenological approach by conducting one-on-one interviews with NGNs. This allowed the researcher to elicit the lived experience of NGNs as they made clinical judgments. Triangulation was utilized with a comparison made between the experiences of the NGNs as they made clinical judgments, the group BKAT scores, and the length of time that the NGNs had been practicing.

Setting

Data collection for this study was completed in adult intensive care units (ICUs) in seven hospitals in the mid-Atlantic region of the United States. Four of these hospitals are affiliated with one health care system, two affiliated with a second health care system, and one is an independent hospital. Currently within those hospitals there are 14 adult ICUs into which new graduates are hired.

Sample

Newly graduated and experienced nurses on adult intensive care units where new graduates are hired comprised the convenience sample for the quantitative portion of this study. All staff nurses on the units were invited to participate. For the qualitative portion of the study, only NGNs were asked to participate. Included in the quantitative research packet was a request for NGNs to participate in a one-on-one interview with the researcher. NGNs that were interesting in participating in the interview were asked to return their contact information with their BKAT answers and demographic questionnaire. Based on the New Graduate Transition Process Model (Schoessler & Waldo, 2006), NGNs are defined as licensed registered nurses who have been working for less than eighteen months. Experienced nurses are defined as licensed registered nurses with 18 or more months of nursing experience. In this study critical care nurses were defined as those RNs working in intensive care units and will not include intermediate care or step down units or the emergency department. The researcher gained study approval and support from the managers and educators on the different units. Nurses were recruited during staff meetings on all shifts and by posting flyers

(Appendices C and D) throughout the units and in staff mailboxes. Study packets were available in crates located at a convenient location in the staff break room on each unit. Included in the study packet were instructions for completing the project and all study materials.

Power analysis. Calculating the power of a statistical test measures the sensitivity of the test. Power calculations are reliant on study significance, effect size, and sample size and can be conducted either before or after data collection. Apriori power analysis is conducted to determine the appropriate sample size needed to avoid making a Type II research error thus accepting a null hypothesis when in fact it is a false hypothesis. Post hoc testing is conducted to determine the likelihood that a Type II error has been committed and the researcher concludes that a relationship does not exist when in fact it does (Kraemer & Theimann, 1987; Polit & Beck, 2004).

Parameters for power, significance and effect size must be determined for calculations to be made. Additionally the researcher is required to estimate the number of nurses available to participate in the study. Apriori power analysis was conducted using an on-line power calculator to assist the researcher to set a goal for sample size to compare BKAT-7 scores between experienced nurses and NGNs. Using a 2-tailed test with a 0.05 significance level, in order to achieve a power of 0.8 and effect size of 0.5 with an estimate of 350 nurses in the population, a sample of 184 nurses is required (Raosoft, 2007). Additionally, since the number of NGNs in each cohort and the entry level degree of the NGNs is unknown at this point, a post hoc power analysis was conducted to determine the power obtained when using analysis of variance, or

comparable non-parametric tests, to examine scores between the three new graduate groups and as between their educational levels.

Instruments Used for Data Collection

Both quantitative and qualitative measures were employed to gather data to answer the research questions. They are as follows.

Demographic forms. Participants completed one of the two researcher developed demographic tools used to describe the population under study. The New Graduate Nurse Demographic Tool (Appendix E) was color coded green and was completed by nurses with up to 18 months experience. The blue Experienced Nurse Demographic Tool (Appendix F) was designed for completion by the nurse with more than 18 months of experience.

Basic Knowledge Assessment Test (BKAT). The BKAT is a copyrighted tool designed by Toth and Ritchey (1984). Permission to use and photocopy the tool has been obtained from Dr. Toth, with the stipulation that no parts of the tool may be converted to an electronic format (Appendix G). All seven versions of the BKAT have been cognitive written examinations that take approximately 45-60 minutes to complete. The test questions range in difficulty from recall of basic information to the application of basic knowledge in practice scenarios, and cover the cognitive, psychomotor and affective domains of learning. The BKAT was developed over a two-year period and released in 1984 as a criterion referenced measure to determine attainment of minimal requirements to safely work in the critical care setting. The goal of the original BKAT was to ascertain what comprises basic critical care knowledge and to develop a tool to quantify that knowledge (Toth & Ritchey, 1984). The researchers based their tool on the standards of

care developed by the American Association of Critical Care Nurses (AACN). Those standards were designed to define safe clinical practice and to guide critical care orientation programs. However, Toth and Richie (1984) reported a dichotomy between what educators and employers expected as minimal competencies. Therefore the tool was developed based on a thorough review of the literature as well as input from staff and head nurses working in critical care units, critical care physicians, and a panel of critical care education experts.

The BKAT has been updated to reflect current practice in critical care nursing and in 2006 the BKAT 7th version was released. It is a 100 question multiple-choice and fill-in-the-blank pencil and paper test that measures basic critical care nursing knowledge. Assessment areas include the following body systems: cardiovascular, pulmonary, neurological, gastrointestinal, endocrine, and renal. Two additional categories include hemodynamic monitoring lines as well as infection control, burn care, hypothermia, and spiritual care. Psychosocial aspects of care are infused throughout the test.

Construct validity of the BKAT was supported through the use of pre-established group differences comparing scores between newly graduated nurses and experienced critical nurses. The experienced nurses had a mean score of 82.3 and reliability of 0.90 while the newly graduated nurses' mean score was 74.8 with a reliability of 0.89. Reliability for BKAT- 7 was established by testing 298 critical care experienced nurses from 26 states and was found to range from 0.88 – 0.90. Repeat reliability testing has not been reported however throughout the previous six versions of the tool reliability is consistently reported above 0.80

Semi-structured interview. Researchers use phenomenological methodology to elicit and interpret the meanings of phenomena as they are described by a specific group. Phenomenology is rooted in German philosophy and is defined as "…an individual's perceptions of his or her presence in the world at the moment when things, truths, or values are constituted" (Morse & Richards, 2002, p. 44). This definition imparts philosophical underpinnings for the assumptions of this approach. Phenomenological researchers believe that the perceptions of those studied present evidence of the real world reflecting how the world is actually lived by those experiencing it, not how it is thought to be by those not experiencing the phenomenon. This approach states that people are conscious within their worlds and understanding is gained only when examined from the perspective or context of those being questioned. Phenomenology allows the researcher to understand the experience as it is known by the participant.

Within the umbrella of phenomenology lie several methodologies based on differing philosophical underpinnings (Munhall, 2001). Hermaneutic phenomenology, a philosophical and methodological approach used to reveal the essence of an experience of phenomena, is an interpretive and inductive form of research. The goal of hermeneutic phenomenology is ontological and therefore strives to reach beyond narrative description to understanding or interpretation. Through this methodology, an understanding of what is "real" occurs and therefore can be interpreted and analyzed based upon the researcher's knowledge and experience in the field (Laverty, 2003).

The NGNs who participate in individual interviews were asked the following primary research question:

Think back to a recent patient situation that was very challenging for you- one in

which you were challenged in making clinical judgments or decisions about how

to proceed with your care. Please share that experience with me.

If during the course of the story the NGN did not provide the information sought, the

primary research question was augmented with the following questions for detail

expansion or clarification.

1. Tell me about what was concerning to you.

    a. What was your gut telling you?

2. Tell me how you proceeded with this patient's care.

    a. What cues did you use to help fine tune your approach?

3. How did you evaluate the outcomes of the plan of care that you chose?

4. As you think back what do you notice differently now? What stands out to you?

Procedures for Data Collection

Data collection for the quantitative and qualitative pieces of this study occurred

simultaneously, however the procedures for data collection for this mixed methods study

will be discussed separately. Experienced nurses only participated in the quantitative

portion of this study. NGNs could choose to participate only in the quantitative aspect of

this study, however only NGNs who return the BKAT-7 and completed demographic

data were considered for participation in the qualitative segment of this study. A letter to

the participants including directions for completing the study was enclosed on the study

packed (Appendix H).

Quantitative data collection. Nurses who consented to participate in the study

received a study packet and completed the 100 question BKAT-7, a demographic tool,

and a consent form that doubled as a request for NGNs to participate in one-on-one interviews with the researcher (Appendix I). The BKAT-7 was completed by participants in a single unsupervised sitting without referring to colleagues or outside sources. Upon completion of the BKAT-7 and demographic tool, the participants returned both tools, a signed copy of the informed consent, and a participant-addressed envelope to the researcher in a postage paid envelope provided in the study packet. Participants received a $25 gift card as compensation for their time (approximately 1 hour) after the researcher received a completed research packet via US mail. Gift cards were sent to the participants via US mail in an envelope that was contained in the research packet and self-addressed by the participant.

Qualitative data collection. NGNs were asked to participate in a one-on-one interview with researcher. This request was included on the informed consent. NGNs who wished to be considered for the interview were asked to provide their name, hospital and unit, and contact number or e-mail on the bottom of the informed consent sheet. NGNs who agreed to participate in the interview were divided into three groups based on their length of time since graduation. From these pools, NGNS were randomly selected using a small table of random digits and contacted to arrange an interview.

The researcher made arrangements for the interviews to take place in a conference room at the hospital, university, public library or community center, based on which location was most convenient to the NGN. It was anticipated that the interviews will last 60-90 minutes. After reviewing the prior informed consent, the researcher obtained permission to audio tape the NGN during the interview, thus allowing the researcher to

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engage in more active listening than would be permissible if constant note taking were required.

The interview began using the research questions previously presented. After completing the scripted questions, the participants were given the opportunity to add any relevant information that they felt was not covered. At the conclusion of the interview, the researcher obtained verbal permission to call the interviewee to clarify data after it has been transcribed and confirm a contact number. The NGN received a $25 WAWA gift card prior to leaving the interview to compensate them for their time.

Procedure for Protection of Human Subjects

Institutional review board approval was obtained from Duquesne University, Sentara Healthcare System and Bon Secours Health Care System through Eastern Virginia Medical School, and Chesapeake Regional Medical Center prior to initiating the study. Participation in quantitative portion of this study posed no risks greater than those encountered in daily life. Participation on the qualitative portion of the study required that the participants recall a challenging patient care scenario and describe their decision making process as they planed the patient's care. While this is not anticipated to pose any emotional risk, the Employee Assistance Programs at these institutions had been contacted and were able to provide debriefing if recall of patient care scenarios poses emotional difficulty for the participants.

Participants received written explanation of the study and a copy of the informed consent (Appendix I). Participants' names did not appear on either tool, no individual identity was made in the data analysis, and responses only appeared as aggregate data in statistical summaries. When qualitative interviews were transcribed all names and any

identifying data were changed to protect the nurse, patient, family, and institution. The

transcriptionist signed a confidentiality statement prior to listening to the audio tapes that

indicated that no copies of the audio tapes were made and the tapes would be returned to

the researcher upon transcription completion. The transcriptionist used the researcher's

password protected computer stored in the researcher's secure office and did not retain a

copy of the files or tapes.

Participants were informed that they could withdraw from the study at any time

and without providing any reason and the decision to not participate or to withdraw from

the study will not negatively impact the nurse. Individual results were not be shared with

the unit manager or educator and thus, there was no impact on the nurses' employment.

Written materials, consent forms, and NGN interview contact information were kept

separately and stored in a locked file in the researcher's office. Data analysis was

conducted on a password protected laptop computer that is stored in the researcher's

locked office.

Procedure for Data Analysis

As with the data collection for this study, data analysis of the quantitative and

qualitative data occurred simultaneously. Data analysis of quantitative data began after an

acceptable number of responses were obtained as determined by power analysis.

Qualitative data analysis commenced upon the completion of all interviews.

Quantitative data analysis. Data obtained from the BKAT-7 and demographic

tools was be entered in the statistical software package SPSS Version 15.0. Staff nurses

were be divided into new graduate and experienced cohorts based on the number of

months that they had worked as indicated on the demographic tool. Experienced nurses

were grouped in a single cohort however the newly graduated nurse cohort was further

subdivided into three groups based on the NGN transition intervals established by

Schoessler and Waldo (2006). Demographics and BKAT scores were reported using

descriptive statistics and a frequency distribution was developed to determine the

appropriateness of parametric testing. The assumptions for parametric testing include

interval or ratio levels of measure, random sampling, normally distributed populations,

and independence of measures (Sprinthall, 2007). Since the assumptions for parametric

testing were met, data analysis was completed including t-tests and analysis of variance

(ANOVA). The 2-tailed t-test was used to determine the hypothesis of difference of mean

BKAT scores between the NGN and experienced nurse groups. ANOVA was used to

determine if there is significance between BKAT means in more than 2 groups. ANOVA

was used to analyze the NGNs' scores within the three stages as well as between the three

entry degree levels. The mean BKAT scores met the parametric testing requirements of

both t-tests and ANOVA by coming from independent groups (NGNs and experienced

nurses for t-test and NGN stages and degree level for ANOVA) and being interval data. If

the assumptions of parametric tests had been unmet, then equivalent non-parametric tests

would have been performed.

    Qualitative data analysis. Qualitative data analysis occurred using an approach

outlined by Creswell (2003). These steps included data transcription and reading, data

coding, rendering descriptions, and interpreting the data. Upon the completion of each

interview, the data was transcribed verbatim into a word processing program. An analysis

team consisting of the principal investigator (PI), two members of the dissertation

committee and a qualitative researcher who is external to the dissertation committee then

analyzed the data. After individually reviewing and commenting on the transcribed tapes, the team members met via conference call to discuss the major categories and thematic analyses identified by the PI. Secondary interviews in person or over the phone were conducted to validate or increase the depth and breadth of themes as identified during analysis.

Often discussed in qualitative research, the concept of bracketing was not adopted when using hermeneutic phenomenology. After engaging in a self-reflective process, the researcher was not required to set aside pre-conceived beliefs, but instead entrenched those assumptions in the interpretive process. This essential step was achieved through journaling. The researcher included apriori experiences on an ongoing basis which assists in interpreting the data. This step permitted the researcher to incorporate implicit and explicit knowledge of the concept to enhance understanding (Laverty, 2003).

Trustworthiness, credibility and dependability of the data were established through purposive sampling. The researcher selected willing participants from the convenience sample based on sample characteristics including length of time since graduation and type of unit (specialty specific i.e. cardiac or general care) in which the NGN works. Only NGNs who were willing to reflect on the phenomena of interest were selected. Participant selection continued in each new grad group until saturation was reached. A comparison of data captured during the taped interview and transcription was conducted as well as a comparison of the responses given by the NGNs. Additionally the researcher who was the sole data collector journaled throughout the research process. Since NGNs face similar challenges wherever they choose to begin practice it was hoped

that the authentic data that was gained is transferable to NGNs working in critical care units outside of this geographic region.

Triangulation. Used to boost credibility and enrich data, triangulation requires using more than one type of data to validate conclusions (Polit & Beck, 2004). The use of unstructured data obtained during NGN interviews was blended with the quantitative measure of NGN knowledge. Upon the completion of qualitative analysis, the PI looked for relationships between the decision making and clinical judgment experiences of NGNs and their BKAT scores. A comparison were made between the NGN clinical judgment experiences, their group scores on the BKAT, and the length of time that the NGNs have been practicing. The coupling of qualitative and quantitative data assisted the researcher to understand and provide an accurate depiction of the phenomena of NGN basic knowledge and decision making in the critical care arena.

Chapter 6

Results

Introduction

Simultaneous quantitative and qualitative data analysis began after four months of BKAT data collection. At that point no additional BKAT packets were being returned in response to flyers or the researcher visiting the units. Qualitative data analysis included journaling and taking field notes. Analysis of the NGN interviews began after all the interviews were completed and transcribed.

Quantitative Data Analysis

Data was entered in the statistical software package SPSS. Staff nurses were divided into new graduate and experienced cohorts based on the number of months that they have worked as indicated on the demographic tool. Data analysis occurred with experienced nurses grouped in a single cohort and the newly graduated nurse cohort subdivided into three groups as described by the Transition Process Model (0-3 months, 4-9 months, 10-18 months). Additional analysis was done dividing the experienced nurses into four cohorts: those with up to two years of experience, those with two to five years of experience, and those with more than five years but less than ten years of experience, and those with more than 10 years of experience.

Sample demographics. One hundred and seventy-three staff nurses in 14 units at 9 hospitals participated in the quantitative portion of this study including 24 nurses from the pilot data collection period. One hundred forty-seven nurses with more than 18 months experience and 26 NGNs participated in the study. NGNs comprise 15% of the

total sample and there were seven nurses (4%) who, while they fit the experienced nurse

criteria, had transferred into critical care within the previous 18 months (Figure 9).

Figure 9. Sample Experience
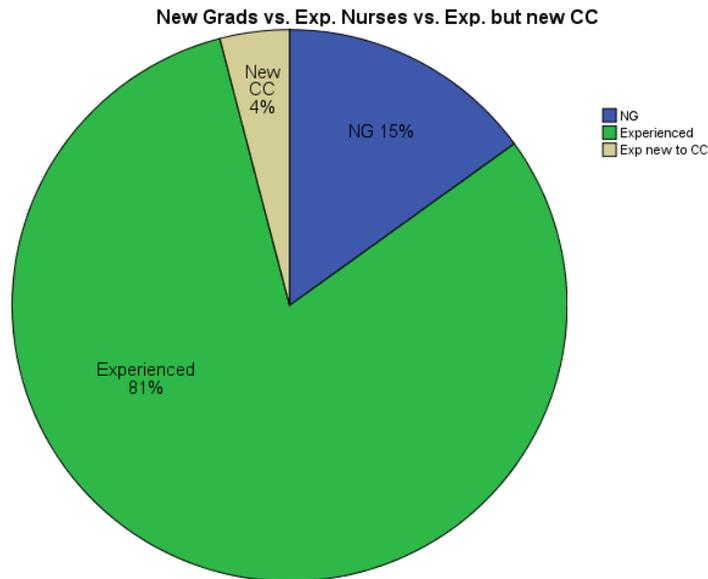
The majority of participating nurses were female (92.5%) as noted in Figure 10

and the nurses' ages ranged from 21 to 66 with a mean of 38.9 years, median of 37 years,

and modes of 26, 27 and 37 years (10 nurses each) (Figure 11). Overall nursing

experience ranged from new graduates with less than one month of experience to 40.25

years of experience (Figure 12). The mean overall experience of the nurses is 12.7 years,

median 7.2 years. Critical care experience ranged from new graduates with less than one

month of experience to 38.17 years of experience. The mean critical care experience of

the nurses is 9.6 with a median of 4.4 years (Figure 13).

Figure 10. Sample Gender
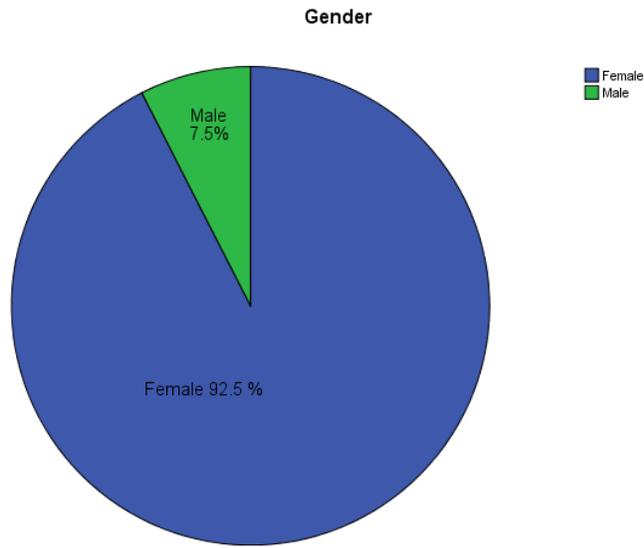
Figure 11. Age of Sample
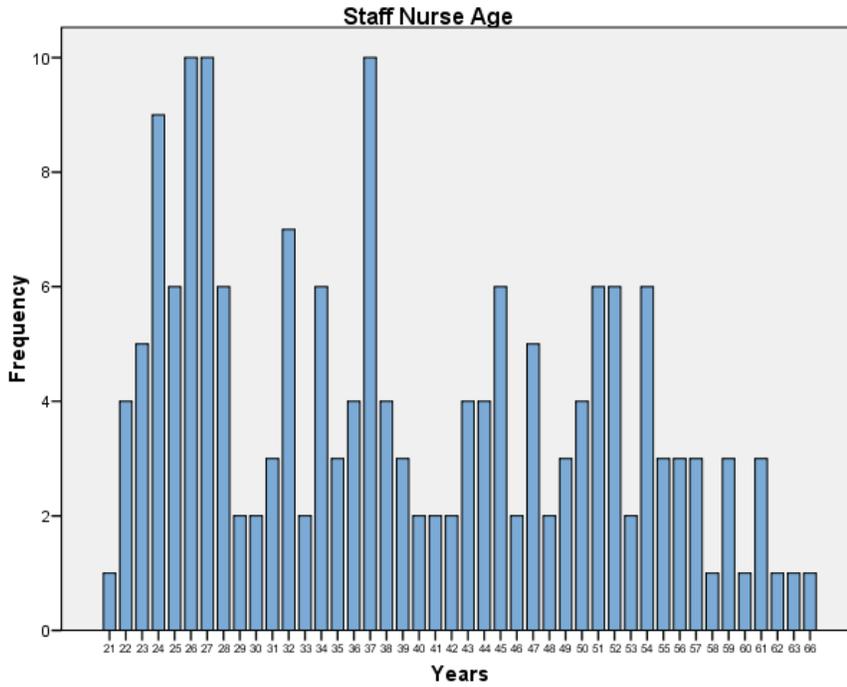
Figure 12. RN Experience
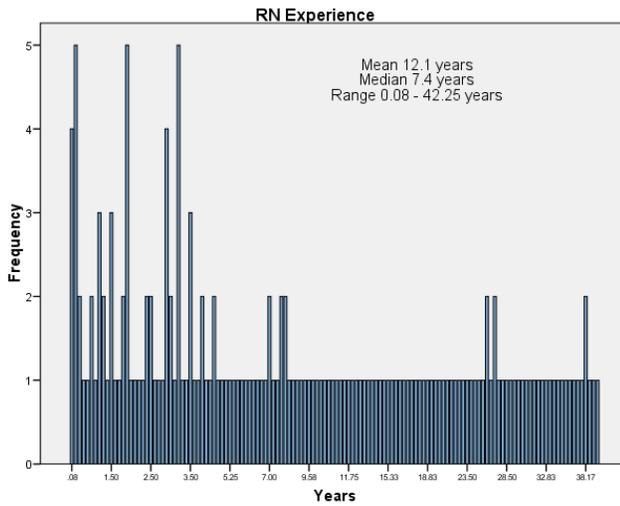
Figure 13. Critical Care Experience
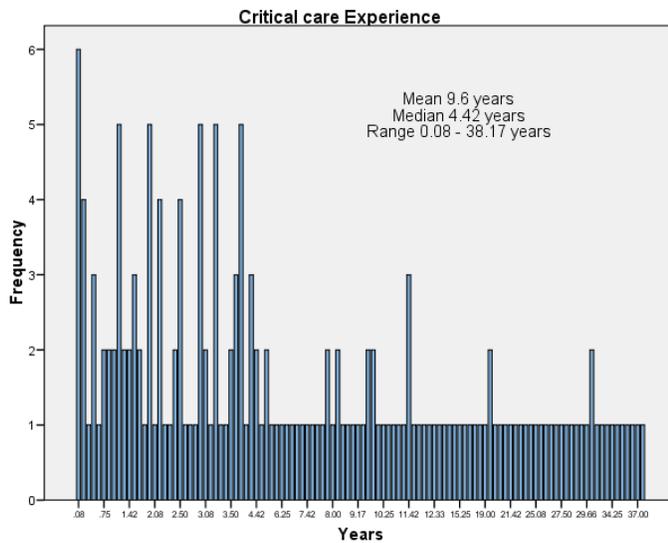
Nearly 46% of the nurses entered the profession with a BSN, 27.7% with an ADN, 23.1% with a Diploma in Nursing, and 3.5% started as LPNs (Figure 14). At the time of the study 52% had a BSN, 26% ADN, 20.2% a Diploma in Nursing, and 1.7% had a MSN (Figure 15). Only forty of the nurses (23.1%) have achieved certification in critical care nursing (Figure 16).

Figure 14. Entry Nursing Degree

Entry Nursing Degree

LPN 3.5%
ADN 27.7%
Diploma 23.1%
BSN 45.7%
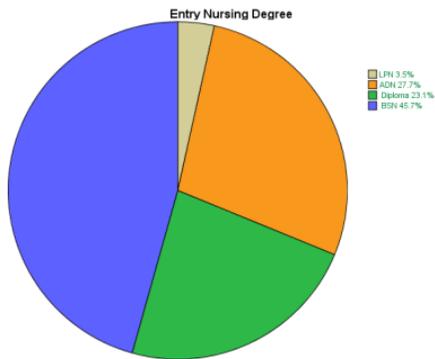
Figure 15. Current Nursing Degree

Current Nursing Degree

ADN 26%
Diploma 20.2%
BSN 52%
MSN 1.7%
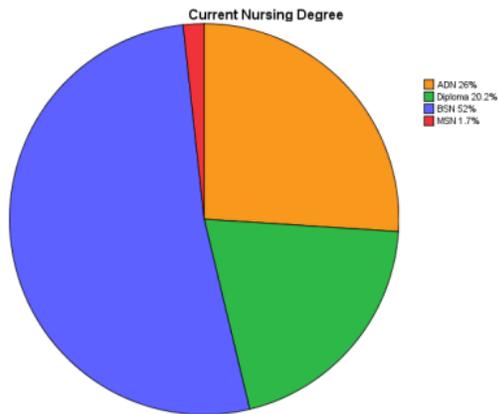
Figure 16. CCRN Certification

CCRN Certification

Not Certified 76.3%
CCRN Certified 23.1%
Did not answer 0.6%
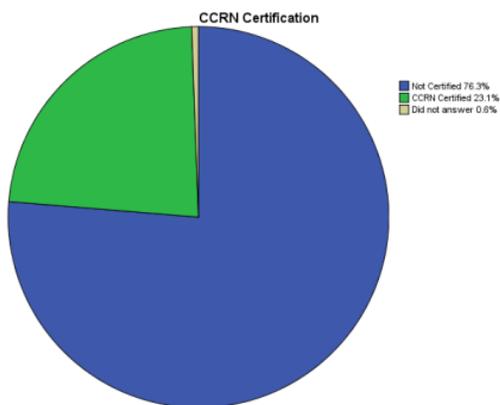
Pre-hypothesis testing. Demographics and BKAT scores were reported using descriptive statistics. A frequency distribution was generated and BKAT scores approximated a normal distribution (Figure 17). The calculated left skew (-0.237) is consistent with expected results obtained when using criterion referenced tools (Waltz et al., 2005) since the tool measures whether the participant has achieved a specific set of targeted knowledge.

Figure 17. Frequency Distribution of BKAT Scores
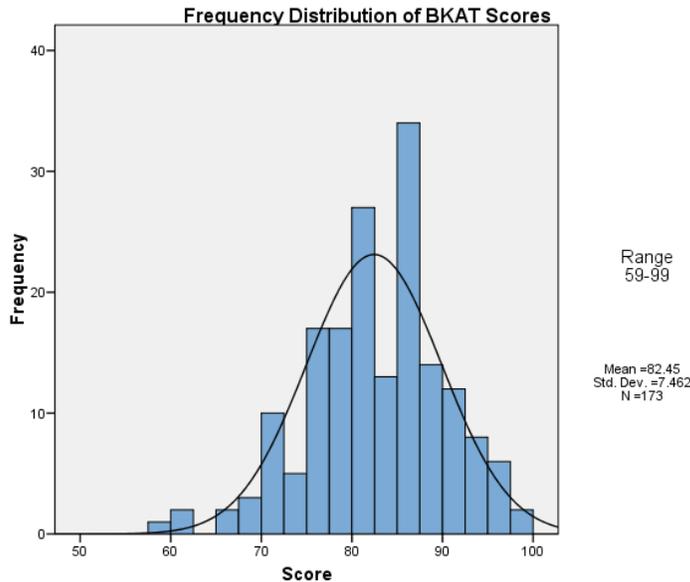
The mean BKAT scores met the parametric testing requirements of both t-tests and ANOVA by coming from independent groups and being interval data. Since the assumptions for parametric testing were met, data analysis was completed including t-tests and analysis of variance (ANOVA). The 2-tailed t-test was used to determine the hypothesis of difference of mean BKAT scores between the NGN and experienced nurse groups. ANOVA was used to determine if there is significance between BKAT means in more than 2 groups. ANOVA was used to analyze the NGNs' scores within the three

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stages as well as between the three entry degree levels as well as compare the BKAT

scores between all experience groupings of NGNs and experienced nurses.

To determine the apriori relationship between experience and basic knowledge in

critical care (BKAT-7 score) a scatter plot was developed mapping BKAT scores and

nursing experience overall and nursing experience in critical care (Figure 18). It was

determined the experience had a quadratic relationship over time with BKAT scores, thus

a generalized linear model was fit. A regression analysis was completed to determine the

relationship between experience and critical care knowledge. Additionally, levels of

experience (NGN versus experienced), hospital/unit, gender, degree earned, specialty

certification, and experience as a preceptor were covariates tested to determine if they

had any effect on BKAT scores.

Figure 18. Scatter Plot Mapping BKAT Scores and Experience
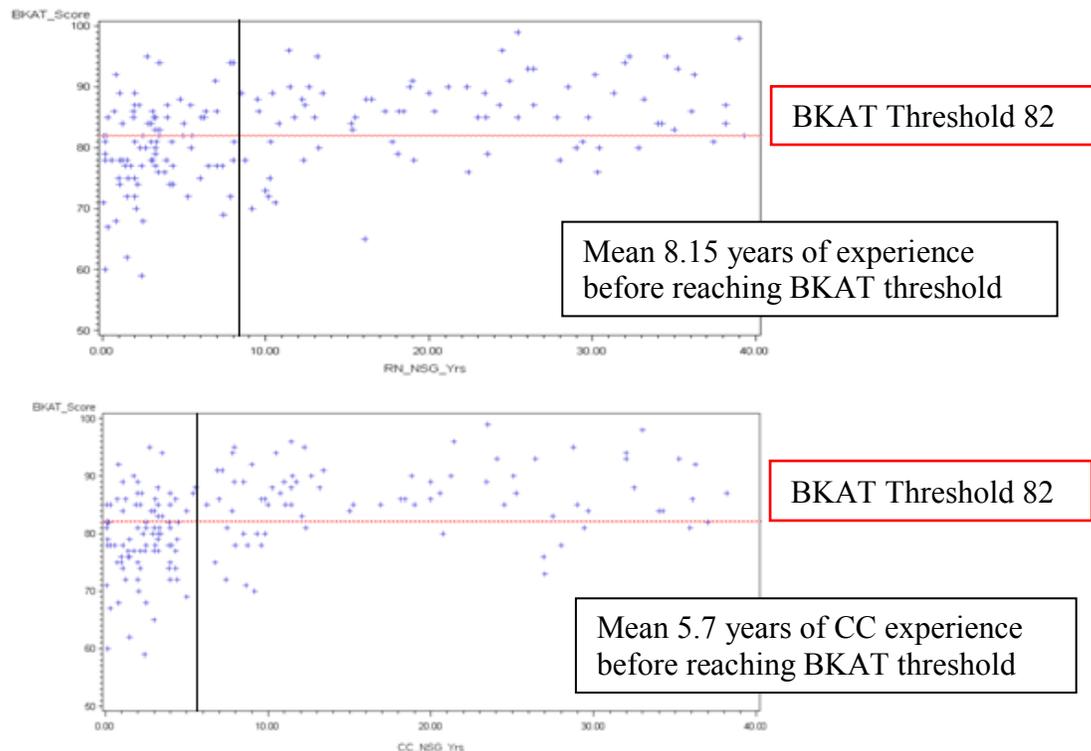
Hypothesis Testing

Research Question 1: What level of basic knowledge and skills, as measured by the BKAT-7, do NGNs have to prepare them to work in critical care compared to experienced nurses.

Hypotheses 1: New Gradate Nurses in critical care will have less basic knowledge as measured by the BKAT than experienced critical are nurses.

Data analysis was conducted to determine the basic knowledge and skills of the NGNs and experienced nurses separately and grouped. The overall mean score on the BKAT was 82.45, median 83, with a SD of 7.462 and scores ranging from 59-99. The NGN mean score was 77.08, median 78, with a SD 7.67 and scores ranging from 60-92. This distribution was normally distributed, however skewed to the left (-0.366) as would be anticipated (Figure 19).

As presented in the instrumentation section, Toth (2006a) suggests that by the end of orientation all critical care nurses should reach a score of 82-84. However, rather than deeming scores as passing or failing, one should consider the questions that are missed and determine if they are required knowledge on the unit where the nurse works. For the purpose of this study, the score of 82-84 is set as the threshold that should be met to demonstrate basic knowledge that prepares a nurse to work in the CC setting.

Figure 19. NGN BKAT Frequency Distribution
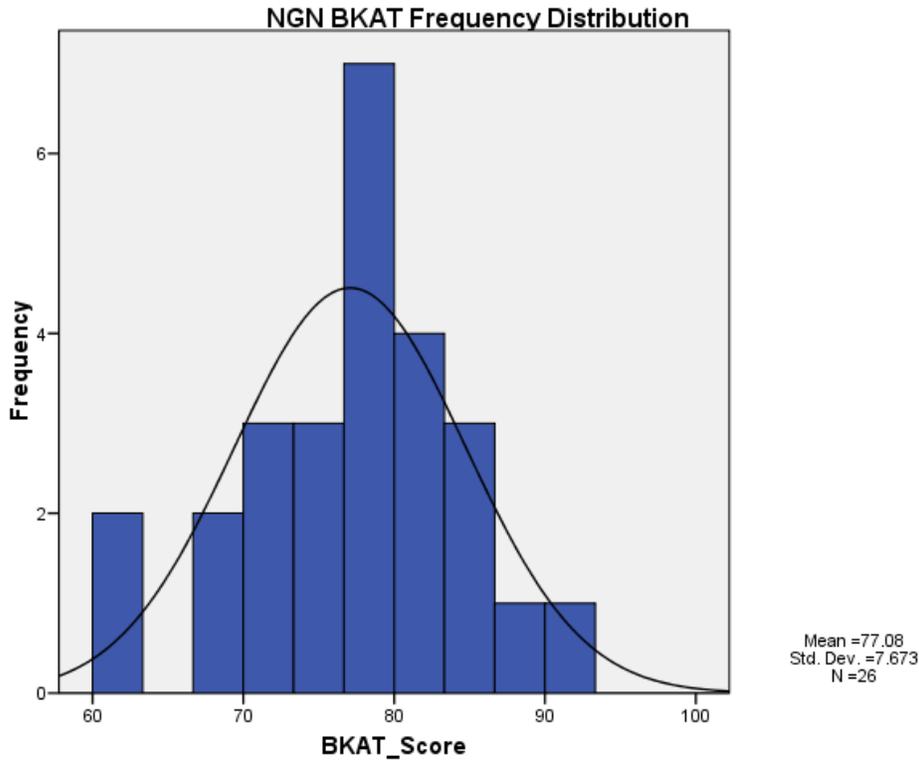
Eighteen of the NGNs (69.2%) did not achieve a score at or higher than the threshold set by Toth, four NGNs (15.4%) obtained a score within the expected range, and four (15.4%) exceeded the score expected at the end of orientation (Figure 20).

Figure 20. NGN BKAT Threshold
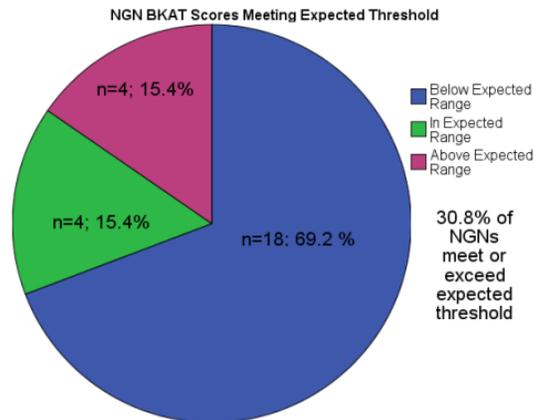
Experienced nurses' mean score was 83.39, mode 84, with a SD 7.03 with scores ranging from 59-99. These scores were also normally distributed and skewed to the left (-0.370) as expected (Figure 21).

Figure 21. Experienced Nurse BKAT Frequency Distribution
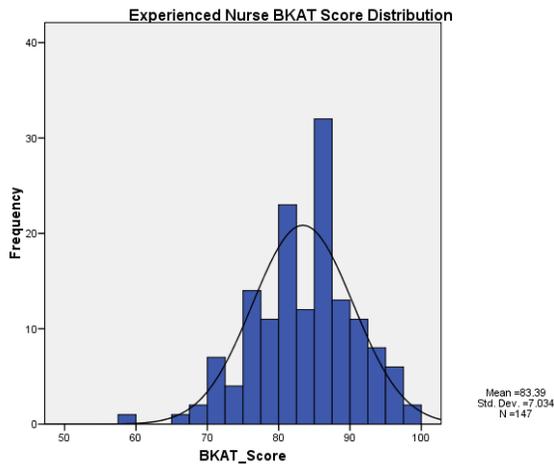
Of the experienced nurses, 60.5% scored at or above the expected score; 17 nurses (11.5%) within the expected range and 72 nurses (49%) above the established score. Of concern, however, remains the fact that 58 nurses (39.5%) who are experienced critical care nurses did not meet the expected competency (Figure 22).

Figure 22. Experienced Nurse Threshold
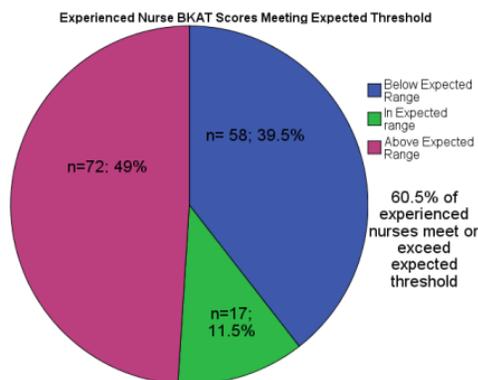
An independent samples t-test was conducted to determine significance between the two cohorts. The results indicate that there is a statistically significant difference between the mean BKAT scores of the NGNs and experienced nurses (t(171df)=-4.164, p= 0.00) with the experienced nurses scoring significantly higher that the NGNs. Based on these results, the null hypothesis that new grads in critical are will not have less basic knowledge than experienced nurses as measured by the BKAT is rejected.

Research Question 2: What demographic variables relate to basic knowledge of NGNs in critical are compared to experienced critical care nurses?

Hypothesis 2: There will be differences in basic knowledge scores between nurses with associates degrees, diplomas, and baccalaureate degrees.

Another portion of this research aimed to determine which demographic variables relate to the basic knowledge of NGNs compared to experienced nurses. A one-way analysis of variance (ANOVA) was conducted to evaluate the relationship between BKAT score and the nurses' levels of experience in critical care. The ANOVA was found to be significant between groups, $F(2,170) = 9.541$, $p = 0.000$. Tukey's HSD was conducted as a post-hoc test to evaluate the pairwise differences among the means based upon Levine's Test of Equality estimate of homogenous variances. There was a significant relationship between the NGNs and experienced nurses at p= 0.00, but not

between the NGNs and nurses new to critical care or between those new to critical care and experienced nurses.

An ANOVA was conducted to examine the relationship between BKAT score and length of time as a nurse and found to be significant between groups, $F_{(6, 166)} = 6.700$, $p = 0.00$. Tukey's HSD was conducted as a post-hoc test to evaluate the pairwise differences among the means based upon Levine's Test of Equality estimate of homogenous variances and found significant relationships between nurses with more than 10 years of experience and the following groups: 0-3 months experience ($p = 0.002$), 10-18 months experience ($p = 0.000$) and those with more than two but less than 5 years experience ($p = 0.002$), but not between any other pairing.

Further ANOVA analysis examined the relationship between BKAT score and length of time as a critical care nurse and found to be significant between groups, $F_{(6, 166)} = 10.456$, $p = 0.00$. Tukey's HSD was conducted as a post-hoc test to evaluate the pairwise differences among the means based upon Levine's Test of Equality estimate of homogenous variances. Again the statistically significant relationships were found between those nurses with more than 10 years of experience and all other cohorts except the 19-24 month experience group (Table 2).

Table 2. BKAT Scores and Critical Care Experience

>10 years experience	0-3 months	p=0.00
	4-9 months	p=0.039
	10-18 months	p=0.000
	19-24 months	p=0.162
	>2-5 years	p=0.000
	>5-<10 years	p=0.048

An independent samples t-test was conducted to determine if there was a significant difference between the BKAT scores of nurses who acted as preceptors and those who did not. The results indicate that there is a statistically significant difference between the mean BKAT scores (t(145df)=-4.601, p= 0.00) with preceptors scoring higher than non-preceptors.

An ANOVA was conducted to evaluate the relationship between BKAT scores and degree levels and was found not to be significant either by entry degree (F, 3, 169)= 0.107, p>0.05) or current degree (F 3,169)= 0.895, p= >0.05 for the entire sample. When examined by cohort statistical significance was not found when examining BKAT scores and degree level in the experienced nurses' entry degree (F 3, 143 = 0.985, p>0.00), experienced nurses' current degree (F 3, 143 = 1.789, p> 0.05), and NGNs' current degree (F 2,23 = 2.613, p>0.05). Additionally there was not a statistically significant difference between BKAT scores and hospital/unit (F12,160=0.765, p>0.05) but as expected significance was found between the BKAT scores of nurses who were certified in critical care (CCRN) versus those who were not (t(170df)= -4.030, p=0.000) with those nurses who are certified scoring higher on the BKAT than those were are not.

Additional analysis was conducted using only the NGN data to determine if any demographic variables yielded a statistical difference in NGN BKAT scores. Independent sample t-tests comparing whether the NGNs had or had not completed orientation and evaluating the presence or absence of prior health care experience did not produce statistically significant results. Likewise, separately conducted ANOVAs did not find statistical differences in BKAT scores when grouped by degree, NGN cohort, length of orientation, number of preceptors, types of previous experience, or the presence of a

critical care preceptorship during school (Table 3). Based on these results, the null

hypothesis that there is not a significant difference in BKAT scores by degree is

accepted.

Table 3. NGN BKAT Scores and Demographics

Demographic variable	Statistical Test	Result
Orientation Completion	Independent t-test	t (24df) = 1.328, p>0.05
Presence of Previous Experience	Independent t-test	T (24df) = -0.603, p>0.05
Type of Previous Experience	ANOVA	F 7, 18 = 1.079, p> 0.05
Entry Degree	ANOVA	F 2,23=2.613, p>0.05
Length of Orientation	ANOVA	F 3,22= 0.446, p>0.05
Number of Preceptors	ANOVA	F 2,23= 1.071, p>0.05
Type of Preceptorship	ANOVA	F 2, 23= 6.634, p>0.05
NGN Cohort	ANOVA	F2, 23= 0.369, p >0.05

Research Question 3: At what point after graduation does the basic knowledge of

the NGNs in critical care reach the level of basic knowledge of experienced

critical care nurses as measured by the critical care BKAT-7.

Hypothesis 3: New graduate nurses will attain similar BKAT scores as

experienced critical are nurses within 18 months of graduation.

Based on the higher than expected number of experienced nurses who did not meet the expected threshold set by Toth, the focus of research question three was changed. Rather than determining the length of time it takes for NGNs to reach the BKAT scores of experienced nurses, the researcher chose to determine at what point in time nurses meet the established threshold. This change was made because identifying the basic knowledge level of critical care nurses is an aim of this study. Identifying when NGNs can achieve similar scores as experienced nurses- when 40% of those nurses did not achieve the threshold- holds little value when considering overall knowledge levels.

Amended Research Question 3: At what point in time after graduation do critical care nurses meet the established threshold score on the BKAT.

Amended Hypothesis 3: Critical care nurses will reach the threshold score on the BKAT by three years after graduation.

To examine the link between experience and basic knowledge in critical care (BKAT-7 score) a scatter plot was developed mapping BKAT scores and nursing experience overall and nursing experience in critical care (Figure 23). Without adjusting for the covariates, nurses typically reached the BKAT benchmark of 82 after 8.15 years of general nursing experience and 5.7 years of critical care nursing experience. There was a non-linear relationship between both overall nursing experience and critical care nursing experience and BKAT scores and the scatter pot of the scores showed a steeper learning curve during the first five years of practice than beyond five years.

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Figure 23. BKAT Scatter Plot
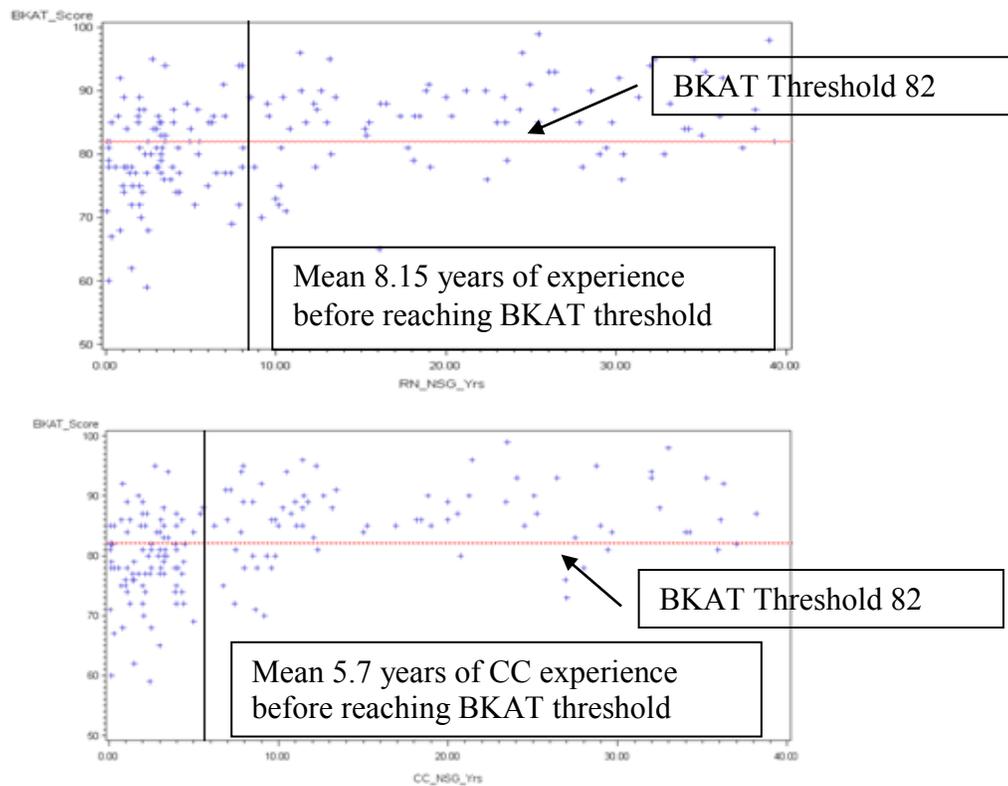
A general linear model was fit of the quadratic function of total nursing experience against expected BKAT score. This non-linear function of total nursing experience was a significant predictor of BKAT score (F=21.29, p<0.001) such that the expected BKAT score with no nursing experience is 77.98 (p<0.001, t=80.93, p<0.001), and increase over time as a typical learning curve by a factor of 0.56 points for each additional year of learning experience (beta1=0.56, t=3.45, p=0.001), decelerating by 0.008 points by the square of each additional year (beta2=-0.008, t=-1.82, p=0.07). Additionally the number of years of critical care nursing experience was also a significant predictor of BKAT score (F=26.81, p<0.001) such that the expected BKAT score with no

critical care nursing experience is 77.42 (p<0.001, t=87.16, p<0.001), and increase over

time as a typical learning curve by a factor of 0.91 points for each additional year of

learning experience (beta1=0.91, t=5.27, p<0.001), decelerating by 0.018 points by the

square of each additional year (beta2=-0.018, t=-3.64, p=0.0004).

To determine the effect of covariates between experience and critical care basic

knowledge, a series of generalized linear models (GLM) were analyzed using BKAT-7

scores as the primary outcome. Only one covariate, being a preceptor, significantly aided

in explaining the relationship between length of experience and critical care knowledge

(F=8.72, p=0.0036). Those nurses who were critical care preceptors reached the expected

BKAT threshold after an average of 3 years and 2 months of total experience compared

with nurses who did not act as preceptors who reached the same threshold at 9.5 years of

total nursing experience.

The same general linear model was fit of the quadratic function of several other

covariates against expected BKAT score. These non-linear functions of each of the

following covariates were not found to significantly predict BKAT score beyond nursing

experience: hospital unit (F=0.82, p>0.05), gender (F=0.28, p>0.05), current degree

(F=0.40, p>0.05), NGN versus experienced nurse (F=1.29, p>0.05), or specialty

certification (F=1.87, p>0.05).

Hypothesis 3, NGNs will attain similar BKAT scores as experienced critical care

nurses by 18 months was not found to be true so the null hypothesis is accepted.

Additionally, the amended hypothesis that critical care nurses will reach the threshold

score by three years after graduation was not found to be true and therefore the jull

hypothesis is accepted. Only critical care nurses who act as preceptors were close the

hypothesized level, achieving the score 3.2 years after graduation

Research Question 4: As identified by the critical care BKAT-7, are there specific

basic knowledge content areas that are consistently not met by NGNs?

Hypothesis 4: There will be specific basic knowledge content areas that are

consistently not met by newly graduated nurses as identified by the BKAT.

In order to determine basic knowledge content consistently not met by NGNs,

subcategory scores were calculated (Table 4). Only in the renal and other categories did

NGNs obtain the scores expected for basic knowledge in critical care.

Table 4. NGN BKAT Category Scores

BKAT Category	Range	Mean	SD	Percent	Threshold
Renal 9Q	6-9	7.54	1.029	83.78%	Meets
Other 9Q	6-9	7.42	0.987	82.44%	Meets
Pulmonary 12Q	7-12	9.69	1.517	80.75%	Below
Neuro 11Q	5-11	8.88	1.451	80.73%	Below
Endocrine 9Q	5-9	7.08	1.262	78.67%	Below
GI 8Q	4-8	5.96	1.148	74.5%	Below
CV 31Q	13-29	22.65	3.577	73.1%	Below
Monitoring Lines 11Q	3-11	7.85	1.891	71.4%	Below

Since the scores of experienced nurses were lower than anticipated, the category

scores were examined for this group as well as the NGNs. Experienced nurses' mean

scores for each BKAT subcategory were calculated and ranged from 76.8% for the

gastrointestinal content to a high of 88.9% for renal content for the cohorts of

experienced nurses (Table 5). Only the subcategory of GI had mean scores below the

threshold established for the BKAT.

Table 5. Experienced Nurses BKAT Category Scores

BKAT CAtegory	Range	Mean	SD	Percent	Threshold
Renal (9 questions)	3-9	8.00	1.079	88.9%	Above
Pulmonary (12 questions)	2-12	10.37	1.262	86.42%	Above
Other (9 questions)	5-9	7.61	1.031	84.56%	Above
Monitoring Lines (11 questions)	2-11	9.21	1.685	83.73%	Meets
Neuro (11 questions)	6-11	9.16	1.259	83.27%	Meets
Endocrine (9 questions)	4-9	7.48	1.207	83.11%	Meets
Cardiovascular (31 questions)	16-31	25.42	2.998	82%	Meets
Gastrointestinal (8 questions)	2-8	6.14	1.324	76.8%	Below

An independent samples t-test was conducted for each subcategory to determine

significance between the NGNs and experienced nurses. The results indicate the

experienced nurses scoring significantly higher than the NGNs in four categories:

cardiovascular (t(171df)= -4.212, p=0.00), monitoring lines (t(171df)=-3.737, p=0.00),

pulmonary(t(171df)=-2.461, p= 0.015), and renal (t(171df)=-2.024, p=0.045). Mean

scores between the experienced and NGN cohorts in the other categories were not found

to be statistically significant at the p=0.05 level: endocrine (t(171df)=-1.571, p>0.05), neuro (t(171df)=-0.991, p>0.05), other (t(171df)=-0.837, p>0.05), and GI (t(171df)=-0.656, p>0.05).

The hypotheses that the BKAT will identify specific basic knowledge content areas that are consistently not met by NGNs was found to be accurate so the null hypothesis is rejected. NGNs did not meet the threshold score in six of the eight BKAT categories.

Power Analysis

Post hoc power analysis was calculated using two on-line power calculators. Using a 2-tailed test with a 0.05 significance level, an effect size of 0.8, and an estimated 508 nurses in the population, with the 173 participants power is estimated to be 1.0 (DSS research) and 0.99 (Sloper).

Power analysis was also conducted for the General Linear Model and found that for a sample size of 173, the multiple liner regression test of R^2=0 (Type I error = 0.05) for 3 normally distributed covariates will have 99% power to detect an R^2 of 0.25 (Figure 24). Since the power is calculated to be above the acceptable standard of 0.80, the obtained sample size should be adequate to make inferences about the population studied with little chance of committing a Type II error.

Figure 24. Power Analysis for Linear Regression
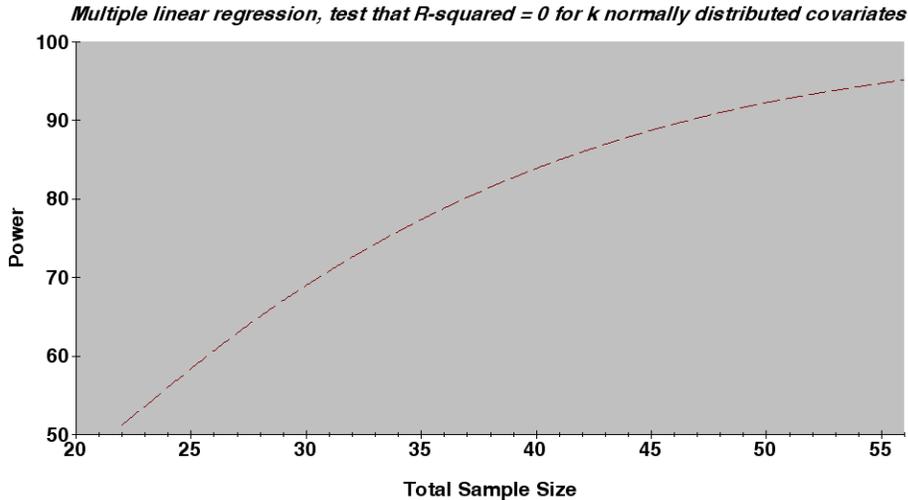
Qualitative Analysis

The purpose of the qualitative portion of this study was to gain an understanding of the experience of NGNs as they make clinical judgments during their first 18 months of employment and to see if those experiences differ based on the length of time the NGN has worked in critical care. Emphasis was placed on those experiences recounted by a majority of the nurses interviewed.

Participants. All NGNs who completed the quantitative portion of the study were invited to participate in the NGN interviews. Nine NGNs provided contact information when returning their BKAT, and five of those nurses responded to the researcher's request to schedule an interview (Table 6). The sample included four BSN prepared nurses and one ADN prepared nurse and represented three of the units where the study was conducted. The experience of the NGNs ranged from 4 months to 17 months at the

time if the interview, however the most recent NGN had only 2 months of experience when she completed the BKAT.

Table 6. Demographics of Nurses Interviewed (N=5)

NGN Pseudonym	Degree	Length of Experience at BKAT	Length of Experience at Interview
Shelby	BSN	14 months**	17 months**
Chloe	BSN	4 months	6 months
Addie	BSN	3 months	8 months
Hailey	BSN	12 months	17 months
Mel	ADN	2 weeks	4 months

Note: ** includes 12 weeks maternity leave

Data collection and analysis. Interviews were conducted by the researcher at a location based on interviewee preference. These sites included the researcher's office at the University and hospital conference rooms. The informed consent process was reviewed with each participant and verbal permission to audio tape the interviews was obtained. The interviews lasted between 14 and 36 minutes. At the conclusion of each interview the participant was thanked and given a $25 WAWA gift card to compensate them for their time. In order to clarify interview information, follow-up phone calls lasting less than 10 minutes were conducted for 2 interviewees, and 2 interviewees initiated follow-up e-mail contact with the interviewer.

Researchers use phenomenological methodology to elicit and interpret the meanings of phenomena as they are described by a specific group. A hermeneutic

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phenomenological approach was used by conducting one-on-one interviews with NGNs to allow the researcher to elicit the lived experience of NGNs as they make clinical judgments. In addition to providing a narrative description of their experiences, the researcher's knowledge and experience were integrated with the NGNs portrayal of making clinical decisions in order to analyze and interpret the experiences of these nurses. The tape recorded interviews were transcribed verbatim by a paid transcriptionist. Names of the interviewees and any staff mentioned were changed to protect anonymity. The researcher then reviewed the transcription while listening to the recordings to verify accuracy and add comments. The written text provided the data for analysis.

Data analysis occurred in phases during which the researcher returned to the transcripts and tape recordings to remain immersed in the data. After verifying the accuracy of the transcription, the researcher reviewed the individual transcripts and coded the accounts. Next the researcher created a table outlining the categories identified by all 5 NGNs, 4 NGNs, 3 NGNs, 2NGNs, and a single NGN. The interviews and researcher summary were shared with the team members that included three doctorally prepared nurse researchers, two members of the dissertation committee, and one external member with qualitative research expertise. After individually reviewing and coding the material, the group met via phone conference to discuss categories and themes and link them to the research questions.

Findings and Themes Described

Although the NGNs discussed a variety of topics and several themes emerged, congruent with the research's desire to elicit the NGN's experiences relative to decision making, the following themes were identified in data analysis: Developing confidence in

practice; Seeking assistance; Decision making. The similarities and differences between the interviewees are summarized and generalized. In this chapter the themes will be presented.

Developing confidence in practice. Confidence or lack thereof, was a theme identified by all of the NGNs. Examples ranged from situational paralysis, self doubt, and second guessing decisions to defining moments. Four of the NGNs mentioned concerns about making an error or described errors that they made that shattered their confidence. Reflection on practice is required to develop confidence, and as the NGNs reflect they begin to see ways to improve their care as well as successes that they have had.

Shelby described a patient she received from the Emergency Department about six months after graduation. While Shelby was charting, the patient self-extubated and pulled out her only IV access. Shelby stated, "…she was restrained, so I thought……I thought everything as alright….. The doctor was really mad at me- I got yelled at, SCREAMED at." That experience caused Shelby to question her abilities. "I felt like I didn't know what I was doing anymore….. and questioned myself am I fit to do this- be an ICU nurse". Addie recounted a similar experience when she, too "Got chewed out- I need thick skin to work here."

Chloe shared a similar crisis experience as a nurse with 3 months of experience who was on her first day off of orientation. Chloe received a patient who returned from the OR after getting a tracheostomy and PEG tube. Due to the patient's large size, there were complications with tracheostomy placement and the tracheostomy became dislodged. Chloe describes "freaking out" to the point of being unable to follow directions to bag or pull meds from the Pyxis "I just didn't know what to do." As she

reflects on this day months later, Chloe states that based on her experience now, "I definitely wouldn't freak out like I did- I didn't know anything… now I know who to call…I'd be a lot calmer and not so flustered and out of control." The previous examples are congruent with Benner's Advanced Beginner level where the nurse sees activities as a challenge to her ability and looks at the picture from her perspective thus far unable to shift to the patient and family point of view.

Mel, the most recent NGN with 4 months of experience at the time of the interview, purports confidence that is greater than the other NGNs stating, "It was easy enough. I'm not being cocky. I am good- I know that." Interestingly, Mel's confidence is almost completely linked to the ability to complete tasks and rarely does she speak about decision making or seeing the whole patient picture. Mel believes that the staff are confident in her ability to provide care "I feel real confident that everyone believes in me….I take it as a compliment when they leave me in the room [with a new admission] … they all left so I take it as a compliment that I can handle it all…. Hopefully everything was done! [laughs]." Although Mel claims confidence and competence, it is not always supported by her examples. Mel discussed a patient who required transfer from the step-down unit to the ICU because of his deteriorating condition. During her recount of the experience she referred to peritoneal dialysis, pleurevacs and paracentesis interchangeably to treat constant acsites highlighting her lack of understanding of the purpose of these treatments.

Unlike the other NGNs who were interviewed, Mel spent over 4 years as a patient care tech in a variety of clinical settings prior to enrolling in an ADN nursing program. Whether her comfort stems from experience on the unit where she works, experience

with many of the hands on skills, difference in entry level degree, or lack of experience

looking at the big picture, this nurse has more confidence than the others interviewed.

Unfortunately several of her examples do not support that level of confidence. She

expresses frustration that she is not assigned to the critically ill patients but rather the

step-down overflow or less acute patients.

Likewise Hailey gave more examples of confidence in her ability than she did

lack of confidence. Seventeen months after graduation she reflects and states that by 12

months out she was completely comfortable in her decision making role. Her only hint of

a lack of confidence occurred approximately 3 months after graduation. When recounting

her first patient code Hailey describes a patient who had been recently extubated, was

permitted to eat , and consequently coded. Hailey stated, "So maybe he aspirated. That

one was hard because then you start thinking maybe I shouldn't have fed him [laughing].

We go to try to intubate and you know tons of stuff came out… he didn't make it."

Hailey also expressed frustration with a physician who doubted her assessment

and did not respond as she would have liked.

> "My first patient that I ever, you know, I felt that something you know like I
>
> knew what was going on and the doctors weren't didn't want to agree, was a
>
> patient who was in DIC. And this patient had started bleeding from his foley and
>
> from everywhere else and I'm like "this is DIC" and they are like "no his INR is
>
> just elevated blah blah blah blah" and I'm like "look at all this you know all this
>
> other stuff". Well the patient ended up coding ended up bleeding everywhere and
>
> ended up dying. [Laughs] You know I mean they had started to treating him for
>
> DIC at that point but you know if was just kind of that was like a big challenge for

me just like realizing that you know everybody doesn't agree and you know just trying to get someone to I don't know……. Just trying to figure out if what they are saying is correct of if you're or is it more like since you're new you're second guessing what you really think is wrong."

Reflecting on both code situations 12 months later, Hailey sees her role changing from the person who completed tasks (compressions, meds) to the person who leads the code until the physicians arrive. She also feels that the physicians trust her judgment more now and that she had that level of trust earlier in her career the patient with DIC may have been treated more aggressively.

Shelby described an incident that happened during the same week as the patient extubation where she felt that she had a defining moment and became part of the team. During a code situation Shelby "pushed meds and did compressions" which made her feel "I made everyone realize that I knew what I wanted- that I know how to do my job". Although Shelby is reflecting on the tasks she has accomplished and the confidence it afforded her, even at 17 months after graduation she has not identified that she was not in fact leading the code or providing the critical thinking piece, but performing tasks as directed by others.

Likewise, Addie described a code situation that she felt was a defining moment. After an initial "What did I do moment" followed by feeling "helpless" rather than becoming paralyzed Addie took charge of the situation and directed team members to complete tasks. She spoke of the importance of thinking on her feet "You have to think about it right now… you know I thought airway, breathing, circulation…. That's how I made decisions- starting from airway and moving down… you delegate because you have

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the help that you need… and everything comes together." She prided herself in the ability to give a comprehensive patient report to the code physician who was not familiar with the patient. "You know, so I was proud of myself and actually, I wasn't happy that he coded, but I was still focused on what happened."

Chloe's example of her defining moment shows insight into the patient situation. Based on her assessment a patient with respiratory and heart failure, she sought the physician requesting to change the plan of care stating "Dr. S, like honestly I don't feel comfortable extubating him. I was like he doesn't look, he just doesn't look OK at all. And he [physician] was like 'alright we'll just wait' and we didn't extubate him and he ended up going on CRRT [continuous dialysis]." Chloe's ability at assert that she was not comfortable with a plan demonstrates increasing confidence in her care.

Addie, Chloe, and Mel all equated organization with success which gives them confidence. Mel states "I always have time to clean my room….. the day that you come in my room and there's trash on the floor you'll know that I've had a hard day." Addie echoes the need for organization to feel confident adding, "I guess what I tried to do to keep up with everything… ..you have like at least an hour or 2 when you do your assessment, try to get everything straight before the family comes in. So that way you can kind of get your thoughts together." Chloe stated that as long as she is organized, she can manage the patient safely.

Seeking assistance. As expected, each of the NGNs sought the help of co-workers to assist them with patient care. Staff nurses and other team members provided valuable resources to back up the NGNs, validate their knowledge, solve a problem, or completely intervene when the NGN lacked knowledge about or confidence in the

situation. Using the resource system available, the NGNs were able to delegate up to more experienced nurses who had the necessary background knowledge to provide safe care. Within the concept of seeking help, each NGN identified the need to seek help prior to contacting physicians, identified the resources to whom they were most and least likely to turn, and described times when they consciously chose not to seek assistance.

Consistently the NGNs acknowledged conferring with their preceptor or charge nurse prior to calling a physician. Mel acknowledged that deciding when to call the physician was the most difficult decision stating, "The most difficult part is when to call the doctor. When is my limit up? Getting the doctor involved is the hardest part for me." Twice Shelby mentioned her fear of communication with physicians stating, "As a brand new grad I was scared to death to talk to a doctor" and "I always call doctors last…. I used to be afraid of them." A common theme was that the NGNs feared "asking questions because they will laugh at you", not being able to express themselves, the physician being mad at them for calling, and not knowing answers to physician questions. NGNs combated this fear by seeking assistance and validation from other nurses prior to making the phone call. As the NGNs gained experience and confidence, four of the five found phone calls to physicians less intimidating. Shelby relates, "I feel like I can talk to them [physicians] a lot better. I'm more confident in what I do…. in my skills. And I think that confidence helps me communicating with them." In addition to feeling uncomfortable calling physicians, the NGNs often felt flustered engaging in patient conversations and unit rounds with physicians. Comments included that those interactions included Chloe describing them as "intimidating", Addie feeling "flustered", and Mel "disorganized."

Looking for guidance and validation, all of the NGNs used their charge nurses as resources. This double check boosts the NGNs' self confidence and helps them make decisions. Hailey commented that she asked the charge nurse for help "so often that I don't even think about it- I just go ahead and ask them." Likewise Shelby commented that she still relies heavily on the charge nurse to answer questions. Mel and Shelby stated that they "always" checked with the charge nurse prior to calling a physician. Addie related that she chose to look up information on her own and verify with the charge nurse rather asking for help before using other sources. She mentioned feeling afraid about asking questions because other people will laugh or think that she doesn't have the knowledge necessary to work in critical care. During times of patient crisis the charge nurse is generally the first person sought by the NGN. As previously presented, Chloe and Shelby both described situations where the charge nurse assumed primary care of their patient because they were unable to make decisions or act.

Based on their experiences with preceptors, some relied more heavily on the preceptor as a mentor or information source after orientation than did others. The level of preceptor support ranged from little support and interaction to great support and continued mentorship. Three of the NGNs discussed the relationships that they had with their preceptors and opportunities to seek assistance now that orientation has ended. Hailey commented that her preceptor was and continues to be a great resource for her and that he serves to validate her knowledge and provide direction as needed. Chloe also had a positive relationship with her preceptor, however comments that she may have been too reliant on her. Chloe describes being "babied" stating that "I learned so much because she was always there" and then expressing concern as orientation ended , "I was really scared

when I got off because I knew she wasn't there". Chloe feels that she has lost the safety net that was around her although she frequently seeks assistance from her preceptor and values her opinion and insight. Unfortunately Addie describes negative experiences with her preceptor and stated that her preceptor was the last person from whom she will seek assistance, "I don't feel that I can talk to her." Addie describes a relationship where the preceptor offered little supervision and assistance. Addie described feeling "alone", "belittled", and "laughed at" and "demeaned" when she sought clarification or assistance. Addie described an instance where she became tangled in tubing and lines while completing and assessment and stated that her preceptor "Would look at [me] and say 'What are you doing?' and it just made me feel really incompetent." Addie commented that having a preceptor who became a mentor would be a benefit "But it didn't happen to me."

In addition to describing incidents when they sought help, three of the NGNs also described choosing not to seek help for various reasons. Chloe describes safety as her denominator as whether to work through problems or seek help stating "I've been doing a lot of stuff by myself and trying not to ask for help unless I feel like it's going to be a safety issue to the patient because I feel that it's going to make me better as far as organizing stuff." Addie prefers to look things up in references or on the computer rather than asking for help. She keeps her critical care text and drug book in her locker for easy access. After finding the answer she then clarifies with the charge nurse or another staff nurse if needed. Although she only had four months of experience at the time of the interview, Mel prides independence stating that she "felt like doggy paddling for a while" when trying to settle a newly admitted ICU patient. When she finally elicited help from

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the charge nurse the nurse questioned why she had not sought help sooner. In a separate

incident, Mel describes choosing not to call a physician for orders or elicit help from the

charge nurse to do so and instead Mel gave the unstable patient fluid boluses while she

completed admission paperwork. After completing her patient database she then called

the physician and started the patient on vasopressors to increase his BP. The decision not

to seek help lends concern to her prioritization of paperwork over patient and

overstepping her limits. It also provides a contrast of not seeking help because of a desire

to learn and become more independent in the role of nursing and not knowing when help

is needed.

As the NGNs amount of experience increased, as expected, there was a reciprocal

decrease in the amount of assistance sought. All of the NGNs valued the knowledge of

experienced nurses. Hailey summarized the concept of seeking help stating "Honestly, I

think that the key to like being comfortable when you're a new grad is having strong

people that you work with and people that are willing to help you."

Decision making. Theoretical knowledge, practical knowledge and personal

knowing all influence the nurses' ability to make decisions. The NGNs displayed a

variety of decision making experiences that ranged from Addie using an Airway-

Breathing-Circulation approach to plan her care during a crisis situation to Shelby and

Hailey becoming paralyzed and unable to make decisions or provide care. In some

instances the NGNs provided examples of reflection in action to make decisions, working

through the problem in real time. At other times the reflection on action did not occur

until after the decision had been made. Regardless of when it occurs, reflection is an

integral part of learning and deepening superficial knowledge which will be used to guide further practice.

Self doubt, tunnel vision, and a lack of experience often limited the ability to make decisions requiring reliance on charge nurses and preceptors to make decisions for them. For example, Chloe's superficial knowledge of the drugs required for rapid sequence intubation rendered her unable to make a decision when trying to gather meds, "I just couldn't even think. When I was at the Pyxis, I couldn't… I was just so scared… I was shaking so bad." Similarly Shelby described turning over care to the charge nurse when she was unable to make decisions.

Hailey recounted an example of deciding to call a physician because she believed that her patient was going into DIC. Stemming from her theoretical knowledge about the disease process coupled with her knowing the patient because she had cared for him several times over the previous week, Hailey was able to pick up changes in the patient condition, interpret what they meant, and deduce that the changes warranted further testing, treatment and physician notification. Hailey then expressed frustration that she was ignored by the physician. Using the chain of command, Hailey decided to elicit the help of the charge nurse to state her case. Appropriate lab tests were ordered "after a couple of hours" and the physician eventually acknowledge Hailey's conclusion, however treatment was not initiated before the patient coded. Hailey provided a great example of reflection in action and appropriate decision making.

Chloe also provided an example of reflection in action when she conferred with a physician over orders to extubate her patient. Considering on her assessment and knowledge about the patient's pathophysiology, Chloe approached the physician saying

"Honestly I don't feel comfortable extubating him………. he doesn't look OK at all." The decision not to extubate was supported as the patient further deteriorated that day requiring multiple vasopressors and continuous renal replacement therapy.

Even with prompting, Mel had difficulty reflecting in or on action. Her descriptions of patient care were primarily task oriented and did not encompass the big picture. With only four months of experience, she does not appear to have reached the stage of knowing the patient and is caught up in the technical perspective and doesn't appear to have made an emotional connection. She outlined a situation when she was speaking with the family of a patient with an intra-cranial hemorrhage who would be undergoing brain death testing. She described the family as "ghetto……. didn't know anything………… and speaking that weird way." She was unable to explain to the family the patient's condition, they weren't able to understand Mel and were becoming upset with her, so Mel got frustrated and left the room. Another experienced nurse intervened and explained the patient's condition to the family. When asked if she could have done differently Mel responded, "No. It's just that they asked the same questions over and over again. I tried so hard."

Additional reflections on action repeated by the NGNs were that "I should have planned better" and "now I know who to call" they state that with increased experience they can now anticipate what the patient may need and plan accordingly. Addie and Chloe, each with 8 months of experience, reflect on the need for better planning and prioritization and talk about how outcomes could be different based on the knowledge that they have gained. Hailey, the NGN with the most experience (17 months) stated that it took her a year to be truly comfortable in her role. Likewise, Shelby, who also has 17

months experience, but had recently returned from 3 month of maternity leave, stated that she had just become confident in her role, but has declined to become a charge nurse because she doesn't feel that she is ready to be a resource for others.

In addition to studying the experiences of the NGNs as they made decisions, the researcher hoped to determine if the experiences differed based on the length of time that the NGN has worked in critical care. The differences in experience seem to be a combination of time worked and personal experiences the NGN has encountered.

The NGN with the least experience as a NGN, Mel, touted the most confidence in her abilities, boasted that she had never been challenged, yet was the one least able to back up her bravado with examples. Several examples she provided only highlighted the knowledge that she has yet to gain (inappropriate terminology, inability to explain concepts, actions without physician orders), unbeknownst to her. She has yet to participate in a scenario where she feels challenged. She laments that she is assigned the least acute "needy, wanting, boring patients" and does not equate her level of preparedness with patient assignments. In fact she states "They all left me so I take that as a complement that I can handle it all………….. hopefully everything was done [laughing]." Mel seems to be in the early phase of transition, focused on organization and procedures, not yet progressing to the point where she can plan and implement patient care. Interestingly, two of the other NGNs interviewed work on the same unit, both caring for high acuity patients, and both able to describe challenges and reflect on their experiences. Mel's prior experience and comfort with the unit routines and some aspects of patient care may have provided her with a false sense of security which other NGNs did not experience.

Addie's examples of reflection show that she is undergoing personal and professional development and beginning to see the patient holistically. She recognized dilemmas, for example a patient dying with HIV related pneumonia who wished that her family not know her HIV status, and reflected on ways to care for the patient meeting her needs and explain to the family why the patient isn't responding to treatment. Additionally although she felt "helpless" and wondered "What did I do?" when her patient coded, she did not become paralyzed in the helplessness and reflected on her decision making stating "You know, I thought airway, breathing, circulation and everything comes together…it's all going to work out, I have to bag him." Addie's ability to reflect on her eight months of experience and look ahead is demonstrated when she recounts the 3 things that would be most beneficial to a NGN: prioritization skills, confidence, and support. She acknowledges that she is still new to nursing and working to improve her prioritization and decision making, and that with time she has increased confidence in her ability. As she works through her transition and has become more confident in her abilities, Addie still struggles with finding her place on the unit and feels "isolated" remarking nursing is not what she expected. Addie shared that she Googled new graduate nurses and found a blog called "I Hate Nursing." She felt comforted that she is not alone in her insecurities and spoke of the many resources needed by new grads. "No one realizes it until they come out- it's a big secret, " she says, "My career isn't bad-it's just the point where I am. I want to be the success story, though." Her experiences clearly parallel experiences of other NGNs in the first year of their careers.

Although Chloe also had 8 months of experience at the time of the interview, she had not reached the same level of confidence as Addie and openly voiced her concern

that she made the correct career choice. These feelings of inadequacy and self-doubt are commonly experienced by NGNs during their transition, particularly during the 4-9 month time frame. Chloe was repeatedly tearful during the interview stating on a day-by-day basis she fluctuates between hating her decision stating, "I just don't want to be a nurse anymore…. I hate it….it's not what I expected" to having a great day the next day. These peaks and valleys are typical of nurses at her level of experience.

Shelby and Hailey, with 14 and 17 months experience respectively, have transitioned to the new beginning phase. They were able to reflect on their experiences and recognize their growth. They have become more adept at recognizing complex problems, analyze patient care at deeper levels, and portray more confidence when relating their stories. Although both are sometimes unsure of their plan of action, both feel confident seeking assistance as needed and can identify appropriate resources. Shelby has been recognized as resource on her unit, acting as a preceptor to an experienced critical care nurse and being recommended to accept charge nurse duties.

Themes linked to research question. Asked to describe patient situations that they found challenging and describe how they proceeded with care, NGNS shared their experiences as they made decisions. The NGNs interviewed and the experiences they recounted represented all three phases in of Schoessler and Waldo's NG Transition Process Model. They are summarized in Table 7.

Table 7. Qualitative Themes

Theme	Described	Example
Developing Confidence in Practice	Situational Paralysis	"I felt like I didn't know what I was doing anymore…. And questioned myself am I fit to do this- to be an ICU nurse?
	Self-confidence	"It was easy enough. I'm not cocky. I am good- I know that"
	Defining Moment	"Dr. S., like honestly I don't feel comfortable extubating him. He doesn't look, he just doesn't look OK at all."
Seeking Assistance	Importance of Support	"Honestly, I think that the key to like being comfortable when you're a new grad is having strong people that you work with and people that are willing to help you."
	Lack of Support	"MY preceptor is the last person I will go to. I just don't feel that I can talk to her."
	Calling the Physician	"The most difficult part is when to call the doctor." "I always check with another nurse before I call the physician"
Decision Making	Self doubt	"I just couldn't even think of what to do… I was shaking so bad."
	Lack of Experience	Mel walked out of the room frustrated because she could not explain the patient condition to the family.
	Decision Framework	"You know I thought Airway – Breathing- Circulation and everything comes together….it's all going to work out… I have to bag him."
	Reflection	"I should have planned better." and "Now I know who to call."

Chapter 7

Discussion

Introduction

Having presented a thorough review of the results of this study in the previous chapter it is now necessary to discuss and compare these results with those found in previous studies. Inferences, recommendations, and suggestions for studies will be given.

Discussion of Quantitative Results

While the researcher was not surprised to find a statistical difference between NGN and experienced nurses' BKAT scores, the fact that nearly 40% of the experienced nurses did not reach the threshold of 82-84 set by Toth was astonishing. Based on that finding, one focus of the research study changed from determining when NGNs reach the BKAT score of experienced nurses to determining when critical care nurses reach the threshold score identified by Toth.

Demographics and BKAT scores. Multiple demographic variables were studied in relation to BKAT scores. ANOVA of scores between NGNs, experienced nurses and experienced nurses new to critical care showed that both experienced nurses and experienced nurses new to critical care had higher BKAT scored than NGNs. Based on these results one can conclude that general nursing knowledge and experience obtained outside of the critical care unit provides a firm foundation for the basic knowledge required in critical care. When length of experience was compared to BKAT scores, nurses with more than 10 years of experience scored statistically higher than each experience bracket with the exception of the 19-24 month cohort. It is not surprising that

the nurses with the most experience had the highest mean scores and the time frame of 10 years of experience closely matches the linear progression prediction that nurses who are not preceptors require 10 years 5 months of critical care nursing experience to reach the threshold. The only other demographic variable determined to be a significant predictor of BKAT score was specialty certification in critical care. However seven of the 40 CCRN certified nurses (17.5%) scored below the threshold score. Considering that the specialty certification examination covers much more complex critical care knowledge than the BKAT the result is surprising.

There were no significant differences found between the type of critical care unit where the nurses worked (general versus specialized, regional medical center versus community hospital, magnet versus non-magnet) and BKAT scores. The researcher anticipated the scores might be higher in the regional medical center that receives critically ill patients from outlying hospitals, but that was not the case. Likewise Magnet status was not a predictor of BKAT results. The staff nurses on the three critical care units in the hospital with magnet designation did not have statistically higher BKAT scores than nurses in other hospitals. In contrast with the pilot study results, neither entry level nor current degree was found to have statistical significance related to BKAT scores for experienced or newly graduated nurses.

Additionally NGN amount or type of previous work experience in health care and internships during formal education were not predictors of BKAT scores. Orientation variations (number of preceptors, type of orientation) also were not found to be statistically significant predictors of BKAT scores. Likewise BKAT scores did not differ between NGNs who had completed versus those currently on orientation and the length

of orientation did not result in statistically significant BKAT scores. While it seems logical that NGNs who were competent and confident while on orientation are released from orientation earlier, that is not supported by BKAT scores. Based on the lack of statistically significant demographic factor, nurse managers do not have a reliable predictor of which nurses may excel versus struggle in the critical care setting.

Nurses' basic knowledge. Results obtained in this study support the research literature claiming that NGNs may not be sufficiently prepared to care for patients. As expected, based on BKAT scores NGNs have less basic knowledge than experienced critical care nurses. It was not surprising that the NGN mean BKAT score was below the threshold set by Toth. In fact only 31% of NGNs reached that milestone. While the mean score of experienced nurses falls within the expected range, it is concerning that nearly 40% of experienced nurses did not achieve the expected score. When the cohorts are combined 43.9% of the staff nurses who participated in this study did not meet the threshold BKAT scores. If a link between patient care and BKAT scores were drawn, there would be significant concerns about the level of patient safety provided by a significant portion of this sample.

BKAT identified knowledge deficit. Based on the scores of both groups, the researcher chose to conduct a more detailed examination of each component of the BKAT exam for experienced nurses rather than focusing only on the scores of the NGNs. Experienced nurses met or exceeded the expected score in each BKAT subcategory with the exception of one (GI) and the NGNs only met or exceeded the anticipated score in two categories (Renal and Other). There were only four categories where the scores of the experienced nurses were statistically significantly higher than the NGN scores:

cardiovascular, monitoring lines, pulmonary, and renal. For NGNs specifically, these category scores show the need for additional didactic education beyond what is gained during formal education programs and hospital orientation.

The NGN and experienced nurses' BKAT results by individual question (percentage of staff answering each question correctly) and category (mean score per category) were compiled. Information gleaned from these results can be used to plan educational strategies aimed to increase knowledge in content areas where scores are lagging. The nurse managers and educators were provided with a detailed data analysis of the aggregate data as well as aggregate data for their unit and an explanation of anticipated results. The researcher reviewed these scores with the managers and educators and encouraged them to look at questions individually and determine if the data tested were relevant to that unit. Managers and educators were encouraged to use the BKAT results to plan educational offerings for the staff.

Achieving expected results. The body of knowledge tested by the BKAT is beyond the scope required for licensure and has been deemed the knowledge necessary to provide safe nursing care to patients in the critical care setting. It is important to understand that no nurse is expected to achieve a perfect score on the BKAT-7 and that the threshold of 82-84% while expected by the completion of orientation should not be considered to be a passing score. It is imperative that the person administering the exam considers the specific questions that have been missed and determine if those questions are relevant to clinical practice in that setting. That being stated, it is concerning that overall the participants in this sample took much longer than anticipated to achieve the expected score.

Several factors could account for this discrepancy. First, participation in this study was voluntary. The sample consisted of only 30.5% of the experienced nurses who work on those units (range per unit 4-57%). The NGN response rate was higher however at 61% (range per unit 50-100%). Although the power analysis purports that the sample was large enough to make generalizations, there is no way to determine if those who did not participate might have elevated the overall BKAT score. Unlike the mean which can be skewed by a few extreme scores, the median is a much more stable measure of central tendency. The median critical care experience was 4.4 years which is less than half of the mean experience of 9.6 years. The positive distribution of right skew of experience gives a distorted perception of the experience level of the nurses when considering only the mean experience when, in fact, half of the sample has 4.4 or less years of critical care experience. Finally, the researcher is unable to determine the amount of effort the participant placed on the BKAT. Since it was given in an un-proctored setting, it is not known how much time was spent taking the exam or whether the participants completed the test in a single sitting while non-distracted as requested. It is also unknown whether the participants gave 100% effort on the exam or, although this is unlikely, returned the packet only for the $25 gift card.

The preceptor factor. It is encouraging that nurses who act as preceptors reached had exceeded the BKAT threshold scores much earlier in their careers than did nurses who were not preceptors (3 years 2 months versus 9 years 6 months). Nearly 71% of the experienced nurses (104 out of 147) have been preceptors for experienced nurses who come into critical care and nearly 69% (101 out of 147) have precepted new graduates in the critical care setting. Nurses who act as preceptors averaged 16.5years of experience

versus 8.2 years of experience for the nurses who have not precepted. The mean score of nurses who have precepted was 84.7 versus 80.1 for those nurses who have not. Unknown to the researcher is whether the critical care knowledge is a factor of years of experience, is gained by teaching, or whether preceptors have greater basic knowledge and thus are chosen to teach, or a combination of these factors.

Comparison with previous BKAT research. The overall BKAT scores for the sample in this study were below the expectation set by Toth as well as reported in some other studies present in the literature. A sample of 68 experienced critical care nurses had a mean score of 84 on the BKAT-3 (Michard & Henry, 1998), and, using the BKAT-4 with a sample of 38 experienced critical care nurses the mean score was 87.27 (Price, 1993) . Using the BKAT 5 and a sample of 528 critical care nurses from the US, Toth (2003) found the mean score of the experienced nurses to be 85.8 (range 46-100) and using the BKAT-7, Toth (2007) found the mean score of experienced critical care nurses to be 82.3 (range 44-98) compared to this study's findings of 83.39 (range 59-99).

Although the mean BKAT score found in this study aligns with others it is still concerning that nearly 40% of the experienced nurses did not meet the threshold. A breakdown of the percentage of nurses who meet and exceed the expected threshold was not presented in any of the previously mentioned studies. The implications of these results on the actual units should be addressed individually. For example, on a specialty neurological intensive care unit the manager and educator may not be as concerned with a score that is below the expectation if the nurse scored at or above the expectation on the scenarios typically seen in that unit's population. Likewise the nurses on the cardio-

vascular surgery unit at one hospital, while having similar overall mean scores as nurses on other units, scored very high in the CV and monitoring lines sections of the BKAT.

As in previous studies using the BKAT to measure NGN basic knowledge of critical care, the NGNs in this study scored below the expected threshold set by Toth, with NGNs in this sample having a mean score of 77.08 (range 60-92). It is encouraging to note that the NGNs who participated in this study achieved a higher mean score than did NGNs in 4 of 5 groups of NGNs in other studies. As a basis for comparison, the mean BKAT-5 score of 104 Finnish NGNs working in critical care was 40 with a range of 4-76 (Aari et al., 2004), 40 NGNs from the US scored a mean of 65.3 on the BKAT-3 at the end of their first year (Lanford, 1989). Using the BKAT-7, Toth (2007) found the mean BKAT score of 26 NGNs to be 74.8. In a study of NGNs over a two year period, only the first year cohort scored higher on the BKAT than did the sample for this study, with a mean of 81, while the second year cohort yielded a mean BKAT score of 76.42 (Messmer et al., 2004).

A contrast between this study and previous studies occurs when examining the statistical significance of NGN scores in relation to demographics. In this study there was not a statistical significance in NGN scores based on gender, orientation style or length, previous experience, or entry level degree. Aari et al. (2004) found statistical significance in BKAT scores with males scoring higher than females and students who had critical care courses during college scoring higher than those who did not. Likewise Lanford (1989) found that NGNs with critical care course had significantly higher scores than did those NGNs without critical care courses. A similar comparison cannot be made with this sample since all NGNs received a critical care course during their nursing program.

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It is noteworthy that the mean scores achieved by these groups of NGNs have not achieved Toth's threshold of required basic knowledge. It is not meant to infer that individual nurses are not able to effectively care for critical care patients or that NGNs should not be hired in the critical care setting, however it is a cause for concern that as a cohort, NGNs need more education and support than they can receive during orientation alone.

This study has added to the body of research knowledge by expanding the current BKAT studies that reflect scores to predicting when scores will be obtained. To date the researcher has been unable to find any other study that conducted a regression analysis to determine the relationship between critical experience and BKAT score. Similarly no studies employing a general linear model to fit the quadratic function of nursing experience against BKAT score in order to predict the point at which a nurse would achieve a threshold score were found. Because there is no baseline of comparison, this researcher is unable to determine whether the mean of 5.7 years of overall experience and 3.1 years of experience for nurses who precept is the norm.

Decision Making Experiences

Decision making is a fluid process that combines both looking inward at one's self and knowledge and outward at the situation at hand and combining the elements to make a judgment. The themes identified by these NGNs are consistent with Benner's Novice and Advanced Beginner levels and Tanner's Model of clinical judgment. The NGNs shared their struggles making decisions- struggles that stemmed from a lack of experience-based knowledge, lack of confidence, lack of support, and a lack of knowing

the team resources available for use. These results are similar to those found by Etheridge (2007) who found that in order to think like nurses NGNs needed to develop confidence, learn responsibility, form relationships with the health care team, and think critically. Although the difficulties making decisions can be concerning from a safety standpoint, these challenges are expected and well documented in the literature including research by McKenna and Green (2004) founding that during the first six months of practice NGNs focused primarily on tasks while they struggled to survive. In addition McKenna and Newton (2008) found that NGNs had difficulty responding to unexpected situations during their entire first year of practice. Results from del Bueno's (2005) study on NGNs yielded similar results; 70% of the time NGNs were unable to recognize and synthesize patient problems and thus provide safe nursing care.

Benner (2001) speaks of clinical knowledge, a combination of theoretical knowledge and practical knowledge which is gained over time based on repeated experiences. The nurse is often unaware that this database of knowledge is being built but calls upon it to recognize patterns and predict outcomes and make decisions. Due to their lack of experience, NGNs do not have this resource from which to pull and therefore often have difficulty deciding how to proceed. Shelby and Chloe both shared stories citing their inability to made decisions and care for a patient base on lack of experience with the situation. At this point the NGNs shared their stories in bits and pieces- looking at the situation in chunks rather than as a complete interactive whole.

Likewise these NGNs are at different points of knowing the patient, an integral part of decision making as claimed by Tanner, Benner, Chelsea, and Gordon (1993). Repeated patient exposures provide nurses with an understanding of the patient's needs

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and desires. Knowing the patient enables nurses to make better care decisions. In most examples provided by the NGNs in this study, that level of interaction and knowing the patient had not been achieved and therefore could not be transferred to NGN decision making. Only Hailey was able to discuss knowing that something was different based on repeated exposures to a particular patient thus spurring her decision to consult the physician about changes in patient status. Since judgments are often impacted by the nurse's prior experience and knowledge base it is expected that the ability to make clinical judgments will improve over time. Until the time occurs when nurses make judgments based on tacit knowledge, they generally utilize analytical thinking to make sense of the situation and decide upon a course of action (C A Tanner, 2006)

With the exception of one story shared by a single NGN, these novice and advanced beginner nurses based their decisions on rules and had challenges to make decisions when situations occurred for which the NGN had no pre-determined rule to follow. Because of this they frequently couldn't choose the most important intervention, and in two instances had to stand back completely and allow care to be given by experienced nurses. Benner purports that the novice and advanced beginner nurses need to have backup available preferably a nurse who functions at least at the Competent level (2-3 years of experience).

Reflecting on their actions months later, the NGNs are able to dissect what happened and talk about how different decisions would now be made if they faced similar experiences. However, when the interviews took place the NGNs continued to have a "me" focus rather than a patient focus which is consistent with the novice and advanced beginner levels. Shelby shared a situation and although mentioned lack of IV access and

patient self extubation, but focused on being yelled at by the physician. The NGNs often recounted their experiences as it related to them as nurses and had yet to see how their actions and decisions, or lack thereof, affected the patients and others. Although they have not moved to a point of reflecting from the patient perspective, reflecting is necessary for learning to occur and, according to Tanner (2006), this reflection on action is a necessary component to "Thinking like a Nurse."

Triangulation

Relationships between BKAT scores and experiences making decisions will be delved into to determine if there is a relationship between amount of basic knowledge in critical care and the NGNs experience making decisions. To protect anonymity on units where there were only a small number of NGNs, individual BKAT scores were not linked with NGN accounts of decision making therefore generalized comparisons of NGN BKAT scores and decision making experiences will be explored. At the time of the interviews, 3 of the nurses fell in the 4-9 month cohort and 2 in the 10-18 month cohort. However the NGN with the least experience, beginning her fourth month, had only 2 months of experience when completing the BKAT so she straddles two cohorts. The other four nurses remained in the same cohort for both the quantitative and qualitative portions of the study.

An unanticipated finding of this study is that there was not a statistical significance in BKAT scores between the three cohorts of NGNs based on their length of time since graduation (Table 8). It was expected that as NGNs gained experience, their BKAT scores would increase, however that did not happen. In fact, of the three groups, the cohort with the most clinical experience had the lowest mean score. The wide range

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of BKAT scores makes it challenging to link basic knowledge scores and decision making, especially considering that none of the three cohorts achieved a mean score in the expected range, a value that is anticipated by the end of orientation.

Table 8. NGN BKAT Scores by Cohort

NGN Cohort	Sample size	Mean BKAT score	BKAT score range
0-3 months	9	76.22	60- 82
4-9 months	5	81.6	67-92
10-18 months	12	75.8	62-89

Knowledge can be described as both horizontal, bits of knowledge about a broad range of topics, and vertical, in depth knowledge about topics. Students learn at least the bits and pieces of a wide variety of nursing knowledge while in school. If that learning had not occurred, graduates would not have gained licensure and begun practice. For some of the NGNs, more in-depth knowledge was gained or reinforced based on their clinical experiences during school or internships. Both types of knowledge are necessary for effective clinical practice however it takes more than knowledge to make good decisions. Decision making required inward and outward thought- a combination of one's knowledge coupled with the external situation. The nurse needs to combine personal knowing of the patient and context and didactic knowledge to make the best clinical decisions.

The NGNs interviewed seemed to have the horizontal knowledge necessary to made decisions and judgments during expected, typical patient scenarios. However based

on their stories, they often lacked the vertical and contextual knowledge necessary to make decisions when met with unexpected or unfamiliar events. They very much follow a set of known rules, and become stuck when they meet a challenge. The quagmires in which the NGNs found themselves occurred due to a combination of lack of knowledge about the situation or patient and the inability to apply that knowledge due to inexperience. The NGNs focused on tasks, for example beginning CPR or pushing drugs, demonstrating basic levels of task oriented decision making, but doesn't portray understanding of the overall patient situation. Chloe and Shelby both gave accounts of patient situations when they became unable to complete even simple tasks, for example pulling medications out of a Pyxis machine or oxygenating a patient because they were paralyzed in the situation. Examples like theses demonstrate that NGNs don't always apply their horizontal knowledge , often lack the vertical and contextual knowledge necessary to perform patient care in complex situations, and may need assistance from experienced nurses to make quick and sometimes life and death decisions for them. The low mean BKAT scores provide quantifiable evidence of the NGNs need for help.

Conversely, experienced nurses make decisions based on intuition, clinical reasoning and personal knowing of the patient. In addition experienced nurses have increased familiarity with the standards of practice, resources available to them, and increased comfort communicating with various members of the health care team. This socially embedded knowledge is gained over time, often without the nurses' knowledge, and is lacked by most NGNs. In this study, however, the BKAT scores yielded yet another area of concern: the basic knowledge of the experienced nurses as a whole. Since 40% of the experienced critical care nurses in this sample scored the below threshold

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BKAT scores, there is cause for alarm that these NGNs may not have appropriate resources on some units, especially units where the staff is relatively inexperienced. Since experienced nurses were not interviewed, it's impossible to judge their ability to make decisions as compared with their basic knowledge in critical care as measured on the BKAT.

It is important to note that the accounts relayed by these NGNs often took place during the early part of their first year- often times soon after the conclusion of orientation. Therefore their current BKAT scores, especially those in the middle cohort who scored the highest, may not have a direct correlation to their knowledge at the time of the crisis. For example Chloe's situation where she completely delegated the care of her patient to the charge nurse took place when she had three months of experience and was only one week off of orientation- only half of the clinical experience that she had when completing the BKAT (6 months) and participating in the interview at 8 months. Since these times are not aligned, it may be difficult to draw parallels between the events and knowledge level. However it is reasonable to conclude, based on her experiences, that at eight months although she is gaining confidence, she has not yet reached the clinical maturity of an experienced RN. The premise linking experience and improved decision making is further supported since the NGNs shared stories from several months prior to the interview versus more challenging situations that occurred more recently. One could conclude that the NGNs are gaining contextual knowledge and deepening their vertical knowledge and becoming more confident in integrating their knowledge when faced with challenging situations.

The NGNs' lack experience, in-depth knowledge, and confidence. Their general inexperience coupled with low BKAT scores that measure specialty specific knowledge hinders their ability to make decisions. This is evidenced by their reliance on experienced nurses to guide them in crisis situations and remain safe in the clinical setting. The level of decision making experienced by these NGNs is within the expected range of nurses in their position. Until they garner more experience upon which to make decisions, they should, and hopefully will, seek help as needed. Only in one circumstance did Mel, the nurse with the least experience, forage ahead- even to the point of overstepping nursing bounds- without seeking council. Based on the amount of knowledge quantified by the BKAT, their reliance on experienced nurses is warranted and provides a safety net for NGN practice.

Study Limitations

Despite attempts to conduct a rigorous study, limitations are inherent in all projects. Limitations related to the quantitative aspects of this research may include the following:

1. The ability to generalize beyond the region may be limited because a majority of the nurses attended local nursing programs.

2. The BKAT was given in an un-proctored setting.

3. Voluntary participation yielded uneven response rate between units, ranging from 4-57% of experienced staff nurses and 50-100% of NGNs.

4. The median years of experience, 4.4 years, is much lower than thet mean years of experience, 9.2 years, thus the nurses who comprised the sample were relatively inexperienced.

Limitations of the qualitative portion of this study may be related to the make-up of the interview participants since the researcher was not able to garner a sample reflective of the regional NGN population.

1. Three of the five volunteers were from the same hospital.

2. Volunteers represented only 3 of the 9 local hospitals and 3 of the 14 units.

3. Four of the five participants were BSN grads, three from the same program and only one from a program outside of our region.

4. Diploma NGNs comprise 20% of the NGN sample. Although repeated attempts to include other participants were made, no Diploma graduates agreed to participate in interviews. Therefore experiences of diploma graduates, who are often deemed to have more clinical experience than ADN and BSN graduates were not accounted for.

5. Experienced nurses were not interviewed therefore no link can be made between their decision making experiences and BKAT scores.

Recommendations

Although NGNs are routinely hired in critical care, it is concerning that NGNs do not appear to be sufficiently prepared to care for high acuity patients. Based on the results of this study, it is evident that in order to promote the rapid transition from student to

staff nurse, additional supports are required for NGNs. This support ideally would combine didactic knowledge, hands on practice, and scenario-based decision making practice. It is recommended that hospitals evaluate their NGN orientation programs and identify best practices, including NGN friendly units to be used to orient NGNs. Furthermore nursing programs should conduct curricular reviews to ensure that the content being taught is relevant in today's workplace. Outdated subject matter should be replaced with current and technology savvy content.

When obtaining permission to use the BKAT tool, the researcher or clinician must agree to Toth's stipulation that the BKAT is not to be used for hiring and firing. The value of this tool lies in its ability to provide essential information about the nurse's knowledge base and areas of deficit. It is recommended that the orientation program on critical care units use the BKAT, or a similar tested, valid and reliable tool, to measure the knowledge of new hires including NGNs and experienced nurses. Based on the nurse's BKAT score coupled with clinical decisions and actions, an appropriate length of orientation can be determined. Additionally, by completing an item analysis of questions missed, an individualized education plan can be developed for nurses.

For experienced nurses who transition to critical care for the first time or experienced nurses shifting between units or hospitals, the use of the BKAT as an assessment tool provides the orientation planner an overview of the nurse's strengths and areas where learning needs to be reinforced. This knowledge can be coupled with patient acuity and pathophysiology to select patients that will provide valuable learning experiences for the nurse on orientation.

Additionally it is recommended that the unit managers and educators use the BKAT scores provided to them to improve the basic knowledge of their staff. Each unit was provided with a comprehensive overview their nurses' scores and a copy of the BKAT exam. Educators and managers were encouraged to examine the frequently missed items, determine their relevance to clinical practice on that unit, and develop teaching plans to match unit needs.

Etheridge (2007) found that NGNs learned by discussing clinical experiences with their peers and preferred to work through the problems rather than being given solutions. Similarly delBueno (2005) found that NGNs believed application of knowledge was more valuable than increased didactic knowledge. These strategies could be used to promote decision making by NGNs by providing them with group based scenarios where participants work through problems to apply and synthesize knowledge and make safe decisions. These scenarios could be reflections on actual patients from whom the NGNs cared or developed cases. Additionally where available the use of simulation could be added to these case discussions. By having the NGNs work as a team, they can share knowledge, roles and responsibilities and they role play in various crisis situations. These repeated experiences with patient problems, whether real, reflection, or simulated, provide NGNs with additional exposure to scenarios with which they are likely to be faced.

Suggestions for further Research

This study only begins to fill the gap of knowledge about NGNs' readiness to care for acute critically ill patients. In addition to replicating a similar study in a different location or again with a new cohort of NGNs, other studies can branch out from this.

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This study expanded the body of nursing science by providing initial data using linear regressions to predict attainment of threshold scores. Since there is no baseline of comparison, although power analysis suggests the necessary strength to generalize was achieved, a replication of this portion of the study would be beneficial.

Additionally, the GI section of the BKAT is consistently the lowest scoring section in both the NG and experienced nurse cohorts. Future research could be aimed at uncovering whether the low scores can be attributed to lack of exposure to this patient population or gaps in nursing education and practice.

An additional area for study would be to examine why the critical care preceptors reached the threshold score sooner than did the non-preceptors. It would be interesting to determine whether the preceptors were chosen because of the knowledge, gained this knowledge while teaching, or a combination of these factors.

Since NGNs generally haven't reached that level of knowledge that was anticipated at the end of orientation, future research could be conducted determine what factors lead to decision making. A link between those factors and individual BKAT scores could then be studied to relate BKAT scores, decision making and overall success as a nurse.

In this study the researcher was unable to make a direct link between the NGN's BKAT score and the NGN's interview. In the future it would be interesting to compare individual's scores with their experience making decisions to see if there is a correlation between didactic knowledge, length of time since graduation, and confidence making decisions and acting in the clinical setting. Additionally, this study did not include any observation of the NGN's ability to provide patient care, only their account of individual

ability. A comparison of the NGN's BKAT scores, stories of their experiences as they make decisions, and evaluation of clinical performance could be valuable to determine the NGN's readiness to care for patients independently.

Summary

Mastery of complex clinical situations and the ability to think critically "on the fly" are traits needed by all nurses caring for patients in high acuity settings. Knowing the patient is an integral component to patient decision making. Results of this study, as well as the results of other studies examining NGNs in critical care do not avow that a majority of NGNs have mastered these skills. Success in critical care, much like other nursing specialties is related to basic knowledge but does not seem to be entirely determined by it. Even with the advent of critical care courses in the undergraduate curriculum and during orientation periods, novice nurses typically do not meet the expected threshold score on the BKAT by 18 months after graduation, let alone by the end of orientation. Additionally accounts by the NGNs themselves relate that at the end of orientation they are not confident in their decision making and ability to provide competent care to patients in a critical care setting that requires rapid decision making.

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   practice. *Journal for Nurses in Staff Development, 25*(1), 28-34.

Appendix A

Permission to use Kolb

Appendix B

Permission to use Schoessler

Appendix C

Recruitment Flyer

DUQUESNE UNIVERSITY

600 FORBES AVENUE ¨ PITTSBURGH, PA 15282

Research Study

Basic Knowledge in Critical Care: A Comparison Between Newly Graduated and Experienced Nurses

Participants will complete the Basic Knowledge of Critical Care (BKAT-7) questionnaire & demographic tool independently, without using references in a setting at the time and place of their choice. The BKAT-7 & demographic tool will be returned to the researcher by mail in a stamped self-addressed envelope.

Results of the BKAT will remain confidential & have no impact on employment.

Research packets are available from Lynn or in the staff lounge.

$25 WaWa Gift Card

**Primary Investigator:
Lynn Wiles, MSN RN CEN
PhD Student, Duquesne University
Critical Care Nursing Faculty
Old Dominion University**

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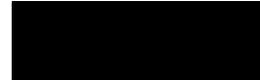
Appendix D

Recruitment Flyer on Study Packets

DUQUESNE UNIVERSITY

600 FORBES AVENUE ¨ PITTSBURGH, PA 15282

Research Study

Basic Knowledge in Critical Care:
A Comparison Between Newly Graduated and Experienced Nurses

Primary Investigator:
Lynn Wiles, MSN RN CEN
PhD Student
Duquesne University
Critical Care Nursing Faculty
Old Dominion University
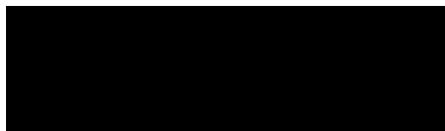
Appendix E

New Graduate Nurse Demographic Tool

New Graduate Nurse Demographic Tool
(< 18 months experience)

1. General Information

Age:

Gender: Male   Female

Date of RN nursing program graduation (month/year):

Date started first RN position (month/year):

Date started in critical care (month /year):

Entry level nursing degree: ADN   Diploma   BSN

Current nursing degree: ADN   Diploma   BSN

Are you working toward a degree that you have not yet completed?   Yes   No

Are you certified in critical care nursing?   Yes   No

      When did you complete the CCRN?

Do you have other certifications?   Yes   No

      If yes, please list.

Did you have health care experience prior to becoming an RN?   Yes   No

      If so, in what capacity?

New Graduate Nurse Demographic Tool
(< 18 months experience)

2. Information about your entry-level nursing program

Did you have a critical care course in school?   Yes   No

     If yes, how many weeks and hours per week or semester hours was the course?

Did you have critical care clinical in school?   Yes   No

     If yes, how many clinical hours did you complete?

Did you complete a clinical preceptorship while in school?   Yes   No

     If yes, how many clinical hours did you complete?

     Type of clinical unit?

3. Information about your orientation on this unit

How many weeks was your orientation?

How many preceptors did you have during orientation?

Did you complete a critical care course during orientation? Yes   No

     If yes, please circle all the components included in the course

     Classroom Instruction   Computer Tutorials   On-line Tutorials

     Self-Learning Packets   Hands on Skills Day

     Other (please describe):

Appendix F

Experienced Nurse Demographic Tool

Experienced Nurse Demographic Tool
(> 18 months RN experience)

Age:

Gender: Male   Female

Date of RN nursing program graduation (month/year):

Date started first RN position (month/year):

Date started in critical care (month /year):

Entry level nursing degree: ADN   Diploma   BSN

Current nursing degree: ADN   Diploma   BSN

Are you working toward a degree that you have not yet completed?   Yes
          No

Are you or have you ever been certified in critical care nursing?   Yes   No

          When did you complete the CCRN?

Do you have other certifications?   Yes   No

          If yes, please list.

Did you have health care experience prior to becoming an RN?   Yes   No

          If so, in what capacity?

Have you been a preceptor for experienced nurses who transfer into critical care? Yes
          No

Have you been a preceptor for new graduates in critical care?   Yes   No

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Appendix G

Permission to Use Tool
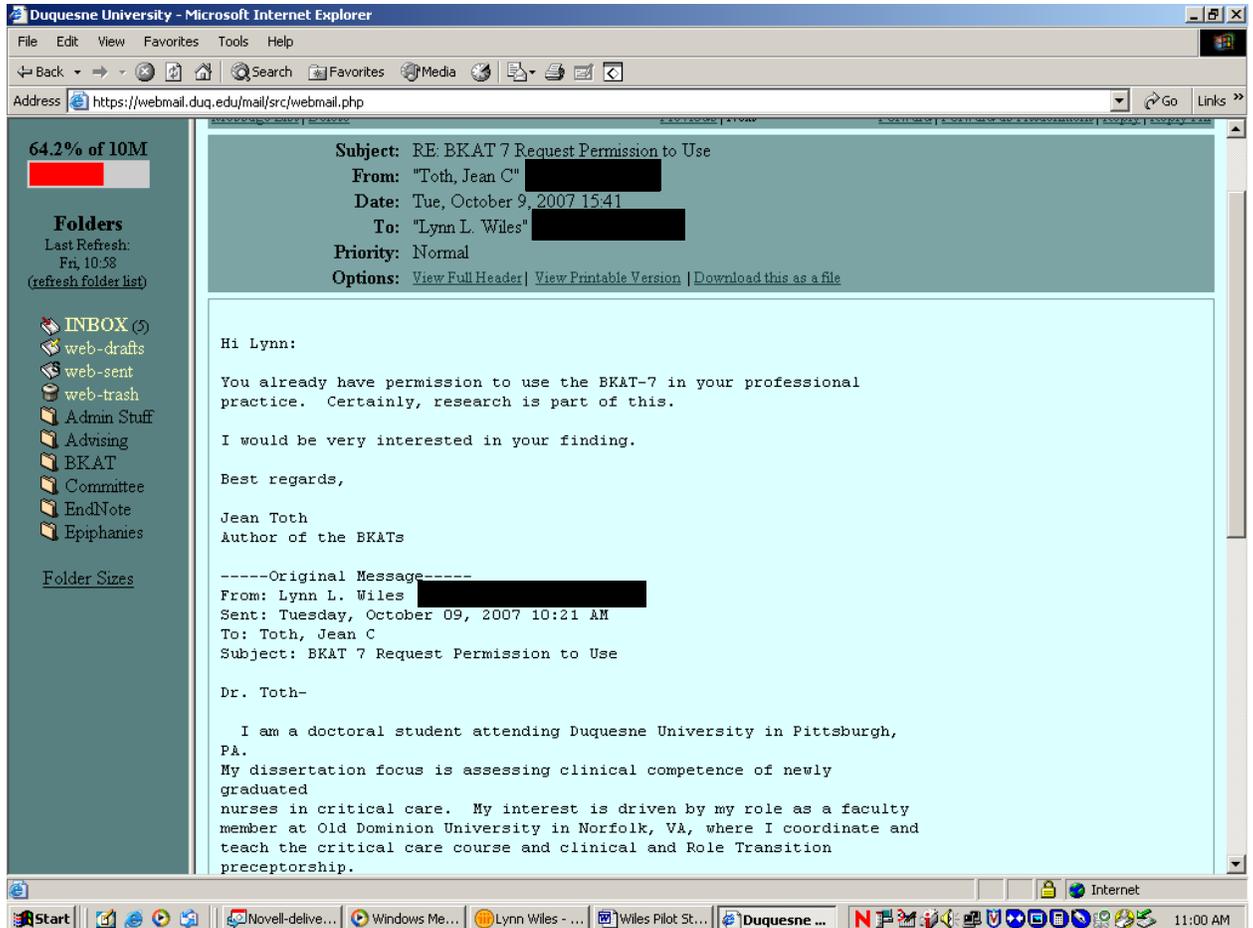
Appendix H

Cover Letter for Research Packet

Dear Critical Care Registered Nurse,

Thank you for your interest in participating in this research study which investigates the basic knowledge (BK) of newly graduated nurses (NGNs) working in the adult critical care setting by comparing their BK with that of their experienced counterparts. My goal is to determine at what point the BK of NGNs reaches the same level as the experienced RNs. Additionally I wish to explore the experiences of NGNs as they make patient care clinical judgments and decisions. NGNs are defined as RNs currently working in critical care and have less than 18 months experience as nurses and experienced nurses as those nurses with 18 or more months of nursing experience. Critical care nurses are defined as RNs working in intensive care units and does not include intermediate care units, step down units or the emergency department.

The critical care Basic Knowledge Assessment Test (BKAT-7) will be used as the measure of nursing basic knowledge. I ask that you complete the 100 question BKAT-7 in a single sitting without referring to colleagues or outside sources. You will also need to complete either the NGN or experienced nurse demographic tool. Your name will not appear on the demographic tool or BKAT, no individual identity will be made in the data analysis, and responses will only appear as aggregate data in statistical summaries. Individual BKAT-7 results will not be shared with the unit manager or educator and therefore your choice to participate in this study will not have any impact on your employment.

I also seeking approximately 10 NGNs participate in a 60 minute interview where they will share a challenging patient care situation and their clinical judgment and decision making experiences as they cared for the patient. NGNs who would like to be considered to participate in the interview should fill out their contact information on the informed consent form included in this packet. As with the BKAT-7 scores, all information obtained during this interview will remain confidential.

As compensation for your time, approximately 45-60 minutes, a $25 WAWA gift card will be mailed to you after you return the completed research packet in the enclosed self-addressed postage paid envelope. The BKAT answers will also be mailed with the gift card. NGNs who participate in the interview will receive an additional $25 WAWA gift card at the completion of the interview.

Please use the enclosed postage paid envelope to return the following items by insert date:

- A **SIGNED** copy of the informed consent (there are 2 copies- one is for you to keep)
- The completed BKAT-7 answer sheet and scantron (bubble sheet)
- A completed demographic tool (either New Graduate RN or Experienced RN)

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- The legal paper size envelope with your name and address so I can mail you the gift card & answers

Again, I thank you for your participation in this study. If you have any questions, please feel free to contact me at ███████████████████ .

Sincerely,

Lynn Wiles, PhD(c) MSN RN CEN

Doctoral Student, Duquesne University School of Nursing;

Nursing Faculty, Old Dominion University

Appendix I

Informed Consent

DUQUESNE UNIVERSITY

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE:

Basic Knowledge in Critical Care: A Comparison of Experienced and Newly Graduated Nurses Augmented with an Examination of Newly Graduated Nurses' Experiences Making Clinical Judgments

INVESTIGATOR:

Lynn L. Wiles, PhD(c) MSN RN CEN
Doctoral Student
Duquesne University School of Nursing

███████████████

Virginia Beach, VA ██████
███████████████
███████████████

ADVISOR:

Lynn C. Simko, RN PhD CCRN
Associate Professor
School of Nursing, Duquesne University

███████████████

Pittsburgh, PA ██████
███████████████
███████████████

SOURCE OF SUPPORT:

This study is being performed as partial fulfillment of the requirements for the doctoral degree in Nursing at Duquesne University. Support for this study will be sought through grant funding.

PURPOSE:

You are being asked to participate in a research project that seeks to investigate the basic knowledge of newly graduated nurses (NGN) working in the adult critical care setting as compared to the knowledge base of experienced nurses in that setting. Additionally this study aims to explore the experience of NGNs as they make patient care clinical judgments and decisions.

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Newly graduates nurses are defined as recent graduates from an accredited school of nursing who have been employed in an adult critical care setting for less than 18 months. Experienced nurses are those who have worked for longer than 18 months.

You will be asked to complete the 100 question Basic Knowledge Assessment Tool, Version Seven (BKAT-7) which measures basic knowledge in critical care nursing and a demographic data collection tool. The BKAT-7 takes approximately 45 minutes to complete and will be administered in an unsupervised setting of your choice. You are agreeing to complete the BKAT-7 in a single sitting without referring to colleagues or outside sources. You will also be asked to complete a demographic questionnaire. Upon completion of the BKAT and demographic tools, they should be mailed with a signed copy of the informed consent to the researcher in the postage paid self-addressed envelope found in the research package.

Newly graduated nurses are also invited to participate in an audio-taped one-on-one interview with the researcher. The researcher will ask the NGN to describe a patient care situation that the NGN found challenging so the researcher can explore and understand the experience of the NGN as clinical judgments were made.

RISKS AND BENEFITS:

Participation in this study poses no risks greater than those encountered in daily life and there are no anticipated direct benefits. However, change in new graduate orientation to critical care units may result based on the scores on the BKAT-7 which benefits both the profession of nursing as a whole as well as your clinical unit.

Participation in this study has no bearing on your employment and will not impact your job performance evaluation. Individual results of the BKAT-7 will not be shared with any member of your clinical unit nor the management or educational teams.

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COMPENSATION: Participation in the project will require no monetary cost to you. Participants will be provided a $25 gift card to WAWA as compensation for their time completing the BKAT-7 and demographic questionnaire. Participants are eligible to receive the gift card after the researcher receives a completed research packet (signed informed consent, BKAT, and demographic tools). Gift cards will be sent to participants via US mail. Participants are asked to self-address the envelope found in the research packet in order to receive the compensation.

NGNs who participate in the one-on-one interview will receive a second $25 WAWA gift card to compensate them for their time. Gift cards will be distributed at the end of the interview.

CONFIDENTIALITY: Your name will never appear on the BKAT-7 or the demographic data collection tool. No individual identity will be made in the data analysis and responses will only appear as aggregate data in statistical summaries. When audio-taped interviews are transcribed all names will be changed to protect the nurse, patient, family, and institution. Additionally the transcriptionist will sign a confidentiality statement, use a password protected computer, and return the tapes and any files upon completion of the transcription.

All written materials and consent forms will be stored in a locked file in the researcher's office. Consent forms will be kept separate from the BKAT and demographic tools. Details and records about this study may be inspected by the IRB at each of the health care institutions, the DU and EVMS IRBs, and the Food and Drug Administration.

At the end of this study the data will be kept in a password protected computer in the researcher's office. BKAT-7 scores and data may be used in subsequent data analysis. The researcher intends to publish and present the aggregate results of this study.

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RIGHT TO WITHDRAW: You are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time and without offering any reason.

SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing to participate in this research project.

I understand that should I have any further questions about my participation in this study, I may contact the Principal Investigator, Lynn Wiles at ████████████████████████ the Dissertation Advisor, Lynn Simko at ███████████, the Chair of the Duquesne University Institutional Review Board, Dr. Paul Richer at ██████████, and/or the EVMS IRB Coordinator at ██████-██████

_____   _____
Participant's Signature   Date

_____   _____
Researcher's Signature   Date

_____   I am a newly graduated nurse who is interested in being considered for the one-on-one audio taped interview.
Please print your name, address, contact phone number or e-mail address below.