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Effect of Clinical Hours and Program Type on NCLEX Pass Rates

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This is to certify that the doctoral dissertation by

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Walden University
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Abstract

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MSN, San Jose State University, 2004

BSN, Norwich University 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Clinical education is an essential portion of prelicensure nursing education throughout the United States. There is a lack of research examining clinical education in nursing programs and minimum competency for entry into practice as measured by the National Council Licensure Exam (NCLEX) results and differences in levels of care between associate degree (ADN) nurses and bachelor's degree (BSN) nurses. The purposes of this study, guided by Benner's novice to expert theory, were to determine whether the total number of clinical hours, program type (ADN vs. BSN) ,simulation hours, patient care clinical hours, and skills lab hours between ADN and BSN predict NCLEX pass rates. Data included 119 responses for Research Questions 1 and 3, and 168 responses for Research Question 2. Overall multiple linear regression model was not statistically significant, meaning the predictors (program type, the total number of clinical hours, patient care clinical hours, simulation hours and skills lab hours) did not predict NCLEX pass rates. There was a significant difference in the total number of clinical hours and patient care clinical hours between ADN and BSN programs. More research is needed to determine the ideal number of clinical hours which are needed to adequately educate new nurses from both ADN and BSN programs for practice. These results can promote positive social change by informing nursing education about clinical hours so that nurses are better prepared for practice.

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Part 1: Overview

Introduction

Nurses are currently experiencing high vacancy and turnover rates of 8% and 17% respectively (Nursing Solutions Inc., 2019). Research has suggested that new nurses are feeling unprepared for practice, causing them to leave the bedside (Ackerson & Stiles, 2018; Monaghan, 2015; Odland, Sneltvdt, & Sörlie, 2014). The nursing shortage is leading to understaffed units and poor patient outcomes such as increased hospital-acquired infections, cost of care, and increased patient morbidity and mortality (Kennedy, Tevis, & Kent, 2014; Kutney-Lee et al., 2009; Nursing Solutions Inc., 2016).

One aspect that affects the preparedness of nurses to enter practice is their prelicensure education. Nursing prelicensure education is tasked with preparing safe and competent nurses prepared to practice in a constantly changing practice (Ruth-Sahd, 2014). Nursing education contains two components: theory and clinical (Jeppesen, Christiansen, & Frederiksen, 2017; National Council of State Boards of Nursing [NCSBN], 2005). The theoretical nursing education includes theory and medical knowledge, whereas clinical training consists of the practical application of theoretical knowledge. Researchers have studied best practices in the theoretical education of nursing students to obtain competency (Horntvedt, Nordsteien, Fermann, & Severinsson, 2018; Kalb, O'Conner-Von, Brockway, Rierson, & Sendelbach, 2015; Obermann, De Gagne, & Phillips, 2018; Smith & Fitzpatrick, 2006). But currently, there is little published research to support best clinical education practices in prelicensure clinical education. Furthermore, nursing schools are experiencing larger class sizes and

enrollment numbers as a result of attempts to try and alleviate nursing shortages by training more nurses. As a result of not only the increasing number of students but also the difficulty nursing schools have in obtaining clinical placements, instructors are developing teaching strategies outside of clinical hours to allow students to learn important nursing care skills (NCSBN, 2005). Due to these changes in clinical education of nursing students, further research is needed in the area of clinical education.

Background

With clinical experience, or clinical hours in prelicensure programs, nurses gain competency and move from novice to expert in their fields (Benner, 1984). However, there is a significant variation in the number of clinical hours required in prelicensure nursing programs (NCSBN, 2005, 2018; Smiley, 2019). Some states regulate the minimum number of clinical hours nursing students must complete before being eligible to take the National Council Licensure Examination (NCLEX; NCSBN, 2018, Spector, Hooper, Silvestre, & Qian, 2018), but these hours vary from 400 to over 1,000 (NCSBN, 2018). The variation also ranges between program types, where Bachelor of Science in nursing (BSN) programs have ranged from 432 to 960 and associate degree (ADN) programs ranged from 270 to 855 (Smiley, 2019). Though minimum clinical competencies may be met by students if they pass an accredited nursing program, clinical requirements may vary greatly between programs and degree type (Lewallen, 2019; NCSBN, 2005; Poster et al., 2005; Rice, 2015). But there has been no evidence to support the minimum number of clinical hours needed to establish competency in prelicensure clinical education (Bowling, Cooper, Kellish, Kubin, & Smith, 2018). Therefore, the

relationship between prelicensure clinical hours and minimum competency as measure by NCLEX pass rates warrants further examination. Researching the relationship between prelicensure clinical hours and NCLEX pass rates is an initial step to determining the relationship between prelicensure clinical education and nursing competency.

Although authors stress the importance of quality of clinical education (Benner, Sutphen, Leonard, & Day, 2010; Bradley et al., 2019; Spector et al., 2018), authors do not agree on the specific clinical education practices that lead to a quality clinical education (Caputi, 2018; Jeppesen et al., 2017; Poster et al., 2005; Rice, 2015; Smiley, 2019; Spector et al., 2018). Further, there is a lack of evidence to support the quantity of prelicensure clinical education (Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector et al., 2018). There is wide variation in clinical education practices such as number of hours, number of days, and length of clinical days across clinical education programs (NCSBN, 2005; Spector et al., 2018; Smiley, 2019). Additionally, studies evaluating best clinical education techniques have shown limitations such as evaluating perceived confidence rather than objective competence and having small sample sizes (Flott & Linden, 2015; Grealish et al., 2018; Jayasekara et al., 2017; Poster et al., 2005; Rice, 2015). Further confounding this problem is that clinical evaluation tools lack validity and reliability, which may explain why new nurses are often feeling unprepared for practice (Lewallen, 2019; Wu, Enskär, Lee, & Wang, 2015).

New nurses feeling unprepared for practice is commonly referred to as the theory–practice gap (Hickerson, Taylor, & Terhaar, 2016; Hussein & Osuji, 2016; Saifan, AbuRuz, & Masa’deh, 2015). The theory–practice gap has been found to be at least

partially responsible for the low nursing retention rates and the nursing shortage (Ackerson & Stiles, 2018; Hickerson et al., 2016; Hussein & Osuji, 2016; Monaghan, 2015; Odland et al., 2014; Spector et al., 2015). Though the literature has focused on transition into practice programs to elevate this gap (Marion, Marie, Bernadette, Nick, & Keithia, 2015; Read & Laschinger, 2017; Goode, Ponte, & Havens, 2016), more research on prelicensure clinical education may help narrow the theory–practice gap for prelicensure nurses (Caputi, 2018; Rice, 2015).

To better understand the theory–practice gap, it is necessary to look at the variety of settings in which prelicensure nurses may spend the required clinical hours. The three main areas that are included in prelicensure clinical education are simulation, patient care, and skills lab hours (NCSBN, 2005). Patient care clinical hours are the traditional foundation of nursing clinical education (Jeppesen et al., 2017). Patient care clinical hours include time when students practice with real patients (Jeppesen et al., 2017; Forber et al., 2016; NCSBN, 2005). Skills lab hours include learning or practice new psychomotor skills in a controlled lab environment (Jeppesen et al., 2017; Haraldseid, Friberg, & Aase, 2015). Finally, prelicensure clinical students may also spend clinical time caring for simulated patients in a controlled environment, referred to as simulation (Bradley et al., 2019; Gore & Thomson, 2016).

Patient care clinical hours are an essential component of undergraduate nursing programs (Bradley et al., 2019; California Board of Registered Nursing, 2016; Forber et al., 2015; Jayasekara et al., 2018; NCSBN, 2005; Spector et al., 2018). Authors have studied the effectiveness of different types of patient care clinical models that include

preceptor models, clinical facilitator models, and dedicated education unit models (Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018). Preceptor models of clinical education are when students are placed with a nurse preceptor or mentor in a patient care facility. In the preceptor model students are guided through the clinical experience by a registered nurse (RN) who is employed by the clinical facility and is working in that facility as an RN (Forber et al., 2016; Jayasekara et al., 2018). The clinical facilitator model is the traditional clinical education model used in the United States (Forber et al., 2016). In the model, the clinical facilitator is faculty employed by the college or university who guides student learning at the clinical facility through a variety of teaching and learning techniques (Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018). The final clinical education model is the dedicated education unit, which uses clinical facilitators on a unit provided by the facility including nurses who facilitate student learning and integration into the role of the RN in a collaborative environment (Forber et al., 2016; Jayasekara et al., 2018). Although a variety of studies have examined the different educational models, research has not supported the superiority of any of the clinical education models or the best number of hours for students to spend in the clinical setting (Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018).

Even within these teaching models, research shows that there is variation in types of education and clinical experiences (Flott & Linden, 2015; Grealish et al., 2018; Jeppesen, Christiansen, & Fredriksen, 2017; Torabi & Zadeh, 2018). Student instruction can come from either the nurse faculty or the RN working with the student (Flott & Linden, 2015; Jeppsen et al., 2017). There is a variety of qualifications for RNs

supervising students in clinical ranging from 5 years of experience and taking a hospital provided course to no requirements at all (Flott & Linden, 2015). Teaching and learning strategies and the facilities where students are placed for clinical education also vary between institutions and instructors (Forber et al., 2016; Pai, 2016; Stomski et al., 2018). Furthermore, there is no standardized way to assess the clinical competence of nursing students or newly graduated nurses (Lewallen, 2019; Poster et al., 2005; Rice, 2015; Wu et al., 2015). These factors add an additional complexity to researching clinical education, as research has not established best practices in clinical education models, placements, or teaching and learning strategies (Flott & Linden, 2015; Grealish et al., 2018; Jeppsen et al., 2017; Sharghi, Alami, Khosravan, Mansoorian, & Ekerami, 2015; Torabi & Zadeh, 2018). Therefore, further research is warranted on patient care clinical hours and the amount of time that students spend in the clinical environment or on clinical education activities.

Along with patient care hours, skills lab hours are a portion of clinical education, though students do not interact with patients but rather learn and practice skills in a controlled learning environment (Bugaj & Nikendel, 2016). The skills lab environment generally includes both didactic instruction on clinical skills and opportunities for students to observe and practice clinical skills in a safe environment prior to performing these skills on actual patients (Bugaj & Nikendel, 2016; Sahu, Chattu, Rewatker, & Sakhamuri, 2019). One important aspect of clinical hours spent in the skills lab is that students are provided opportunities to practice clinical skills with direct observation from an instructor or a peer to provide feedback so the student may improve the clinical skills

(Bugaj & Nikendel, 2016; Sahu, et al., 2019). Education in the skills lab setting can take a variety of forms, including low fidelity simulation or simulated skills training, deliberate practice, peer-assisted learning, role playing, and problem-based learning (Bugaj & Nikendel, 2016; Sahu et al., 2019; Struksnes & Engelien, 2016). The primary purpose of skills labs is to allow students to become proficient in skills in a controlled environment prior to applying these skills in the clinical environment, to decrease the risk of harm to patients, and improve the quality of patient care (Bugaj & Nikendel, 2016; Sahu et al., 2019; Struksnes & Engelien, 2016). However, in the skills lab, students do not experience all the complexities of patient care (Bugaj & Nikendel, 2016; Sahu, et al., 2019). Therefore, many state boards of nursing regulate the amount or percentage of clinical time that may be spent in the skills lab (California Board of Registered Nursing, 2019; NCSBN, n.d., 2005). Further, the number of skills lab hours in a nursing program and its relationship to NCLEX pass rates warrants further investigation.

Simulation is similar to skills lab hours in that it does not involve caring for actual patients (Palaganas, 2015). In simulation, students can practice skills, critical thinking, and clinical decision making in a controlled environment where no harm can come to patients (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). However, simulation differs from skills lab hours in that students are expected to care for simulated patients in a simulated hospital environment (Hayden et al., 2014; Palaganas, 2015). Simulation uses high fidelity manikins that have a variety of life-like capabilities that allow students to perform a variety of tasks and skills (Hayden et al., 2014; Palaganas, 2015). Simulation is also being used by nurse educators to improve students' clinical

judgment and remediate underperforming students (Fey & Kardong-Edgren, 2017; Johnson et al., 2012; Lavoie, Pepin & Cossette, 2014; Lindsey & Jenkins, 2013; Lock, 2019) by letting them practice a skill in a complex simulated environment on high fidelity manikins rather than live patients (Palaganas, 2015). Students are observed by instructors in simulation and receive feedback from instructors and peers after the simulation is complete (Hayden et al., 2014; Palaganas, 2015). However, students do not receive direct instruction and multiple chances to perform one skill but rather focus on providing comprehensive care to the manikin in the simulated care environment (Hayden et al., 2014; Palaganas, 2015).

There has been significant research on simulation environments, strategies to facilitate simulation, and how to facilitate learning from the simulations learners participate in (Battista, 2017; Brown, Wong, & Ahmed, 2018; Cheng, Eppich, Grant, Sherbino, Zendejas, & Cook, 2014; Kelly, Berragan, Husebø, & Orr, 2016; Sittner et al., 2015; Wiggins, 2018). Best practices in simulation have also been outlined by organizations such as the National League for Nursing (n.d.) and Society for Simulation in Health Care (2018) to guide the use of simulation in healthcare and in nursing education. These organizations also support the education of faculty in simulation and the use of simulation in education to further support best practices in simulation in education (National League for Nursing, n.d., Society for Simulation in Health Care, n.d.). This support may lead to simulation being a strong method of clinical education for nursing students increasing NCLEX pass rates.

Simulation is also being used to replace clinical hours in many nursing programs (Alexander et al., 2015; Beroz, 2017; Bradley et al., 2019; Gore & Thomson, 2016). Researchers agree that 50% of traditional clinical hours can be replaced with simulation without impeding traditional measures of student success such as meeting program objectives, grade point average, passing national licensing exams, and self-perceived readiness to practice (Hayden et al., 2014; Meyer, Connors, Hou, & Gajewski, 2011; Schlairet & Fenster, 2012; Sportsman, Schumacker,& Hamilton, 2011; Watson et al., 2012). Although there is support that up to 50% of clinical hours can be replaced with simulation hours without a negative effect on students, no published research has evaluated the number of hours students spend in simulation to student outcomes.

Further, though simulation can be used to replace clinical hours in nursing education, there is a wide variety in simulation use and the percentage of clinical replaced by simulation (Bradley, Jhonson, Dreifuerst, Conde, & Curry-Lourenco, 2019; Breymier et al., 2015; Smiley, 2019). Bradley et al. (2019) found that of 50 states surveyed 30 boards of nursing had documented regulations on simulation use in nursing programs. Of those, 13 allowed up to 50% of clinical time replaced with simulation hours, two allowed 30%, seven allowed 25%, four did not specify the number of hours that could be allowed, and six had percentages that varied based on program or simulation characteristics. Adding to this variation is that schools may use simulation in substitution for clinical hours at different ratios and that these ratios are inconsistently reported (Bradley et al., 2019; Breymier et al, 2015; Smiley, 2019). Furthermore, the regulations from boards of nursing regarding the ratio of simulation to clinical hour replacement also varies greatly:

three have allowed the replacement of clinical with simulation at a 1:1 ratio, one allowed a ratio of 1:1 or 1:2, and the other 25 boards of nursing did not define an equivalence ratio (Bradley et al., 2019). Due to this wide variation in simulation percentages and use across states, further research is warranted regarding the number of hours students spend in simulation and resulting competency as measured by NCLEX pass rates.

Another aspect of prelicensure clinical education that warrants further investigation is the difference in education of BSN and ADN prelicensure nursing students. Authors have found that hospitals who employ more nurses who possess higher levels of education had lower morbidity and mortality rates (Aiken, Clarke, Cheung, Salone, & Silber, 2003; Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013; Blegen, Goode, Park, Vaughn, & Spetz, 2013; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005; Tourangeau et al., 2007). Nurses with a BSN degree or higher also had lower rates of failure to rescue and appear to have improved clinical judgement compared to diploma an ADN prepared nurses (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Belegen et al., 2013). This evidence of improved patient outcomes has been used to mandate that the BSN degree should be the minimum for entry into practice as an RN (American Association of Colleges of Nursing, 2019). However, some have argued that both ADN and BSN programs prepare nurses for entry into practice, as both degrees prepare students to pass the NCLEX (Cabaniss, 2014).

ADN prepared nurses have also experienced more challenges coordinating care for patients in an interdisciplinary team and showed some limitations in data analysis, handoff reporting, and beginning critical conversations with the interdisciplinary team

compared to BSN prepared nurses (Loversidge et al., 2018). But although ADN programs have shown some limitations in clinical education, BSN programs have also shown some limitations (Loversidge, et al, 2018; Melnyk et al., 2018). Both ADN and BSN prepared nurses have lacked in meeting evidence-based practice competencies, although BSN prepared students were slightly better at meeting the competencies than ADN students (Melynk et al., 2018). Further arguments have been made that baccalaureate clinical education is not producing nurses adequately educated to meet the needs of the healthcare environment (Hickey, 2010).

Although competencies of ADN, BSN, and all prelicensure clinical education has been examined, authors do not agree on the definition of the concept or the minimum standards to achieve clinical competence (Cabaniss, 2014; Diede, McNish, & Coose, 2000; Poster et al., 2005; Torabi & Zadeh, 2018; Garside & Nhemachena, 2013; Uley-Smith, 2004). Research has also focused on patient safety and the development of advanced clinical competencies in RN to BSN programs, suggesting that ADN students benefit from further clinical education to enhance their performance to meet the level of BSN clinical performance (Anbari & Vogelsmeier, 2018; Diede et al., 2000; Fisher, 2014; Northrup-Snyder, Menkens, & Dean, 2017). Therefore, further research is needed on clinical competency and clinical education of ADN and BSN nurses. Specifically, none of the authors examining clinical competency and clinical education examined the number or type of clinical hours used in programs to develop competency. Although Smiley (2019) did find that there was variation in the number of clinical hours in ADN and BSN programs, they did not determine if there was a statistically significant

difference between the two types of programs. Examining the number and type of clinical hours used in ADN and BSN programs and comparing these hours is an initial step in identifying differences in the clinical education of ADN and BSN nurses and could be used to create ADN programs that create nurses that are better prepared to provide the same level of care as BSN graduates.

Theoretical Framework

Benner (1984) created the novice-to-expert model, which explains how an individual gains knowledge and skills to move from the novice phase to the expert phase. Benner's theory is based on the Dreyfus model of skill acquisition and posits that clinical experience and time in the profession influence the speed in which an individual moves through the novice to expert phases (Benner, 1984; Benner, Chesla, & Tanner, 2009). Benner theorized that with experience nurses move through five stages: novice, advanced beginner, competent, proficient, and expert.

Authors generally agree that nurses with more education and in the more expert stages of Benner's theory provide higher levels of care (Aiken, Cimiotti, et al., 2011; Bathish, Wilson, & Potempa, 2018; Bobay, Gentile, & Hagle, 2009; Cho et al., 2015; Estabrooks et al., 2005; Jan & Popescu, 2014). Conversely, the novice nurse has no experience in a situation where they are expected to perform (Benner, 1984; Benner, Chesla, et al., 2009). The novice nurse lacks the confidence and experience to predict patient situations and to practice safe and effective care (Benner, Chesla, et al., 2009). The novice nurse requires supervision to practice safely (Benner, 1984; Benner, Chesla,

et al., 2009; Murray, Sundin, Cope, 2019; Ozdemir, 2019). A novice nurse is generally considered a nursing student in the beginning of their clinical practice (Ozdemir, 2019).

Advanced beginners have some experience that allows them to recognize meaningful repeated situations but provide a marginal level of care (Benner, 1984; Benner, Chesla, et al., 2009). Advanced beginners also possess the knowledge base needed but are continuing to develop skills and application of knowledge into practice (Benner, Chesla, et al., 2009; Murray et al., 2019; Ozdemir, 2019). Advanced beginner nurses continue to need occasional support to practice safely and effectively and generally focus on skills and tasks rather than the overall patient condition (Benner, Chesla, et al., 2009; Ozdemir, 2019). Newly graduated nurses and nurses within their first 6 months of practice are generally considered in the novice or advanced beginner level of Benner's (1984) theory (Benner, Chesla, et al., 2009; Grochow, 2008; Murray et al., 2019; Jan & Popescu, 2014; Solem & Stewart, n.d.).

Competent nurses are better able to cope with a wider range of situations than the advanced beginner (Benner, 1984; Benner, Chesla, et al., 2009). They are able to individualize nursing care to each of their patients and are able to predict standard patients' recovery (Benner, Chesla, et al., 2009; Murray et al., 2019). They are developing confidence in their ability to care for patients and can provide safe and effective care without immediate supervision (Benner, 1984; Benner, Chesla, et al., 2009; Murray et al., 2019). Competent nurses are continuing to develop their reflection and feedback on practice, which comes at later phases (Benner, Chesla, et al., 2009; Ozdemir, 2019). These nurses have generally been in practice for 1 to 2 years (Ozdemir, 2019).

Proficient nurses have a broader understanding of their patients' conditions and are better at understanding the entirety of the patient's situation (Benner, 1984; Benner, Chesla, et al., 2009; Jan & Popescu, 2014). Proficient nurses have developed their skills and knowledge sufficiently to enable them to respond appropriately to changing patient conditions (Benner, 1984; Murray et al., 2019; Ozdemir, 2019; Uhrenfeldt & Hall, 2007). Proficient nurses are also prepared to take on leadership roles when needed and mentor new nurses in the field (Benner, Chesla, et al., 2009; Ozdemir, 2019). Nurses have generally worked in the profession for 3 or more years to become proficient (Ozdemir, 2019).

Expert nurses have a broad vision of nursing care; they are able to make critical decisions intuitively and possess the knowledge and skills to implement innovative solutions (Benner, 1984; Benner, Chesla, et al., 2009; McHugh & Lake, 2010; Ozdemir, 2019). Expert nurses are better able to notice changes in conditions and intuitively predict problems and complications that may occur (Fraley, 2016; Ozdmir, 2019). Expert nurses are best prepared to not only mentor new nurses but also evaluate outcomes of the training programs for new nurses (Ozdmir, 2019; Thomas & Kellegren, 2017).

Proficiency increases with experience (Aiken, Clarke, Cheung, et al., 2003; Belgen, Vaugn, & Goode, 2013; Benner, 1984; Clarke, Rockett, Salone, & Aiken, 2002; Ju-Hui & Sook-Hee, 2018), but studies indicate that experience alone is not sufficient to move through Benner's novice to expert phases—rather, the types of experiences and reflection on experiences are important to move into expert practice (Aiken, Cimiotti, Sloane, Smith, Flynn, & Neff, 2011; Aiken, Clarke, Sloane, Lake, & Cheney, 2009;

Torabi & Zadeh, 2018). There has also been no association between nurses' years of experience and the safety of patient care provided (Kutney-Lee, Sloane, & Aiken, 2013; Lee et al., 2018). This may be because even advanced beginner nurses are able to provide safe care and the emphasis on safety in clinical education (Potter, 2018; Tanicala, Scheffer, & Roberts, 2011).

The lack of consensus on the relationship between experience and attainment of expertise warrants further investigation. Specifically, no studies have addressed the correlation of the number of clinical hours or amount of clinical experience in prelicensure education and graduate nurse competencies, and the type of clinical education of skills lab hours, patient care clinical hours, and simulation hours relationship to competency as measured by the NCLEX. Furthermore, due to the differences in quality of care seen between ADN and BSN nurses, further research comparing the clinical education of the two groups is warranted. Therefore, examining the relationship between the number of prelicensure clinical hours, types of clinical hours, and NCLEX pass rates as well as comparing ADN and BSN clinical education is an initial step to take in examining the relationship between clinical hours and prelicensure nurse competency.

Overview of the Manuscripts

Nursing education has traditionally used clinical education to prepare nurses for practice as an essential portion of nursing education (Bradley et al., 2019; Forber et al., 2015; NCSBN, 2005; Spector et al, 2018). However, there is little evidence to support the number of clinical education hours required for students to become competent new graduate nurses as measured by the NCLEX (Benner, Sutphen, et al., 2010; Bradley et

al., 2019; Spector et al., 2018). Evidence also supports that clinical education time is split up into three primary areas—patient care clinical hours, skills lab hours, and simulation hours—yet there is little evidence to support which methods best correlate with NCLEX pass rates (NCSBN, 2005; Smiley, 2019; Spector et al., 2018). Even though research shows that BSN nurses provide superior care to ADN nurses, there is little evidence showing differences in NCLEX pass rates between groups and no evidence showing significant differences in the clinical education of each group (Aiken, Sloane, et al., 2013; Blegen et al., 2013; Estabrooks et al., 2005; Tourangeau et al., 2007).

The purposes of the manuscripts were to determine whether there was a relationship between prelicensure clinical hours and competency, as measured by NCLEX pass rates, in the graduating nurses and determine whether there is a difference in NCLEX pass rates and clinical hours between BSN and ADN nursing graduates. I also compared the types of clinical hours of patient care hours, simulation hours, and lab hours to determine whether the type of clinical hours correlated with NCLEX pass rates, and I compared these hours between ADN and BSN groups to see whether there was a significant difference in the clinical education of these two groups. I used quantitative methods of comparing the secondary data of nursing program clinical hours and NCLEX pass rates to determine the relationship between clinical hours and competency.

Manuscript 1

Currently there is a lack of evidence to support the number of clinical hours required in prelicensure clinical education (Benner, Sutphen, et al., 2010; Bowling et al., 2018; Bradley et al., 2019; Spector et al., 2018). Furthermore, research shows that BSN

prepared nurses are providing superior care to that of ADN nurses, but differences in NCLEX pass rates between the two program types has not been sufficiently explored (Aiken, Sloane, et al., 2013; Blegen et al., 2013; Estabrooks et al., 2005; Tourangeau et al., 2007).

Research Question: What are the concurrent effects of the total number of clinical hours and program type (ADN vs. BSN) on percentage of students that pass the NCLEX from each school 2019?

H_0: There are no concurrent effects of the total number of clinical hours and program type (ADN vs. BSN) on percentage of students that pass the NCLEX from each school 2019.

H_a: There are concurrent effects of the total number of clinical hours and program type (ADN vs. BSN) on percentage of students that pass the NCLEX from each school 2019.

Nature of the study. I conducted a nonexperimental, descriptive, correlation study using a multiple linear regression model to determine the relationship between the number of clinical hours in prelicensure nursing programs and the type of nursing program of ADN and BSN and NCLEX pass rates. Specifically, I determined whether the number of prelicensure clinical or program type hours are predictive of NCLEX pass rates.

Possible types and sources of data. I collected data by calling the nursing schools and identifying the best person to contact regarding clinical education in the school. That member was contacted by phone, and if they agreed they were sent a short

12 question survey (Appendix A) that included demographic data (Appendix B) and questions about program type, clinical hours and the number of graduates, and the number who passed the NCLEX on the first attempt.

Manuscript 2

Evidence supports that BSN prepared nurses provide superior care to ADN prepared nurses (Aiken, Sloane, et al., 2013; Blegen et al., 2013; Estabrooks et al., 2005; Tourangeau et al., 2007). Although program statistics suggest that there may be a difference in the clinical education of ADN and BSN nurses, there is no published evidence supporting that there is a significant difference in the number of clinical hours in ADN and BSN programs (Smiley, 2019). Furthermore, there is a lack of evidence supporting the best amount of time to be spent in each clinical area, of skills lab, simulation, and patient care, and whether there are differences in the amount of time students spend in each area between BSN and ADN programs. Identifying the differences in the clinical education of these two groups may assist nurse educators in identifying the areas of clinical education that lead to best practice in new nurses and assist educators in creating programs to better prepare nurses for practice.

Research Question: What is the difference in number of clinical hours, simulation hours, patient care clinical hours, and skills lab hours between ADN and BSN prelicensure nursing programs?

H_0: There is no difference in the means of the variables of simulation hours, patient care clinical hours, and skills lab hours between ADN and BSN prelicensure nursing programs.

H_a: There is a difference in the means of the variables of simulation hours, patient care clinical hours, and skills lab hours between ADN and BSN prelicensure nursing programs.

Nature of the study. I conducted a quantitative, comparative analysis using a factorial multivariate analysis of variance MANOVA to determine whether there are differences between the number of clinical hours, simulation hours, patient care clinical hours, and skills lab hours of ADN versus BSN prelicensure nursing programs.

Possible types and sources of data. I collected data by calling the nursing schools and identifying the best person to contact regarding clinical education in the school. That member was contacted by phone, and if they agreed they were sent a short 12 question survey (Appendix A) that included demographic data (Appendix B) and questions about program type, clinical hours and the number of graduates, and the number that passed the NCLEX on the first attempt.

Manuscript 3

Clinical education is an essential portion of prelicensure clinical education (Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector, et al., 2018). In prelicensure nursing programs three types of clinical education are commonly used: simulation clinical hours, patient care clinical hours, and skills lab hours (NCSBN, 2005). Although there is evidence to support that up to 50% of patient care clinical hours can be replaced with simulation, there is no published evidence correlating the type of clinical hours and their relationship to NCLEX pass rates (Hayden et al., 2014; Schlairet & Fenster, 2012; Watson et al., 2012).

Research Question: What is the relationship between simulation clinical hours, patient care clinical hours, and skills lab hours in ADN and BSN prelicensure nursing programs and the percentage of graduating students who passed the NCLEX in 2019?

H_0: There will be no relationship between simulation clinical hours, patient care clinical hours, and skills lab hours in ADN and BSN and the percentage of graduating students who passed the NCLEX in 2019.

H_a: There will be a relationship between simulation clinical hours, patient care clinical hours, and skills lab hours in ADN and BSN prelicensure nursing programs and percentage of graduating students who passed the NCLEX in 2019.

Nature of the study. I conducted a nonexperimental, descriptive, correlational study using a multiple linear regression model to determine the relationship between the type of clinical hours of lab hours, simulation hours, and patient care clinical hours in prelicensure nursing programs and the percentage of students that pass the NCLEX. Specifically, this study was conducted to determine whether the number or type of clinical hours will predict if a student will pass the NCLEX.

Possible types and sources of data. I collected data by calling the nursing schools and identifying the best person to contact regarding clinical education in the school. That member was contacted by phone, and if they agreed they were sent a short 12 question survey (Appendix A) that included demographic data (Appendix B) and questions about program type, clinical hours and the number of graduates, and the number who passed the NCLEX on the first attempt.

Significance

This research addressed the gap of examining the relationship between clinical hours, type of nursing degree (ADN compared to BSN), and competency of newly graduated nurses as measured by passing the NCLEX. Findings from my study may assist nursing schools to determine if the current number of clinical hours is sufficient to produce graduating nurses better prepared to pass the NCLEX (see NCSBN, 2019). Examining the number and types of clinical hours in nursing programs and the differences in those hours between types of programs can also be used to support nursing faculty creating more efficient programs that produce qualified nurses prepared to stay at the bedside and help reduce the nursing shortage (see Ackerson & Stiles, 2018; Aiken, Sloane, et al., 2013; Forber et al, 2016; Fulcher & Mullin, 2011). Furthermore, comparing the differences in clinical education between ADN and BSN programs can help nurse educators identify the factors that that may lead to the gaps in the ability to provide care between ADN and BSN nurses and guide nursing faculty to develop ADN nurses that provide similar levels of care to BSN nurses, which can effect positive social change (see Aiken, Sloane, et al., 2013; Fulcher & Mullin, 2011).

Summary

With the continued nursing shortage and nurses leaving practice due to feeling unprepared, it is essential that nurse educators determine best nursing clinical education practices to (Ackerson & Stiles, 2018; Monaghan, 2015; Nursing Solutions Inc., 2019; Odland, Sneltvdt, & Sörlie, 2014). Due to the lack of evidence to support the number of clinical hours in prelicensure nursing programs and the number of clinical hours in each

area of prelicensure clinical education, there is a needs for further investigation. Furthermore, further research is needed comparing prelicensure clinical education of ADN and BSN programs due to the superior patient care that BSN prepared nurses provide (see Cabaniss, 2014; Poster et al., 2005; Torabi & Zadeh, 2018; Uley-Smith, 2004).

Part 2: Manuscripts

Clinical Hours and Program Types Effects on NCLEX Pass Rates

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MSN, San Jose State University, 2004

BSN, Norwich University 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Nursing

Walden University

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Outlet for Manuscript

Teaching and Learning in Nursing is a scholarly, peer-reviewed journal with a target audience of associate degree nurse educators, and its goal is disseminating evidence in the practice of education. This journal focuses on associate degree nursing education, practice, administration, and research. Accepted types of manuscripts are manuscripts including research, practice improvement, education innovations, translation of nursing education research, and literature reviews. The submission requirements for this journal include:

- Abstract of 75-150 words.
- This journal requires the reference style used by the American Psychological Association 6th edition.
- Original research articles have a maximum length of 16 double-spaced pages, including all references, tables, charts, and figures.

Information about the journal can be accessed at the following: https://www.journals.elsevier.com/teaching-and-learning-in-nursing

Information about submission requirements can be accessed at the following: https://www.elsevier.com/wps/find/journaldescription.cws_home/706538?generatepdf=true.

Abstract

Clinical education is an essential portion of prelicensure clinical education. However, little is known about the relationship between clinical hours and National Council Licensure Examination (NCLEX) pass rates or whether program type is predictive of NCLEX pass rates. The purpose of this study was to examine the relationship between clinical hours, program type, and NCLEX pass rates. A total of 722 nursing schools were surveyed, with a final sample size of 107. Multiple linear regression analysis revealed that there was no correlation between program type and NCLEX pass rates or the total number of clinical hours in a school and NCLEX pass rates. The results reflect that both program types are adequately preparing students for the NCLEX. Future research could be conducted to determine if the type of clinical education students receive is related to NCLEX pass rates.

Introduction

The United States is currently experiencing a shortage of qualified nurses at the bedside (Nursing Solutions Inc., 2019). Evidence suggests that nurses are leaving the bedside due to feeling unprepared for practice (Ackerson & Stiles, 2018; Odland, Sneltvedt, & Sörlie, 2014). Two factors that affect new nurses' preparedness to practice is prelicensure clinical education and the type of education they receive—either an associate's degree (ADN) or a bachelor's degree (BSN; Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013; Anbari & Vogelsmeier, 2018; Bradley et al., 2019; Forber et al., 2015; Jayasekara et al., 2018; National Council of State Boards of Nursing [NCSBN], 2005; Spector Hooper, Silvestre, & Qian, 2018;).

Significance

New nurses not being adequately prepared for practice is referred to in the literature as the theory–practice gap (Hickerson, Taylor, & Terhaar, 2016; Hussein & Osuji, 2016; Saifan, AbuRuz, & Masa'deh, 2015). There is a connection between the theory–practice gap and the increasing nursing shortage due to new nurses leaving preactice(Ackerson & Stiles, 2018; Hickerson et al., 2016; Hussein & Osuji, 2016; Monaghan, 2015; Odland et al., 2014; Spector et al., 2015). The turnover rate for new nurses in the first year of practice is 17.2% (Nursing Solutions Inc., 2019).

New nurses are leaving bedside practice due to feeling insufficiently prepared by their nursing education to cope with the realities of working as a nurse at the bedside (Ackerson & Stiles, 2018; Monaghan, 2015; Odland et al., 2014). New nurses lack confidence in their ability to practice as a nurse and have stated that their prelicensure

education did not adequately prepare them for practice in the hospital setting (Hickey, 2010; Monaghan, 2015; Odland et al., 2014). New nurses have felt that there were significant discrepancies between how they were educated to practice and what their job as a registered nurse required of them in the hospitals where they were employed (Odland et al., 2014). Furthermore, new nurses felt that there was not enough dedicated training time in clinical in their prelicensure education, and they wanted more time to practice communication, organization, time management, and psychomotor skills (Hickey, 2010; Monaghan, 2015).

More research on prelicensure clinical education may help narrow the theory–practice gap for prelicensure nurses creating nurses better prepared to stay at the bedside (Caputi, 2018; Rice, 2015). Experience helps nurses gain expertise (Aiken, Clarke, Cheung, Salone, & Silber, 2003; Belgen, Vaugn, & Goode, 200; Benner, 1984; Clarke, Rockett, Salone, & Aiken, 2002; Ju-Hui & Sook-Hee, 2018). In prelicensure clinical education, clinical hours provide this experience to nursing students (Jeppesen, Christiansen, & Frederiksen, 2017; NCSBN, 2005). Therefore, further research on the type of clinical hours that students are receiving during their prelicensure clinical education may assist nurse educators to better understand how clinical education affects a new nurse's preparation for entering practice and revise nursing programs to support best practices for prelicensure clinical education.

Relevant Scholarship

Clinical education is an essential portion of prelicensure nursing education (Bradley et al., 2019; California Board of Registered Nursing, 2016; Forber et al., 2015;

Jayasekara et al., 2018; NCSBN, 2005; Spector et al, 2018). Despite the importance of clinical in nursing education clinical hours in prelicensure nursing programs vary greatly within and between program types (Smiley, 2019). Smiley also found that BSN programs clinical hours ranged from 432 to 960, and ADN programs ranged from 270 to 855. The great variability in clinical hours may be influenced by state regulations of clinical hours. Some states regulate the minimum number of clinical hours nursing students must complete in prelicensure nursing programs, whereas others do not (NCSBN, 2018, Spector, Hooper, Silvestre, & Qian, 2018). Even among the states that regulate clinical hours, the minimum number of clinical hours required vary from 400 to over 1,000 (NCSBN, 2018). A seminal study from the NCSBN found that most of the state boards of nursing surveyed thought that a minimum number of clinical hours should be mandated by the state nursing board (NCSBN, 2005). Research also supports that nursing students have met the minimum clinical competencies when they graduate from a board accredited nursing program (NCSBN, 2005; Poster et al., 2005; Rice, 2015). However, students graduating nursing schools in different states or programs may have large variations in the number of clinical hours they complete, which may affect their preparedness to enter nursing practice (Benner, Chesla, & Tanner, 2009; Ju-Hui & Sook-Hee, 2018; NCSBN, 2005; Smiley, 2019)

Although previous research stressed the importance of high quality clinical education, there is little evidence to support the number of hours required to provide a high quality nursing education to prelicensure nursing students (Benner, Sutphen, Leonard, & Day, 2010; Bradley et al., 2019; Spector et al., 2018). Research has also

revealed that nursing education lacks evidence to support the number of clinical hours needed to obtain competency (Bowling, Cooper, Kellish, Kubin, & Smith, 2018). Determining the relationship between prelicensure nursing education and the National Council Licensure exam (NCLEX) is an initial step in determining the clinical hours needed to obtain minimum competency.

Another factor of prelicensure nursing education is the type of degree that students choose for entry into practice. There are three types of nursing degrees, the ADN, the BSN, and a diploma, with the ADN and BSN degrees comprising the majority of nursing programs (Spector et al., 2018). Although ADN nursing programs produce the majority of new nurses, evidence supports that BSN prepared nurses are providing higher levels of care (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Blegen, Goode, Park, Vaughn, & Spetz, 2013; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005; Spector et al., 2019; Tourangeau et al., 2007). Better patient outcomes are reported in hospitals that employ higher numbers of BSN nurses (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Blegen, et al., 2013; Estabrooks, et al., 2005; Tourangeau et al., 2007). Authors also found that nurses with a BSN degree or higher also had lower rates of failure to rescue and appear to have improved clinical judgement as compared to diploma and ADN prepared nurses (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Belegen et al., 2013). Furthermore, nursing associations are calling for the BSN to be the minimum for entry into nursing practice and the Institute of Medicine has a goal of 80% BSN nurses by 2020 (American Association of Colleges of Nursing, 2019; Institute of Medicine, 2011). Despite this call

for more BSN prepared nurses, few studies have addressed the difference in NCLEX pass rates from BSN and ADN schools or compared whether degree type or number of clinical hours is more predicative of passing the NCLEX.

Theoretical Framework

The theoretical framework used to guide this research is Benner's (1984) novice-to-expert theory. Benner theorized that nurses gain experience as they move through the five levels of practice of novice, advanced beginner, competent, proficient, and expert. Experience is essential for nurses to gain the knowledge and skills to move from a novice practitioner to an expert practitioner where they provide the highest level of care (Aiken, Cimiotti, et al., 2011; Bathish, Wilson, & Potempa, 2018; Benner, 1984; Bobay, Gentile, & Hagle, 2009; Cho et al., 2015; Estabrooks et al., 2005; Jan & Popescu, 2014). In prelicensure clinical education, experience is gained in the form of clinical education where nursing students practice their skills in the patient care environment and the simulated environment (Forber et al., 2016; Jeppesen et al., 2017; NCSBN, 2005). Despite this agreement on the need for experience to gain competency and clinical hours providing experience in prelicensure clinical education there is a dearth of literature exploring the relationship between prelicensure clinical hours and competency of nursing students and newly graduated nurses (Bowling et al. 2018). Previously there was no research examining the number of clinical hours in prelicensure programs and the relationship between those clinical hours and NCLEX pass rates, or how nursing program type of ADN or BSN correlates with NCLEX pass rates. Despite the research showing that clinical hours are important in nursing education and that BSN prepared nurses

provide higher levels of care than ADN nurses (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Blegen et al., 2013; Bradley et al., 2019; California Board of Registered Nursing, 2016; Estabrooks et al., 2005; Forber et al., 2015; Jayasekara et al., 2018; NCSBN, 2005; Spector et al, 2018; Tourangeau et al., 2007).

Purpose

The purpose of this research was to determine if there is a relationship between the total number of clinical hours and program type of ADN or BSN in prelicensure nursing programs and the percentage of students who pass the NCLEX.

Research Question and Design

The research question for this manuscript is: What is the relationship between the total number of clinical hours and program type of ADN or BSN in prelicensure nursing programs and the percentage of students who pass the NCLEX? I used descriptive quantitative approach to first identify the number and ranges in the numbers of clinical hours in nursing programs. The independent variables were the program type of ADN or BSN and the total number of clinical hours, and the dependent variable is the percentage of students who pass the NCLEX from each school.

Methods

Participants

The population for this study was ADN and BSN nursing schools in the United States whose graduates take the NCLEX. Programs with less than 10 graduates were excluded from the analysis due to the small sample being an inadequate representation of the clinical hours in a program's correlation with a student's ability to pass the NCLEX.

Step programs for licensed practical nurses to become registered nurses were also excluded from the study because these graduates would have completed a significant portion of their clinical education in the practical nursing program.

Sample and Power

A list of all the prelicensure nursing schools was compiled from each state board of nursing website in the United States. This list was then entered into an Excel spreadsheet and the random number generator was used to assign each school a random number. I then contacted each school in ascending order until the required sample size was met. I used G*-power to calculate the sample size using multiple linear regression model with two predictors, a medium effect size of 0.15, an alpha of 0.05, and a power of 0.95, which yielded a sample size of 107. I used the first 107 responses included in this analysis after the removal of outliers and incomplete data sets.

Variables/Sources of Data

I analyzed the data using multiple linear regression to determine the extent to which a nursing program's type and number of clinical hours explain the variance in the percentage of NCLEX pass rates. Multiple linear regression requires at least two independent variables and a dependent variable which must be continuous (Warner, 2013). The independent variables for this research were school type of ADN or BSN and number of clinical hours. The dependent variable was the percentage of students who graduated in 2019 who passed the NCLEX on the first attempt. These data were evaluated to meet the requirements for the multiple regression analysis including multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of

residuals. Multicollinearity was evaluated by viewing the correlation coefficients among the predictor variables. Outliers were identified using Mahalanobis distance, and meeting the assumptions of normality, linearity, homoscedasticity, and independence of residuals was evaluated by examining the plots of normal residual.

Instrumentation or Measures

I called the first 250 schools and used a template asking nursing offices for the contact information for the faculty that would now the programs clinical hours and for the percentage of students who passed the NCLEX in 2019 (see Appendix C). When I was directed to contact other people in the program, the second script was used to ask if I could send them a survey (see Appendix C). I sent an e-mail with a link to the survey to people who agreed to fill out the survey. If the person did not agree, no further contacts were made. Once a person agreed to fill out the survey, a link to an online survey through Questionpro was e-mailed to them.

During data collection, the COVID-19 pandemic occurred, so after the initial 250 participants were contacted data collection methods needed to be changed due to campuses being closed. For the remainder of the surveys, participants were contacted via e-mail in groups of 50 from publicly available contact information. I generally contacted the program coordinators or clinical coordinators from the publicly available contact information, as they were usually the person I was directed to when I called the schools. After the initial e-mail requesting participation, participants were sent reminder e-mails 2 weeks apart until the survey was completed. No more than two reminder e-mails were

sent to any individual. This research was approved by the Walden University Institutional Review Board with an approval number of 03-11-20-0976767.

Finally, I downloaded an excel spreadsheet from Questionpro that included the state the school is located in, the school name, the degree type it offers ADN or BSN, the total number of clinical hours in the program, the number of skills lab hours in the program, simulation hours in the program, and patient care clinical hours in the program, and percentage of graduating students who passed the NCLEX in 2019 from the survey responses to be entered into SPSS 25. I created a table with demographic data (see Appendix B) for the analysis and generalizability of the data.

Design and Analysis

Once the data were collected, they were analyzed it using SPSS version 25 and multiple linear regression to determine prelicensure nursing schools' clinical hours correlation with percentage of graduating students who passed the NCLEX in 2019, as well as the type of school ADN or BSN and the correlation with the percentage of graduating students who passed the NCLEX in 2019.

Results

A total of 800 schools with nursing education programs were randomly selected from the list of all the state approved schools in the United States. After closed programs, bridge programs, and programs where contact information could not be found were removed from the sample, a total of 722 schools were e-mailed to request participation in the study. A total of 119 surveys were returned. The COVID-19 pandemic occurred at the time of sampling, which may have affected response rate. The total sample of 119

schools came from 40 states with no more than nine responses from the same state. Sixty-nine responses came from associate degree programs, whereas the remaining 50 were from bachelor's degree programs. The total number of clinical hours ranged from a minimum of 226 to a maximum of 1,240. These data were found to have a broad representation of prelicensure nursing schools in the United States.

Data were entered into SPSS and evaluated for multivariate outliers using Mahalanobis distance and incomplete responses. Two multivariate outliers were identified and removed along with eight schools that had less than 10 graduates and two responses with incomplete data sets. This left a final sample size of 107 (n = 107) of nursing schools to be incorporated in the linear regression model and to be further tested for meeting the assumptions of linear regression.

Tests of Assumptions

The assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were evaluated.

Multicollinearity. Multicollinearity was evaluated by viewing the correlation coefficients among the predictor variables. All bivariate correlations were small to medium (see Table 1); therefore, the assumptions of multicollinearity have been met. Table 1 contains the correlation coefficients.

Table 1

Correlation Coefficients Among Study Predictor Variables

Variable	% of students passing the NCLEX	Program type	Total number of clinical hours
% of students passing the	1.00	0.65	0.139

NCLEX			
Program type	0.065	1.00	0.321
Total number of clinical hours	0.139	0.321	1.00

Note. $n = 107$.

Normality, linearity, homoscedasticity, and independence of residuals.

Normality, linearity, homoscedasticity, and independence of residuals were evaluated by examining the normal probability plot of the regression standardized residual (see Figure 1) and the scatterplot of the standardized residuals (see Figure 2). The examinations indicated that there were slight violations of these assumptions. The deviation of the points from the straight line (see Figure 1), diagonal from the bottom left to the top right, indicates that the assumption of normality was slightly violated (Remler & Van Ryzin, 2015). The lack of a clear or systematic pattern in the scatterplot of the standardized residuals (see Figure 2) supports the reasonability of the assumptions being met.

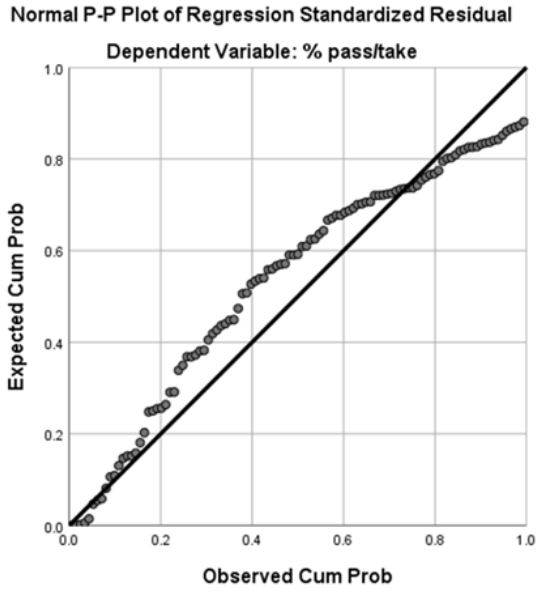

Figure 1. Normal probability plot (P-P) of the regression standardized residuals.

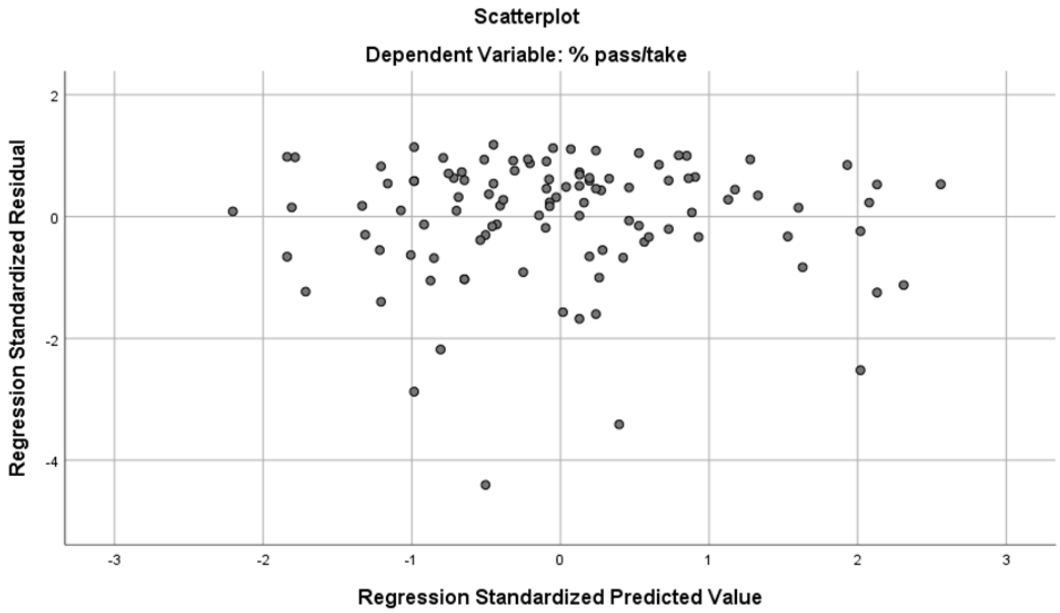

Figure 2. Scatterplot of the standardized residuals.

Descriptive Statistics

Table 2 contains the descriptive statistics of the continuous study. The dichotomous variable of program type had a median of 0 and a mode of 0.

Table 2

Means and Standard Deviations for Quantitative Study Variables

Variable	*M*	*SD*
% of students passing the NCLEX	91.6766844172	7.452310038
Total number of clinical hours	692.551	210.2795

Inferential Results

Standard multiple linear regression, $\alpha = .05$ (two-tailed), was used to examine the influence of program type (ADN = 0, BSN = 1) and total number of clinical hours in a program on the percentage of students from each school that passed the NCLEX. The

independent variables were program type and the total number of clinical hours in the program. The dependent variable was the percentage of students passing the NCLEX. Preliminary analyses were conducted to assess whether the assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were met; minor violations were noted (see *Tests of Assumptions*). The model as a whole was not able to significantly predict NCLEX pass rates, $F = 1.044$, $p > 0.05$, $R^2 = 0.020$. Therefore, the null hypothesis was retained. Furthermore, neither of the independent variables of the program type or total number of clinical hours were significant predictors of NCLEX pass rates with p values of 0.505 and 0.414 respectively. Neither program type nor the number of clinical hours in the program were significant predictors of NCLEX pass rates. Therefore, I concluded that NCLEX pass rates are predicted by factors not included in this research.

Discussion

Interpretation

These data showed that the program type and total number of clinical hours were not predictive of the percentage of students who pass the NCLEX for entry into practice. My findings supported those of previous researchers like Cabaniss (2014) that both ADN and BSN programs adequately prepare nursing students for the NCLEX. Furthermore, these data indicated that the number of clinical hours do not influence NCLEX pass rates.

My results showed that neither ADN nor BSN programs had better NCLEX pass rates, so neither program type was superior in preparing nurses for the NCLEX (see Cabaniss, 2014). Both program types also had similar limitations in education and

clinical education (Loversidge et al., 2018; Melnyk et al., 2018). Baccalaureate programs have limitations to their educational programs that may not be adequately preparing nurses for practice (Hickey, 2010). Many states and organizations who approve nursing programs require the same minimum NCEX pass rate for accreditation and approval, regardless of program type (Accreditation Commission for Nursing Education, n.d.; California State Board of Nursing, 2020; Nevada State Board of Nursing, n.d.), which may account for both program types having no significant difference in NCLEX pass rates.

The results of my study did not show correlation between the number of clinical hours and NCLEX pass rates, meaning that nursing programs do have sufficient clinical hours for NCLEX preparation (see NCSBN, n.d.). Similarly, passing the NCLEX is the minimum standard for entry into practice, so programs with minimal hours in each area may be adequately preparing nurses for the NCLEX but may not be adequately preparing nurses for clinical practice (see Hickerson, Taylor, & Terhaar, 2016; Hussein & Osuji, 2016; NCSBN, 2020; Odland et al., 2014; Saifan, AbuRuz, & Masa'deh, 2015; Spector et al., 2015). This lack of correlation also suggests that the NCLEX does not adequately measure the skills and competencies obtained through clinical since nurses state that they did not have enough training time in clinical to adequately prepare them for practice (see Hickey, 2010; Monaghan, 2015).

The lack of correlation between the number of clinical hours and NCLEX pass rates could also indicate that the types of clinical education and clinical experiences may be more important in clinical education than only the number of hours spent in the

clinical setting, which aligns with Benner's (1984) novice-to-expert theory. There are large variations in clinical education practices such as number of hours, number of days, and length of clinical days across clinical education programs (NCSBN, 2005; Smiley, 2019; Spector et al., 2018), types of education techniques, and types of clinical experiences (Flott & Linden, 2015; Grealish et al., 2018; Jeppesen, Christiansen, & Fredriksen, 2017; Torabi & Zadeh, 2018). These may have greater influence on nurses obtaining competency than the number of hours the students spend in the clinical setting. For instance, researchers support that the quality of clinical education is the most important factor in preparing qualified nurses and nursing students gaining expertise (Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector et al., 2018). But frequently the clinical portion of the student's education is taught by adjunct faculty (Gies, 2013), who are often not sufficiently oriented, evaluated, or given the resources that full-time faculty receive (Ballantyne, Berret, & Harst, 2010; Brannagan & Oriol, 2014; Gies, 2013; Hunt, McGee, Gutteridge, & Hughes 2016; Jacobson, 2013; Langen, 2011; Louis, 2009; Mann & De Gagne, 2017; Milliken & Jurgens, 2008; Morton, 2012; Vinales, 2015), which can affect the quality of the clinical education students receive.

Limitations

One limitation of this study is that it examined only the total number of clinical hours in a program and the type of program of BSN or ADN and NCLEX pass rates. There are many other variables that may affect NCLEX pass rates that are not included in this study. Furthermore, there may have been some ambiguity in the survey questions on what constitutes clinical hours as some responses included simulation and skills lab hours

where others did not. This may have caused the total number of clinical hours to be a misrepresentation of the actual number of clinical hours in a program. Also, schools that had high NCLEX pass rates may have been more likely to report their pass rates which may have falsely skewed the results. Finally, the low response rate due to the COVID-19 pandemic may have limited the generalizability of the results.

Implications

Implications to the discipline. I did not find any correlation between the number of clinical hours and NCLEX pass rates. This supports previous research that the quality of clinical education may is more important than the quantity (see Benner, Sutphen, et al., 2010; Bradely et al., 2019; Spector et al., 2018). This lack of correlation also suggests that since passing the NCLEX is the minimum for entry into practice that the NCLEX may not adequately measure competencies obtained in the clinical enviornment (see NCSBN, 2020).

The results show that both ADN and BSN programs adequately prepare nurses for the NCLEX. However, the previous studies showed that BSN nurses provide higher levels of care (Aiken et al., 2003; Aiken et al., 2013; Blegen, et al., 2013; Estabrooks, et al., 2005; Spector et al., 2019; Tourangeau et al., 2007). My findings show that both ADN and BSN programs prepare nursing students to take the NCLEX.

Implications for theory. My research showed that the number of hours in clinical was not related to success on the NCLEX. The lack of correlation between clinical hours and NCLEX pass rates supported the novice-to-expert theory that experience alone is not

enough to gain expertise, but rather good experiences lead to expertise (see Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector, et al., 2018).

Implications for social change. My findings supported the social change of supporting both ADN and BSN schools for preparing nurses for the minimum entry into practice of passing the NCLEX. Furthermore, my findings found that all programs appear to have adequate clinical hours to meet the minimum competency of passing the NCLEX. Although passing the NCLEX is the minimum for entry into practice (NCSBN, 2020). The lack of correlation between NCLEX pass rates and clinical hours suggest that the NCLEX does not measure competencies obtained in clinical. This information can be used to guide further research in clinical education and NCLEX competencies.

Recommendations

Further research is needed in clinical education. Since I found no correlation between the total number of clinical hours in a program and NCLEX pass rates, other factors may account for the variation in NCLEX pass rates across programs. Therefore more research is warranted to identify if other factors such as clinical education methods used, the areas in which students spend their clinical time, number of days in clinical, and number of hours each day in clinical correlate with NCLEX pass rates (see Flott & Linden, 2015; Grealish et al., 2018; Jeppesen et al., 2017; NCSBN, 2005; Spector et al., 2018; Smiley, 2019; Torabi & Zadeh, 2018). Furthermore, more research is warranted on clinical competencies to determine if clinical competencies are measured by the NCLEX.

Conclusion

These data showed no correlation between program type of ADN and NCLEX pass rates or the total number of clinical hours in a program and NCLEX pass rates. This may be due to both program types adequately preparing students for the NCLEX, and other clinical factors affecting NCLEX pass rates. Further research is warranted on the differences in education in ADN and BSN programs to examine what factors in the education may lead to the higher levels of care provided by BSN nurses and on the variations in clinical education if they might account for some of the variability in NCEX pass rates.

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Differences in Clinical Hour Types Between Associate Degree and Bachelor's Degree Nursing Programs

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Abstract

Nursing education for entry into nursing practice is primarily composed of two types of nursing degrees: the associate degree in nursing (ADN) and the bachelor's degree in nursing (BSN). But there are significant differences in the education of ADN nurses and BSN nurses such as total number of education hours, student learning outcomes, and areas of focus in their education. Healthcare institutions that employ higher numbers of nurses who hold a BSN or above have lower morbidity and mortality rates. However, little research has evaluated the difference in the clinical education of ADN nurse and BSN degree nurses. The purpose of this study was to determine whether there are differences in total number of clinical hours, patient care clinical hours, skills lab hours, and simulation hours between ADN and BSN nursing programs. Data were analyzed from 168 nursing schools. BSN programs had significantly more clinical hours and patient care clinical hours than ADN programs. The higher number of clinical hours may be one factor that improves the quality of care new nurses can provide. This information can be used to guide educators to create clinical education programs to better prepare nurses to improve patient outcomes.

Introduction

Nursing education for entry into nursing practice is primarily composed of two types of nursing degrees: the associate degree in nursing (ADN) and the bachelor's degree in nursing (BSN; Spector, Hooper, Silvestre, & Qian, 2018). Better patient outcomes occur in hospitals that hire higher levels of BSN or higher educated nurses (Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013; Blegen, Goode, Park, Vaughn, & Spetz, 2013; Estabrooks, Midodzi, Cummings, Ricker, & Giovannetti, 2005; Tourangeau et al., 2007). This may be due to significant differences in the education of ADN nurses and BSN nurses such as total number of education hours, student learning outcomes, and areas of focus in their education (Cabaniss, 2014; Halstead, 2019; Loversidge et al, 2018; Poster et al., 2005). Further, the clinical education of nurses is well recognized as the portion of prelicensure education that best prepares nurses for practice. However, there is little research comparing the clinical education of ADN and BSN nurses (Bradley et al., 2019; Forber, et al., 2015; Jayasekara et al., 2018; National Council of State Boards of Nursing [NCSBN], 2005; Spector et al., 2018).

Significance/Importance

Hospitals that employ more highly educated nurses have lower rates of morbidity and mortality (Aiken, Clarke, Cheung, Salone, & Silber, 2003; Aiken, Sloane, et al., 2013; Blegen et al., 2013; Estabrooks et al., 2005; Tourangeau et al., 2007). Nurses with a BSN degree or higher have also been found to have lower rates of failure to rescue and improved clinical judgement compared to diploma an ADN prepared nurses (Aiken, Clarke, et al, 2003; Aiken, Sloane, et al., 2013; Belegen et al., 2013). This evidence of

improved patient outcomes in hospitals with higher educated nurses has been used to mandate that the BSN degree should be the minimum for entry into practice as a registered nurse and the Institute of Medicine to call for 80% of nurses to be BSN prepared by 2020 (American Association of Colleges of Nursing, 2019; Institute of Medicine, 2011). However, there is a lack of research on the clinical education of these two groups of nurses (Cabaniss, 2014; Loversidge et al, 2018). Examining the clinical education between these two groups may help explain why BSN nurses are able to provide superior care (Aiken, Cimiotti, et al., 2011; Aiken, Clarke, Sloane, Lake, & Cheney, 2009; Torabi & Zadeh, 2018).

Relevant Scholarship

Previous research on the clinical education of ADN and BSN nurses has shown some differences in the clinical competencies between groups (Cabaniss, 2014; Loversidge et al., 2018). ADN prepared nurses, compared with BSN prepared nurses, were found to have difficulty coordinating care for patients in an interdisciplinary team, analyzing data, giving handoff reports, and beginning critical conversations with the interdisciplinary team (Loversidge et al., 2018). ADN programs in Alabama lacked the integration of quality and safety education for nurses' competencies into their clinical education (Cabaniss, 2014). ADN students have also been lacking evidence-based practice competencies (Melynk et al., 2019). Although BSN students have also been found to lack evidence-based competencies, BSN students did meet the evidence-based competencies to a greater extent compared to ADN students (Melnyk et al., 2019). Furthermore, authors do not agree on minimum standards for clinical competencies, and

although ADN have met the minimum clinical competencies to become a registered nurse, they may benefit from further clinical education to provide a higher level of care (Anbari & Vogelsmeier, 2018; Cabaniss, 2014; Diede, McNish, & Coose, 2000; Fisher, 2014; Garside & Nhemachena, 2013; Northrup-Snyder, Menkens, & Dean, 2017; Poster et al., 2005; Torabi & Zadeh, 2018).

Despite the research supporting that BSN nurses are able to provide care that leads to better patient outcomes than ADN nurses, there is a dearth of information comparing the clinical education of these two groups (Cabaniss, 2014; Diede et al., 2000; Garside & Nhemachena, 2013; Poster et al., 2005; Torabi & Zadeh, 2018). Although it is well established that BSN programs contain more credit hours than ADN programs there is no literature comparing clinical hours and composition between these two groups (Halstead, 2019; NCSBN, 2005). Smiley (2019) researched simulation hours in prelicensure programs, and their findings suggested there was variation in the number of clinical hours between ADN and BSN programs but did not determine if there was a significant variation in the number of hours in the two program types, or if there were variations in where the students in each program spent their clinical time. Other research in the area of clinical education of ADN and BSN nurses has focused on clinical competencies of these two degree types and the clinical experiences in ADN and BSN programs (Cabaniss, 2014; Loversidge et al., 2018; Oermann, 1998). Finally, much of the research surrounding clinical education in nursing education is quite old and may not be relevant to todays practice (Giddens, 2006; Gignac-Caille & Oermann, 2001; Oermann,

1998; Oermann & Standfest, 1997; Primm, 1987). Therefore, further research in the areas of prelicensure clinical education is warranted.

Prelicensure clinical education time is generally completed between three distinct areas of skills labs, patient care, and simulation (NCSBN, 2005). Skills labs are generally a controlled lab environment where students are provided with didactic demonstrations, and then hands on practice of clinical skills (Haraldseid, Friberg, & Aase, 2015; Jeppesen, Christiansen, & Frederiksen, 2017). Patient care is where students are placed in a clinical facility and practice the skill they have learned while caring for actual patients (Forber et al., 2016; Jeppesen et al., 2017; NCSBN, 2005). Finally, simulation provides students with a simulated patient experience to practice clinical skills on manikins or simulated patients for noninvasive skills (Bradley et al., 2019; Gore & Thomson, 2016).

Often skills lab and simulation hours are regulated by boards of nursing, with the majority of clinical taking place in patient care, and a small portion of time is spent in skills lab to learn and practice new skills (Bradley et al., 2019; California Board of Registered Nursing, 2016; Forber et al., 2015; Jayasekara et al., 2018; NCSBN, 2005; Smiley, 2019; Spector et al, 2018). Patient care clinical hours are essential in nursing education for nurses to develop the skills necessary for practice in the clinical setting, supporting boards of nursing's decision to regulate the number of hours spent outside of patient care (Benner, Chesla, & Tanner, 2009; Forber, 2016; Grealish et al., 2018). However, research is now showing that up to 50% of clinical time may be spent in simulation without any negative effects on nursing students (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries; 2014; Meyer, Connors, Hou, & Gajewski, 2011; Schlairet &

Fenster, 2012; Sportsman, Schumacker,& Hamilton, 2011; Watson et al., 2012). However, there is no published research evaluating the types of clinical hours between program types of ADN and BSN.

Theoretical Framework

The theoretical framework guiding this research is Benner's (1984) novice-to-expert theory. Benner theorized that nurses gain experience as they move through the five levels of practice of novice, advanced beginner, competent, proficient, and expert. Experience is essential for nurses to gain the knowledge and skills to move from a novice practitioner to an expert practitioner where they provide the highest level of care (Aiken, Cimiotti, et al., 2011; Bathish, Wilson, & Potempa, 2018; Benner, 1984; Bobay, Gentile, & Hagle, 2009; Cho et al., 2015; Estabrooks et al., 2005; Jan & Popescu, 2014). In prelicensure clinical education, experience is gained in the form of clinical education where nursing students practice their skills in the patient care environment and the simulated environment (Forber et al., 2016; Jeppesen et al., 2017; NCSBN, 2005). Despite this agreement on the need for experience to gain competency and clinical hours, offering experience in prelicensure clinical education there is a dearth of literature exploring the relationship between prelicensure clinical hours and competency of nursing students and newly graduated nurses (Bowling et al., 2018).

Purpose

The purpose of this research was to determine if there was a difference in number of clinical hours, simulation hours, patient care clinical hours, and skills lab hours between ADN and BSN prelicensure nursing programs. BSN prepared nurses provide a

higher level of care than ADN prepared nurse even when controlling for experience (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Blegen et al., 2013; Estabrooks et al., 2005; Tourangeau et al., 2007). Currently there is no research establishing the differences in the clinical education of ADN and BSN nurses. Discovering if there is a significant difference in the areas in which ADN and BSN nursing students spend their clinical hours can be used to help identify the education practices in BSN programs that lead to BSN prepared nurses providing higher levels of patient care.

Research Question and Design

The research question for this comparative analysis study was: What is the difference in number of clinical hours, simulation hours, patient care clinical hours, and skills lab hours between ADN and BSN prelicensure nursing programs? The factors include the program type of ADN or BSN, and the dependent or response variables include total number of clinical hours, skills lab hours, simulation hours, and patient care clinical hours.

Methods

The population for this study was ADN and BSN nursing schools in the United States whose graduates take the National Council Licensure Exam (NCLEX). Programs with less than 10 graduates were excluded from the analysis due to the small sample being an inadequate representation of the clinical hours in a program's correlation with a student's ability to pass the NCLEX. Step programs for licensed practical nurses to become registered nurses were also excluded from the study because these graduates

would have completed a significant portion of their clinical education in the practical nursing program.

Sample and Power

A list of all the prelicensure nursing schools was compiled from each state board of nursing website in the United States. This list was then entered into an Excel spreadsheet, and the random number generator was used to assign each school a random number. I then contacted each school in ascending order until the required sample size was met. I used G*Power to calculate a sample size using a multivariate analysis of variance (MANOVA) analysis with two groups and four response variables, an effect size of 0.06025, an alpha of 0.05, and a power of 0.8 a sample size of 196 is required (Faul, Erdfelder, Buchner, & Lang, 2009).

Variables/Sources of Data

I used a MANOVA to analyze these data. This research contains a categorical factor of program type of either BSN or ADN and four discrete numeric variables of the total number of clinical hours, the number of skills lab hours, the number of patient care clinical hours, and the number of simulation hours. These data meet the requirements for a MANOVA (see Warner, 2013), as there are more than one numeric dependent variables and one nominal factor. Furthermore, these data came from independent random responses. These data would be further evaluated if they met the assumptions of normal distribution in groups and equal covariance matrices. I expected that the means of all of the clinical hours would be higher in BSN programs compared to ADN programs, as

BSN programs have higher credit hours and therefore may have more clinical time to be distributed across all clinical areas (Halstead, 2019; NCSBN, 2005).

Instrumentation or Measures

I called the first 250 schools and used a template asking nursing offices for the contact information for the faculty that would now the programs clinical hours and for the percentage of students who passed the NCLEX in 2019 (see Appendix C). When I was directed to contact other people in the program the second script was used asking if I could send them a survey (see Appendix C). I sent an email with a link to the survey to people who agreed to fill out the survey. If the person did not agree, no further contacts were made. Once a person agreed to fill out the survey, a link to an online survey through Questionpro was emailed to them. This research was approved by the Walden University Institutional Review Board with an approval number of 03-11-20-0976767.

During data collection the COVID-19 pandemic occurred and after the initial 250 participants were contacted data collection methods needed to be changed due to campuses being closed. For the remainder of the survey's participants were contacted via email, in groups of 50, from publicly available contact information. I generally contacted the program coordinators or clinical coordinators from the publicly available contact information as they were usually the person I was directed to when I called the schools. After the initial email requesting participation, participants were sent reminder emails 2 weeks apart until the survey was completed, no more than two reminder emails were sent to any individual.

Finally, I downloaded an excel spreadsheet from Questionpro that included the state the school is located in, the school name, the degree type it offers ADN or BSN, the total number of clinical hours in the program, the number of skills lab hours in the program, simulation hours in the program, and patient care clinical hours in the program, and percentage of graduating students who passed the NCLEX in 2019 from the survey responses to be entered into SPSS 25. I created a table with demographic data (see Appendix D) for the analysis and generalizability of the data.

Design and Analysis

These data were entered into SPSS 25 and descriptive and inferential statistical analyses were performed. A MANOVA with two groups of ADN and BSN nurses, and four variables of the total number of clinical hours, the number of skills lab hours, the number of simulation hours, and the number of patient care clinical hours was performed to determine if there are significant differences in these variables between groups.

Results

Execution

A total of 1,070 schools were randomly selected from the list of all the state approved schools in the United States. After closed programs, bridge programs, and programs where contact information could not be found were removed from the sample, a total of 975 schools were e-mailed to request participation in the study. From those 975 schools, a total of 184 surveys were returned, yielding a response rate of 18.87%. The COVID-19 pandemic occurred when sampling took place, which may have affected the response rate. The total sample of 184 schools came from 43 states with no more than 11

responses from the same state. Ninety-four responses came from associate degree programs, and the remaining 90 were from bachelor's degree programs. The total number of clinical hours ranged from a minimum of 150 hours to a maximum of 1,296 hours. These data were found to have a broad representation of prelicensure nursing schools in the United States.

Data were entered into SPSS and evaluated for multivariate outliers using Mahalanobis distance. Three multivariate outliers were identified and removed along with nine schools who had less than ten graduates, and there were four responses with incomplete data sets that were not included in the analysis. This left a final sample size of 168 schools for analysis.

Tests of Assumptions

The dependent variables of the total number of clinical hours, the number of skills lab hours, the number of simulation hours, and the number of patient care clinical hours are all continuous variables and were tested across the two groups of ADN or BSN program which met the first assumption for MANOVA. The population covariance matrices of each group were equal as shown through an insignificant box with a *p* value of 0.175. Furthermore, these data showed an insignificant Levene's test for equality of variance (see Table 3) for all variables except the total number of clinical hours. Upon examining the descriptive statistics between groups, the standard deviation for the total number of clinical hours in BSN programs was not more than four times greater compared to ADN programs (see Table 4). Therefore, these data met the assumptions for a MANOVA (Remler & Van Ryzin, 2015).

Table 3

Levene's Test of Equality of Error Variances

		Levene Statistic	Sig.
Total Number of Clinical Hours	Based on Mean	5.304	0.023
Skills Lab Hours	Based on Mean	.288	0.592
Simulation Hours	Based on Mean	.338	0.562
Patient Care Hours	Based on Mean	3.567	0.061

Descriptive Statistics

Table 4 contains the descriptive statistics of the study variables. A post hoc power analysis was performed in G*Power using a sensitivity analysis with a sample of 168, two groups, and four response variables resulted in an effect size of 0.073138.

Table 4

Descriptive Statistics

Variable		*M*	*SD*
Total Number of Clinical Hours	ADN	648.882	228.5221
	BSN	788.981	165.8763
Skills Lab Hours	ADN	76.8	81.98775
	BSN	78.3987	75.73086
Simulation Hours	ADN	58.5079	61.07879
	BSN	57.4304	58.26727
Patient Care Clinical Hours	ADN	507.5708	197.43090
	BSN	653.5063	153.16094

Inferential Results

MANOVA was used to determine if there were statistical differences in the total number of clinical hours, the number of skills lab hours, the number of simulation hours, and the number of patient care clinical hours between the ADN and BSN programs. The

dependent variables were the total number of clinical hours, the number of skills lab hours, simulation hours, and patient care hours. The independent variables were the program type of ADN or BSN. Preliminary analyses were conducted to assess whether the assumptions of covariance of matrices was met (see *Test of Assumptions*) and these data were found to meet the assumptions for a MANOVA. The MANOVA model was found to be significant with a Pilla's Trace of $F = 7.314$ and $p < 0.001$. Therefore, I rejected the null hypothesis that the total number of clinical hours, skills lab hours, simulation hours, and patient care clinical hours were equal across ADN and BSN programs. Furthermore, the Partial Eta Squared for this model was 0.152 which is interpreted as 15% of the variability in clinical hours which can be explained through the program type of ADN or BSN.

Table 5 illustrates that both the total number of clinical hours and patient care clinical hours were statistically different between ADN and BSN nursing programs. Specifically, that 10.8% of the variability in the total number of clinical hours can be explained through program type, and 14.5% of the variability in patient care clinical hours can be explained through program type.

Table 5

Tests of Between-Subjects Effects

	Dependent Variable	F	Sig.	Partial Eta Squared	Observed Power
Program Type ADN or BSN	Total Number of Clinical Hours	20.208	.000	.109	.994
	Skills Lab Hours	.017	.896	.000	.052
	Simulation Hours	.051	.822	.000	.056

	Patient Care Clinical Hours	28.129	.000	.145	1.000

Discussion

Interpretation

There was a significant difference between both the total number of clinical hours and the number of patient care clinical hours between ADN and BSN programs. Specifically, 10.8% of the variability in the total number of clinical hours can be explained through program type, and 14.5% of the variability in patient care clinical hours can be explained through program type. BSN programs had significantly more clinical hours ($p < 0.01$, mean = 788.981) than ADN programs (mean = 648.882), as well as significantly more patient care clinical hours ($p = <0.01$, means 653.5063 and 507.5708 respectively). These findings support that the difference in clinical hours and patient care clinical hours may be associated with higher levels of care that BSN nurses are able to provide as compared to ADN nurses (see Anbari & Vogelsmeier, 2018; Cabaniss, 2014; Diede et al., 2000; Fisher, 2014; Garside & Nhemachena, 2013; Northrup-Snyder et al., 2017; Poster et al., 2005; Torabi & Zadeh, 2018). Furthermore, these findings support Benner's (1984) novice-to-expert theory that experience. as in total number of clinical hours and the number of patient care clinical hours, lead to expertise as shown through the higher levels of care BSN nurses provide.

My results also support findings that clinical hours vary greatly within and across program types (see NCSBN, 2005; Smiley, 2019; Spector et al., 2018). This variation in the number of clinical hours and where they are spent could affect the quality of

education that prelicensure nurses receive and their readiness to practice (Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector et al., 2018).

Limitations

I had a low response rate, which may have been a result of the COVID-19 pandemic and limits the generalizability of the findings. Furthermore, this research identifies whether there was a significant difference between the clinical education of BSN and ADN nurses. It did not identify if that difference causes the higher levels of care BSN nurses are able to provide. Furthermore, there may have been some ambiguity in the survey questions on what constitutes clinical hours as some responses included simulation and skills lab hours where others did not. This may have caused the total number of clinical hours to be a misrepresentation of the actual number of clinical hours in a program. Some respondents stated that skills lab hours are separate from clinical hours and did not include them in their responses, which may have affected the results.

Implications

Implications to the discipline. My findings showed there are significant differences in the clinical education between ADN and BSN programs because BSN programs have significantly more total number of clinical hours and patient care clinical hours. My findings support that increased clinical education in nursing programs may be one factor that leads to higher levels of nursing care practice (see Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector et al., 2018). This may help guide ADN nursing programs to increase the number of clinical hours and patient care clinical hours to improve the level of care ADN nurses provide.

Implications to theory. My research supports Benner's (1984) novice to expert theory because Benner's theory posits that experience leads to expertise which is supported by my findings that BSN nursing programs have more clinical hours and patient care clinical hours than ADN programs and that BSN prepared nurses are able to provide higher levels of care (Anbari & Vogelsmeier, 2018; Cabaniss, 2014; Diede et al., 2000; Fisher, 2014; Garside & Nhemachena, 2013; Northrup-Snyder et al., 2017; Poster et al., 2005; Torabi & Zadeh, 2018). Furthermore, this supports that time in clinical is equivalent to experience for prelicensure nursing education because prelicensure nurses gain the expertise as shown through the BSN prepared nurses who have more clinical hours being able to provide higher levels of care (Anbari & Vogelsmeier, 2018; Fisher, 2014; Northrup-Snyder et al., 2017; Poster et al., 2005). Therefore, educators need to continue to support clinical hours and patient care clinical hours in nursing education.

Implications to social change. Preparing nurses to provide high levels of care and stay at the bedside is important to nursing practice (Bradley et al., 2019; Jeppesen et al., 2017; Spector, et al., 2018). The total number of clinical hours and the number of patient care hours may be one factor that contributes to the ability of BSN prepared nurses to provide higher levels of care because BSN programs have more clinical hours and patient care clinical hours than ADN programs (see Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector et al., 2018). This research supports positive social change in identifying one factor that may contribute to the BSN prepared nurses' ability to provide higher levels of care. This information can help guide nurse educators in further

research and in identifying the areas of education that best prepare nurses for providing high quality care.

Recommendations

Although this research suggests that clinical hours is one factor of BSN prelicensure nursing education that differs ADN prelicensure nursing education, the results did not show that the number of clinical hours are directly correlated with higher levels of care. Further research is needed to determine if the number of clinical hours and patient care clinical hours are related to higher levels of nursing care. Further research is also needed to explain and understand if the large variation in the number of clinical hours that prelicensure nurses complete between the ADN and BSN nursing program affects the level of care nurses provide, and to determine the ideal number of clinical hours which are needed to adequately educate new nurses from both ADN and BSN programs for practice.

Conclusion

Clinical education and patient care clinical hours are an essential component of prelicensure nursing education. My findings showed a significant difference in the total number of clinical hours and the number of patient care clinical hours between ADN and BSN prelicensure nursing programs. This may be one factor that contributes to BSN prepared nursed providing higher levels of care. Further research is needed to determine if more clinical hours and patient care clinical hours lead to improved patient care and effect positive social change.

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Relationship Among Types of Clinical Hours and NCLEX Pass Rates

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Abstract

Aim: To determine whether there is a relationship between simulation clinical hours, patient care clinical hours, and skills lab hours in ADN and BSN prelicensure nursing programs and the percentage of graduating students who passed the NCLEX in 2019.

Background: Clinical education is an essential part of prelicensure nursing education. There is little published research on the relationship between clinical education in prelicensure programs and competency.

Methods: Multiple linear regression was used to determine the relationship between type of clinical hours of patient care clinical hours, skills lab hours, and simulation hours, and NCLEX pass rates.

Results: The model was not able to significantly predict NCLEX pass rates ($p > 0.005$). Furthermore, none of the independent variables of the skills lab hours, simulation hours, or patient care hours were significant predictors of NCLEX pass rates.

Conclusions: None of the variables included in this research were predictive of NCLEX pass rates.

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Introduction

Clinical education is an essential portion of prelicensure nursing education and is crucial for preparing new nurses to practice in the field (Benner, Sutphen, Leonard, & Day, 2010; Bradley et al., 2019; Spector, Hooper, Silvestre, & Qian, 2018). However, new graduate nurses are reporting feeling unprepared for practice and are leaving bedside nursing practice at high rates (Ackerson & Stiles, 2018; Hickey, 2010; Monaghan, 2015; Nursing Solutions Inc., 2019; Odland, Sneltvedt, & Sörlie, 2014). Because clinical education is where nursing students gain experience to prepare them for practice (Benner, Chesla, & Tanner 2009; Jeppesen, Christiansen, & Frederiksen, 2017), this area warrants further investigation. Specifically, the areas of clinical education where time is spent and its relationship to minimum competencies for entry into practice, because prelicensure clinical education is traditionally split into three different learning areas: skills lab, simulation, and patient care (National Council of States Boards of Nursing [NCSBN], 2005).

Significance/Importance

Experience has been found to lead to better nursing practice (Aiken, Clarke, Cheung, Salone, & Silber, 2003; Belgen, Vaugn, & Goode, 2013; Benner, 1984; Clarke, Rockett, Salone, & Aiken, 2002; Ju-Hui & Sook-Hee, 2018). In prelicensure clinical education, experience is gained in the form of clinical hours (Benner, Chesla, et al., 2009; NCSBN, 2005; Smiley, 2019). However, there is a lack of evidence to support the number of clinical hours needed to obtain competency in prelicensure clinical education (Bowling, Cooper, Kellish, Kubin, & Smith, 2018). Furthermore, there is variation in

clinical education between schools, and states as well as in the regulation of clinical education by states (NCSBN, 2005, 2018; Smiley, 2019). Therefore, further research is needed on the relationship between clinical hours and minimum level of competency as measured by the National Council Licensure Examination (NCLEX).

Theoretical Framework

The theoretical framework guiding this research was Benner's (1984) novice-to-expert theory. Benner theorized that nurses move through five stages of competency in practice with experience: novice, advanced beginner, competent, proficient, and expert, with newly graduated nurses at the advanced beginner phase (Benner, Chesla, et al., 2009; Grochow, 2008; Jan & Popescu, 2014; Murray, Sundin, & Cope, 2019; Solem & Stewart, n.d.). Although experience is essential to moving through Benner's stages, experience alone may not be enough (Aiken, Cimiotti, et al., 2011; Aiken, Clarke, Sloane, Lake, & Cheney, 2009; Torabi & Zadeh, 2018). The type of experience is essential for developing competency, and in prelicensure clinical education experience is generally divided into three areas of skills lab, simulation, and patient care clinical hours (Aiken, Cimiottie, et al., 2011; Aiken, Clarke, Sloane, et al., 2009; Torabi & Zadeh, 2018). Therefore, the total number of clinical hours and the types of clinical hours of skill lab hours, simulation hours, and patient care hours warrants further investigation to determine if one may more adequately prepare nurses than others. Further, because experience leads to competence and experience in prelicensure nursing education is gained through clinical hours, further investigation on clinical education in prelicensure nursing education is warranted (Aiken, Cimiottie, et al., 2011; Aiken, Clarke, Sloane, et

al., 2009; Benner, 1984; Benner, Chesla, et al., 2009; Jayasekara et al., 2018; Torabi & Zadeh, 2018). No previous research has examined the types of clinical hours in nursing programs and their relationship to competency. The purpose of this manuscript was to determine the relationship among simulation clinical hours, patient care clinical hours, and skills lab hours in associate's degree in nursing (ADN) and bachelor's degree in nursing (BSN) prelicensure nursing programs on NCLEX pass rates.

Relevant Scholarship

Currently in the United States clinical hours in prelicensure nursing education vary greatly (NCSBN, 2018, 2005; Smiley, 2019). Further obscuring clinical education in prelicensure nursing education is the fact that some states regulate the minimum number of clinical hours required in nursing programs, whereas others do not (NCSBN, 2018, Spector et al., 2018). Even among the states that regulate clinical hours, the minimum number of clinical hours required vary from 400 to over 1,000 (NCSBN, 2018). This great variation in the number of clinical hours in programs could significantly affect the competency of newly graduated nurses.

A seminal study from the NCSBN (2005) found that state boards of nursing agreed that students met the minimum clinical competencies to be a nurse if they passed a board accredited nursing program. They also discovered that most state boards of nursing agreed that the minimum number of clinical hours should be mandated by the states board of nursing (NCSBN, 2005). However, research suggests that clinical requirements vary greatly between nursing programs and degree types, which could greatly affect the

competency of these newly graduated nurses (Lewallen, 2019; NCSBN, 2005; Poster et al., 2005; Rice, 2015; Wu, Enskär, Lee, & Wang, 2015).

Even further complicating prelicensure clinical education is that not only do the number of clinical hours vary greatly between programs, but clinical hours can also be completed in a variety of settings (Bugaj & Nikendel, 2016; Jeppesen, Christiansen, & Frederiksen, 2017; NCSBN, 2005; Smiley, 2019). There are three main clinical environments in prelicensure clinical education, these include the skills lab, simulation, and patient care (NCSBN, 2005). Each of these environments offer different types of learning experiences and have different educational goals (Bradley et al., 2019; Forber et al., 2016; Gore & Thomson, 2016; Haraldseid, Friberg, & Aase, 2015; Jeppesen et al., 2017; NCSBN, 2005).

Skills lab hours are a traditional component of nursing education (Haraldseid et al., 2015; Jeppesen et al., 2017). Skills lab hours are used to teach nursing students new psychomotor skills in a controlled lab environment and include time to practice theses skills in isolation, without having to work them into the overall care of the patient (Haraldseid, Friberg, & Aase, 2015; Jeppesen et al., 2017). Simulation is a newer environment that has been integrated into prelicensure clinical education (Bradley et al., 2019; Gore & Thomson, 2016). In simulation students can integrate knowledge and skills to care for a simulated patient in a controlled environment where mistakes can be made without hurting patients (Bradley et al., 2019; Gore & Thomson, 2016). Finally, patient care hours are the traditional foundation of prelicensure clinical education (Jeppesen et al., 2017). During patient care clinical hours student nurses care for patients under the

supervision of a nursing instructor and/or a registered nurse (Forber et al., 2016; Jeppesen et al., 2017; NCSBN, 2005).

In skills lab hours students do not interact with patients (Bugaj & Nikendel, 2016). In skills lab students learn how to perform skills with didactics, as well as practice skills in the controlled learning environment (Bugaj & Nikendel, 2016; Sahu, Chattu, Rewatker, Sakhamuri, 2019). Another important aspect of skills lab is that in skills lab students practice skills with direct observation from instructors who can provide feedback and correct the student's practice (Bugaj & Nikendel, 2016; Sahu, et al., 2019). This allows students to become proficient in skills prior to implementing these skills in practice on living patients to decrease the risk of harm to patients (Bugaj & Nikendel, 2016; Sahu, et al., 2019). Despite the benefits of skills lab the limitation is that in the skills lab students do not experience all of the complexities of patient care which has caused some boards of nursing to regulate the number of clinical hours spent in lab (Bugaj & Nikendel, 2016; California Board of Registered Nursing, 2019; NCSBN, 2005; Nevada State Board of Nursing, n.d.; Sahu, et al., 2019). There is no recent published literature exploring skills labs hours and competency or NCLEX pass rates. Therefore, further research is needed on the relationship of skills lab hours and NCLEX pass rates.

Simulation is another area that prelicensure nursing students spend their clinical time (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014; Palaganas, 2015). Like skills lab students do not care for actual patients in simulation, but rather practice in a controlled environment (Hayden et al., 2014). However, in simulation the complex patient and hospital environment is simulated allowing students to practice skills, critical

thinking and clinical decision making in an environment similar to the hospital setting (Fey & Kardong-Edgren, 2017; Hayden et al., 2014; Johnson et al., 2012; Lavoie, Pepin & Cossette, 2014; Lindsey & Jenkins, 2013; Lock, 2019). The focus in simulation is not learning a new skill but rather to practice applying it in the simulated setting where students can make mistakes without causing harm (Hayden et al., 2014; Palaganas, 2015).

Simulation use is prominent in the literature and many nursing programs are using simulation to replace patient care and lab clinical hours with simulation (Alexander et al., 2015; Beroz, 2017; Bradley et al., 2019; Gore & Thomson, 2016). Authors have found that up to 50% of traditional clinical hours can be replaced with simulation without affecting traditional measures of success such as grade point average, meeting program objectives, perceived readiness to practice, and passing national licensing exams (Hayden et al., 2014; Meyer, Connors, Hou, & Gajewski, 2011; Schlairet & Fenster, 2012; Sportsman, Schumacker,& Hamilton, 2011; Watson et al., 2012).

Even though researchers have established that simulation can effectively replace up to 50% of clinical hours, there is still a wide variation across programs in the percentage of clinical replaced by simulation (Bradley et al., 2019; Breymier et al., 2015; Smiley, 2019). A survey of 50 state boards of nursing conducted in 2019 found that 30 boards regulated simulation in nursing programs, and 13 of those allowed up to 50% of clinical to be replaced with simulation, seven allowed 25%, four did not specify the amount, and six had percentages that varied (Bradley et al., 2019). Another factor that further complicates simulation use in nursing programs is that the ratio of the number of clinical hours to simulation hours can vary between states (Bradley et al., 2019; Breymier

et al, 2015; Smiley, 2019). Furthermore, Breymier et al. (2019) found that the ratios for simulation to replace clinical were inconsistently reported. Whereas Bradley (2019) found that three boards of nursing allowed clinical to be replaced by simulation at a 1:1 ratio, one allowed 1:1 or 2:1, and 25 did not define the ratio. Due to this wide variation in simulation use and implementation further investigation on the use of simulation as part of clinical education is needed.

The use of simulation in nursing education is prominent in the literature. Currently there are several organizations offering certifications for educators who wish to champion healthcare simulation at institutions (National League for Nursing, n.d.; Society for Simulation in Health Care, n.d.). There has also been significant research on simulation environments, strategies to facilitate simulation, and how to facilitate learning from the simulations learners participate in (Battista, 2017; Brown, Wong, & Ahmed, 2018; Cheng, Eppich, Grant, Sherbino, Zendejas, & Cook, 2014; Kelly, Berragan, Husebø, & Orr, 2016; Sittner et al., 2015; Wiggins, 2018). As well as best practices in simulation have also been outlined by organizations such as the National League for Nursing and Society for Simulation in Health Care to guide the use of simulation in healthcare and in nursing education. These organizations also support the education of faculty in simulation and the use of simulation in education to further support best practices in simulation in education (National League for Nursing, n.d.; Society for Simulation in Health Care, n.d.). This abundance of literature and education to support best practices in clinical education may lead to simulation being a strong method of clinical education for nursing students increasing NCLEX pass rates.

Finally, researchers and regulating bodies agree that patient care clinical hours are essential in the education of new nurses (Bradley et al., 2019; California Board of Registered Nursing, 2016; Forber et al., 2015; Jayasekara et al., 2018; NCSBN, 2005; Spector et al, 2018). Although recent authors have investigated different types of patient care clinical models for their effectiveness, there continues to be a dearth of information supporting the number of clinical hours needed to obtain minimum competency for entry into practice (Bowling et al., 2019; Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018). Further complicating patient care clinical education is the fact that researchers agree that high quality clinical education is essential in building competency, however authors disagree on what exactly constitutes high quality clinical education (Caputi, 2018; Flott & Linden, 2016; Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018; Rice, 2015). Therefore, an initial step in understanding prelicensure clinical education and its relationship to competency is comparing the number of each type of clinical hours in a nursing program with the percentage of students who pass the NCLEX.

Research Question and Design

Research question: What is the relationship between simulation clinical hours, patient care clinical hours, and skills lab hours in prelicensure nursing programs (ADN and BSN) and the percentage of graduating students who passed the NCLEX in 2019? Descriptive and quantitative methods were used to examine clinical hours and types of clinical hours in nursing programs. The independent variables for this research were the total number of clinical hours, the number of skills lab hours, simulation hours, and

patient care clinical hours. The dependent variable was the percentage of students who passed the NCLEX on the first try from each school in 2019.

Methods

Participants

The population was ADN and BSN nursing schools in the United States whose graduates take the NCLEX for licensure. Programs with less than 10 graduates were excluded from the analysis due to the small sample being an inadequate representation of the clinical hours in a program's correlation with a student's ability to pass the NCLEX. Step programs for licensed practical nurses to become registered nurses were also excluded from the study because these graduates would have completed a significant portion of their clinical education in the practical nursing program.

Sample and Power

A list of all the prelicensure nursing schools was compiled from each state board of nursing website in the United States. This list was then entered into an Excel spreadsheet, and the random number generator was used to assign each school a random number. I then contacted each school in ascending order until the required sample size was met. I used G*Power to calculate a sample size using a multiple linear regression model with three predictors, a medium effect size of 0.15, an alpha of 0.05, and a power of 0.8, a sample of 77 was needed for the same predictors with a power of 0.95 a sample of 119 was required (Faul, Erdfelder, Buchner, & Lang, 2009).

Variables/Sources of Data

I used multiple linear regression for this research to determine the extent to which a nursing program's type and number of clinical hours explain the variance in the percentage of NCLEX pass rates. Multiple linear regression requires at least two independent variable and the dependent variable are continuous numeric variables (Warner, 2013). The independent variables for this research were school type of ADN or BSN and number of clinical hours. The dependent variable was the percentage of students who graduated in 2019 who passed the NCLEX on the first attempt. These data were evaluated to meet the requirements for the multiple regression analysis including multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals. Multicollinearity was evaluated by viewing the correlation coefficients among the predictor variables. Outliers were identified using Mahalanobis distance, and meeting the assumptions of normality, linearity, homoscedasticity, and independence of residuals was evaluated through the evaluation of the plots of normal residual.

Instrumentation or Measures

I called the first 250 schools and used a template asking nursing offices for the contact information for the faculty that would now the programs clinical hours and for the percentage of students who passed the NCLEX in 2019 (see Appendix C). When I was directed to contact other people in the program, the second script was used to ask if I could send them a survey (see Appendix C). I sent an e-mail with a link to the survey to people who agreed to fill out the survey. If the person did not agree, no further contacts were made. Once a person agreed to fill out the survey, a link to an online survey through

Questionpro was emailed to them. This research was approved by the Walden University Institutional Review Board with an approval number of 03-11-20-0976767.

During data collection the COVID-19 pandemic occurred and after the initial 250 participants were contacted data collection methods needed to be changed due to campuses being closed. For the remainder of the survey's participants were contacted via email, in groups of 50, from publicly available contact information. I generally contacted the program coordinators or clinical coordinators from the publicly available contact information as they were usually the person I was directed to when I called the schools. After the initial email requesting participation, participants were sent reminder emails 2 weeks apart until the survey was completed, no more than two reminder emails were sent to any individual.

Finally, I downloaded an excel spreadsheet from Questionpro that included the state the school is located in, the school name, the degree type it offers ADN or BSN, the total number of clinical hours in the program, the number of skills lab hours in the program, simulation hours in the program, and patient care clinical hours in the program, and percentage of graduating students who passed the NCLEX in 2019 from the survey responses to be entered into SPSS 25. I created a table with demographic data (see Appendix B) for the analysis and generalizability of the data.

Design and Analysis

I put the data into SPSS version 25 and used multiple linear regression to determine prelicensure nursing schools' clinical hours' correlation with NCLEX pass

rates, as well as the type of school ADN or BSN and the correlation with NCLEX pass rates.

Results

Execution

A total of 800 schools were randomly selected from the list of all the state approved schools in the United States. After closed programs, bridge programs, and programs where contact information could not be found were removed from the sample, a total of 722 schools were e-mailed to request participation in the study. From those 722 schools a total of 119 surveys were returned (16.48%). The COVID-19 pandemic occurred when sampling took place, which may account for the low response rate. The total sample of 119 schools came from 40 states with no more than nine responses from the same state. Sixty-nine responses came from associate degree programs, and 50 were from bachelor's degree programs. The total number of clinical hours ranged from a minimum of 226 to a maximum of 1,240. These data were found to have a broad representation of prelicensure nursing schools in the United States.

I entered these data into SPSS and evaluated for multivariate outliers using Mahalanobis distance and incomplete responses. Two multivariate outliers were identified and removed along with eight schools who had less than ten graduates, and two responses with incomplete data sets. This left a final sample size of 105 schools, which were incorporated in the linear regression model and were further tested for meeting the assumptions of linear regression. I conducted a post-hoc power analysis using G*power

with an effect size of 0.15 and an alpha of 0.05, and three predictor variables, and this resulted in a power of 0.948 with a sample of 105.

Tests of Assumptions

The assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were evaluated.

Multicollinearity. Multicollinearity was evaluated by viewing the correlation coefficients among the predictor variables. All bivariate correlations were small to medium (see Table 6); therefore, the assumptions of multicollinearity were met. Table 6 contains the correlation coefficients.

Table 6

Correlation Coefficients Among Study Predictor Variables

Variable	% of Students passing the NCLEX	Skills Lab Hours	Simulation Hours	Patient Care Hours
% of students passing the NCLEX	1.00	0.68	0.171	0.120
Skills Lab Hours	0.68	1.00	0.186	0.150
Simulation Hours	0.171	0.186	1.00	-0.010
Patient Care Hours	0.120	0.150	-0.010	1.00

Note. $n = 105$.

Normality, linearity, homoscedasticity, and independence of residuals. Normality, linearity, homoscedasticity, and independence of residuals were evaluated by examining the normal probability plot of the regression standardized residual (see Figure 3) and the scatterplot of the standardized residuals (see Figure 4). The examinations indicated there were slight violations of these assumptions. The deviation of the points from the straight line (see Figure 3), diagonal from the bottom left to the top right,

indicates that the assumption of normality has been slightly violated, however slight violations are acceptable in samples larger than 15 (Remler & Van Ryzin, 2015). The lack of a clear or systematic pattern in the scatterplot of the standardized residuals (Figure 4) indicated that this assumption was met.

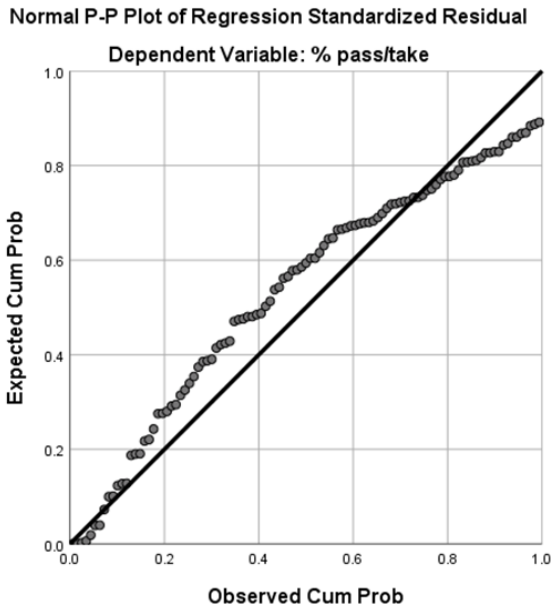

Figure 3. Normal probability plot (P-P) of the regression standardized residuals where % pass take is the % of Students passing the NCLEX

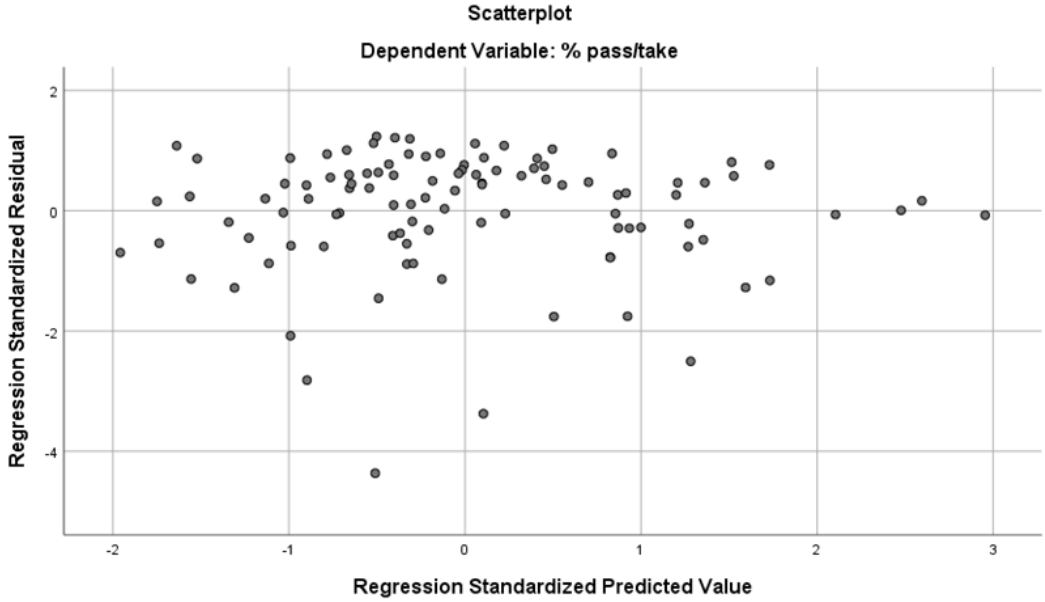

Figure 4 Scatterplot of the standardized residuals.

Descriptive Statistics

In total 119 surveys were returned, and these data were entered into SPSS and evaluated for multivariate outliers using Mahalanobis distance and incomplete responses. Two multivariate outliers were identified and removed along with eight schools who had less than ten graduates, and two responses with incomplete data sets which left a final sample size of 105 schools (n=105). Table 4 contains the descriptive statistics of the study variables.

Table 7

Means and Standard Deviations for Quantitative Study Variables

Variable	*M*	*SD*
% of students passing the NCLEX	91.604091	7.497074
Skills Lab Hours	72.433	75.6180
Simulation Hours	58.8476	58.90912
Patient Care Hours	565.4333	192.47981

Note. $n = 105$.

Inferential Results

I calculated the results using standard multiple linear regression, $\alpha = .05$ (two-tailed), to examine the influence of the number of skills lab hours, simulation hours, and patient care hours in a program on the percentage of students from each school that passed the NCLEX. The independent variables were the number of skills lab hours, simulation hours and patient care hours in a program. The dependent variable was the percentage of students passing the NCLEX. The null hypothesis was that the number of skills lab hours, simulation hours, and patient care clinical hours would not significantly predict NCLEX pass rates. The alternative hypothesis was that the number of skills lab hours, simulation hours, and patient care clinical hours would significantly predict NCLEX pass rates. Preliminary analyses were conducted to assess whether the assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were met; minor violations were noted (see *Tests of Assumptions*). The model as a whole was not able to significantly predict NCLEX pass rates, $F = 1.558$, $p > 0.05$, $R^2 = 0.044$. The coefficients (Table 7) show that skills lab hours, patient care hours, and patient care clinical hours were not significant predictors of passing the NCLEX. Therefore, the null hypothesis was retained because there was no relationship between the number of skills lab hours, simulation hours and patient care hours in ADN and BSN programs and NCLEX pass rates.

Table 8

Coefficients

Model	*B*	*Sig (2-Tailed)*
Skills Lab Hours	0.002	0.855
Simulation Hours	0.021	0.092
Patient Care Hours	0.005	0.232

Discussion

The data showed that the number of skills lab hours, simulation hours, and the number of patient care hours in clinical are not predictive of the percentage of students who pass the NCLEX for entry into practice. This may be explained through skills lab hours being designed to teach the nursing student skills proficiency, which frequently does not include complex patient care situations to prepare students for the NCLEX. Furthermore, skills lab hours are generally focused on learning or practicing new psychomotor skills in a controlled lab environment (; Haraldseid, Friberg, & Aase, 2015; Jeppesen et al., 2017). Because the majority of skills lab clinical time is spent learning new psychomotor skills and practicing them safely before transitioning the practice environment, skills lab hours may not provide students with adequate practice of complex care situations to prepare them for the NCLEX (Bugaj & Nikendel, 2016; Sahu, Chattu, Rewatker, Sakhamuri, 2019; Struksnes & Engelien).

Patient care clinical hours may not have shown correlation to NCLEX pass rates due to all nursing programs containing a significant number of clinical hours that may overall prepare students for the NCLEX. Patient care clinical hours are an essential component of nursing education, and simulation hours have been found to be equivalent

to clinical hours (Forber et al., 2016; Grealish et al., 2018; Hamilton, 2011; Hayden et al., 2014; Jayasekara et al., 2018; Meyer et al., 2011; Schlairet & Fenster, 2012; Sportsman et al., 2012). Simulation hours have been shown to produce the same results as patient care clinical hours; therefore, the lack of correlation between patient care clinical hours and NCLEX pass rates may explain the lack of correlation between simulation hours and NCLEX pass rates (see Hayden et al., 2014; Meyer, Connors, Hou, & Gajewski, 2011; Schlairet & Fenster, 2012; Sportsman, Schumacker,& Hamilton, 2011; Watson et al., 2012).

My results indicated that nursing programs do have sufficient patient care hours and simulation hours for NCLEX preparation because the NCLEX is the minimum qualification for entry into practice (see NCSBN, 2020). But some states limit the number of clinical hours that students can spend in the lab setting (California Board of Registered Nursing, 2019; NCSBN, n.d., 2005.). However, previous research identified that there is no association between nurses' years of experience and the safety of patient care provided (Kutney-Lee, Sloane, & Aiken, 2013; Lee, et al., 2018) because advanced beginner nurses are able to provide safe care (Potter, 2018; Tanicala, Scheffer, & Roberts, 2011). Similarly, passing the NCLEX is the minimum standard for entry into practice, so programs with minimal patient care clinical hours and simulation hours may be adequately preparing nurses for the NCLEX but may not be adequately preparing nurses for clinical practice (Hickerson, Taylor, & Terhaar, 2016; Hussein & Osuji, 2016; NCSBN, 2020; Odland et al., 2014; Saifan, AbuRuz, & Masa'deh, 2015; Spector et al.,

2015). Therefore, NCLEX pass rates may not be the best indicator for the way patient care clinical hours prepare students for practice.

Another possible explanation for the lack of correlation between the number of patient care clinical hours and NCLEX pass rates could be that the types of clinical education. Types of clinical experiences may be more important than only the number of hours spent in the clinical setting. Large variations in clinical education practices exist such as number of hours, number of days, and length of clinical days across clinical education programs (NCSBN, 2005; Smiley, 2019; Spector et al., 2018). There are also variations in types of education techniques used and types of clinical experiences (Flott & Linden, 2015; Grealish et al., 2018; Jeppesen et al., 2017; Torabi & Zadeh, 2018). These may have greater influence on nurses obtaining competency than only the number of hours students spend in the clinical setting.

Limitations

One limitation was that this study examined only the relationship between factors of skills lab hours, simulation hours, and patient care hours and NCLEX pass rates. There are many other variables that may affect NCLEX pass rates that are not included in this study. Furthermore, there may have been some ambiguity in the survey questions on what constitutes clinical hours as some responses included simulation and skills lab hours where others did not. This may have caused the total number of clinical hours to be a misrepresentation of the actual number of clinical hours in a program. Some respondents stated that skills lab hours are separate from clinical hours and did not include them in their responses which may have affected the results. Schools of nursing that had high

NCLEX pass rates may have been more likely to report their pass rates than schools with low pass rates which may have skewed the results. Finally, the response rate could have been affected by the COVID-19 pandemic which limited generalizability.

Implications

Implications to the discipline/practice. The lack of correlation between skills lab hours, simulation hours, and patient care clinical hours and NCLEX pass rates indicated that nursing programs have sufficient clinical hours in these areas to prepare nurses for the NCLEX. This further supports that the NCLEX is the minimum for entry into nursing practice since all programs had an adequate number of clinical hours to pass the NCEX (see NCSBN, 2020). Furthermore, this information suggests that the areas of nursing knowledge and education measured by the NCLEX is not enhanced by clinical education.

Theoretical implications. These findings supported Benner's (1984) novice to expert theory that quality experiences leads to improved practice. The lack of correlation between patient care clinical hours and NCLEX pass rates supported the novice to expert theory that experience alone is not enough to gain expertise, but rather good experiences lead to expertise (Benner, Sutphen, et al., 2010; Bradley et al., 2019; Spector, et al., 2018). Further research is needed in patient care clinical education as there was no agreement found on best practices in patient care clinical education and if the differences in teaching strategies causes variation in the quality of the experience students have in the patient care setting (NCSBN, 2005; Smiley, 2019; Spector et al., 2018).

Impact for social change. The lack of correlation between skills lab hours, simulation hours, and patient care clinical hours and NCLEX pass rates indicated that no one area of clinical education is superior in preparing nurses for the NCLEX. This information supports that schools currently contain adequate clinical hours to prepare nurse for the NCLEX which affect positive social change. However, since nurses who pass the NCEX continue to be unprepared for practice nurse educators need to explore other measurements for preparedness to practice (see Hickerson et al., 2016; Hussein & Osuji, 2016; NCSBN, 2020; Odland et al., 2014; Saifan, AbuRuz, & Masa'deh, 2015; Spector et al., 2015).

Recommendation

Further research is needed in the area of clinical education. My results did not show any significant correlation between patient care clinical hours, simulation hours or skills lab hours and NCLEX pass rates in my sample. Since clinical education is accepted as a cornerstone of nursing more research is needed to identify which areas of readiness for practice clinical education correlates with education (see Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018). More research in patient care clinical hours is needed to establish best practices in the education of nurses in patient care settings and to determine if areas of clinical education and patient care clinical hours are better predictors of readiness to practice than the NCLEX.

Conclusion

The number of skills lab hours, simulation hours, and patient care clinical hours in a program were not significant predictors of the programs NCLEX pass rates despite

researchers agreeing that clinical education is the cornerstone of nursing education (see Forber et al., 2016; Grealish et al., 2018; Jayasekara et al., 2018). Therefore, more research is needed in the area of clinical education including specific clinical education practices to establish best practices in clinical education, and to identify which areas of readiness for practice with which clinical education correlates fand to establish best practices in the clinical education of nursing students to better prepare them for practice.

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Part 3: Summary

Integration of the Studies

These three research projects showed that there was no correlation between program type of ADN or BSN and NCLEX pass rates. There was also no correlation between the total number of clinical hours or where those hours were spent between skills lab, simulation, and patient care and NCLEX pass rates. These findings suggest that all nursing programs and the minimum number of clinical hours and both ADN and BSN programs are adequately preparing nursing students to pass the NCLEX; however, the finding also support previous research that suggested the NCLEX may not be an adequate measurement of nurses preparedness to enter practice (Ackerson & Stiles, 2018; Monaghan, 2015; Odland, Sneltvdt, & Sörlie, 2014).

I also found that there was a significant difference between the total number of clinical hours and patient care clinical hours between ADN and BSN programs. BSN programs have significantly more total number of clinical hours and patient care clinical hours. BSN prepared nurses have also been shown to be able to provide higher levels of care rates (Aiken, Clarke, Cheung, et al., 2003; Aiken, Sloane, et al., 2013; Blegen et al., 2013; Estabrooks et al., 2005; Tourangeau et al., 2007). Thus, BSN students completing more clinical and patient care clinical hours than ADN students and may be one factor contributing to BSN prepared nurses being able to provide higher levels of care, which supports Benner's (1984) theory that experience leads to development of expertise. However, more research is needed in clinical education to see if the time in clinical correlates with higher levels of care provided.

There was no correlation between clinical hours and NCLEX pass rates, but the prominence of evidence of the theory–practice gap in the literature suggests that passing the NCLEX alone may not be an adequate measure of readiness for entry into practice for newly graduated nurses (Hickerson et al., 2016; Hussein & Osuji, 2016; Saifan et al., 2015). Further research is needed to determine whether more clinical hours or patient care clinical hours correlate with other measures of readiness for entry into practice such as length of orientation time needed to be independent in practice and nurses staying at the bedside. Because there is much variation in the number of hours of clinical prelicensure nursing students complete, more research is also needed to establish best clinical education practices to create more efficient and effective clinical education practices that would better prepare new nurses for entry into practice.

Conclusion

Clinical hours are an essential portion of clinical education. My findings suggest that clinical education led to higher levels of care because BSN programs had more clinical hours and more patient care clinical hours as compared to ADN programs, and BSN nurses have been shown to provide higher levels of care than ADN nurses. The lack of correlation between the number of clinical hours and program type and NCLEX pass rates suggest that clinical hours and program type of ADN or BSN are not important for students to pass the NCLEX but also suggest that passing the NCLEX alone is not an adequate measure of readiness to enter into practice. More research is needed to determine whether completing more clinical hours in prelicensure education leads to new

nurses being able to provide higher levels of care and to establish best clinical education practices.

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Appendix A: Survey

If you feel you understand the study well enough to make a decision about it, please indicate your consent by clicking the "yes" below.

___Yes

___No

What type of prelicensure program are you providing data for?

__Associate's degree

__Bachelor's degree

How many students graduated the program in 2019?

How many students from this program took the NCLEX for the first time in 2019?

How many of the students that took the NCLEX for the first time in 2019 passed the NCLEX on the first attempt?

What is the total number of clinical hours the 2019 graduates completed in the prelicensure program?

How many of those clinical hours were spent in the skills lab (not including simulation)?

How many of those clinical hours were spent in simulation?

How many of those clinical hours were spent in the facilities providing patient care?

Thank you for completing this survey! If you would like to be notified of how to access the results of this research once it is complete you may enter your email below. You will then be emailed when the results of this study are available to the public

Appendix B: Demographic Data Manuscripts 1 and 2

RID	R	PT	# graduated	# of who took NCLEX	Passed NCLEX	% pass/take	Total hours	SLH	SHs	PCH
59512252	IL	1	24.00	24.00	22.00	91.67	750.00	64.00	32.00	654.00
59516935	WA	0	26.00	26.00	25.00	96.15	552.00	0.00	83.00	469.00
59521108	TX	1	32.00	29.00	27.00	93.10	845.00		295.75	549.25
59521801	VA	1	110.00	110.00	108.00	98.18	575.00		40.00	535.00
59531266	CO	0	65.00	65.00	63.00	96.92	750.00	0.00	275.00	475.00
59574911	NY	0	65.00	65.00	55.00	84.62	665.00	42.00	35.00	588.00
59597580	NC	0	20.00	21.00	20.00	95.24	620.00	10.00	155.00	455.00
59600524	OH	1	23.00	23.00	23.00	100.00	662.00	251.00	0.00	662.00
59753355	CO	1	387.00	350.00	335.00	95.71	750.00	80.00	300.00	450.00
59805419	NC	0	31.00	31.00	27.00	87.10	816.00	52.00	100.00	664.00
59891342	MN	1	4.00	4.00	4.00	100.00	450.00	0.00	0.00	450.00
59902268	TX	0	52.00	52.00	50.00	96.15	704.00	128.00	72.00	504.00
60269284	CA	1	23.00	23.00	22.00	95.65	945.00	90.00	40.00	835.00
62249400	IN	1	43.00	43.00	41.00	95.35	655.00	45.00	20.00	567.00
62249503	CA	0	59.00	59.00	58.00	98.31	1296.00	231.00	64.00	1001.00
62249767	AL	0	40.00	39.00	26.00	66.67	810.00	135.00	48.00	627.00
62250403	AL	0	9.00	9.00	9.00	100.00	810.00	220.00	95.00	495.00
62250455	MI	1	45.00	45.00	43.00	95.56	675.00	20.00	10.00	645.00
62251006	OR	1	49.00	49.00	44.00	89.80	780.00	120.00	16.00	644.00
62252397	FL	0	240.00	240.00	214.00	89.17	848.00	0.00	124.00	724.00
62253555	UT	0	276.00	250.00	229.00	91.60	421.50	59.50	126.00	336.00
62254720	NC	0	32.00	32.00	32.00	100.00	912.00	275.00	80.00	557.00
62256794	TX	0	40.00	40.00	40.00	100.00	1008.00	200.00	80.00	1008.00
62260643	SC	0	117.00	117.00	116.00	99.15	500.00	72.00	64.00	364.00
62263949	KY	1				#DIV/0!	942.00	340.00	170.00	602.00
62284491	IL	0	36.00	36.00	32.00	88.89	608.00	80.00	64.00	468.00
62291165	NV	0	51.00	51.00	50.00	98.04	544.00	83.00	39.00	424.00
62316030	AR	1	12.00	11.00	10.00	90.91	810.00	246.00	144.00	420.00
62333061	PA	1	28.00	28.00	26.00	92.86	630.00	0.00	44.00	586.00
62368071	AL	0	148.00	148.00	145.00	97.97	675.00	0.00	32.00	643.00
62841312	MI	0	109.00	109.00	96.00	88.07	426.00	28.00	0.00	398.00
62842907	MT	0	8.00	6.00	4.00	66.67	495.00	45.00	100.00	350.00
62847749	CA	1	77.00	75.00	69.00	92.00	1100.00	60.00	60.00	1000.00
62861970	MI	0	130.00	130.00	128.00	98.46	672.00	4.00	40.00	632.00
62862784	NY	0	61.00	59.00	44.00	74.58	540.00	18.00	0.00	522.00
62927958	NC	0	10.00	10.00	9.00	90.00	226.00	0.00	12.00	214.00
63496519	OK	0	102.00	102.00	85.00	83.33	576.00	107.00	0.00	445.00
63591040	OK	0	72.00	71.00	61.00	85.92	495.00	0.00	27.00	468.00
63592336	TX	1	150.00	150.00	150.00	100.00	700.00	252.00	126.00	700.00
63592653	CO	0	36.00	36.00	35.00	97.22	750.00	90.00	150.00	600.00
63592739	OR	0	29.00	29.00	28.00	96.55	450.00	135.00	45.00	266.00
63593147	WV	1	9.00	4.00	4.00	100.00	600.00	90.00	60.00	510.00
63594240	IA	0	100.00	100.00	95.00	95.00	700.00	0.00	55.00	645.00
63594755	WA	0	98.00	72.00	66.00	91.67	564.00	0.00	0.00	564.00
63594868	WY	0	28.00	28.00	27.00	96.43	572.00	30.00	143.00	300.00
63595419	WY	0	33.00	33.00	32.00	96.97	652.00	120.00	192.00	340.00
63595827	AZ	1	37.00	13.00	13.00	100.00	1080.00	120.00	40.00	920.00
63596534	ME	1	185.00	100.00	94.00	94.00	640.00	0.00	57.00	583.00
63596847	GA	1	79.00	79.00	77.00	97.47	850.00	40.00	40.00	800.00
63597037	KY	1	17.00	17.00	17.00	100.00	765.00	250.00	75.00	440.00

63597732	MT	0	21.00	17.00	17.00	100.00	620.00	120.00	50.00	452.00
63599298	WY	0	34.00	34.00	33.00	97.06	320.00		120.00	200.00
63602142	VA	1	73.00	73.00	71.00	97.26	840.00	28.00	49.00	627.00
63603128	NJ	0	16.00	15.00	14.00	93.33	567.00	135.00	9.00	423.00
63606081	WV	1	12.00	12.00	11.00	91.67	614.00	0.00	60.00	450.00
63607753	NY	0	41.00	39.00	35.00	89.74	515.00	0.00	0.00	515.00
63607781	NY	0	34.00	34.00	33.00	97.06	308.00	0.00	0.00	308.00
63610140	KS	0	27.00	27.00	25.00	92.59	630.00	30.00	150.00	450.00
63616199	MA	1		200.00	189.00	94.50	850.00	85.00	42.50	722.50
63618714	CA	1	78.00	39.00	34.00	87.18	1012.50	135.00	60.00	817.50
63632695	TN	1	78.00	81.00	7.00	8.64	796.00	135.00	25.00	636.00
63659136	TN	1	46.00	46.00	45.00	97.83	1125.00	200.00	20.00	850.00
63663813	CA	1	227.00	142.00	129.00	90.85	990.00	36.00	54.00	900.00
63678621	MI	1	43.00	43.00	41.00	95.35	700.00	12.00	10.00	678.00
63678775	NC	0	38.00	36.00	36.00	100.00	900.00	0.00	12.00	888.00
63680257	DE	1	42.00	41.00	34.00	82.93	450.00	60.00	112.00	278.00
63689165	CA	0	7.00	7.00	781.00	11157.14	810.00	40.00	10.00	765.00
63689179	IL	0	87.00	85.00	75.00	88.24	600.00	150.00	50.00	450.00
63689818	IL	1	145.00	145.00	138.00	95.17	708.00	68.00	64.00	576.00
63694752	LA	0	53.00	53.00	52.00	98.11	606.00	15.00	50.00	520.00
63696184	OK	1	33.00	33.00	29.00	87.88	710.00	45.00	0.00	710.00
63709163	CA	0	155.00	155.00	153.00	98.71	870.00	60.00	45.00	775.00
63740550	TX	1	99.00	99.00	91.00	91.92	675.00	60.00	34.00	581.00
63741426	OK	0	217.00	114.00	92.00	80.70	336.00	0.00	0.00	336.00
63760369	ID	1	80.00	79.00	75.00	94.94	900.00	24.00	130.00	550.00
63792363	FL	0	45.00	36.00	21.00	58.33	608.00	100.00	40.00	468.00
63801956	OH	0	104.00	100.00	87.00	87.00	765.00	111.00	14.00	646.00
63820649	WV	1	30.00	28.00	21.00	75.00	1100.00	112.00	75.00	913.00
64222283	NY		39.00	38.00	37.00	97.37	600.00	0.00	0.00	600.00
64222515	OK	1	42.00	31.00	29.00	93.55	682.00	0.00	0.00	682.00
64222556	FL	0	23.00	23.00	22.00	95.65	560.00	0.00	24.00	236.00
64223035	OH	1	120.00	120.00	116.00	96.67	720.00	0.00	0.00	720.00
64224355	MT	0	20.00	16.00	16.00	100.00	710.00	240.00	36.00	434.00
64224408	MA	0	60.00	59.00	57.00	96.61	765.00	81.00	40.00	644.00
64225349	IL	0	40.00	40.00	38.00	95.00	500.00	100.00	100.00	300.00
64225362	GA	1	286.00	286.00	277.00	96.85	810.00	45.00	40.00	725.00
64227355	WV	1	60.00	60.00	56.00	93.33	630.00	68.00	15.00	547.00
64227752	KS	1	154.00	150.00	140.00	93.33	560.00	0.00	0.00	560.00
64227820	TX	0	110.00	110.00	105.00	95.45	576.00	0.00	192.00	384.00
64230337	NY	1	65.00	65.00	52.00	80.00	700.00	0.00	0.00	700.00
64230598	CA	0	32.00	28.00	24.00	85.71	1240.00	240.00	100.00	900.00
64230644	IL	0	105.00	91.00	86.00	94.51	460.00	72.00	52.00	336.00
64236194	WV	0	80.00	80.00	77.00	96.25	765.00	140.00	117.00	508.00
64236402	SC	1	168.00	142.00	128.00	90.14	855.00	180.00	160.00	515.00
64237818	VA	1	51.00	51.00	46.00	90.20	624.00	0.00	0.00	624.00
64253361	NY	0	113.00	115.00	108.00	93.91	613.00	118.00	29.00	466.00
64272510	MO	1	106.00	106.00	105.00	99.06		1120.00	300.00	850.00
64279904	CA	0	88.00	79.00	76.00	96.20	985.00	134.00	50.00	740.00
64297559	CA	0	72.00	72.00	68.00	94.44	1081.00	81.00	152.00	848.00
64324946	WV	0	72.00	72.00	65.00	90.28	625.00	90.00	90.00	445.00
64326645	NE	1	27.00	26.00	22.00	84.62	1125.00	80.00	92.00	953.00
64329674	OK	0	71.00	69.00	63.00	91.30	480.00	0.00	0.00	480.00
64334936		0	66.00	66.00	56.00	84.85	308.00	56.00	0.00	252.00
64344668	IL	1	66.00	58.00	49.00	84.48	705.00	68.00	25.00	612.00
64348778	NY	0	74.00	73.00	63.00	86.30	448.00	0.00	0.00	448.00
64349787	MI	0	120.00	120.00	118.00	98.33	700.00	0.00	56.00	644.00

64350559	IL	0	100.00	100.00	80.00	80.00	725.00	300.00	100.00	600.00
64351251	OK	0	102.00	102.00	85.00	83.33	576.00	108.00	0.00	156.00
64352493	MI	1	8.00	8.00	8.00	100.00	1125.00	135.00	90.00	780.00
64419919	MS	0	22.00	22.00	20.00	90.91	315.00	60.00	15.00	240.00
64946040	MI	1	60.00	58.00	46.00	79.31	675.00	0.00	100.00	575.00
64991423	GA	1	180.00	180.00	164.00	91.11	765.00	0.00	126.00	623.00
65195595	SD	0	10.00	5.00	4.00	80.00	450.00	88.00	24.00	274.00
65196122	OH	0	100.00	100.00	90.00	90.00	618.00	0.00	0.00	618.00
65198237	NM	0	12.00	13.00	9.00	69.23	500.00	50.00	25.00	425.00
65202315		0	80.00	80.00	76.00	95.00	500.00	60.00	60.00	340.00
65216161	VA	0	28.00	28.00	24.00	85.71	530.00	0.00	0.00	530.00
65223234	CA	0	45.00	45.00	43.00	95.56	1188.00	108.00	162.00	918.00

Note. RID = response ID, R = region, PT = program type, SLH = skills lab hours, SH = simulation hours, PCH = patient care hours

Appendix C: Scripts

Initial script:

Hello, I'm conducting research on clinical education and I'm looking to speak to someone about the number of clinical hours in the program and where they are spent. Can you direct me to who the best person would be to provide me with this information?

Thank you!

With contact person:

Hello, my name is Kara Potter and I'm a doctoral student at Walden University looking to conduct some research on clinical education and NCLEX pass rates. Are you the right person to contact for this?

If so- Great can I email you a short survey about the number of clinical hours in the program and how many hours are spent in the settings of skills lab, simulation lab, and patient care, and NCLEX pass rates?

If they say yes- Wonderful what is the email address I can send it to?

Do you have any questions currently about my research or participation?

Thank you so much for your time, and I look forward to receiving your response!

Appendix D: MANOVA Demographics

Response ID	Seq. #	Region	Program type*	# of graduates	Total # of clinical hours	Skills lab hours	Simulation hours	Patient care hours
57203019	1	NV	1	32	800	84	46	720
59512252	1	IL	2	24	750	64	32	654
59516935	1	WA	1	26	552	0	83	469
59521108	1	TX	2	32	845		35%	65%
59521801	1	VA	2	110	575		40	535
59531266	1	CO	1	65	750	0	275	475
59574911	1	NY	1	65	665	42	35	588
59597580	1	NC	1	20	620	10	155	455
59600524	1	OH	2	23	662	251	0	662
59753355	1	CO	2	387	750	80	300	450
59805419	1	NC	1	31	816	52	100	664
59902268	1	TX	1	52	704	128	72	504
60269284	1	CA	2	23	945	90	40	835
62249400	1	IN	2	43	655	45	20	567
62249503	1	CA	1	59	1296	231	64	1001
62249767	1	AL	1	40	810	135	48	627
62250455	1	MI	2	45	675	20	10	645
62251006	1	OR	2	49	780	120	16	644
62252397	1	FL	1	240	848	0	124	724
62253555	1	UT	1	276	421.5	59.5	126	336
62254720	1	NC	1	32	912	275	80	557
62256794	1	TX	1	40	1008	200	80	1008
62260643	1	SC	1	117	500	72	64	364
62284491	1	IL	1	36	608	80	64	468
62291165	1	NV	1	51.00	544	83	39	424s
62316030	1	AR	2	12	810	246	144	420
62333061	1	PA	2	28	630	0	44	586
62368071	1	AL	1	148	675	0	32	643
62841312	1	MI	1	109	426	28	0	398
62847749	1	CA	2	77	1100	60	60	1000
62861970	1	MI	1	130	672	4	40	632
62862784	1	NY	1	61	540	18	0	522
62927958	1	NC	1	10	226	0	12	214
63496519	1	OK	1	102	576	~107	0	445
63591040	1	OK	1	72	495	0	27	468
63592336	1	TX	2	150	700	252	126	700
63592653	1	CO	1	36	750	90	150	600
63592739	1	OR	1	29	450	135	45	266
63594240	1	IA	1	100	700	0	55	645
63594755	1	WA	1	98	564	0	0	564
63594868	1	WY	1	28	572	30	143	300
63595419	1	WY	1	33	652	120	192	340
63595827	1	AZ	2	37	1080	120	40	920
63596534	1	ME	2	185	640	0	55	
63596847	1	GA	2	79	850	40	40	800
63597037	1	KY	2	17	765	250	75	440
63597732	1	MT	1	21	620	120	50	452
63599298	1	WY	1	34	320		120	200
63602142	1	VA	2	73	840	28	49	627
63603128	1	NJ	1	16	567	135	9	423

63606081	1	WV	2	12	614		60	450
63607753	1	NY	1	41	515			515
63607781	1	NY	1	34	308	0	0	308
63610140	1	KS	1	27	630	30	150	450
63616199	1	MA	2		850	85	42.5	722.5
63618714	1	CA	2	78	1,012.5	135	60	817.5
63632695	1	TN	2	78	796	135	25	636
63659136	1	TN	2	46	1125	200	20	850
63663813	1	CA	2	227	990	36	54	900
63678621	1	MI	2	43	700	12	10	678
63678775	1	NC	1	38	900	0	12	800
63680257	1	DE	2	42	450	60	112	278
63689165	1	CA	1	7	810	40	10	765
63689179	1	IL	1	87	600	150	50	450
63689818	1	IL	2	145	708	68	64	576
63694752	1	LA	1	53	606	15	50	520
63696184	1	OK	2	33	710	45	0	710
63702776	1	UT	1	328	405			405
63709163	1	CA	1	155	870	60	45	775
63740550	1	TX	2	99	675	60	34	581
63741426	1	OK	1	217	336	0	0	336
63760369	1	ID	2	80	900	24	130	550
63792363	1	FL	1	45	608	100	40	468
63801956	1	OH	1	104	765	111	14	646
63820649	1	WV	2	30	1100	112	75	913
64222283	1	NY		39	600	0	0	600
64222515	1	OK	2	42	682	0	0	682
64222556	1	FL	1	23	560	0	24	236
64223035	1	OH	2	120.00	720	0	0	720
64224355	1	MT	1	20	710	240	36	434
64224408	1	MA	1	60	765	81	40	644
64225349	1	IL	1	40	500	100	100	300
64225362	1	GA	2	286	810	45	40	725
64227355	1	WV	2	60	630	68	15	547
64227752	1	KS	2	154	560			560
64227820	1	TX	1	110	576	0	192	384
64230337	1	NY	2	65	700	0	0	700
64230598	1	CA	1	32	1240	240	100	900
64230644	1	IL	1	105	460	72	52	336
64236194	1	WV	1	80	765	140	117	508
64236402	1	SC	2	168	855	180	160	515
64237818	1	VA	2	51	624	0	0	624
64253361	1	NY	1	113	613	118	29	466
64272510	1	MO	2	106		1120	300	850
64279904	1	CA	1	88	985	134	50	740
64297559	1	CA	1		1081	81	152	848
64324946	1	WV	1	72	625	90	90	445
64326645	1	NE	2	27	1125	80	92	953
64329674	1	OK	1	71	480	0	0	480
64334936	1		1	66	308	56	0	252
64344668	1	IL	2	66	705	68	25	612
64348778	1	NY	1	74	448	0	00	448
64349787	1	MI	1	120	700	0	56	644
64350559	1	IL	1	100	725	300	100	600
64351251	1	OK	1	102	576	108	0	156
64352493	1	MI	2	8	1125	135	90	780

64419919	1	MS	1	22	315	60	15	240
64946040	1	MI	2	60	675	0	100	575
64991423	1	GA	2	180	765	0	126	623
65195595	1	SD	1	10	450	88	24	274
65196122	1	OH	1	100	618	0	0	618
65198237	1	NM	1	12	500	50	25	425
65202315	1		1	80	500	60	60	340
65216161	1	VA	1	28	530	0	0	530
65223234	1	CA	1	45	1188	108	162	918
65415697	1	OK	1	261	453	0	0	453
65609517	1	IA	1	95	330	0	0	330
65686423	1	ME	1	19	486	88	12	390
65707498	1	CA	1	22	242	24	16	218
65805844	1	NY	2	65	700	0	0	700
65805945	1	WI	1	45	816	120	120	684
65807389	1	NC	2	53	835	110	75	550
65807532	1	VA	2	58	718	69	25	624
65808233	1	MD	1	115.00	500	62	26	500
65809113	1	KS	2	151	560	0	0	560
65809944	1	OK	2	38	810	90	20	680
65814794	1	CA	1	20	600	100	50	450
65815930	1	WV	2	69	630	46	20	564
65819777	1	MA	1	37	772	72	0	650
65820486	1	CA	1	93	956	114	48	794
65823362	1	NC	2	9	548	48	100	400
65824653	1	NY	2	400	885	12	12	873
65837975	1		1	28	820	82	205	533
65879194	1	TX	1	74	1152	192	288	672
65881546	1	WV	2	9	600	50	50	500
65885140	1	CA	2	63	1080	119	30	798
65886694	1	CA	1	49	1025	187.5	30	800
65929827	1	IA	1	40	150	6	16	128.
65934709	1	NE	2	26	1095	30	104	991
65942097	1	OK	2	25	696	0	0	696
66040273	1	MO	2	45	700	0	30	400
66540720	1	VA	1	100	540	0	25	515
79205761	1	OR	2	68	900	90	18	792
79206344	1	VA	2	180	699	20	44	635
79208246	1	MO	1	38	968	453	40	465
79211533	1	NC		51	675	97	27	551
79216414	1	KS	2	123	760	36	20	700
79238400	1	OH	2	24	700	200	20	500
79241725	1	IA	2	24	750	125	56	450
79242327	1	PA	2	107	840	106		734
79242496	1	MN	2	37	792	160	0	549
79256208	1	UT	2	144	945	180	60	700
79300041	1	CA	2	158	855	0	150	650
79365943	1	PA	2	43	945	50	60	831
79377504	1	TX	2	127	810	85	155.5	569.5
80202861	1	MT	1	36	500	32	16	452
80204114	1	TX	1	352	336	96	100	236
80222342	1		2	30	648	72	40	536
80981842	1	CA	2	400	1030	0	40	1030
80983963	1		1	63	645	74	78	402
80985995	1	MN	2	36	700	60	0	640
80986242	1	VA	1	33	505	0	35	505

80990819	1	IN	2	29	724	90	24	610
80991681	1	CO	2	350	750	40	188	562
80992017	1	VT	2	24	558	70	40	448
81008009	1	MN	2	28	504	0	0	504
81014175	1	OH	2	52	752	50	255	752
81021609	1	SD	2	22	720	90	20	610
81031583	1	OR	2	58	900	90	24	786
81052574	1	AR	2	105	922.5	292.5	63	637
81132292	1	LA	2	149	900	0	80	820

Note. *1 = ADN