THE JOURNAL OF BSN HONORS RESEARCH

UNIVERSITY OF KANSAS SCHOOL OF NURSING BACHELOR OF SCIENCE IN NURSING HONORS PROGRAM

http://archie.kumc.edu/handle/2271/1469

VOLUME 9, ISSUE 1

Spring 2016

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IMPACT OF SIMULATION EXPERIENCE ON STUDENT PERFORMANCE DURING RESCUE HIGH FIDELITY PATIENT SIMULATION

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Submitted to the School of Nursing in partial fulfillment of the requirements for the Nursing Honors Program

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ABSTRACT

Purpose: When patients' lives are at stake, the most skilled provider should respond to improve the likelihood of rescue. During rescue situations, students become observers; thus, many nurses do not experience key roles in patient rescue until well into their first year of practice. Although nursing education has typically included hands-on resuscitation skills (CPR), only recently have high fidelity mannequins become available to facilitate patient rescue training. High fidelity patient simulation provides the opportunity to become skilled in patient rescue without threatening patient safety.

Patient simulation is a unique learning experience because it requires participants to suspend disbelief, immerse themselves in the scenario, and obtain data from a mannequin. It follows that some participants need experience in the setting to perform well, but the correlation between time spent in simulation and performance remains unknown. The purpose of this study is to investigate the correlation between previous simulation experience (hours and events) and student performance during simulation.

Theoretical Model: This study was conducted within the conceptual framework of Bandura's Social Cognitive Theory, which explores the relationship between self-efficacy and behavioral change. Four constructs influence self-efficacy: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal. Each is relevant to how students experience simulation, and suggests that more simulation may improve performance by enhancing self-efficacy.

Design: This is a descriptive correlational study.

Setting: The University of Kansas School of Nursing, College of the Ozarks, and Grand Valley State University.

Participants: A convenience sample of 27 students in Baccalaureate nursing programs.

Methods: This descriptive correlational study was part of an interventional study to learn how debriefing practices impact performance. Convenience samples were recruited from four nursing schools (N=27). Student performance was measured using the Heart Failure Simulation Competency Evaluation Tool (HFSCET). The Pearson product-moment correlation coefficients were used to correlate faculty-reported simulation experience and performance.

Results: Results indicated a moderate but statistically insignificant correlation between previous simulation hours and total score on the HFSCET ($r = .353$, $p < .077$), and a moderate but statistically insignificant correlation between previous simulation events and total HFSCET score ($r = .300$, $p < .136$).

Conclusions: There was a moderate positive correlation between previous simulation experience and student performance during simulation. Therefore, simulation researchers should control for experience as a confounding variable.

INTRODUCTION

Nurses are in a unique position to recognize the deteriorating patient and intervene appropriately. However, new graduate nurses are often inadequately prepared to take action in rescue scenarios due to limited experience, potentiating a failure to rescue. According to the Agency for Healthcare Research and Quality (AHRQ), failure to rescue includes prevention of clinically important deterioration, such as "death or permanent disability from a complication of an underlying illness (e.g., cardiac arrest in a patient with acute myocardial infarction) or a complication of medical care (e.g., hemorrhage after thrombolysis for acute myocardial infarction)" (2015, p. 1). The concept of failure to rescue was designated as a Patient Safety Indicator (PSI) by the AHRQ in 2006. PSIs, such as failure to rescue, are likely preventable in part by changing aspects of the health care system to reduce the likelihood of their occurrence (AHRQ, 2006). In the hospital setting, failure to rescue often occurs because early signs of deterioration aren't recognized and acted upon by healthcare professionals, particularly novice nurses with limited experience in recognizing and responding to patient deterioration (Clarke & Aiken, 2003). Baccalaureate nursing programs have the potential to play a part in reducing rates of failure to rescue by implementing patient simulations that expose nursing students to rescue scenarios.

Baccalaureate nursing programs have recently begun to incorporate high-fidelity mannequins into their curriculum to allow students to experience a rescue scenario and learn to respond appropriately without putting real, deteriorating patients at further risk for harm. Simulation has been incorporated into nursing programs to supplement traditional approaches such as didactic learning and clinical experiences. These nursing

programs provide students the opportunity to experience high fidelity patient rescue scenarios through simulation in order to build confidence and competency in recognizing a deteriorating patient and taking appropriate action. To gain from the experience, students must become immersed in the scene, moving past the knowledge that the scenario is not real. This mental adjustment requires some experience with simulation, and may influence how a student learns from the experience.

It follows that some participants need experience in the simulation setting to perform well, but the correlation between time spent in simulation and performance remains unknown. The purpose of this study is to investigate the correlation between previous simulation experience (hours and events) and student performance during simulation.

LITERATURE REVIEW

Failure to rescue has been associated with hospital characteristics rather than patient characteristics, and improved rescue rates have been associated with changing aspects of the hospital environment (Clarke & Aiken, 2003; Silber, Williams, Krakauer, & Schwartz, 1992). The literature also suggested that the use of high-fidelity simulation mannequins can be an effective tool in instructing undergraduate nursing students to recognize and correctly respond to the deteriorating patient (Aronson, Glynn, & Squires, 2012). In addition, self-efficacy as defined by psychologist Albert Bandura (2002) plays a role in the student's ability to be successful during simulation.

Failure to Rescue

The concept of failure to rescue "is based on the premise that although deaths in hospitals are sometimes unavoidable, many can be prevented" (Clarke & Aiken, 2003, p. 43). Research indicated that rates of failure to rescue in hospitals were unique from rates of complications and death in that failure to rescue was associated primarily with hospital characteristics rather than patient characteristics. Furthermore, a hospital's failure to rescue rate was a better indicator of the quality of care a hospital provided than the rate of complications or deaths alone (Silber et al., 1992). Frequent surveillance and careful assessment of patients was a key component of preventing failure to rescue, making novice nurses particularly vulnerable to failing to detect a complication or deteriorating condition, as they are still in the process of honing their nursing and assessment skills (Clarke & Aiken, 2003). After recognizing a complication, a nurse must be poised to take appropriate action, which may include activating hospital resources and staff, taking control of the situation, and administering life saving interventions. Timely and effective interventions also included anticipation of potential complications and events, and preparing for those events by collecting necessary supplies. Novice nurses who are still developing their skills may be less likely to anticipate and prepare for potential complications, and may not have the wherewithal to take timely and appropriate action (Clarke & Aiken, 2003).

High-Fidelity Simulation

According to Aronson et al., "research on simulation in nursing education is in its infancy stage" (2012, p. e290). Recently, high-fidelity simulation mannequins have become more common in nursing schools in an effort to increase patient safety and quality of care

(Aronson et al., 2012). More research is needed to determine whether a correlation exists between the use of high-fidelity simulation in nursing education and decreased rates of failure to rescue in novice nurses. Research demonstrated that nursing students performed poorly on clinical assessments of simulated patients who were clinically deteriorating (Aronson, Glenn, & Squires, 2013). It is possible that the student's response to a patient's deteriorating condition may be improved through the use of high-fidelity simulation; however, more research is needed to define the effectiveness of high-fidelity simulation as an educational tool for nursing students.

The Role of Self-Efficacy in Simulation

Social Cognitive Theory, a psychological theory proposed by psychologist Albert Bandura, postulated that human behavior is "extensively motivated and regulated by the ongoing exercise of self-influence" (Bandura, 1991, p. 248). This theory has been used to correlate self-efficacy and behavior change, and includes four constructs: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal (Bandura, 1977). Each of these constructs is relevant to high-fidelity simulation. Performance accomplishments include the student's actions during simulation, and emotional arousal occurs in response to the high-fidelity environment of the scenario. This emotional arousal promotes student success when the student experiences a moderate level of anxiety. Too little or too much anxiety restricts the student's ability to learn (Bandura, 1977), in this case from the simulation experience. Vicarious experiences occur when a student observes others acting in a simulation. Verbal persuasion relates to the debriefing that occurs after simulation. Self-efficacy is considered the pivotal aspect of

Social Cognitive Theory because "it affects action not only directly, but through its impact on other classes of determinants as well" (Bandura, 1999, p. 28). Self-efficacy thus impacts the student's ability to be successful in simulation.

METHODS

DESIGN

This study used a descriptive correlational design. Pearson product-moment correlation coefficient (Pearson's r) was used to examine the correlations between student experience in simulation and performance scores.

INSTRUMENTS

The Heart Failure Simulation Competency Evaluation Tool (HFSCET) (Appendix A) was used to measure student performance during simulation. The HFSCET has been revised and tested with more than 400 students in two undergraduate nursing programs and has acceptable levels of inter-rater reliability (r = .89-.98) and user friendliness (Aronson et al., 2012). The HFSCET includes the following six categories: Initial Patient Safety Activities, Assessments, Communication, Interventions, Core Measure Education about Heart Failure, and Documentation. There are 91 individual behaviors on the checklist; students receive a point for each behavior they successfully complete during the simulation.

Each participant completed a Demographic Data sheet (Appendix B). For the purpose of this data sheet, students were told the number of simulation hours they had participated in during the nursing program, eliminating the potential for inaccurate student estimations of the quantity of previous simulation experiences.

SAMPLE

The sample (N=27) was one of convenience- recruited from Baccalaureate nursing programs from three universities in the Midwestern region of the United States. Two of the three schools were academic medical centers. A fourth nursing program was originally part of this study, but conducted the simulations too late to be included in this study.

PROCEDURES

Human Subjects approval for this study was granted prior to recruiting participants. Participants were recruited from four Baccalaureate nursing programs in the United States and Canada, although only results from the three U.S. sites were available at the time the data were analyzed. Participants were randomly assigned to either the control group or the intervention group. This study was part of an interventional study to learn how debriefing practices impact performance, and this delineation of control and intervention groups was a component of that interventional study. After signing a consent form, each participant completed a Demographic Data Sheet and watched a 40-minute instructional video of an expert nurse completing the heart failure simulation. The participant was then oriented to the simulation room and provided with informational papers pertinent to the simulation, as outlined in Appendix C. Participants in the control group were given 40 minutes to complete the simulation, after which the simulation coordinator led them through a standard debriefing session. Participants in the intervention group were stopped after 20 minutes of the simulation and led through a deliberate practice debriefing session, then allowed to start from the beginning and complete the simulation for another 20 minutes. They were then debriefed again using the deliberate practice debriefing model. Each participant's performance was scored using the HFSCET. Participants were provided with a small gift card and certificate of completion for their participation in the study.

RESULTS

All participants in this study were fourth year Baccalaureate nursing students (N= 27). Of these students, 85.2% participants were female (N= 23) and 14.8% were male (N= 4). In regards to language and ethnicity, 88.9% of participants were Caucasian (N= 24), 7.4% were Hispanic (N= 2), and 3.7% were African American (N= 1). All participants spoke English as their primary language. Of this sample, 63% had been employed in healthcare (N= 17), and 29.6% had never been employed in healthcare (N= 8). The mean number of simulation events was 11.24 (SD= 7.449), and the mean number of simulation hours was 32.59 (SD= 36.184). The mean total score on the Heart Failure Simulation Competency Evaluation Tool (HFSCET) was 48.16 (SD= 10.792). Simulation hours and total score were moderately correlated (r = .353). Simulation events and total score were also moderately correlated (r = .300), but neither of the correlations were statistically significant.

LIMITATIONS AND RECOMMENDATIONS

Although conducting research in multiple sites adds to the generalizability of the findings, it can be challenging for multiple researchers to communicate and adhere to strict simulation and data collection protocol. Collaborating across borders and time zones presented a barrier to effective and timely communication. Additionally, at one site the simulations were not run by the researcher, but rather by the lab staff, resulting in variations in data collection techniques. Two sites had difficulty attracting and retaining participants. Another site completed their simulations months after the rest of the sites; thus, data from this site was not available for this analysis.

The length of the simulation also created challenges in data collection. The 40-minute heart failure simulation was selected primarily because previous researchers had validated the simulation and a corresponding evaluation tool, the HSFCET (Aronson et al., 2012). In retrospect, the intervention group may have been disadvantaged since they were stopped at 20 minutes, debriefed, and then were asked to start over. Although students were more efficient during the second 20-minute encounter, the simulation was so lengthy that most participants struggled to complete all of the content in the scenario, particularly related to administering medication and educating the patient on heart failure.

There was a moderate positive correlation between previous simulation experience and student performance during simulation. This correlation suggested that simulation researchers should control for experience as a confounding variable when measuring performance. Further research is needed to determine whether a causational relationship exists between previous simulation experience and student performance.

Recommendations for future research include refining the simulation to be more concise. This might be easily accomplished by keeping the focus of the simulation on failure to rescue, rather than including the heart failure education piece. This would allow adequate time for most participants to complete the entire scenario within the allotted time, and attracting a larger sample size. Additionally, it is possible that the moderate correlation between simulation hours and total score would reach statistical significance with a larger sample size. More research powered by an adequate sample size is needed to firmly establish the link between the dose of high-fidelity simulation (in terms of both time and events) and student performance.

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APPENDIX A

Heart Failure Simulation Competency Evaluation Tool © (Aronson, Glynn, Squires, 2010)

Student Group # _____

Initial Patient Safety Activities- check if observed

1.	Performs hand hygiene with alcohol based hand rub before entering room (both participants must perform hand hygiene to receive credit)
2.	Checks patient identification using two patient identifiers before providing care (must use two identifiers to receive credit)
3.	Each participant identifies self before providing care (both participants must use own name to receive credit)

_____Total

Assessments

1.	Assesses neurological status (must include assessment of orientation to person, place and time to receive credit)
2.	Assesses fall risk (must include assessment of previous history of falls, use of assistive devices, mobility impairments to receive credit)
3.	Assesses and verbalizes lung sounds (must place stethoscope on chest and identify crackles to receive credit)
4.	Assesses and verbalizes bowel sounds (must place stethoscope on abdomen and identify active bowel sounds to receive credit)
5.	Assess and verbalizes cardiac sounds (must place stethoscope on chest and identify the presence of S3 to receive credit)
6.	Assesses and verbalizes leg edema (must identify bilateral peripheral leg edema to receive credit)
7.	Assesses and verbalizes lower leg circulation (must identify the presence of bilateral pedal pulses to receive credit)
8.	Assesess and verbalizes EKG rhythm (must look at monitor and identify atrial fibrillation to receive credit)
9.	Assesses and verbalizes intravenous site (must identify date of insertion, integrity of dressing, and lack of swelling, edema and pain to receive credit)
10.	Assesses and verbalizes intravenous fluid (must identify type of fluid {.09%} and compare with order, pump rate {50 ml/hr}, and tubing date to receive credit)
11.	Assesses and verbalizes skin integrity (must assess anterior and posterior pressure points and verbalize the finding of intact skin)
12.	Assesses and verbalizes foley catheter integrity (must assess for kinks and integrity of tubing, presence of catheter tube holder, and condition of insertion site to receive credit)
13.	Assesses and verbalizes urine output (must look at catheter bag and verbalize urine output of about 100 mL to receive credit)
14.	Assesses pain level (must ask about level of pain using analog scale of 1-10 to receive credit)
15.	Assesess and verbalizes oxygen level (must look at and identify flow meter position of 2 liters to receive credit)

16.	Takes and verbalizes accurate initial reading of blood pressure (must be within 4 mmHg of systolic and diastolic reading = 110/70
17.	Takes and verbalizes accurate initial reading of pulse rate (must be within 2 points to receive credit- may use monitor value or take manually= 90/ minute)
18.	Takes and verbalizes accurate initial reading of respiratory rate (must be within 2 points to receive credit = 20/ minute)
19.	Looks at monitor and verbalizes accurate initial reading of pulse oximetry (must look at monitor and verbalize reading= 94%)
20.	Looks at monitor and verbalizes accurate initial reading of temperature (must look at monitor and verbalize reading = 99 degrees)
21.	Takes and verbalizes accurate reading of blood pressure after patient deteriorates (must be within 4 mmHg of systolic and diastolic reading = 90/60 to receive credit)
22.	Takes and verbalizes accurate reading of pulse rate after patient deteriorates (must be within 2 points to receive credit- may use monitor reading or take manually= 120/ minute to receive credit)
23.	Takes and verbalizes accurate reading of respiratory rate after patient deteriorates (must be within 2 points to receive credit = 30/ minute)
24.	Looks at monitor and verbalizes accurate reading of pulse oximetry after patient deteriorates (must look at monitor and verbalize reading= 89% to receive credit)
25.	Takes vital signs together at the same time (must take both sets together to receive credit)

_____ Total

Communication

1.	Responds verbally to patient's complaints of shortness of breath and provides reassurance
2.	Calls physician to report using SBAR format Situation Calls physician and identifies self by name (must include name and designation of title = RN, nurse or student nurse to receive credit)
3.	Identifies the patient being called about- must state Raymond Garrison to receive credit)
4.	Provides brief history of patient (must include date of admission and admission diagnosis of heart failure to receive credit)
5.	Reports change in blood pressure
6.	Reports change in pulse oximetry
7.	Reports change in pulse rate
8.	Reports change in respiratory rate
9.	Reports bilateral peripheral edema
10.	Reports presence of atrial fibrillation
11.	Reports presence of crackles (lung sounds)
12.	Reports complaint of shortness of breath
13.	Reports urine output (100 mL)

14.	**Assessment** Assesses situation and verbalizes conclusion to physician
15.	**Recommendation** Verbalizes need for assistance and makes appropriate recommendations for care
16.	Writes down verbal orders
17.	Reads back and verifies orders (must read back orders accurately to receive credit)

_____Total

Interventions

1.	Elevates head of bed (must elevate at least 45 degrees to receive credit)
2.	Verbalizes need to check weight during shift
3.	Increases oxygen from 2 liters to 4 liters
4.	Washes hands before preparing medications
5.	Checks allergy record before preparing medications (NKA)
6.	Obtains correct medications from pixis (Cardizem and Lasix)
7.	Checks medication name, dose, route on vial against MAR or verbal order (Lasix 40 mg IV push now) three times (must check three times to receive credit)
8.	Checks medication name, dose and route on vial against MAR or verbal order (Cardizem 20 mg IV push now) three times (must check three times to receive credit)
9.	Reviews reference for correct administration of both medications
10.	Draws up correct dose of Lasix (must draw up 4 mL to receive credit- medication is not diluted)
11.	Draws up correct dose of Cardizem (must draw up 4 mL to receive credit- medication is not diluted)
12.	Labels Lasix syringe correctly (must label syringe with patient name, medication name and dose to receive credit)
13.	Labels Cardizem syringe correctly (must label syringe with patient name, medication name and dose to receive credit)
14.	Maintains aspectic technique while preparing Lasix (must wipe vial top before needle is inserted must not contaminate needle to receive credit)
15.	Maintains aspectic technique while preparing Cardizem (must wipe vial top before needle is inserted must not contaminate needle to receive credit)
16.	Checks patient identification using two patient identifiers before administering medications (must use two identifiers to receive credit)
17.	Wipes port of IV catheter with alcohol before needle insertion (must wipe port each time catheter is accessed to receive credit)
18.	Stops pump and kinks tubing before administering meds (must do both)
18.	Flushes site with 1 mL of normal saline before and after administering Lasix (must do both to receive credit)
19.	Flushes site with 1 mL of normal saline before and after administering Cardizem (must do both to receive credit)
20.	Administers Lasix over two minutes
21.	Administers Cardizem over two minutes

22.	Disposes of needles and syringes in appropriate needle box
23.	Washes hands after medication administration
24.	Recognizes and verbalizes the improvement in patient condition after medications administered
25.	Communicates improvement to patient

_____Total

Core Measure Education about Heart Failure

1.	Provides brief explanation to patient about how Lasix works
2.	Provides brief explanation to patient about how Cardizem works
3.	Assesses patient understanding about heart failure
4.	Provides information about heart failure
5.	Assess patient adherence to low sodium diet
6.	Provides information about importance of low sodium diet
7.	Assesses patient's activity level
8.	Provides information about the importance of regular activity
9.	Assesses patient's medication adherence patterns
10.	Provides information about the importance of medication adherence and ways to increase adherence
11.	Assess patient's daily weight check adherence
12.	Provides information about appropriate way to check and record weight
13.	Assesses adherence to follow-up appointments
14.	Provides information about importance of regular follow-up with HCP
15.	Assesses patient's knowledge of signs and symptoms to report to HCP
16.	Provides information related to signs and symptoms to report to HCP (must include discussion of leg edema, weight increase of 2-3 lbs over 2-3 days, increased SOB and orthopnea to receive credit)

_____Total

Documentation

1.	Documents Lasix on medication administration record (must include date, time and initials in correct place to receive credit)
2.	Documents Cardizem on medication administration record (must include date, time and initials in correct place to receive credit)
3.	Documents vital signs (must document initial vital signs and vital signs taken after patient deteriorates, must include BP, P, RR and pulse ox)
4.	Documents assessments (must record results of documentation assessments completed to receive credit)
5.	Writes descriptive narrative note related to patient situation

_____Total

APPENDIX B

Demographic Data

Participant Number _____

Level of student: _____4th year undergraduate student

_____ Other (Please describe) _____

Gender (circle) M F

Race (circle) African American Caucasian

East Indian Asian

American Indian Hispanic

Other _____

Estimate the number of simulation hours you participated in during your nursing program:

_____.

Estimate the number of times you experienced simulation: _____.

Have you ever been exposed to deliberate practice during a simulation or debriefing?

Have you ever been employed in healthcare (paid positions)?

No _____

Yes _____

If yes, describe the setting (i.e. hospital, long term care) _____

What was your title? _____

How long? _____

English first language

Yes _____

No, what is first language learned _____

APPENDIX C

The Heart Failure Response to Rescue Simulation © Aronson, Glynn and Squires, 2010

You are a nurse on a cardiac telemetry unit of a 130 bed community hospital. You receive report from the Emergency Department about a patient who has just arrived on your unit – North 3 room 22. The nursing assistant has put the patient into bed and placed him on telemetry monitoring.

Emergency Room Report
Mr. Garrison is a 75-year old Caucasian male with a history of hypertension, coronary artery disease, and hyperlipidemia. He suffered an acute Myocardial Infarction (MI) four years ago and was treated with Coronary Artery Bypass Graft (CABG) surgery. He was later diagnosed with systolic left-sided heart failure. His ejection fraction is 35%. He is classified as Stage II (New York Hospital Association) heart failure. Mr. Garrison is 5 ft, 10 inches tall and weighs 195 pounds. He has no known allergies to medications.

Mr. Garrison's medications include:

Enalapril (Vasotec) 10mg once a day
Carvedil (Coreg) 12.5 mg BID
Furosemide (Lasix) 40 mg. BID
Digoxin (Lanoxin) 0.25 mg once a day
Aspirin 325 mg. once a day
Plavix 75 mg. once a day
Lipitor 20 mg. once a day

He states he has difficulty remembering to take his medications regularly.

Mr. Garrison is divorced, and lives alone in a single-family dwelling. His son has been notified and will be visiting later in the day.

This is Mr. Garrison's third admission for heart failure in the last two years. He was seen in the Emergency Department this morning complaining of increased orthopnea, and dyspnea on exertion, cough, nausea, and edema of his legs.

We inserted a # 22 Jelco IV in his right forearm, a foley catheter (300 mL output while in ED), put him on 2 liters of oxygen via nasal cannula and did a 12-lead EKG and chest Xray. He has IV fluid of 0.9% at 50 mL/hr rate. He is on the telemetry monitor and he is currently in atrial fibrillation which is a new rhythm for him. We gave him Lasix 40 mg IV several hours ago.

His vital signs are: Temperature 98 degrees, BP 140/80, Pulse 96, Respiratory Rate 22 and O2 Sat of 95% on 2 liters. He has JVD, an S3, and 3 + edema of the lower extremities.
His labs have been drawn. EKG and Chest Xray results are on the computer.

Garrison, Raymond
ID = 7022111 DOB = 6/10/1933

Computer Laboratory Results:

Na = 145 mEq/L	(136 - 145 mEq/L)
K = 5.8 mEq/L	(3.5 - 5.0 mEq/L)
Cl = 106 mEq/L	(98 - 106 mEq/L)
BUN = 20 mg/dl	(10 - 20 mg/dl)
Ca = 4.8 mg/dl	(4.5 - 5.6 mg/dl)
CO2 = 23 mEq/L	(23 - 30 mEq/L)
Creatinine = 1.2 mg/dl	(0.6 - 1.2 mg/dl)
Glucose = 120 mg/dl	(70 - 110 mg/dl)
BNP = 1,200 pg/ml	(<100 pg/ml)
Digoxin level = 0.7 ng/ml	(0.8 - 2.0 ng/dl)
RBC count = 4.0	(4.7 – 6.1)
Hgb = 11 g/dl	(14-18 g/dl)
HCT = 35 %	(42 – 52 %)
MCV = 75 um3	(80 – 95 um3)
MCH = 25 pg	(27-31 pg)
MCHC = 29 g/dl	(32 – 36 g/dl)
RDW = 10%	(11%- 14.5%)
WBC count = 9, 500	(5,000-10,000/mm3)
Neutrophils = 65%	(55% - 70%)
Lymphoctyes = 30%	(20% - 40%)
Monoctyes = 2%	(2% - 8%)
Esosinophils = 2%	(1% - 4%)
Basophils = 1%	(0.5% - 1%)
Blood smear = nl	(nl size, shape and color or RBCs)
Platelet count = 170,000 mm3	(150,000 - 400,000/mm3)
MPV = 8.5 fL	(7.4 – 10.4 fL)
PT = 11.8 seconds	(11.0 – 12.5 seconds)
PTT = 24	(20 – 34 seconds)
Troponin T = 0.1 ng/ml	(<0.2 mg/dL)
Troponin I = 0.02 ng/ml	(<0.03 ng/ml)
CPK = 160 units/L	(55 – 170 units/L)
CPK - MM 100%	(100%)
CPK - MB = 0%	(0%)
CPK – BB = 0%	(0%)

Garrison, Raymond
ID = 7022111 DOB = 6/10/1933

Chest Xray Report
Bilateral pleural effusions

12-lead EKG Report
Atrial fibrillation with a ventricular response rate of 74

Simulation set-up

Male patient in supine position
Alcohol hand rub available at bedside
Oxygen is at 2 liters via nasal cannula
Patient identification band on {Raymond Garrison, DOB 6/10/33, ID = 7022111]
Bilateral leg edema
EKG rhythm = atrial fibrillation
Pulse oximeter probe on
Lung sounds = crackles bilaterally
Cardiac sounds = presence of S3
Side rails up, bed in low position, call bell within reach
IV pump with 1,000 mL of 0.9 NS at 50 mL /hr
IV site right forearm (# 22 Jelco), dressing labeled with correct date
IV fluid (9 % NS at 20 cc/hr) via pump, tubing labeled with correct date
Foley catheter with yellow urine (50 cc in bag) with leg stabilizing device
Medication cart or pixis
10 mL syringes with needles
Normal saline flush syringes
Syringe labels
Alcohol wipes
Vial with Lasix 40 mg
Vial with Cardizem 20 mg
Telephone in room
Pen and note paper in room

Initial vital signs
Telemetry monitor =Atrial Fibrillation (rate of 90)
VS= BP 110/70, P= 90, RR = 20, Temp = 98.6 degrees, O2 sat = 94%

Ten minutes into scenario, Mr. Garrison states he is having trouble breathing and states heart is pounding rapidly

Deteriorating vital signs
BP decreases to 90/60, P = 120.RR = 30
O2 sat decreases to 89% on 2 liters

Physician orders when called:
Give IV meds (Lasix 40 mg IV push)
Cardizem 20 mg (IV push)
Increase O2 to 4 liters
I will be up to see him shortly

APPENDIX D

Table 1. *Sim Hours and Sim Events Correlations (n=26)*

		SimHrs	SimEvents
SimHrs	Pearson Correlation	1	.943
	Sig. (2-tailed)		
	N	27	27
TotalScore	Pearson Correlation	.353	.300
	Sig. (2-tailed)	.077	.136
	N	26*	26*

*One participant's score was incomplete

AUSCULTATING THROUGH A PATIENT GOWN

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Submitted to the School of Nursing in partial fulfillment of the requirements for the Nursing Honors Program

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ABSTRACT

Purpose: Students are traditionally taught to auscultate with a stethoscope on bare chest. While, in practice many healthcare providers auscultate through clothing. Only two studies evaluated the ability to hear sounds when auscultating through fabric. The aim of this study was to determine if advanced practice nursing students could accurately assess heart and lung sounds through a patient gown using a stethoscope.

Theoretical Model: Sociocultural Theory states that human activities take place in cultural contexts, are mediated by language and other symbol systems, and can be best understood when investigated in their historical development. Based on this theory, nurses learn procedures by modeling instructor's behaviors and improve their skills under guided participation.

Participants: Advanced Practice students in Health Assessment, Primary Care I and Adult/Gero Healthcare I were invited to participate in this study.

Methods: This was a quantitative study evaluating the accuracy of advanced practice nursing students' assessments of recorded heart and lung sounds heard through a hospital gown compared to that heard directly on the chest wall of a manikin. During data collection, subjects were asked to identify three different heart sounds and three different lung sounds repeated randomly for a total of 5 assessments under each condition. The number of correct responses compared to incorrect assessments were calculated to determine if there was a significant difference with and without a gown.

Results: A total of 7 participants completed the study. There were a few errors, but most of the time subjects were accurate in their identification with both abnormal and normal heart and lung sounds both with and without the hospital gown. Some subjects stated that it was easier to hear without the gown, especially the heart sounds. Some also complained of the noise of the manikin motor.

Conclusions: Further study of this issue should be done with a larger sample size using heart and lung sounds from actual people.

INTRODUCTION

Nursing students have traditionally been taught to always auscultate heart and lung sounds with a stethoscope applied to the patient's bare skin. In practice however, healthcare providers are often observed auscultating through the patient's gown. The assessment is done in this manner, often times due to its convenience. Very few studies have been done to determine if performing this vital procedure in this manner has a detrimental effect on practice and patient outcomes. The aim of this study was to determine if students in an advance practice nursing program taking Advanced Health Assessment and Clinical Reasoning, Primary Care I, and Adult/Gero Healthcare I could accurately assess lung and heart sounds though a patient gown using a stethoscope.

REVIEW OF LITERATURE

A review of the literature revealed where and how to perform a pulmonary and cardiac auscultation. Many authors gave a detailed description of how to perform these assessments. While others identified the errors made by students and professionals and ways to correct these errors. The authors looked at how to improve teaching methods for healthcare professionals, but little is mentioned in literature about performing an auscultation assessment over clothing. Of the literature reviewed, only Jarvis (2012) and Reiner-Kent (2013) mention performing this assessment on bare skin. Only two studies were found that examined auscultation on fabric (Rankin, Rankin, & Rankin, 2015) (Kraman, 2008). In an editorial, Sherman (2009) scolds providers who auscultate over the patient's fabric. The author proceeded to state that even though there is little evidence to prove fabric does not interfere with cardiac or lung sounds, there is an increase in the number of providers auscultating through fabric.

A two-part series by Reimer-Kent (2013a) was designed to inform of different techniques providers can use to help improve the auscultating sound. One of the techniques listed focused on adequate exposure to the pericardium without interference from clothing and body hair. The first article part of this series also focused on demonstrating the basics of heart sounds and the heart's cycle in relation to the sound heard when auscultating. The author mentioned the importance of being able to master the understanding of cardiac anatomy and both its physiology and pathophysiology in order to fully differentiate the heart sounds and then recognize any abnormalities. Nurses that have not mastered this ability tend to have less confidence when it comes to stating their findings related to cardiac auscultation. Reimer-Kent (2013a) concluded that the lack in confidence these nurses' possess could lead to inaccurately performed examinations and inaccurate findings of cardiac abnormalities.

The second part to this series by Reimer-Kent (2013b) was designed to provide an overview of the anatomy and pathophysiology related to heart disease and the description of the heart sounds associated with different valve conditions. The author gave a short review of the anatomy of the aortic and mitral valves, followed by a short summary of systolic and diastolic murmurs. The author then focused on stenotic and regurgitant valvular heart disease. The author included a description of the pathophysiology of each one, followed by a description of the heart sounds associated with each valvular heart disease as well (2013b).

Nielsen, Mølgaard, Ringsted, & Eika (2010) designed an instrument for assessing cardiac auscultation skills of medical students and physicians that provided a high degree

of accuracy in the reproduction of normal heart sounds and murmurs, while also mimicking clinical situations. A goal for the instrument was to allow for convenient and cost effective standardized testing which would avoid the difficulties that using an actual patient may present. The study addressed the participants' ability to identify patients with cardiac murmurs among a group of persons with normal and abnormal heart sounds. The two-part test instrument used in this study was designed containing heart sound recordings from patients with common murmurs as well as patients with healthy cardiac sounds. The results showed there was a correlation between clinical experience and diagnostic ability. However, being able to distinguish abnormal murmurs from normal heart sounds seemed to be independent of clinical experience.

Germanakis, Petridou, Varlamis, Matsoukis, Papadopoulou-Legbelou, & Kalmanti, (2013) examined the performance of pediatricians in pediatric auscultation and the impact of a multimedia-based teaching intervention. The study included four multimedia-based pediatric cardiac auscultation teaching courses offered to 106 primary healthcare physicians within a two year period. The physicians were of different specialties and training levels, but all cared for pediatric patients either exclusively or partially. The courses were based on virtual patients' presentation and the participants' performance was evaluated at the beginning and the end of each course. At the end of the study it was noted that multimedia-based teaching was associated with a significant improvement in the detection of abnormal murmurs and additional sounds by the providers. However, the study showed the rate of innocent murmurs interpreted as abnormal did not change after the multimedia-based courses were offered. This study supported the use of multimedia-

based teaching interventions as an effective way to improve cardiac auscultation skills in pediatrics.

Kraman (2008) explored the assessment of artificial lung sounds through t-shirt material and through flannel. This study found flannel to be thicker, to have a greater negative effect on auscultation quality, and that low frequency sounds were harder to accurately assess. The author went on to warn of extraneous sounds mimicking crackles. He concluded that "[t]his study show[ed] that lung sounds are well transmitted through indoor clothing provided that extra force is applied to the stethoscope head" (Kraman, 2008, p. 88). This study, however, did not investigate auscultation of heart sounds through t-shirt material and flannel.

Only one research study (Rankin et al, 2015) explored the assessment of both lung and normal heart sounds through fabric. The aim of this study was to determine the impact on quality of the sounds this method had as well as how often physicians performed their assessment using this method. This study found that physicians were more "likely to listen to breath sounds than heart sounds through patients' gowns" (Rankin et al, 2015). The main reason physicians gave for performing auscultation over fabric was for compassion. Patient privacy was the first reason followed by patient immobility. Most physicians were not able to distinguish between sounds heard through a gown or skin (Rankin et al, 2015).

THEORETICAL MODEL

Sociocultural Theory states that human activities take place in cultural contexts, are mediated by language and other symbol systems, and can be best understood when

investigated in their historical development. Based on this theory, nurses learn procedures by modeling instructor's behaviors and improve their skills under guided participation.

METHODS

DESIGN

This quantitative descriptive study evaluated the accuracy of advanced practice nursing students' assessments of recorded heart and lung sounds through a hospital gown compared to the sounds heard directly on the chest wall of a high fidelity manikin.

RESEARCH QUESTIONS

- Can practitioners accurately assess heart sounds through a patient gown?
- Can practitioners accurately assess lung sounds through a patient gown?

INSTRUMENTS

The investigators developed a Data Sheet (Appendix A) to document the type of heart and lung sounds presented and the students' assessments of those sounds. The following three demographic questions were developed by the investigators and were asked:

- What month and year did you graduate as an RN?
- In what area do you work?
- How frequently do you auscultate heart and lung sounds per shift?

SAMPLE

Advanced practice nursing students in Health Assessment, Primary Care I, and Adult/Gero Healthcare I were invited to participate in this study. The assessment course has a laboratory component where students assess a manikin and each other. The other two courses have clinical experiences which include supervised assessment and care of patients.

ETHICAL PERMISSION

This study was approved by the Institutional Review Board (IRB) as an exempt study. Humans were not used as subjects to perform the assessments on, but students were used as participants within the study. In order to eliminate a power gradient, the course instructors did not receive data on who participated or how well they performed.

PROCEDURES

Advanced practice nursing students were taught heart and lung sounds in class and had the opportunity to practice auscultation of these sounds on the laerdal-high-fidelity manikins in the School of Nursing Clinical Learning Laboratory. Investigators informed students of the study during one of their classes and offered them the opportunity to participate. Informed consent was obtained from the participants the day they came to participate in the study.

Laerdal-high-fidelity manikins whose chests rise and fall, were used to generate the heart and lung sounds. Students used their own stethoscopes as they would when providing patient care or used a Littman Classic II if they did not bring one. The hospital gowns used in this study were obtained from hospital laundry. During data collection,

students were asked to identify three different heart sounds and three different lung sounds repeated randomly for a total of 5 assessments under each condition. They auscultated lung sounds first through the gown and then directly on the manikin chest wall. The students were not told in advance which sounds to expect. The order for each set of the sounds was randomly listed on the data collection form. This process was repeated for heart sounds. Subjects were not given feedback during data collection. The lung and heart sound level was predetermined by the investigators and remained constant throughout data collection. Subjects were asked the three demographic questions prior to auscultation and the assessments were documented on the Data Sheet by the investigators.

RESULTS

A total of seven subjects participated in this study. There were a few errors, but the subjects were accurate in their identification with abnormal and normal heart and lung sounds both with and without the hospital gown most of the time. The participants made an error identifying the heart sounds on the manikin's chest wall on 3 out of the 35 (8.6%) assessments (Table 1) compared to 5 (14.3%) mistakes when auscultating through the gown (Table 2). There were four mistakes made identifying normal heart sounds on the chest wall as murmurs and one normal sound as atrial-fibrillation (Table 1). The mistakes made when auscultating through the gown were all identifying murmurs as normal heart sounds (Table 2). The subjects performed similarly when identifying lung sounds. There were 5 (9%) mistakes out of the 35 assessments identifying the lung sounds on the chest wall (Table 3). All of the participants that made a mistake in this condition identified rales as normal lung sounds (Table 3). The participants made 7 (20%) errors when auscultating

with a gown (Table 4). Three participants identified normal sounds as rales, one identified rales as normal, one identified wheezes as normal sounds, and two identified them as rales (Table 4).

LIMITATIONS AND RECOMMENDATIONS

Some subjects stated that it was easier to hear without the gown, particularly for the heart sounds. The mechanics of the manikin made it hard for the participants to be able to determine if the additional noises were coming from the friction between the gown and the stethoscope or from the manikin. The participants took longer to identify the sounds with the gown on. This could have been due to this assessment being the first one performed on the manikin. Overall the participants took longer to perform the assessments than anticipated. It was anticipated that the assessment would take the participants approximately fifteen minutes, but it took them between twenty five to thirty minutes instead. The participants also seemed to have a difficult time identifying landmarks on the manikin both with and without the gown.

Due to the small number of participants the researchers were unable to perform a statistical analysis of the data collected for this study. The limitations of this study include the use of only one cohort of students at one university as a sample and therefore may not be generalizable to other programs. Further study of this issue should be done with a larger sample size. Furthermore, it is not possible to make any conclusions or recommendations.

However, it can be noted that healthcare providers may require more training on the assessment of heart sounds. The participants of this study had the most errors identifying murmurs as normal sounds. This is a similar finding to that of Rankin et al (2015) in their

study. Rankin et al (2015) only presented normal heart sound recordings to its participants, but many participants reported hearing added sounds. The most common sound reported by the participants was systolic murmurs. Future studies should evaluate the participants' auscultation skills and their ability to differentiate abnormal sounds. It may be necessary to offer them a course to help reduce the disparities between their abilities to recognize cardiac or lung abnormalities when auscultating in order to help reduce possible errors. Multimedia-based teaching such as that used by Germanakis et al. (2012) could be implemented in future studies in order to have a significant improvement in abnormal murmurs and additional sounds detected by the providers. The investigators also observed that none of the participants palpated landmarks to find the correct location for auscultation, which may have played a role in their ability to accurately identify the sounds.

There are many reasons why nursing students are taught to auscultate on bare skin, but not enough literature to prove this is best practice and results in best patient outcomes. Rankin et al would argue that "listening to heart sounds through a gown carries the risk of missing soft added sounds; listening to breath sounds adds the risk of mistaking sounds caused by the rubbing of gown on stethoscope as pulmonary crackles" (2015). The identification of best practice for this assessment is vital due to the importance of this clinical assessment. Even though there is an increase in the use of more advanced technology to help accurately diagnose patients by physicians, the stethoscope is the primary instrument available to nurses at the bedside. Nurses perform this clinical assessment multiple times per shift and it is very important that they do this using best practice.

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APPENDIX A

Data Sheet

Assessment of Heart and Lung Sounds

Demographics:

1. What month and year did you graduate as an RN? _____
2. In what area do you work? _____
3. How frequently do you auscultate heart and lung sounds per shift? _____

Stethoscope _____

Sequence form _____

Lung Sounds with Gown Code: C = normal, clear W = wheezes R = rales, crackles

Played Assessed, Student statement

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Sequence form _____

Lung Sounds on Chest Wall Code: C = normal, clear W = wheezes R = rales, crackles

Played Assessed, Student statement

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Sequence form _____

Heart Sounds with Gown Code: N = normal, M = murmur S = atrial fibrillation

Played Assessed, Student statement

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Sequence form _____

Heart Sounds on Chest Wall Code: N = normal, M = murmur S = atrial fibrillation

Played Assessed, Student statement

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

APPENDIX B

Table 1.

Heart Sounds on Chest Wall

SUBJECT 1	SUBJECT 2	SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7
M	S->N	M	M	M	N	M-> N
S	N	N	M	S	M	S
M	S	M-> N	N	S	S	N
S	M-> N	S	S	N	S	M
N	M-> N	S	S	M	M	S

Notes. N = normal, M = murmur, S = atrial fibrillation

Table 2.

Heart Sounds with Gown

SUBJECT 1	SUBJECT 2	SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7
S	N	S CANT HEAR-> S	N	N	S	N
S	M	S	S	M	N	M
N	S	M	S	S	M	S
M	S	N	M	M-> N	S	S
N	M-> N	M-> N	M-> N	S VERY FAINT	M	M

Notes. N = normal, M = murmur, S = atrial fibrillation

Table 3.

Lung Sounds on Chest Wall

SUBJECT 1	SUBJECT 2	SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7
C	C	C	R	C	R	R
R	W	R->C MECHANICAL NOISE	W	W	C	C
R	W	W	C	R	R	R
W	R->C	W	R	R	W	W
W	R	R->C	W	W	W	W

Notes. C = normal/clear, W = wheezes, R = rales/crackles

Table 4.

Lung Sounds with Gown

SUBJECT 1	SUBJECT 2	SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7
R	W	W	W-> R	W	W	W-> C
W	R->C	R	R	C	C->R	R
C	C	W	R	R	W	R
W	W	R	C-> R	R	R	C-> R
R	R	C	W	W	R	W-> R

Notes. C = normal/clear, W = wheezes, R = rales/crackles

MATERNAL-INFANT SEPARATION DURING HOSPITALIZATION AFTER BIRTH

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Submitted to the School of Nursing in partial fulfillment of the requirements for the Nursing Honors Program

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ABSTRACT

Purpose and Background: The purpose of this study was to examine mother-infant separation after birth as a means to understand the "rooming-in" practices at the study facility. Rooming-in is defined as care of the mother-infant dyad with minimal separation. To obtain a Baby Friendly Hospital Initiative designation, a birthing facility must provide "rooming-in" for all mother-infant dyads, unless separation is medically necessary.

Method: This descriptive study took place at a Midwest academic medical center. Mother-infant separation was recorded at the crib by care providers each time the infant arrived or left the mother's room. Data were entered into Excel and SPSS for analysis by the research team. Statistical analysis included mean time of separation, mean number of separations, and reason for mother-infant separation. In addition, differences between male and female mother-infant separations, as well as separation differences by ethnicity, were examined.

Results: A total of 403 births occurred during this study. The mean length of maternal-infant separation in minutes for September, October, and November was 56.90, 60.53, 57.47, respectively. The mean length of maternal-infant separation in minutes for September, October, and November did not differ significantly. Additionally, mean number of separations, which ranged from 0.72 to 1.12 for each month, was not significantly different. Additionally, mean number of separations was 0.7234, 0.9394, and 1.1170 per day for each month. The two most common reasons for separation were circumcision and maternal request. There were no statistically significant differences between male and female infants in mean length of separations or mean number of separations.

Conclusions and Implications: On average, maternal-infant dyads participating in this study experienced separation less than 60 minutes per day. Understanding the length of separations, and reasons for separation, between mothers and infants helps the hospital reduce separation. The results of this study are directing efforts for achieving Baby Friendly Hospital Initiative designation at the study facility.

INTRODUCTION

The purpose of this study was to analyze maternal-infant separation after birth in order to understand the "rooming-in" habits at the study facility. According to the *Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation* (2010), rooming-in is defined as care of the mother-infant dyad with separation less than one hour in a 24-hour period. The Baby Friendly Hospital Initiative designates hospitals and birthing centers maintaining excellent practices in breastfeeding and provision of an optimal mother-infant bonding environment. To obtain a Baby Friendly Hospital designation the birthing facility must practice "rooming-in" for all mother-infant dyads, unless separation is medically necessary.

According to Crenshaw (2004), childbirth transitioned from a home setting to a hospital setting in the early 20th century. Promptly following delivery, mothers were sent to hospital rooms, while newborns were kept in nurseries. Healthcare professionals believed maternal-infant separation provided mothers more uninterrupted sleep through the night (Crenshaw, 2004). Recent research shows "that mothers whose babies are cared for in the nursery do not get more sleep than other mothers who room-in with their babies at night" (Crenshaw, 2004, p. 37). Additionally, it was believed separation of the mother and newborn was best practice in order to limit germ exposure for the newborn (Crenshaw, 2004). Current research contradicts this theory. Crenshaw (2004) states "skin-to-skin contact provides an opportunity for a baby to be exposed to the normal bacteria on his mother's skin, and decreases the risk of the baby becoming sick due to harmful germs" (p. 36).

In addition to healthy bacterial exposure, limited separation beginning at birth is correlated with greater newborn thermoregulatory stability mainly due to an increased chance for skin-to-skin contact between mother and infant (Lawrence & Nolan, 2009). Infants with a decrease in temperature return to baseline more quickly when held skin-to-skin by their mothers (Charpak et al., 2005). According to Crenshaw (2014), early infant separation for bathing purposes raises the risk of neonatal hypothermia. Skin-to-skin contact reduces the risk of neonatal hypothermia because the mother's breast rises in temperature to promote adequate temperature in her newborn (Crenshaw, 2014). In addition to stable temperature control, skin-to-skin contact promotes better cardiorespiratory stability (Moore, Anderson, & Bergman, 2007). Immediately following delivery, babies held skin-to-skin are naturally inclined to breastfeed, and usually initiate breastfeeding within one hour (Crenshaw, 2007). Furthermore, this touch promotes a larger supply of breast milk, and longer duration of breastfeeding sessions (Crenshaw, 2007).

Takahashi et al. (2011) states skin-to-skin contact for 60 minutes or longer produced a significant drop in infant salivary cortisol levels, a hormone indicative of stress. Obtaining salivary cortisol lends an accurate, minimally invasive measurement of infant stress response to physical or environmental stimuli. The initiation of skin-to-skin contact directly after birth led to a decrease in infant stress levels and shorter lengths of crying time (Takahashi et al., 2011). Infants denied skin-to-skin contact immediately following delivery "have been shown to cry more than infants not separated. High salivary cortisol levels, a stress indicator, and increased respiratory and heart rates have been associated with crying" (Lawrence & Nolan, 2009, p. 431).

Among healthcare providers, breastfeeding exclusively has been viewed as the greatest method for preventing common causes of newborn illness. Research suggests breastfeeding exclusively for 6 months is one of the "most significant strategies to improve infant and child health and reduce childhood illness and mortality" (Crenshaw, 2014, p. 215). Breastfed infants demonstrated significantly decreased rates of lower respiratory tract infections, otitis media, diarrhea, Type 1 and Type 2 diabetes, childhood leukemia, necrotizing enterocolitis, and Sudden Infant Death Syndrome (*Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation*, 2010, p. 3). Breastfeeding mothers experience health benefits, as well. A "lower risk of Type 2 diabetes, breast, and ovarian cancer" as well as a "reduction in the risk for cardiovascular and other related diseases" is recorded among breastfeeding mothers (*Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation*, 2010, p. 3).

Additionally, maternal-infant benefits are enhanced through rooming-in practices. Rooming-in is defined as "allowing mothers and infants to remain together twenty-four hours a day" ("Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation", 2010, p. 16). Rooming-in provides the optimal environment for maternal-infant bonding through uninterrupted skin-to-skin contact and baby-led breastfeeding. Crenshaw (2014) states rooming-in increases the likelihood of breastfeeding exclusivity. Furthermore, rooming-in is associated with higher rates of breastfeeding exclusivity for longer durations of time after hospital discharge.

According to Forster and McLachlan (2007), rooming-in starting at birth is the optimal method for infant-led breastfeeding. Maternal-infant separation creates missed

opportunities for the mother to recognize infant feeding cues (Buchko, Gutshall, & Maugans, 2013). Subsequently, this limits the ability for a nurse to promote the benefits of breastfeeding and provide necessary breastfeeding education. Mothers that practice rooming-in show a greater understanding of their babies' feeding cues and needs (Crenshaw, 2007). This heightened understanding is correlated with "higher scores on tests that measure the strength of a mother's attachment to her baby" (Crenshaw, 2007, p. 41). Frequent or continuous contact may have long lasting impacts on the maternal-infant relationship, as well. According to Crenshaw (2007), lower rates of "child abuse, neglect, and abandonment" (p. 41) are seen among mothers and infants who engaged in rooming-in.

According to the *Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation* (2010), the Baby Friendly Hospital Initiative (BFHI) recognizes hospitals and birthing centers providing excellent aid in breastfeeding and maintaining optimal mother-infant bonding. Attainment of Baby Friendly Hospital Initiative designation requires rigorous participation of all stakeholders. Forster and McLachlan (2007) state accreditation is achieved through 80% compliance with each of the "Ten Steps to Successful Breastfeeding". These Ten Steps promote the best practices to ensure optimal breastfeeding. Women who give birth in BFHI-recognized hospitals have seen an increased rate in "positive breastfeeding outcomes" (Forster & McLachlan, 2007, p. 274).

Step 7 of the "Ten Steps to Successful Breastfeeding" requires the implementation of rooming-in. The BFHI recognizes rooming-in should be practiced, regardless of feeding method, unless separation is medically indicated (*Guidelines and Evaluation Criteria for*

Facilities Seeking Baby-Friendly Designation, 2010). Optimization of breastfeeding is encouraged through the implementation of BFHI recognition (Forster & McLachlan, 2007).

In summary, maternal-infant bonding and breastfeeding is promoted by rooming-in. It is the obligation of the healthcare professional to encourage and educate patients on best practices regarding maternal-infant bonding. In order to maintain a patient-centered focus, healthcare professionals must receive continuous education on best practices. Therefore, the purpose of this study was to examine and quantify current mother-infant separation habits at the study facility. Knowing the amount of time mothers and infants are separated, as well as the reasons for this separation will assist this hospital in reducing the amount of separation. Ultimately, the results of this study will support efforts for achieving Baby Friendly Hospital Initiative designation at the study facility.

THEORETICAL FRAMEWORK

Anderson's mother-infant mutual caregiving model (1977) was used to guide this study. This model posits that mother-infant interaction should be self-regulatory and uninterrupted directly after birth to encourage shared maternal-infant caregiving. This mutual caregiving model encourages infant-led breastfeeding and prompt skin-to-skin contact following delivery. Additionally, this model provides a way for mothers to know their infants, and develop positive bonding habits.

METHODS

STUDY DESIGN, SETTING, AND SAMPLE

This descriptive study took take place at a Midwest academic medical center, providing obstetric and neonatal care. The hospital facility is Magnet-designated and this study was embedded in the quality improvement process already underway in order to achieve BFHI designation at the study facility. Data collection occurred between September 1, 2015 and November 30, 2015. All births that occurred during the study period were included. Quality improvement designation was obtained from the Human Subjects Committee at the medical center.

INSTRUMENTS

Healthcare professionals recorded mother-infant separation each time the infant arrived or left the mother's room on the crib form sheet, an instrument developed by the "Rooming-In Team" of the breastfeeding taskforce at the study facility. Each infant had this form on their crib/bassinet for recording "check-out" time and reason for separation from mother. The form recorded "check-in" times when the infant was returned to the mother. Each of these forms was identified with a number that corresponded to the birth order for the month (hospital facility birth order). In addition, length of stay, feeding technique (breastfed or bottle-fed), newborn gender and ethnicity were documented. The research team also utilized the "Breastfeeding Exclusivity" report. This report included all babies that were discharged from the newborn nursery during the study period and their indicated method of feeding. Demographics included on the "Breastfeeding Exclusivity" report were gender of infant, length of hospitalization, and ethnicity.

DATA COLLECTION METHODS

Participants in the study were identified in order of birth for the month (1st birth = 1, 2nd birth = 2, etc.). This number matched the number provided on the crib form for each infant. The same number assigned on the crib form matched the number on the "Breastfeeding Exclusivity" report. These crib forms were collected for analysis monthly.

DATA ANALYSIS

Data were entered into Excel and SPSS for analysis by the research team. Descriptive statistics were calculated and included mean total time of mother-infant separation, mean number of separations, mean duration of separation, and reason for mother-infant separation. Differences between male and female infant separations and differences between ethnicities were examined using t-tests. Analysis of variance was used to analyze mean differences across the three study months for mean number of separations, mean duration of separation, and total time of mother-infant separation.

In order to standardize missing information, all of the identical reasons for separation (e.g. circumcision) for that month were averaged. This mean number was used as a replacement for the missing data.

RESULTS

A total of 403 mother-infant dyads were included in this study. There were 139, 124, and 140 births for September, October, and November 2015, respectively (see Table 1). Crib form completion steadily increased throughout the three months. September had the lowest crib form completion rate with 59 (42%) total forms. October had 73 (59%) total crib forms completed. November had the highest completed crib form rate with 97 (69%)

total crib forms. The mean length of hospital stay in hours for infants during September, October, and November were 48.6, 50.63, and 51.97, respectively. Cesarean section births had the longest length of stay for infants with a mean of 71.03 hours. Vaginally delivered births had a mean length of stay of 46.39 hours.

The mean length of maternal-infant separation in minutes was 56.90, 60.53, and 57.47 for September, October, and November, respectively (see Table 2). Table 2 also shows the average number of separations for each month of the study, which was 0.723 (September), 0.9394 (October), and 1.1170 (November). In September, the separations ranged from 0-3. The range for length of separation in minutes was 5-250 for the month of September. The number of separations in October ranged from 0-4, with the length of separation in minutes ranging from 6-380. The number of separations in November ranged from 0-5, with the length of separation in minutes ranging from 5-240. We found there was no statistically significant difference in mean length of separation between the three months (p = .815) and in total length of separation between the three months (p = .331). Furthermore, there was no statistically significant difference in the mean number of separations throughout the three months (p = .075).

Table 3 includes the most common reasons for separation of mothers and infants. The two most common reasons for separation in September, October, and November were circumcision and maternal request. During September, separation for circumcision occurred 13 (27.1%) times, and separation for maternal request occurred 12 (25.0%) times. Separation for circumcision occurred 23 (33.8%) times and separation for maternal request occurred 11 (16.2%) times during the month of October. In November, separation

for maternal request occurred most frequently at 38 times (34.9%). Separation for circumcisions during the month of November occurred 33 times (30.3%).

Table 4 reveals total length of separations for each month by infant gender. The mean total length of separation time in minutes in September for females was 40.18, while the mean total length of separation time in minutes for males was 47.45. In September, the mean length of each separation in minutes for females was 34.15 and 31.79 minutes for males. Additionally, the mean total length of separation in minutes in October in females and males was 43.96 and 56.81, respectively. In October, the mean length of each separation for males and females was 29.30 and 36.82, respectively. Mean total length of separation in minutes in November for females was 64.59, and for males was 62.44. The mean length of each separation in minutes in November for females and males was 34.68 and 38.83, respectively. Despite male separation for circumcision, there were no statistically significant differences between mean total length of time of separation (p = .738 for September, p = .429 for October, and p = .895 for November) and mean length of each separation (p = .875 for September, p = .438 for October, and p = .588 for November) between male and female infants.

Table 5 identifies length of maternal-infant separations by ethnicity. Mean total length of separation in minutes for September in Hispanic participants was 37.15. Non-Hispanic participant's mean total length of separation in minutes was 47.55. Mean total length of separation in minutes for October was 56.03 (Hispanic) and 50.01 (Non-Hispanic). Mean length of separation in minutes for November in Hispanic participants was 55.64, whereas non-Hispanic participants had a mean of 64.97. There were no statistically significant

differences in mean total length of separation (p = .659 for September, p = .732 for October, and p = .619 for November) or mean length of each separation (p = .704 for September, p = .964 for October, and p = .326 for November) between ethnicities.

LIMITATIONS

One significant limitation to our study was the lack of strict crib form compliance. When analyzing data, we found missing information in the check-out or check-in sections. In the future, strict compliance to completion of crib forms will help to promote a more accurate representation of the data.

Another limitation was the use of only one study facility. The concentration on a singular study facility was due to the efforts to achieve BFHI designation at this study facility. In the future, using a sample that includes multiple hospitals could positively benefit the research by providing a broader view of rooming-in practices, as well as a more diversified patient population.

DISCUSSION AND CONCLUSION

Of the 403 births that occurred at the study facility, only 229 (56.82%) total crib forms were collected. The percent of crib form completion steadily rose through the months of study participation. Low crib sheet adherence may be due to lack of proper participation education. The research team believes nurses became more accustomed to the crib form sheets as the months progressed, resulting in higher completion. We believe crib sheet completion rates would rise if the study were to be continued in the future for a longer duration of time.

On average, infants included in this study were separated from their mothers less than 60 minutes per day. These results are consistent with the views of best practice as defined by the *Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation* (2010). According to Baby-Friendly designation, separation less than 60 minutes in a 24-hour period is considered rooming-in. October showed the highest mean length of separation, just above 60 minutes. Although infants were separated less than one hour per day, the length of separations in minutes had a wide range due to maternal surgeries and car seat challenges.

Overall, circumcision was found to be the most common reason for separation for two of the three months. Maternal request was the second most common reason for separation. Crib form sheets contained many reasons for maternal request in the "comments" section. Reasons for maternal request included tubal ligation, leaving unit to smoke, showering, etc. Analyzing the crib form sheets showed some of the maternal request reasons for separation to be unnecessary. The research team believes staff and maternal education on the importance of rooming-in may have a significant impact on the reduction of unnecessary maternal-infant separations.

For future studies, the research team recommends researching maternal-infant separation time per nurse, although this could be difficult due to lack of confidentiality. Analyzing this information can help the research team to understand differences in individual nursing practice. Additionally, this can help the study facility further educate nurses on the benefits of rooming-in. The research team also recommends inquiry into reasons behind maternal request for separation. This is in an effort to reduce unnecessary

separation, and to encourage rooming-in when the situation arises. Finally, the research team recommends the implementation of a more efficient way of documenting maternal-infant separation. A more efficient documenting strategy may obtain higher completion of crib forms.

Understanding the reasons and amount of time for each separation of mothers and infants helps to assist the study facility in decreasing the amount of time of separation. The results of this study will help the study facility achieve Baby Friendly Hospital Initiative designation.

FUNDING

No funding was received for this study.

CONFLICT OF INTEREST

No conflict of interest exists.

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APPENDIX A

Table 1

Number of Participants and Crib Form Information

	September	October	November
Number of Births	139	124	140
Number of Crib Forms Missing Identifiers	10	6	4
Number of Completed Crib Forms with All Identifiers	49	67	93
Percentage Completed	42%	59%	69%
Mean Length of Stay for Infants in Hours	48.6	50.63	51.97
Cesarean	65.68	75.65	71.76
Vaginal	44.5	45.52	49.15
Forceps-Assisted	61	n/a	n/a
Vacuum-Assisted	n/a	n/a	55

Table 2

Number and Length of Separations

Month	Number of Separations Range	Number of Separations Mean	Length of Separations Range (in minutes)	Length of Separations Mean (in minutes)
September	0-3	0.7234	5-250	56.90
October	0-4	.9394	6-380	60.53
November	0-5	1.1170	5-240	57.47

Table 3

Total Number of Separations per Reason by Month

	September	October	November
Car Seat Challenge	2 (4.2%)	6 (8.8%)	3 (2.8%)
Circumcision	13 (27.1%)	23 (33.8%)	33 (30.3%)
Imaging	5 (10.4%)	0 (N/A)	7 (6.4%)
Hearing Screen	3 (6.3%)	9 (13.2%)	4 (3.7%)
Lab Draw	5 (10.4%)	6 (8.8%)	16 (14.7%)
Maternal Request	12 (25.0%)	11 (16.2%)	38 (34.9%)

Table 4

Mean Total Length and Mean Length of Each Separation Based on Gender (Minutes)

	September	October	November
Mean Total Length of Separation Time			
Female	40.1850	43.9638	64.5909
Male	47.4536	56.8082	62.4388
Mean Length of Each Separation			
Female	34.1478	29.3019	34.6795
Male	31.7893	36.8245	38.8316

Table 5

Mean Total Length and Mean Length of Each Separation Based on Ethnicity (Minutes)

	September	October	November
Mean Total Length of Separation Time			
Hispanic	37.1538	56.0332	55.6364
Non-Hispanic	47.5464	50.0162	64.9653
Mean Length of Each Separation			
Hispanic	37.1538	33.5221	29.8636
Non-Hispanic	30.9624	33.9981	38.4951

JOB SATISFACTION AND INTENT TO STAY AMONG NEW RNS: DIFFERENCES BY UNIT TYPE

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ABSTRACT

Purpose: Newly licensed registered nurses (NLRNs) are the pipeline of the nursing workforce, which will fall short of needs in the coming years. Within two years of employment one in three NLRNs are estimated to leave their first job. Previous studies found nurse job satisfaction varies by unit type, and predicts intent to stay and turnover. This study describes NLRNs and examines unit type differences in NLRN job satisfaction and intent to stay in their current position.

Theoretical Model: An adaptation of Price and Mueller's RN Turnover Model is used, which posits that hospital, unit, and RN factors effect RN job satisfaction, which in turn affects intent to stay, the best predictor of turnover. Researchers have found empirical support for the relationships depicted.

Methods: A secondary analysis was performed using cross-sectional data from the on-line, 2013 National Database of Nursing Quality Indicators (NDNQI) RN Survey. Our study sample was limited to 6,461 NLRNs in selected unit types in 259 general and pediatric hospitals in 43 states. Analysis included descriptive statistics as well as ANOVA and Chi Square procedures testing unit type differences among NLRN reports of job satisfaction and intent to stay.

Results: Most NLRNs are beginning their nursing career with adults, on either medical-surgical, step-down, or critical care units. Significant differences among unit types were found in NLRN reports of both job satisfaction and intent to stay in their current position. NLRNs in pediatric units were significantly more satisfied than those in medical-surgical, step-down, or peri-operative units. Overall, 75% intend to stay, with only NLRNs working in adult medical-surgical (69%) and step-down units (70%) reporting lower percentages.

Discussion: Findings from NLRNs in our study support work of previous researchers in both the level of intent to leave among NLRNs, and unit types in which RNs in general report the highest and lowest levels of job satisfaction and intent to leave.

Conclusions: By guiding NLRNs to units with better job satisfaction for their initial position, findings may be used to help reduce early exits of NLRNs and improve successful transitions into practice. Unit managers may use results to evaluate effects of orientation programs. Researchers should compare factors influencing job satisfaction and intent to stay on adult medical-surgical units to pediatric units. Further studies should explore effects of RN residency programs on NLRN transitions into practice.

INTRODUCTION

New RNs are the pipeline of the nursing workforce, which is presently predicted to fall short of needs in the coming years (Kovner, Brewer, Greene, & Fairchild, 2009). Yet the transition into practice is difficult, as evidenced by high turnover rates of RNs in their first year or two of practice. Bowles & Candela (2005) reported finding 30% of new RNs left their first job within a year of practice. New RNs enter the profession from a variety of educational programs with a wide range of skills and confidence in their new role. Approximately 90% begin their career in a hospital setting, in which nursing shortages, high patient acuity, and scarce resources are common. Residency programs have been strongly recommended to address the transition needs of new RNs (Institute of Medicine, 2011). However, such programs may not be widely available as the costs are left solely to hospitals, in contrast to funding from the Center for Medicare and Medicaid Services for physician and pharmacy programs (Goode, Lynn, Krsek, & Bednash, 2009).

Researchers have been examining the transition of new RNs with renewed interest this century due to the predicted nursing workforce shortages. In their 2006-2012 panel study, Kovner, Brewer, Fatehi, and June (2014) found that high rates of turnover among new RNs continue. Kramer, Maguire, Halfer, and Schmalenberg, (2012) found better outcomes among new RNs whose first job was on a hospital nursing care unit with very healthy nursing work environments. Previously, Boyle et al. (2006) had found differences in job satisfaction by type of unit among RN unit workgroups without regard for tenure of members, which suggests that unit type may also be important in the transition of new RNs. Collectively, these findings confirm the continued need to understand factors that

influence the job satisfaction and intent to stay of new RNs in hospitals today. In this study, we examined unit type differences among the job satisfaction and intent to stay of new RNs.

REVIEW OF LITERATURE

In this section we will present an overview of the purpose, conceptual framework, methodology, and major findings of quantitative studies examining NLRN outcomes conducted in the United States and published since 2007. We selected studies and research programs that were guided by the purpose of examining NLRN job satisfaction, intent to stay, and turnover, as well as factors affecting these outcomes. Kovner and colleagues conducted the RN Work Project, a rigorous ten-year panel study designed to quantify NLRN turnover rates and trends (Brewer, Kovner, Greene, Tukov-Shuser & Djukic, 2011; Brewer, Kovner, Yingrengreung, & Djukic, 2012; Kovner, Brewer, Fairchild, Poorima, Kim, & Djukic, 2007; Kovner, Brewer, Fatehi, & Jun, 2014; Kovner, Brewer, Fatehi, & Katigbak, 2014; Kovner, Brewer, Greene, & Fairchild, 2009; Kovner & Djukic, 2009). Kramer and colleagues conducted a 7-study, 5-year research program designed to examine the effects of healthy unit work environments and residency programs on NLRN retention rates and transitions (Halfer, Graf, & Sullivan, 2008; Kramer, Brewer, & Maguire, 2011; Kramer, Halfer, Maguire, & Schmalenberg; Kramer, Maguire, & Brewer, 2011; Kramer, Maguire, Halfer, Brewer, & Schmalenberg, 2011; Kramer, Maguire, Halfer, & Schmalenberg, 2012; Kramer, Maguire, Halfer, Budin, Hall, et al., 2012).

Several studies were reviewed that evaluated the effects of a nurse residency program. Outcomes from the Versant program were examined by Beecroft, Dorey, and Wenten, (2008), Trepanier, Early, Ulrich, and Cherry (2012) and Ulrich, Krozek, Early, Ashlock,

Africa, and Carman (2010), while outcomes from the residency program developed by the University HealthSystem Consortium (UHC) and the American Association of Colleges of Nursing (AACN) were examined by Goode, Lynn, Krsek, and Bednash, (2009). The remaining studies examined factors that influence NLRNs intent to stay (Scott, Engelke, & Swanson, 2008; Unruh & Zhang, 2013; Unruh, Zhang, & Chisolm 2014; Wu, Fox, Stokes, & Adam, 2012),

Two conceptual frameworks were used in these investigations, a turnover model and the systems research organizing model. The Brewer-Kovner Turnover Model (Kovner et al., 2007) is an extension of the Price Turnover Model (see Conceptual Framework section below for a description of the Price Turnover Model). The Systems Research Organizational Model was used by Kramer and colleagues (Kramer, Halfer, Maguire, & Schmalenberg, 2012). This model is based on the American Academy of Nursing Quality Health Outcomes Model and Donabedian's structure, process, outcome paradigm, and posits that characteristics of the organization (the context), the unit (the focus of action), and the new graduate (the client) interact with each other and influence safety and quality outcomes.

Study designs included both cross-sectional and longitudinal. Brewer and Kovner used a panel study design for their rigorous examination of trends in NLRN turnover rates (Kovner et al., 2007; Kovner, Brewer, Greene, & Fairchild, 2009; Brewer et al., 2011; Brewer, Kovner, Yingrengreung, & Djukic, 2012; Kovner, Brewer, Fatehi, & Katigbak, 2014).

Researchers obtained samples from state licensing boards, Magnet hospitals, Academic Medical Centers, multisite RN residency programs, and single hospitals. Kovner and

colleagues gathered their sample from state licensing boards (Kovner et al., 2007; Kovner, Brewer, Greene, & Fairchild, 2009; Brewer et al., 2011; Brewer, Kovner, Yingrengreung, & Djukic, 2012; Kovner, Brewer, Fatehi, & Katigbak, 2014). They followed three panels of NLRNs, beginning with 3266 NLRNs in 60 sites in 34 states licensed in 2004-2005, and ending with 1613 NLRNs in 23 sites in 14 states. Kramer and colleagues obtained samples from Magnet hospitals, which ranged from 5316 NLRNs in 28 hospitals (Kramer, Halfer, Maguire, & Schmalenberg, 2012) to 468 NLRNs in 17 hospitals (Kramer, Brewer, & Maguire, 2012). Samples in other studies examining nurse residency programs ranged from 329 NLRNs to 665 NLRNs, collecting their sample from individual state licensing boards or American Medical Centers (AMCs) (Goode, Lynn, Krsek, & Bednash, 2009; Trepanier, Early, Ulrich, & Cherry, 2012). The years for sampling ranged from 2004-2009. The remaining articles sample size varied from 414 to over 6000 NLRNs with samples from the years 1999-2008 (Beecroft, Dorey, & Wenten, 2008; Scott, Engelke, & Swanson, 2008; Ulrich, et al., 2010; Wu, Fox, Stokes, & Adam, 2012; Unruh & Zhang, 2013; Unruh, Zhang, & Chisolm 2014). The large sample of studies we reviewed enabled us to gather a significant understanding of the information we researched.

The instruments utilized to assess work environment during these studies were rather consistent throughout the studies. Kovner and colleagues (Kovner, et al., 2007) developed an instrument for this work, which was also used by Unruh and Zhang (2013). Kramer and Schmalenberg used the Essentials of Magnetism tool for their research (Kramer, Halfer, Maguire, & Schmalenberg, 2012; Kramer, Brewer, & Maguire, 2013).

The primary dependent variables that were measured were intent to stay, turnover, and satisfaction for NLRNs. The primary independent variables measured in these articles varied. For Kovner and Brewer's studies, they looked at NLRNs demographics, their work attitudes about work environment, and intent to stay (Kovner et al., 2007; Kovner, Brewer, Greene, & Fairchild, 2009; Brewer et al., 2011; Brewer, Kovner, Yingrengreung, & Djukic, 2012; Kovner, Brewer, Fatehi, & Katigbak, 2014). The studies examining residency programs measured the quality of orientation (Goode, Lynn, Krsek, & Bednash, 2009; Trepanier, Early, Ulrich, & Cherry, 2012). Lastly, Kramer and Schmalenberg viewed unit types and the quality of work environment as their independent variables (Kramer, Halfer, Maguire, & Schmalenberg, 2012; Kramer, Brewer, & Maguire, 2013).

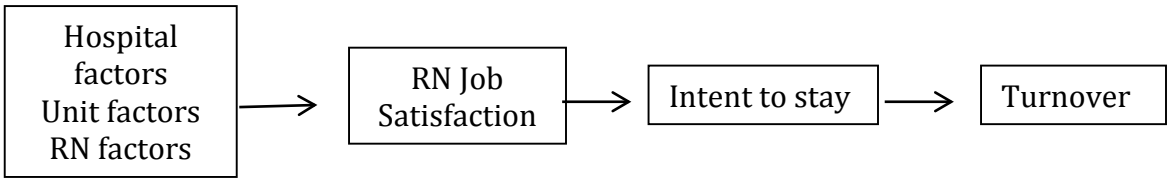
Kovner found a range of turnover from 13 to 18 percent after 1 year and 26 percent after 2 years (Kovner et al., 2007; Kovner, Brewer, Greene, & Fairchild, 2009; Brewer et al., 2011). Kramer and Schmalenberg found that the NLRNs on units identified as having work environments needing improvement (WENI) had increased rates of turnover compared to NLRNs on units with very healthy work environments (VHWEs), who showed high retention rates (Kramer, Halfer, Maguire, & Schmalenberg, 2012; Kramer, Brewer, & Maguire, 2013). The studies examining NLRNs in residency programs found as a majority that those NLRNs who were a part of a residency program showed decreased turnover rates.

This research identified factors associated with NLRN intent to stay and turnover, but it did not examine unit type differences. This research supports the further study that we conducted, because it shows that NLRN turnover rates remain high and need further

investigation. Our research took a closer look at NLRN intent to stay, examining unit type differences in hopes of giving better insight for NLRNs to help determine where they would be most satisfied while seeking a job as a new hire registered nurse. The purpose of this study is to describe new RNs, and examine unit type differences in their job satisfaction and intent to stay.

CONCEPTUAL FRAMEWORK

The conceptual framework of this study is an adaptation of the Price-Mueller Nurse Turnover Model (Price & Mueller, 1981; Price & Mueller, 1986). Price, Mueller, and colleagues developed and refined a comprehensive model of nurse turnover that has generated a large body of research including tests of model extensions (Hinshaw, Smeltzer, & Atwood, 1987; Taunton et al., 1997). The Brewer-Kovner Turnover Model is also an extension of the Price-Mueller Nursing Turnover Model (Kovner et al., 2007). Studies based on this model and its extensions have provided strong evidence of the causal order illustrated below.



AIMS

The purpose of the research reported here is to examine intent to stay among new RNs using variables identified in our adaptation of the Price-Mueller Turnover model. The following three aims guided this study:

1. Describe types of hospitals and units in which newly licensed RNs work.

2. Describe the characteristics, job satisfaction, and intent to stay of new graduate RNs.

3. Explore differences in perceptions of quality of care delivered, job satisfaction, and intent to stay of new graduate RNs among unit types.

METHODOLOGY

This is a secondary analysis of cross-sectional data from the 2013 National Database of Nursing Quality Indicators™ (NDNQI®) RN Survey. The American Nurses Association established the NDNQI in 1998 in response to concerns about RN job satisfaction, RN staffing, and quality of patient care within acute care hospitals. In 2013, NDNQI membership included 1986 hospitals from all states and the District of Columbia, representing approximately 1/3 of all hospitals within the United States. Hospitals join NDNQI to support quality improvement efforts, to meet regulatory requirements, and to support efforts to gain and maintain the American Nurses Credential Corporation's Magnet® designation.

SAMPLE AND SETTING

In 2013, 888 NDNQI member hospitals volunteered to participate in the annual RN Survey. Hospitals selected between survey instrument options including either the Practice Environment Scale or Job Satisfaction Scale. Responses were received from 315,851 RNs in 18,113 units, for a 71% unit response rate. The NDNQI RN Survey eligibility criteria limits participation to RNs whose position requires a minimum of 50% direct patient care and who have been a member of their unit or RN workgroup a minimum of three months.

In the research reported here, we limited our sample to NLRNs who had been employed in nursing one year or less. Although other researchers have considered RNs who were up to three years post initial licensure as NLRNs, we chose the more restricted timeframe of one year or less. Because data were not available to indicate whether our selected sample remained in their first position or not, we choose the more restricted timeframe to reduce the possibility of including NLRNs who had left their first unit between year one and two.

We limited our sample to RNs who were educated and employed in the United States, who worked in general or pediatric hospitals, who worked in unit types in which RNs most commonly begin practice, and who entered practice with BSN as the highest education or RN as the highest license. Unit types in which 90% of the NLRN respondents in the 2013 NDNQI RN Survey and which we therefore included in the sample were adult critical care units, adult step-down units, combined medical-surgical units, pediatric units, obstetric and neonate units, peri-operative units, and emergency departments. These sample limits controlled for factors that lay outside our interest. Finally, we also limited the sample to NLRNs in hospitals that had selected a survey option with job satisfaction scales, which included the job satisfaction variable of interest to our study.

MEASURES

Study measures included hospital characteristics, unit type, NLRN characteristics, and NLRN attitudes. These measures were chosen based on our conceptual framework, our literature review, and the data available for this secondary analysis.

Hospital Characteristics

Hospital characteristics included hospital teaching status, bed size, ownership, metropolitan area, and Magnet status. Upon joining the NDNQI, site coordinators enter hospital characteristic data into the secure member website. NDNQI staff than confirm these data using external data sources, such as, for Magnet status, the American Nurses Credentialing Corporation (ANCC) website. In addition, member site coordinators must confirm hospital characteristics quarterly to capture any changes in status over time.

Unit Type

NDNQI unit types are based on patient acuity, age of patients, and/or type of care provided. Unit types were originally developed by NDNQI as a form of risk stratification for comparison of nursing-sensitive patient outcomes, and were subsequently expanded over time as new indicators were developed for additional areas. By generally reflecting common nursing department organizations, as well as patient acuity, age, and/or care, unit type comparison data are considered most useful to members, according to feedback from site coordinators. Site coordinators enroll units into the NDNQI and assign the unit type based on standardized guidelines. NDNQI staff then conducts a telephone conference with the site coordinator to review and confirm each unit type assignment. Unit type classifications are updated as needed as unit patients and care provided change occur over time.

NLRN characteristics

NLRN characteristics were collected from RNs participating in the 2013 NDNQI RN Survey, and included age, gender, race/ethnic group, highest level of education, usual shift worked, shift rotation, and professional tenure. Professional tenure was used to identify

the study sample. The question asked was: How many years have you worked as an RN in the United States? The response options included: <3 months, 3-6 months, 7-11 months, 1 year, 2 years, …….54 years, =>55 years. For this study, we included participants that selected the response options of 3-6 months, 7-11 months, or 1 year.

NLRN attitudes

NLRN attitudes, collected from RNs participating in the 2013 NDNQI RN Survey, included opinions regarding influence over work schedule, adequacy of orientation, quality of the care delivered on their unit, job satisfaction, and intent to stay in their current position. The items used to measure these attitudes are described below.

Intent to stay

NLRNs were asked "What are your job plans for the next year?" Response options include stay in my current position, stay in direct patient care but in another unit in the hospital, stay in direct patient care but outside this hospital, leave direct patient care but stay in the nursing profession, leave the nursing profession for another career, and retire. In the study reported here, we calculated the percent of NLRNs who selected the response option "stay in my current position." This item was developed for the RN Survey by NDNQI staff.

Job satisfaction

NLRNs were asked to indicate their level of agreement with the phrase "I am fairly well satisfied with my job." The six-point Likert-type response options ranged from strongly disagree (1) to strongly agree (6), with a higher score being a more positive rating. This

item was developed as part of the modification and addition of items from Brayfield and Roth's Job Enjoyment scale (Brayfield & Rothe, 1951; Taunton et al., 2004). The Job Enjoyment scale is a general measure of job satisfaction of any employee. This item was selected because it measures RN job satisfaction at the individual level, while other job enjoyment items are unit level measures.

Quality of care

NLRNs were asked to rate quality of care with the following question: In general, how would you describe the quality of nursing care delivered to patients on your unit? A four-point Likert-type response options included poor (1), fair (2), good (3), and excellent (4), with a higher score being the more positive rating. This item was developed by Dr. Aiken and colleagues (Aiken, Clarke, & Sloan, 2002; Aiken & Patrician 2000) and included in the NDNQI RN Survey with permission from Dr. Aiken.

Adequacy of orientation

NLRNs were asked to rate the quality of their orientation with the following question: "I received an orientation that adequately prepared me for my current position." The six-point Likert-type response options ranged from strongly disagree (1), to strongly agree (6), with a higher score being a more positive rating. This item was developed for the RN Survey by NDNQI staff.

Influence over schedule

NLRNs were asked to rate their influence over their schedule with the following item: "How much influence do you have over the hours or schedule that you work?" The five-

point Likert-type response options included very little (1), little (2), moderate (3), much (4), and very much (5), with a higher score being a more positive rating. This item was developed for the RN Survey by NDNQI staff.

DATA COLLECTION PROCEDURES

NDNQI data are collected on-line through the member website. Upon joining NDNQI, each hospital identifies a site coordinator who enters hospital characteristics, enrolls nursing units through the NDNQI member website, and serves as the primary point of contact with NDNQI. NDNQI offers the annual, web-based survey for a 3-week period during the months of April, May, June, August, September, and October. Site coordinators prepare for the RN Survey at the member website by completing the following tasks: register annually for the RN Survey, select a collection month, obtain a standardized data collection protocol and unique hospital identification code, select nursing units to participate in the survey from a list of their units enrolled in NDNQI, and enter the number of RNs on each unit that are eligible for the RN Survey.

Site coordinators publicize the survey internally, offer incentives within protocol guidelines, and distribute two reminder postcards during the 3-week data collection period. Prior to the survey, site coordinators distribute an invitation letter from their hospital's nursing administration listing the hospital's unique identification code RNs must enter on the web to participate in the survey. RNs can complete the survey from any computer (e.g., home computer) with internet access.

ETHICAL CONSIDERATIONS

Institutional review board (IRB) approval for protection of human rights for NDNQI and its component parts was provided by the University of Kansas Medical Center. All eligible RNs received an invitation letter from NDNQI describing the survey, informing them of procedures in place to protect their anonymity and confidentiality, including participant names are not collected, responses are submitted directly to NDNQI, participant demographics are only provided to their hospital aggregated to the hospital level, survey results are only provided to their hospital aggregated to the unit level for units with 5 or more responses, participation is voluntary, and jobs will not be affected if they choose not to participate. In addition, the letter from NDNQI includes contact information for NDNQI and the University of Kansas Medical Center's IRB.

To participate in the NDNQI RN Survey, hospital site coordinators are required to acknowledge they accept responsibility for (1) distributing the NDNQI survey invitation letter, (2) ensuring that jobs of eligible RNs are not affected by participation or nonparticipation, (3) ensuring that RNs are not monitored or watched while completing the survey, and (4) ensuring that names of RNs who respond or do not respond to the survey are not listed or tracked in any way.

DATA ANALYSIS

All NDNQI data are maintained as a relational database in a secure Microsoft Structured Query Language (SQL) Server data repository. Hospital characteristic, unit type, and RN Survey data are collected and stored in separate SQL tables. Data were extracted and then merged into one Statistical Program for Social Sciences (SPSS 20.0) data file for analysis.

Raw, individual level survey data were examined for missing items and logical consistency of responses to interdependent items. RN responses were deleted that did not include any responses to PES items. Logically inconsistent responses to inter-dependent items (e.g., age and tenure) were deleted. Prior to analysis, negatively worded items were reverse coded so that all items were positively oriented. All data had relatively normal distributions.

Descriptive statistics, including counts, percentages, means, and standard deviations, were used to address Aims 1 and 2 of this study. Aim 1 was to describe the types of hospitals and units in which NLRN work, and Aim 2 was to describe the demographic characteristics of NLRNs, as well as their reported job satisfaction and intent to stay in their current job. Aim 3, to explore unit type differences in NLRN job satisfaction and intent to stay, was explored using ANOVA and Chi Square procedures. Differences in job satisfaction were examined with ANOVA procedures. Because intent to stay in the current position were captured as yes or no responses, unit type differences were examined using Chi Square. An alpha level of $P<=0.05$ was used for tests of statistical significance.

RESULTS

NLRN HOSPITAL AND UNIT TYPES

The types of hospitals and units in which our sample of NLRNs were found to be working are described below, addressing study Aim 1. Our study sample of new RNs worked in a total of 259 hospitals (see Table 1). In the hospitals in our sample, NLRNs were found in selected unit types, all hospitals did not include all unit types or NLRNs in every unit type. NLRNs were found in adult medical-surgical in most, or 230 of the 259

hospitals, emergency department in 148 hospitals. Adult critical care units were found in approximately half, or 138 hospitals, obstetrics and neonate in 127 hospitals, adult step-down in 111 hospitals, and perioperative in 102 hospitals, and pediatrics in only 60.

Our sample included 250 general hospitals and 9 pediatric hospitals. All 9 pediatric hospitals included NLRNs in pediatric units, 7 hospitals included NLRNs in obstetric and neonate units, 7 hospitals included NLRNs in EDs, and only 3 hospitals included NLRNs in peri-operative units. The majority of the hospitals in the sample were non-teaching, between 100 and 299 beds in size, located in a metropolitan area, and were not designated as Magnets.

Our study sample included a total of 6,461 NLRNs (see Table 2). Overall, 72% worked in adult units, including 3,072 in adult medical-surgical units, 811 in adult step-down units, and 764 in adult critical care. The remaining NLRNs worked in obstetrics and neonate (549 NLRNs), emergency departments (520 NLRNs), 473 in pediatric units, and 272 in peri-operative units. Nearly 95 percent of new-graduates worked in general, rather than pediatric, hospitals. While a majority of the hospitals were in the 100-299 bed range, hospitals of this size represented only 38% of NLRN, with 32% found in hospitals with +>500 beds. Corresponding to hospital characteristics, the majority of NLRNs were found in metropolitan and non-Magnet hospitals, although more NLRNs were found in teaching rather than the more numerous non-teaching hospitals.

NLRN CHARACTERISTICS

The characteristics of NLRNs in the study sample, as well as their reported job satisfaction and intent to stay, are described below, addressing study Aim 2.

Table 3 displays the number and percentage of each RN characteristic overall and for each unit type. The percentage of NLRN who are female was 88% overall, varying by unit type from 78% in emergency and 80% in adult critical care to 94% in obstetrics and neonate and in pediatrics and 98% in obstetrics and neonate. Most NLRNs in the sample (79%) were White/Non-Hispanic, varying from 76% in adult medical surgical to 85%in pediatrics. The majority of NLRNs (65%) obtained their BSN. The proportion of BSN educated NLRNs was highest in pediatrics (78%) and adult critical care (76%), and lowest in peri-operative (57%), emergency (60%) and adult medical surgical (61%). Overall, 75% of NLRNs reported they intend to stay in their current position over the next year. NLRNs in adult medical surgical (69%) and step-down (70%) units reported the lowest intention to stay, while NLRNs in adult critical care, obstetric and neonate, and peri-operative reported the highest at 86% each.

Table 4 displays the mean score for individual RN characteristics overall and by unit types. The mean age of the sample overall was 28 years, and ranged from 27 in pediatrics to 30 in peri-operative units. Overall, NLRNs rated the quality of care delivered on the unit in general to be good (Mean=3.41), with the exceptions being NLRNs in obstetrics and neonate (Mean=3.57), adult critical care (Mean=3.61), and pediatrics (Mean=3.67) who rated the quality of care as excellent. Overall, NLRNs rated their influence over their schedule as moderate (Mean=3.24), with the only exception being NLRNs in peri-operative who rated their influence as little (Mean=2.43). Overall and within all unit types, NLRNs agreed that their orientation was adequate. Overall, NLRNs agreed they were satisfied with their job (Mean=4.58), with the only exception being adult medical-surgical, who only somewhat agreed (Mean=4.45).

UNIT TYPE DIFFERENCES

Unit type differences in NLRN reported job satisfaction and intent to stay in their current position are described below, addressing study Aim 3. Unit type differences are also described for NLRN perceptions of quality of care delivered on their unit and the adequacy of their orientation in preparing them for their current position.

Differences Among Unit Types in Mean Rates of Quality of Care

A one-way analysis of variance was conducted to evaluate the relationship between new RNs rating of quality of care between different unit types. The independent variable included unit types and 7 unit types were included. The dependent variable was the new RNs rating of quality of care. The ANOVA was significant, F (6, 6441) = 39.04, p = .000. The strength of the relationship between the new RNs rating of quality of care and the unit type they worked on, as assessed by the partial eta squared results, was small, with the unit types accounting for 4% of the variance of the dependent variable.

Follow-up tests were conducted to evaluate pairwise differences among the means (see Table 5). The results of theses tests, as well as the means and standard deviations for the seven unit types, are reported in Table 5. Pediatrics and critical care were significantly different than perioperative, ED, step-down, and medical-surgical. OB was significantly different than ED, step-down, and medical-surgical. Peri-op was significantly different than medical-surgical. There was a significant difference across the 7 different unit types regarding quality of care, depicted by the ANOVAs with Bonferri post hoc. All RNs rated between the good and excellent range of 3-4 when describing the quality of care they provided. The ANOVA showed that NLRNs working in pediatrics, critical care, and OB were

the most satisfied compared to step down and medical-surgical who were the least satisfied. Specifically, pediatrics ranked the highest in quality of care (t-score 3.67) and medical-surgical graded the lowest (t-score 3.34).

Differences Among Unit Types in Mean Rates of Adequate Orientation

A one-way analysis of variance was conducted to evaluate the relationship between new RNs rating of adequacy of orientation between different unit types. The independent variable included unit types, which included 7 different unit types. The dependent variable was the new RNs rating of adequacy of orientation. The ANOVA was significant, F (6, 6392) = 6.80, p = .000. The strength of the relationship between the new RNs rating of adequacy of orientation and the unit type they worked on, as assessed by the partial eta squared results, was small, with the unit types accounting for 1% of the variance of the dependent variable.

Follow-up tests were again conducted to evaluate pairwise differences among the means. The results of theses tests, as well as the means and standard deviations for the seven unit types, are reported in Table 6. All unit types were significantly better than perioperative regarding adequacy of orientation. Pediatrics was significantly better than both medical-surgical and perioperative. Significance across the 7 unit types for adequate orientation was not as marginal, but still yielded some substantive results. All NLRNs ANOVA results showed that they categorized between tend to agree and agree for adequate orientation based on unit type. The results from this ANOVA showed that NLRNs working in pediatrics, critical care, and step down had the best orientation; whereas, medical-surgical and perioperative had the lowest levels of orientation. Overall, pediatrics reported

the highest adequacy of orientation (t-score 5.24) and perioperative showed the lowest (t-score 4.80).

Differences among Unit Types in Mean Rates of Job Satisfaction

A final one-way analysis of variance was conducted to evaluate the relationship between new RNs rating of job satisfaction among different unit types. The independent variable included unit types, which included 7 different unit types. The dependent variable was the new RNs rating of job satisfaction. The ANOVA was significant, F (6, 6451) = 21.12, p = .000. The strength of the relationship between the new RNs rating of job satisfaction and the unit type they worked on, as assessed by the partial eta squared results, was small, with the unit types accounting for 2% of the variance of the dependent variable.

Follow-up tests were again conducted to evaluate pairwise differences among the means. The results of theses tests, as well as the means and standard deviations for the seven unit types, are reported in Table 7. Pediatrics was significantly better than perioperative, step down, and medical-surgical concerning job satisfaction. OB, critical care, and ED were significantly better than both step down and medical-surgical. Differences between unit types in mean rates of job satisfaction were significant. Results for this test showed pediatrics, OB, and critical care produced the highest job satisfaction while its counterparts, step down and medical-surgical, constructed the lowest job satisfaction of the 7 unit types. The mean data reported from this ANOVA for the seven unit types fell into tend to agree or agree. As a whole, pediatrics ranked the highest of the 7 unit types (t-score 4.86) and medical-surgical scored the lowest (t-score 4.45).

Unit type Differences in Intent to Stay in Current Position

A Chi Square test was performed to determine intent to stay across the seven unit types. The Chi Square was significant, χ^2 (1,6) = 190.552, $p \leq 0.000$. The independent variable was the seven selected unit types and the dependent variable was the new RNs intent to stay in their current position. No follow-up tests were conducted. Overall, perioperative, OB, and critical care reported the highest intent to stay while step-down and medical-surgical reported the lowest.

Overall, medical-surgical units are home to nearly half of new RNs after graduation and were found in 230 of 259 hospitals. Over 90% of NLRNs worked in general hospitals, and the majority of NLRNs were found in the metropolitan area. Most newly licensed RNs were BSN prepared, white and female. The ratio of women to men varied throughout the units with the ED displaying the lowest percentage of women at 78. Critical care NLRNs perceived they had the highest control over their schedule with perioperative having the lowest. Amongst the 7 unit types, pediatrics demonstrated the highest level of job satisfaction, quality of care in general, and adequacy of orientation. Medical-surgical scores were the lowest of the 7 unit types for job satisfaction and quality of care. Perioperative exhibited the lowest score in adequacy of orientation across the 7 units. Perioperative, OB, and critical care reported the highest levels of intent to stay while medical-surgical reported the lowest.

DISCUSSION

This study supports previous findings that NLRNs are currently leaving their first job at a high rate. This research furthers previous studies by identifying unit level variations for new graduate RNs leaving their initial job. There is a good amount of research describing

job satisfaction and quality of care, but not specific to unit types in which new graduate RNs work. As mentioned previously, these results are important because NLRNs help set the platform for providing healthcare to future generations.

We found that new licensed RNs display the highest job satisfaction working in pediatric unit types. This finding supports previous research that has shown pediatrics have the highest levels of satisfaction for nurses in general. It furthers this evidence by showing that this satisfaction is evident upon entry into practice, not several years down the road. This research also showed that NLRNs working in medical-surgical units have the lowest job satisfaction. This finding is also congruent with previous research.

We found intent to stay is associated with unit type, ability to deliver quality care, and receiving an adequate orientation. Units reporting high level of job satisfaction also reported high levels of perceived quality of care delivered. It is likely that when nurses are satisfied they feel that the care they provide is positively impacting the patients being cared for. This is evident through our results because pediatrics, OB, and critical care reported the highest levels of job satisfaction and quality of care delivered. Similarly, step down and medical-surgical scored lowest in job satisfaction and quality of care delivered. Based on these findings, it is probable that increasing job satisfaction on a unit would increase quality of care as well.

Findings also show that around 60 percent of NLRNs begin their career in an adult medical-surgical or telemetry unit. This means that approximately 3 out of 5 new nurses are starting their nursing career on units that display the lowest job satisfaction, quality of care, and intent to stay of these 7 unit types. After one year step-down nurses report a 70

percent intent to stay and medical-surgical 69. With intent to stay being a large predictor of nurse turnover, these findings support previous research findings that identify these two unit types as having the highest levels of turnover.

Our results also show that most units with high orientation levels are more satisfied with their jobs and perceive their quality of care delivered to be higher. The main exception to this finding was step down units. They ranked 3rd in adequacy of orientation and 6th in job satisfaction. We believe this may be due to the high level of orientation required to develop a sufficient understanding of their job and the tasks it required. This may cause the new RN to have a higher level of orientation because of the extensive time and explaining necessary for this unit type. However these NLRNs show lower levels of job satisfaction. This could be due to the high work demands and increased patient load with patients at an intermediate acuity level. This causes these RNs to perform a great deal of tasks, similar to that of a critical care nurse, but with lower patient acuity levels, while juggling close to the same patient load as a medical-surgical nurse.

LIMITATIONS AND RECOMMENDATIONS/CONCLUSIONS

Limitations: Study was limited to hospitals using the NDNQI RN survey, hospitals in the US, RNs employed one year or less, and general and pediatric hospitals, limiting generalizability of the findings.

Understanding these results informs the new graduate RN about the current perceived job satisfaction level on the unit in which they may be employed. For NLRNs, this allows for a broader understanding beyond job satisfaction of what to expect for each unit type and the weaknesses of the varying units. For example, if a NLRN desired to have control

over their schedule but was not concerned about job satisfaction this data shows they might not want to go into pediatrics. This study also informs unit managers on areas that need improvement. For managers, this draws attention to the need to improve certain units to increase NLRN's perceptions and ultimately facilitate increased retention and satisfaction. This information also gives NLRNs and managers a baseline for comparison of many important characteristics that help determine turnover from unit to unit. With this information NLRNs can compare units of interest in hopes to start practice in a unit that best aligns with their wants and needs. This study also allows managers to see how they rank compared to other units, which could prompt managers to adopt strategies from other units to increase NLRN intent to stay.

Residency programs have yielded results showing they increase nurse retention. Recommendations for future research might explore the effects of hospitals with residency programs on intent to stay and compare those findings to hospitals without residency programs. Future research could also explore frequency of residency programs by unit type. This would show how these programs affect intent to stay by unit.

APPENDIX A

Table 1. Number of Hospitals by Hospital Characteristic and Unit Type

Hospital Characteristic	Number of Hospitals							
	Total	Adult Critical Care	Adult Step Down	Adult Medical Surgical	Obstetrics and Neonate	Peds	Peri-op	ED
Total	259	138	111	230	127	60	102	148
Hospital Type								
General	250	138	111	230	120	51	99	141
Pediatric	9	0	0	0	7	9	3	7
Hospital Bed Size								
1-99	56	13	13	41	18	1	17	21
100-199	87	39	31	79	37	20	32	47
200-299	50	30	22	45	29	13	20	31
300-399	28	22	15	27	15	8	9	17
400-499	15	14	12	15	8	7	7	12
>=500	23	20	18	23	20	11	17	20
Hospital Teaching Status								
Academic Medical Center	22	20	17	21	18	12	16	16
Teaching	101	62	39	91	51	34	37	61
Non-Teaching	136	56	55	118	58	14	49	71
Metropolitan Status								
Non-Metropolitan	4	0	1	2	1	0	0	2
Micropolitan	38	18	12	32	18	7	17	19
Metropolitan	217	120	98	196	108	53	85	127
Magnet Status								
Magnet	71	46	44	66	43	17	38	43
Non-Magnet	188	92	67	164	84	43	64	105

Table 2. Number of Newly Licensed RNs by Hospital Characteristic and Unit Type

Hospital Characteristic	Number of NLRNs							
	Total	Adult Critical Care	Adult Step Down	Adult Medical Surgical	Obstetrics and Neonate	Peds	Peri-op	ED
Hospital Type	6461	764	811	3072	549	473	272	520
General	6137	764	811	3072	494	243	264	489
Pediatric	324	0	0	0	55	230	8	31
Hospital Bed Size								
1-99	289	22	30	143	36	3	25	30
100-199	1208	74	118	652	106	89	60	109
200-299	1243	118	119	535	128	182	32	129
300-399	959	164	93	507	67	12	29	87
400-499	668	81	141	292	53	28	21	52
>=500	2094	305	310	943	159	159	105	113
Hospital Teaching Status								
Academic Medical Center	1834	295	260	738	150	185	103	103
Teaching Hospital	2639	288	312	1271	227	259	79	203
Non-Teaching	1988	181	239	1063	172	29	90	214
Metropolitan Status								
Non-Metropolitan	12	0	3	5	2	0	0	2
Micropolitan	458	51	39	247	42	10	34	35
Metropolitan	5991	713	769	2820	505	463	238	483
Magnet Status								
Magnet Hospital	2780	350	388	1374	213	137	129	189
Non-Magnet Hospital	3681	414	423	1698	336	336	143	331

Table 3. Numbers and Percents of RNs by RN Characteristics and Unit Type

RN Characteristic	All Unit Types	Adult Critical Care	Adult Step-down	Adult Medical-Surgical	Obstetrics and Neonate	Peds	Peri-Op	Emergency
					N (%)			
Gender								
Male	747 (12%)	151 (20%)	104 (13%)	308 (10%)	10 (2%)	27 (6%)	38 (14%)	109 (21%)
Female	5677 (88%)	611 (80%)	705 (87%)	2741 (89%)	537 (98%)	444 (94%)	234 (86%)	405 (78%)
Race								
White/Non-Hispanic	5070 (79%)	637 (83%)	629 (78%)	2342 (76%)	449 (82%)	401 (85%)	209 (77%)	403 (78%)
Nursing Education								
Diploma	63 (1%)	10 (1%)	9 (1%)	28 (1%)	2 (0.4%)	1 (0.2%)	1 (0.4%)	12 (2%)
ADN	2202 (34%)	175 (23%)	267 (33%)	1172 (38%)	171 (31%)	105 (22%)	116 (43%)	196 (38%)
BSN	4196 (65%)	579 (76%)	535 (66%)	1872 (61%)	376 (69%)	367 (78%)	155 (57%)	312 (60%)
Usual Shift								
Day	2466 (38%)	223 (29%)	328 (40%)	1238 (40%)	145 (26%)	138 (29%)	230 (85%)	164 (32%)
Evening	456 (7%)	32 (4%)	32 (4%)	209 (7%)	23 (4%)	18 (4%)	36 (13%)	106 (20%)
Night	2703 (42%)	360 (47%)	335 (41%)	1265 (41%)	320 (58%)	217 (46%)	2 (1%)	204 (39%)
No Shift	813 (13%)	148 (19%)	113 (14%)	350 (11%)	59 (11%)	97 (21%)	4 (2%)	42 (8%)
No Shift Rotation	4829 (75%)	543 (71%)	609 (75%)	2321 (76%)	433 (79%)	311 (66%)	232 (85%)	378 (73%)
Stay in current position	4845 (75%)	653 (86%)	571 (70%)	2113 (69%)	466 (86%)	390 (83%)	234 (86%)	418 (80%)

Table 4. Mean RN Characteristics by Unit Type

RN Characteristic	All Unit Types	Adult Critical Care	Adult Step-down	Adult Medical-Surgical	Obstetrics and Neonate	Pediatrics	Peri-Op	Emergency
Age	28.35	27.43	27.92	28.83	27.67	26.58	30.44	28.81
Quality of Care in general[1]	3.43	3.61	3.39	3.34	3.57	3.67	3.47	3.40
How much influence over schedule[2]	3.24	3.43	3.31	3.27	3.28	3.21	2.43	3.09
Adequate Orientation[3]	5.06	5.12	5.11	5.02	5.09	5.24	4.80	5.05
Satisfied with my job[3]	4.58	4.74	4.51	4.45	4.77	4.86	4.56	4.73

[1]Response options: poor (1), fair (2), good (3), excellent (4)
[2]Response options: very little (1), little (2), moderate (3), much (4), very much (5)
[3]Response options: strongly disagree (1), disagree (2), tend to disagree (3), tend to agree (4), agree (5), strongly agree (6)

Table 5. Quality of Care ANOVA Follow-up Tests

	Mean[1]	Standard Deviation	Pediatrics	Critical Care	OB	Peri-Op	ED	Step Down
Pediatrics	3.67	.506						
Critical Care	3.61	.535	NS					
OB	3.57	.568	NS	NS				
Perioperative	3.47	.582	*	*	NS			
ED	3.40	.597	*	*	*	NS		
Step Down	3.39	.606	*	*	*	NS	NS	
Medical-Surgical	3.34	.645	*	*	*	*	NS	NS

[1]Response options: poor (1), fair (2), good (3), excellent (4)
NS=non-significant
*p<=.05

Table 6. Adequate Orientation ANOVA Follow-up Tests

	Mean[1]	Standard Deviation	Pediatrics	Critical Care	Step Down	OB	ED	Medical-Surgical
Pediatrics	5.24	.931						
Critical Care	5.12	1.008	NS					
Step Down	5.11	.999	NS	NS				
OB	5.09	1.006	NS	NS	NS			
ED	5.05	1.069	NS	NS	NS	NS		
Medical-Surgical	5.02	1.047	*	NS	NS	NS	NS	
Perioperative	4.80	1.166	*	*	*	*	*	*

[1]Response options: strongly disagree (1), disagree (2), tend to disagree (3), tend to agree (4), agree (5), strongly agree (6)
NS=non-significant
*p<=.05

Table 7. Job Satisfaction ANOVA Follow-up Tests

	Mean[1]	Standard Deviation	Pediatrics	OB	Critical Care	ED	Peri-Op	Step Down
Pediatrics	4.86	.930						
OB	4.77	1.007	NS					
Critical Care	4.74	.977	NS	NS				
ED	4.73	.998	NS	NS	NS			
Perioperative	4.56	1.040	*	NS	NS	NS		
Step Down	4.51	1.047	*	*	*	*	NS	
Medical-Surgical	4.45	1.101	*	*	*	*	NS	NS

[1]Response options: strongly disagree (1), disagree (2), tend to disagree (3), tend to agree (4), agree (5), strongly agree (6)
NS=non-significant
*p<=.05

Table 8. NLRN Intent to Stay (%) by Unit Type

Unit Type	Intent to Stay%
Perioperative	86 %
OB	86 %
Critical Care	86 %
Pediatrics	83 %
ED	80 %
Step Down	70 %
Medical-Surgical	69 %

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