

Transition to Practice Study in Hospital Settings

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This multisite study of transition to practice included 105 hospitals in three states. Hospitals volunteered to participate and were randomly assigned to either the study group or the control group, and all new graduate registered nurses hired between July 1 and September 30, 2011, were invited to participate. The study hospitals adopted the National Council of State Boards of Nursing's Transition to Practice model program; control hospitals continued using their existing onboarding programs, which ranged from simple orientation procedures to structured transition programs with preceptorships.

The new graduate nurses who volunteered for the transition to practice study ($n = 1,088$) filled out surveys at baseline, 6, 9, and 12 months after beginning their first nursing position. Competence was reported by both the new nurses and their preceptors. New nurse self-reported data included the number of errors, safety practices, work stress, and job satisfaction. The hospitals provided retention data on all the new graduates hired during the study period. Though the results showed few statistically significant differences between the two groups, when the hospitals in the control group were categorized as having established or limited programs, differences were detected. Hospitals using established programs had higher retention rates, and the nurses in these programs reported fewer patient care errors, employed fewer negative safety practices, and had higher competency levels, lower stress levels, and better job satisfaction. Structured transition programs that included at least six of the following elements were found to provide better support for newly graduated RNs: patient-centered care, communication and teamwork, quality improvement, evidence-based practice, informatics, safety, clinical reasoning, feedback, reflection, and specialty knowledge in an area of practice.

The need for an effective transition to practice program in nursing has been documented for more than 80 years (e.g., Townsend, 1931). Yet, comprehensive study of transition to practice in nursing did not begin until the 1970s. Marlene Kramer published her seminal work, *Reality Shock*, in which she proposed and assessed strategies to ameliorate that shock (Kramer, 1974). Patricia Benner also began studying the nurse's transition from novice to expert (Benner, 1984, 2004) based on the Dreyfus model of skill acquisition (Dreyfus & Dreyfus, 1986).

Today, the transition of new nurses to practice is even more important. Health care is becoming increasingly complex, and the need for systems thinking continues. The patient population is more diverse, sicker, and older, and patients have multiple conditions. Technology is growing exponentially, and nurses are working at a "staccato pace" (Wiggins, 2006). Patients are discharged so quickly that they go home with complex medical, social, and economic issues. Moreover, McMenamin (2014) has issued a "tsunami warning" regarding the looming nursing shortage that will be triggered by massive nurse retirements. Soon there will be fewer seasoned nurses and more novice nurses in the workplace. Along with the complexity of health care and

the projected increase of the proportion of novice nurses, medical errors continue to be a pervasive problem. Recent estimates are that between 210,000 and 400,000 premature deaths occur each year from preventable harm (James, 2013).

A survey of 400 nursing school deans and 5,700 nurse leaders showed a wide gap between perceptions of the deans and the practicing nurse leaders regarding the preparation of newly graduated nurses (Berkow, Virkstis, Stewart, & Conway, 2008). Focusing on 36 competencies, 90% of the deans and directors believed their nursing students were fully prepared to provide safe, effective care to patients, but only 10% of the nurse leaders believed they were fully prepared.

Despite the increased complexity of health care, the alarming number of medical errors, and the expertise gap, nurses, unlike other professionals, often have no comprehensive transition programs to support them as they enter the profession. The Joint Commission, the Institute of Medicine (IOM), and the Carnegie Study of Nursing Education have called for robust transition to practice, or residency, programs for nurses (Benner, Sutphen, Leonard, & Day, 2010; Institute of Medicine [IOM], 2011; The Joint Commission, 2002). Yet, comprehensive, evidence-based nurse residencies are offered by only a minority of employers. A

survey of 628 new graduate registered nurses (RNs) found that only 33% had transition programs separate from orientation programs (NCSBN, 2006). One survey of 219 chief hospital nurse executives reported that only 37% offered nurse residencies in 2011 (Pittman, Herrera, Bass, & Thompson, 2013). A second survey of 203 U.S. hospitals with 250 beds or more found that 48% had nurse residency programs, and these programs differed greatly in content and length (Barnett, Minnick, & Norman, 2014).

Based on the apparent need for transition to practice programs, NCSBN convened a committee that developed the evidence-based TTP model. Input regarding the TTP model and the needs of new graduate nurses was gathered from more than 35 nursing and health care organizations (Spector & Echternacht, 2010).

The consensus of the committee was that the Quality and Safety Education for Nurses (QSEN) competencies (Cronenwett et al., 2007; Sherwood & Barnsteiner, 2012) should be an integral part of the TTP model. QSEN is based on the 2003 IOM competencies (Greiner & Knebel, 2003) for driving quality and improving safety. The QSEN competencies include: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics.

Based on feedback from the many experts consulted during the development of the TTP model and extensive research, the committee determined the essential elements of transition. The following elements were developed into an evidenced-based transition to practice program for adoption by hospitals in the United States.

- An institution-based orientation program. Orientation programs for this study were considered to be “the process of introducing staff to the philosophy, goals, policies, procedures, role expectations and other factors needed to function in a specific work setting. Orientation takes place both for new employees and when changes in nurses’ roles, responsibilities and practice settings occur” (American Nurses Association, 2000).
- Trained preceptors. A key to the TTP model is that a trained preceptor is assigned to work with and guide the new nurse for the first 6 months of practice. The preceptors are educated in their role through an online training module.
- Modules. In the first 6 months of the program, the new nurse will complete five modules:
 - **Module 1: Patient-centered care** with such major subcategories as content specialty (work with preceptor); multiple dimensions of patients; prioritizing and organizing; just culture; moral/ethical concerns; health care systems; professional boundaries
 - **Module 2: Communication and teamwork** with such major subcategories as transitioning from student to an accountable nurse (role socialization); communicating to ensure safe and quality care (TeamSTEPPS, 2014); delegat-

ing and decision making; work environment and conflicts; growing as a professional nurse

- **Module 3: Evidence-based practice** with such major subcategories as defining evidence-based practice with scenarios; using databases; critically appraising the literature; using clinical practice guidelines; evidence-based practice models; implementing evidence-based practice in practice settings
- **Module 4: Quality improvement** with such major subcategories as overview of quality improvement; identifying improvement gap opportunities; quality improvement tools; measuring and monitoring the data; using quality improvement in practice (case study); keys to successful improvement
- **Module 5: Informatics** with such major subcategories as informatics as the foundation of nursing; computer and information literacy skills; information management skills with cases; informatics and the nurse’s role in delivering safe patient care.
- Safety and clinical reasoning threaded throughout the modules.
- Institutional support during the second 6 months of the program. After completing the formal program, the new nurse would be encouraged and supported to participate in system activities, such as committees, unit projects, grand rounds, and other learning opportunities offered by the institution.
- Feedback and reflection. These components are threaded throughout the first year of practice and facilitated by the nurses, preceptors, and managers.

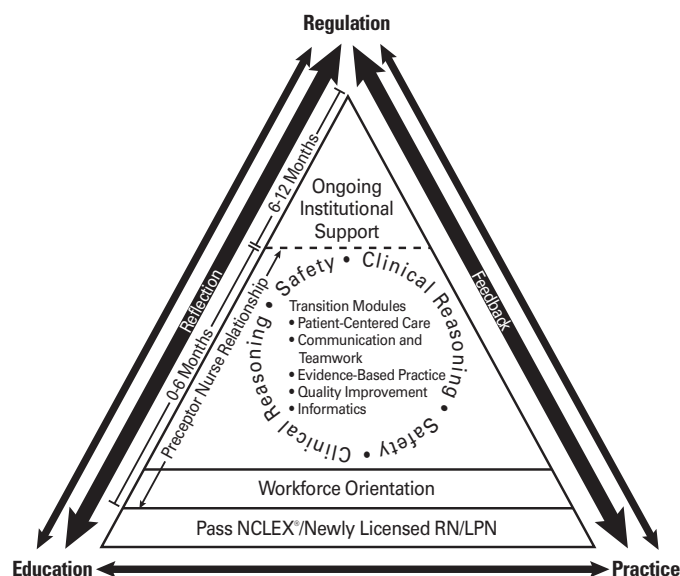
The TTP Model program (See Figure 1), hereafter called the TTP program, was then examined in a randomized, multisite study involving 105 hospitals from three states and more than 1,000 new graduate nurses.

Literature Review

Two national programs (Goode, Lynn, & McElroy, 2013; Ulrich et al., 2010) have reported their experiences with 10 years of longitudinal data. Goode and colleagues (2013) reported on data from the University Health System Consortium/American Association of Colleges of Nursing (UHC/AACN) residency program from 2002 through 2012. The UHC/AACN residency content includes leadership, patient-centered care, interprofessional collaboration, quality and safety, and related nurse-sensitive outcomes, and the professional role, which includes professional issues and the management of changing patient conditions. The UHC/AACN program also requires an evidence-based practice project, face-to-face seminar sessions, and facilitated peer discussions. Goode et al. (2013) found that competence and confidence increased across their three time points during the year, but satisfaction declined significantly from the start to the 6-month point and then stabilized at the 6-month point until completion at 12 months. Goode et al. also found that retention increased from

FIGURE 1

Transition to Practice Model



88% in early years to 94.6%. Effects on job stress were mixed, with the 10-year review finding no significant differences in job stress across the three time points. However, an earlier UHC/AACN study (Williams, Goode, Krsek, Bednash, & Lynn, 2007) found significant decreases in stress across the three time points.

The Versant program instituted in 1999 has reported 10 years of program outcome data (with greater than 6,000 new graduates) (Ulrich et al., 2010). This 18-week program included case studies, structured clinical immersion experiences with team precepting, structured mentoring, self-care sessions, rotations to related departments, and competency validation. Turnover rates decreased over time to 4.3% in the fifth cohort, indicating the importance of allowing the program to become a part of the organization. As they did in the UHC/AACN program, the new nurses in the Versant program showed significant improvement in competency from the beginning to the end of the RN residency.

Two recent reviews of earlier transition to practice studies provide some insight into the evidence-based, best practices of transition programs as well as the quality of the science (Anderson, Hair, & Todero, 2012; Theisen & Sandau, 2013). Both reviews found that a comprehensive transition program is effective when it spans the first year of practice, and both emphasize the importance of a preceptorship. Both reviews called for more rigorous research designs for transition programs, particularly emphasizing the need for control groups and further research on measurement tools for new graduates. There were few multisite studies, making it difficult to generalize beyond a geographical area. Further, most of the data came from large hospital organizations, not rural or smaller hospitals.

Although most of the research on transition programs did come from large medical centers, there are a few exceptions. The

Wisconsin Residency Program has a strong rural aspect (Bratt, Baernholdt, & Pruszyński, 2012). Nurses at urban ($n = 312$) and rural ($n = 86$) sites revealed steep learning curves regarding competency; however, the rural nurse group had significantly higher job satisfaction and lower stress at the end of the program compared with the urban nurse group.

TTP Study

The primary aims of this study were to do the following:

- Conduct a randomized, controlled, multisite study examining quality and safety, stress, competence, job satisfaction, and retention in new graduate nurses using an evidence-based TTP program.
- Compare outcomes with a control group of hospitals that had pre-existing onboarding programs.
- Obtain diverse samples that include rural, suburban, or urban hospitals that range in size from smaller community facilities to large medical centers.

Research suggests that newly licensed nurses need transition programs to support their safe entry to practice (Berkow et al., 2008; NCSBN, 2002, 2004). Therefore, this study would update the state of the science related to transition to practice and inform boards of nursing (BONs) regarding whether transition requirements or regulations are needed to protect the public.

Research Questions

1. How effective is NCSBN's TTP program in terms of safety, competence, stress, job satisfaction, and retention when compared with a control group of various onboarding methods and programs customarily used by hospitals enrolled in the study?

After analyzing the results of this question, a post hoc analysis was performed based on a second question that emerged from the data:

2. Do transition to practice programs make a difference in new graduate outcomes in terms of safety, competence, stress, job satisfaction, and retention?

Method

Design

This comparison study used a longitudinal, randomized, multisite design. The study examined the effects of NCSBN's TTP program and other transition programs in assimilating new graduate nurses to the practice environment in their first professional nursing position. The study was conducted for 18 months and included only hospitals. Newly licensed RNs were enrolled from July 1, 2011, through September 30, 2011.

Preparation for the Study

The NCSBN TTP program consisted of the five online modules referred to earlier. For the study, it was decided to offer the TTP program online to control for the delivery of the content across

the hospitals. Subject matter experts, including a QSEN scholar and a clinical application reviewer, were hired to develop the five modules, with the goal of providing educational, interactive, and engaging learning experiences. The content was then placed in the format of an online course. A TTP website was designed to house the modules and the participant surveys to make it as easy as possible for the study subjects to participate.

In addition, using the same format, a preceptor module was developed to ensure all preceptors in the study group were receiving standardized instruction. The module included an introduction to NCSBN's TTP program, roles and responsibilities of the preceptor, teaching clinical reasoning, learning theories with an emphasis on adult learning, communicating and providing feedback to the nurse, assessment of competence, and fostering a culture of safety. A required exercise was to guide the preceptors to complete a root cause analysis with their new graduates on a real situation that occurred in the institution.

The time to complete all five modules was approximately 20 hours, though additional time was allotted for completing the exercises with preceptors, accessing and reading identified websites, reading handouts and articles, and participating in activities.

Institutional Review Board

Institutional review board (IRB) approval was received from each hospital with a review committee. Hospitals without IRBs received approval from the Western Institutional Review Board.

Participation of new nurses and preceptors for completing the surveys was voluntary; each was given the opportunity to decide whether or not to participate in the study by completing the data collection forms for each time period.

Selection Criteria: States, Sites, and Subjects

In October 2010, a description of the study and state/hospital eligibility requirements was sent via e-mail to executive officers of BONs, inviting them to recruit study sites in their state and apply for participation. To be considered for participation in the study, the state had to have a minimum of 18 hospitals willing to take part in the study. There were no exclusion criteria.

After a review of the states volunteering for participation, three states from geographically diverse areas (Illinois, Ohio and North Carolina) were selected. BONs and other leaders in the states recruited hospitals. All sites that agreed to participate signed a research agreement with NCSBN and identified a site coordinator.

Hospitals had to meet the following inclusion criteria:

- Hire at least 10 new graduate nurses between July 1 and September 30, 2011; in order to recruit diverse sites, hospitals were allowed to form consortiums where, together, two or more hospitals projected they would hire at least 10 new graduates.

- Allow new nurses at least 20 hours per month for 6 months during scheduled work hours to access the online TTP modules.
- Allow the preceptors at least 10 hours total to access the online training modules during scheduled work hours.
- Identify an internal candidate to serve as site coordinator to manage IRB submission and organizational research efforts for the study.

Hospitals using Versant or UHC/AACN residency programs were excluded from the study.

Nurses had to meet the following inclusion criteria:

- Be employed in their first job after graduating from a prelicensure diploma, associate-degree, baccalaureate, or master's-entry program
- Pass the NCLEX®-RN
- Be employed by the participating hospital as an RN not more than 30 days before the enrollment period (July 1, 2011, through September 30, 2011)
- Be hired to fill a 0.5 full-time employee (FTE) position or greater.

Nurses were excluded from the study if they were hired by the hospital as an RN before June 1, 2011, or after September 30, 2011. An RN who worked as a licensed practical nurse (LPN) before being employed as an RN was eligible. Also excluded were nurses who worked in permanent positions as RNs in a hospital before their current employment. Temporary positions at facilities other than hospitals were allowed.

The study was overseen and monitored by three state coordinators hired by NCSBN and individual site coordinators appointed by each participating facility. All state and site coordinators were invited to a kick-off meeting in Chicago. During the meeting, they received a comprehensive overview of the TTP study, including detailed instructions on their specific responsibilities.

Sample Size

Sample size was determined using a software package designed to estimate power in multilevel designs (Spybrook, Raudenbush, & Liu, 2006). This study had the individual nurse nested in the hospital and the hospital nested in the state. Aiming for a moderate effect ($d = .40$), with a power of .98, and an alpha of .05, researchers needed a sample of 750 nurses from 61 sites.

Sheehan (2006) reports that an initial online survey averages a 30% response rate, though Khadjesari et al. (2011) report that response rates at a 3-month follow-up survey may fall to 11% to 15%. Keeping these data in mind, we took several steps to prevent threats to the TTP study and we recruited a final sample of 94 hospitals and 1,088 new nurses to account for substantial attrition.

Procedure

Hospitals were randomized into a control or study group at the outset of the study. More hospitals were assigned to the control group than to the study group because researchers anticipated that control hospitals may be more likely to withdraw from the study. A stratified method was used to ensure that the groups were as equivalent as possible. Stratification was based on stand-alone hospital or consortium, location (urban, suburban, rural), estimated number of new nurses to be hired, disproportionate-share hospital or not (disproportionate-share hospitals are those with a Supplemental Security Income ratio of greater than .10). All study and control hospitals kept their usual new employee orientation to the hospital and unit.

Hospitals in the study group adopted the entire NCSBN TTP program for the study period (June 1, 2011, through September 30, 2012). New nurse hires were asked to participate in the NCSBN study and provide data about their experiences for the first 12 months after their hire dates. Assigned preceptors completed a training module and provided data about the new graduate's performance.

Hospitals in the control group maintained their usual onboarding programs. Site coordinators provided information about the control hospitals' demographics and new nurse retention. The control group site coordinators provided information on their hospitals' existing programs for onboarding new graduates. After the study, the control hospitals were provided complimentary access to the TTP modules for 1 year.

Data Collection

Quantitative data for this project were collected from nurses, preceptors, managers, and site coordinators through online surveys. Hospital descriptive data were entered by the site coordinators at each hospital. In addition, site coordinators tracked the retention status of all new nurses hired. Survey questionnaires were completed by new nurses four times during the year (baseline, 6, 9, and 12 months) and three times by the preceptors (demographics only at baseline and then 6, 9, and 12 months). These surveys included demographic and work characteristics and measures of overall and specific competencies, safety practices, patient-care errors, work stress, and job satisfaction. The new nurses' preceptors completed the overall and specific competency tools evaluating their nurses, and the new nurses' ratings were compared to their matched preceptors' scores. The survey tools completed by the new nurses are described below.

Safety Practices and Errors

The NCSBN *Practice Issues Index* was revised from a previous NCSBN instrument and was used for collecting the number of self-reported errors made and positive and negative safety practices identified by the new nurses. The use of positive safety practices (such as "first to recognize a change") or a negative safety practice ("violated standard precautions") were reported as a mean

percentage of those listed. Likewise, reports of errors ("medication error") were reported as mean percentages. Because this was a simple tool for reporting the number of errors and safety practices, no psychometric testing was required. Expert consultants on the advisory panel agreed that there was face validity.

Competence

Two instruments were used to evaluate new nurse competence: the Overall Competence Tool and the Specific Competency Tool. For the *Overall Competence Tool*, the new nurses rated themselves on six items. Preceptors used the same tool to rate the new nurses at 6, 9, and 12 months. Examination of the differences between the new nurse's self-evaluation and the preceptor's evaluation showed no significant differences, except that preceptors generally rated their new nurses higher than the new nurses did. The difference was statistically significant for the Overall Competence Scale ($p < .05$). The internal consistency of this tool was acceptable ($\alpha = 0.868$).

The study's *Specific Competency Tool* was developed by modifying the Nursing Executive Center's Critical Thinking Diagnostic (Berkow, Virkstis, Stewart, Aronson & Donohue, 2011) instrument (with permission) and was completed by new nurses at baseline, 6, 9, and 12 months and preceptors at 6, 9, and 12 months. The Critical Thinking Diagnostic instrument has previously established reliability and validity. In collaboration with experts from the QSEN initiative (Sullivan, Hirst, & Cronenwett, 2009), the tool was modified for this study to include the QSEN competencies. To ensure the tool remained psychometrically sound, it was piloted at three Chicago hospitals before the study. Cronbach's alpha reliability for the tool in the pilot study ranged between .737 and .832 for new nurses and between .819 and .894 for preceptors. An exploratory factor analysis of the conceptual groupings of the items was also performed, and subscales that could be validated with each group were constructed. After examination of the factor loadings and the patterns of interrelationships, subscales were calculated. The following specific competency subscales were identified: teamwork and communication, patient-centered care, evidence-based practice/quality improvement, and use of technology. Subsequent testing in the TTP study indicated that the instrument had internal consistency ($\alpha = 0.886-0.934$) for each of the four competency scales.

Work Stress

This tool consisted of four questions developed by NCSBN staff to gather data on new nurse work stress. The members of the advisory panel confirmed the questions had face validity. These questions were piloted in three Chicago hospitals ($\alpha = 0.769$), and subsequent testing in the TTP study indicated the instrument had internal consistency ($\alpha = 0.775$).

Job Satisfaction

The Brayfield & Rothe Index of Job Satisfaction (Brayfield & Rothe, 1951) was completed by new nurses at baseline, 6, 9, and 12 months. This is a highly recognized and accepted tool for measuring job satisfaction that has been in use since the 1950s. Validity and reliability have been well established in numerous studies. The instrument was not altered for this study. Subsequent testing in the TTP study indicated the instrument had internal consistency ($\alpha = 0.883$).

Data Analysis

Basic descriptive analyses were performed to assess the data and characterize the new nurses, preceptors, and hospitals. Categorical data were analyzed using frequencies and chi-square analysis. An analysis of variance (ANOVA) was used to analyze the continuous variable effects across the groups, and paired t-tests were used to analyze the effects across time within each group. The descriptive and inferential analyses were performed using SPSS. Two-tailed tests of significance ($\alpha < .05$) were used for descriptive comparisons. For directional hypotheses (e.g., the study group will outperform the control group), researchers used 1-tailed tests of significance ($\alpha < .05$).

Multilevel modeling was used to analyze the effects, using multilevel approaches. These analyses were done using the statistical software R. In addition to finding the effects of the study hospitals, compared with the control hospitals, the multivariate analyses simultaneously controlled for other variables that may affect the results, including time, nurses' education, state, Magnet® status, and university affiliation. Interactions of variables with time were also assessed and controlled. More importantly, because new nurses responded multiple times to the surveys, producing up to 4 points of data for each subject, these data were correlated over time within each nurse and did not meet the assumption of independent observations. Repeated observations from each respondent are referred to as nested and require further analytic approaches. The multilevel analyses are adjusted for the correlations of responses within each nurse respondent.

Finally, multilevel analyses used all of the data from all the respondents whether or not they responded at all four time points by accounting for missing data with predictive equations. Therefore, the statistical significance of the differences for the groups could be calculated more accurately than with basic ANOVAs comparing means at each time period. In sum, the multilevel modeling produced more accurate inferential statistics because of its ability to counter the nesting of observations within new nurse respondents, to control for several variables in the same analysis and use all the data available.

Results

Study results included demographic information on the hospitals, the new nurses, and their preceptors as well as comparisons of the

TABLE 1

Comparison of New Nurse and Preceptor Score Means for New Nurse Competencies

Competencies	6 Months	9 Months	12 Months
<i>Patient-centered care</i>			
New nurse	4.15	4.24	4.34
Preceptor	4.22	4.28	4.36
<i>Quality improvement, evidence-based practice</i>			
New nurse	3.99	4.08	4.20
Preceptor	4.04	4.08	4.20
<i>Technology</i>			
New nurse	4.30	4.34	4.45
Preceptor	4.32	4.35	4.42
<i>Teamwork, communication</i>			
New nurse	4.06	4.14	4.24
Preceptor	4.07	4.10	4.26
<i>Overall competency</i>			
New nurse	3.12	3.13	3.22
Preceptor	3.34	3.34	3.47

three groups regarding patient safety, competency, work stress, job satisfaction, and turnover.

Hospital Characteristics

A total of 105 hospitals in Illinois, North Carolina, and Ohio volunteered for the study. Hospital characteristics were compared across 44 study and 61 control hospital groups, and none of the differences in characteristics were statistically significant, showing that the randomization was successful in creating similar groups of hospitals. Of the 105 hospitals, 31% were Magnet, and 22% were university affiliated. There were more hospitals from Ohio (66) than from North Carolina (21) or Illinois (18). Most of the hospitals (95) were not-for-profit. Only six were government nonfederal hospitals, and four were for-profit, investor-owned hospitals. Hospitals were nearly evenly divided among rural (34), suburban (34), and urban (37) locations. The hospitals averaged 261 beds in a range from 24 to 932. Hospitals were assigned to five bed-size categories: There were 22 hospitals with fewer than 100 beds, 32 with between 100 and 199, 18 with between 200 and 299, 17 with between 300 and 399, and 16 with more than 400 beds.

The number of new nurses hired during the study period varied greatly across these hospitals of different sizes. Seven hospitals hired only one new nurse, and seven hired more than 40 new nurses. The average number of new nurses hired was 15, and the median was 10.

New Nurses

Of the 1,554 new nurses hired, 1,088 (70%) from 94 hospitals (51 control, 43 study) volunteered to be in the research study and completed at least one survey response or demographic form. For the entire sample, the average age was 28 years; 91% were female; and 11% were nonwhite. There were no statistically significant differences in nurse demographic characteristics between study and control hospitals. The nurses worked on a variety of units and shifts with no statistically significant differences across study and control groups. Of the total, 53% worked on medical-surgical units; 36% worked in critical care areas (including emergency departments); 6% worked in some combinations of nursery, postpartum, and labor and delivery settings; and the remaining 5% worked in long-term care or psychiatric units or floated across units. Nurses reported working 12-hour shifts (81%), 10-hour shifts (0.9%), and 8-hour shifts (18.4%). Nearly half (48.8%) worked day shift only; 29.1% worked nights only; 6.2% worked evenings only; and 16% worked some pattern of rotating shifts.

The basic nursing education for this sample was reported as associate degree or diploma for 49%, basic baccalaureate for 44%, and accelerated baccalaureate or master's-entry for 7%. Educational levels did not differ between study and control groups. Previously, 56.4% had worked as a nurse aide and 4.4% had worked as an LPN; these nurses were equally represented in study and control groups.

The characteristics of hospitals in which responding new nurses were employed were statistically significantly different in three areas. A larger percentage of new nurses in the study group worked in university-affiliated hospitals (46%) than those in the control group (39%). The distributions of control and study nurses were significantly different across the three states, with Ohio having the most study nurses and Illinois having the fewest. Also, the distribution of new nurses across hospitals of different sizes differed, with study nurses more likely to work in hospitals with 100 to 199 beds and less likely to work in hospitals with 300 to 399 beds.

New Nurse Attrition

As expected, the number of participants in both groups of the study declined over the time periods, with 1,011 responding initially, 544 responding at 6 months, 518 responding at 9 months, and 241 responding at 12 months. These response numbers did differ significantly across the three states ($p < .01$); there were proportionately more control new nurses responding from Illinois and more study nurses in Ohio responding. Therefore, we controlled for states in the statistical analysis.

The nonresponder characteristics, both in the preceptor group and the new nurse group, were studied to ensure that in the final outcome there was no bias due to subject attrition. Comparisons were done to determine whether the attrition across the four time periods was different in the control group versus

the study group. The proportion of new nurse study respondents versus control respondents at each time point was as follows:

- At 6 months: 53% for the study group versus 47% for the control group
- At 9 months: 51% for the study group versus 49% for the control group
- At 12 months: 52% for the study group versus 48% for the control group

There were no statistically significant differences in the proportion of respondents across the control and intervention groups. Additionally, comparisons were done to determine whether the smaller samples at baseline 6-, 9-, and 12-month surveys had systematically different characteristics from the total sample of new nurses. There were no statistically significant differences in the characteristics of the new nurses in age, gender, race, previous experience, or education across the study and control groups and the four response times.

Preceptors

Preceptors completed surveys for the new nurses, evaluating their competence, using the Overall Competence Tool and the Specific Competency tool. In the control group, the person designated as a preceptor for completing the surveys may have been a manager of the new nurse. The number of preceptor surveys received decreased from 691 at 6 months to 675 at 9 months to 336 at 12 months. There were no statistically significant differences among the preceptors responding at each of the three time periods. Because some of the preceptors were assigned more than one new nurse, there were fewer preceptors than new nurses.

Preceptor and Nurse Scoring

The scores for the Overall Competence and Specific Competency tools for both new nurses and their matched preceptors are presented in Table 1. New nurses provided their responses for these measures at baseline as well as at 6, 9, and 12 months. Preceptors completed these measures for new nurses only after they worked with them at 6, 9, and 12 months. In nearly all cases, the preceptors scored the new nurses nearly the same as or slightly higher than the way new nurses scored themselves. (See Table 1.) Because the new nurses provided scores at all time periods and because there were no significant differences between the new nurse ratings and their matched preceptor ratings (except that the preceptor ratings were higher), analyses were done using only the new nurse data.

Research Question 1

How effective is NCSBN's TTP program in terms of safety, competence, stress, job satisfaction, and retention when compared to a control group of various onboarding methods and programs customarily used by hospitals enrolled in the study?

- Number of errors: The control group made fewer errors at 6 months after starting their new position. Their overall mean

TABLE 2

TTP, Established, and Limited Programs

	TTP Program		Established Programs		Limited Programs		<i>p</i> Value
	Mean %	SD	Mean %	SD	Mean %	SD	
Patient safety							
Total patient errors	(n = 535)		(n = 272)		(n = 177)		
Baseline	5.99	0.11	4.04	0.09	7.49	0.13	.014 Established
6 months	8.03	0.13	6.18	0.11	7.23	0.13	
9 months	5.97	0.11	5.46	0.12	7.24	0.11	
12 months	5.53	0.1	6.25	0.16	5.05	0.1	
Positive safety practices	(n = 484)		(n = 229)		(n = 173)		
Baseline	78	0.29	80.9	0.26	76.64	0.3	.052 (NS)
6 months	85.15	0.18	87.57	0.17	84.94	0.2	
9 months	83.33	0.2	87.26	0.16	78.06	0.25	
12 months	82.05	0.21	91.8	0.13	86.86	0.2	
Negative safety practices	(n = 488)		(n = 231)		(n = 173)		
Baseline	21.11	0.22	18.71	0.21	20.84	0.22	0.016 Established
6 months	24	0.23	19.81	0.2	25.73	0.25	
9 months	19.61	0.19	19.94	0.21	24.94	0.22	
12 months	21.69	0.23	17.15	0.2	23.27	0.23	
Overall competence							
	(n = 536)		(n = 274)		(n = 177)		
Baseline	2.94	0.48	3.03	0.42	3	0.41	0.018 Established
6 months	3.09	0.37	3.18	0.41	3.11	0.41	
9 months	3.12	0.38	3.14	0.36	3.07	0.45	
12 months	3.2	0.41	3.23	0.37	3.16	0.39	
Specific competencies							
Patient-centered care	(n = 543)		(n = 285)		(n = 179)		
Baseline	3.94	0.56	3.98	0.57	3.96	0.56	NS
6 months	4.19	0.52	4.18	0.58	4.2	0.5	
9 months	4.22	0.58	4.29	0.48	4.12	0.54	
12 months	4.36	0.54	4.39	0.62	4.3	0.42	
Evidence-based practice and quality improvement	(n = 542)		(n = 283)		(n = 179)		
Baseline	3.72	0.561	3.69	0.52	3.7	0.59	NS
6 months	4.01	0.5	4	0.47	3.98	0.54	
9 months	4.04	0.48	4.10	0.51	3.96	0.51	
12 months	4.14	0.49	4.16	0.48	4.2	0.46	
Use of technology	(n = 540)		(n = 283)		(n = 179)		
Baseline	4.03	0.58628	4.02	0.57	4.07	0.57	0.022 (TTP)
6 months	4.32	0.53988	4.31	0.51	4.31	0.54	
9 months	4.33	0.51114	4.36	0.52	4.3	0.59	
12 months	4.44	0.52762	4.41	0.49	4.4	0.47	
(continued)							

(continued)

TTP, Established, and Limited Programs (continued)

	TTP Program		Established Programs		Limited Programs		<i>p</i> Value
	Mean %	SD	Mean %	SD	Mean %	SD	
<i>Communication & teamwork</i>	<i>(n = 542)</i>		<i>(n = 282)</i>		<i>(n = 179)</i>		0.064 (NS)
Baseline	3.72	0.59	3.76	0.57	3.82	0.56	
6 months	4.07	0.51	4.1	0.53	4.12	0.48	
9 months	4.12	0.51	4.17	0.52	4.08	0.55	
12 months	4.23	0.48	4.21	0.59	4.23	0.49	
Work stress							
	<i>(n = 505)</i>		<i>(n = 244)</i>		<i>(n = 173)</i>		0.029 Established
Baseline	0.94	0.45	0.9	0.43	0.99	0.52	
6 months	0.98	0.45	0.96	0.43	1.06	0.55	
9 months	0.98	0.48	0.95	0.4	1	0.54	
12 months	0.93	0.45	0.82	0.32	0.87	0.38	
Job satisfaction							
	<i>(n = 539)</i>		<i>(n = 281)</i>		<i>(n = 176)</i>		0.031 Established
Baseline	4.22	0.51	4.19	0.59	4.18	0.54	
6 months	3.95	0.64	3.99	0.67	3.81	0.71	
9 months	3.81	0.68	3.92	0.68	3.8	0.7	
12 months	3.86	0.73	4.05	0.63	3.91	0.69	

percentage of errors over time when compared with the study group was also lower, and this was statistically significant ($p = .034$).

- Positive and negative safety practices: There was no statistically significant difference between the study and control groups for positive safety practices; however, for negative safety practices, there was a statistically significant ($p = .031$) difference indicating the control group had fewer negative safety practices.
- Overall competence: To measure competence, the new nurses and their preceptors completed a survey on overall competency (Overall Competence Tool). Though both groups significantly improved over the 12 months in overall competence, there was no statistically significant difference in improvement between the groups ($p = .054$).
- Specific competencies: The Specific Competency Tool was used to measure competence in the following four areas: patient-centered care, communication and teamwork, quality improvement/evidence-based practice, and use of technology. As with overall competence, both groups significantly improved over time with the specific competencies. The TTP group rated its competency significantly higher for patient-centered care ($p = .041$), use of technology ($p = .045$), and communication and teamwork ($p = .023$).

- Stress: Work stress increased from the baseline survey to 6 months and then began to decline; the 12-month value was the lowest. There was a statistically significant decrease in stress over time in the control group when compared with the TTP group ($p = 0.044$).
- Job satisfaction: There were no statistically significant differences between the TTP and control groups over time regarding job satisfaction.
- Turnover: There was little difference between the TTP (15%) and control (16.7%) groups regarding voluntary new nurse turnover at the end of the 12-month study period ($p = 0.212$).

Though both groups had statistically significant improvements over time (using multilevel modeling) regarding overall competency and the specific competencies, there were few significant findings when comparing the TTP group to the control group. After reviewing these results, the research team asked the question: What do these findings mean? Do they mean both the TTP program and the onboarding programs in the control group were close to being equally effective in transitioning new nurses during their first year of practice? Alternatively, are the findings a result of time, learning, and experience that would have naturally occurred independent of a transition program intervention? Therefore, a post hoc question was explored:

Research Question 2

Do TTP programs make a difference in new graduate outcomes in terms of safety, competence, stress, job satisfaction, and retention?

To investigate this question, the researchers examined the onboarding methods used by the control hospitals. Their onboarding methods and transition programs varied widely. Out of the 51 programs in the control group, 29 met at least six of our evidence-based criteria (the criteria include Patient-centered care, Communication and teamwork, Quality improvement, Evidence-based practice, Informatics, Safety, Clinical reasoning, Feedback, Reflection, Preceptorship and Specialty knowledge in area of practice) for a transition program and were classified as established programs. Twenty-two programs did not have a structured curriculum and had fewer than six elements the literature describes as being essential to transition. They were classified as limited programs.

The three groups to be analyzed were as follows:

- Established programs ($n=29$ programs; 300 subjects)
- Limited programs ($n=22$ programs; 186 subjects)
- TTP study programs (TTP group) ($n=43$ programs; 577 subjects).

When comparing the hospitals across the three groups, we found a few differences. The limited programs were statistically less likely to be Magnet programs and the established programs were statistically more likely to be university affiliated. Also, the limited programs were more likely to be small and rural, but those differences were not significant.

Comparing the new nurses across the three groups revealed some small but statistically significant differences in the distribution of RN education background, categorized in the total sample as associate/diploma (49%), basic baccalaureate (43.3%), and accelerated baccalaureate and master's entry (7.7%). TTP hospitals had the highest percentage of accelerated baccalaureate and master's entry new nurses (9%). Established program hospitals had the highest percentage of associate/diploma nurses (52%). And limited programs had the highest percentage of basic bachelor's degree nurses (52%). There were no other significant differences among the new nurses across the three groups.

Our hypothesis was that if a substantial evidence-based transition program had little to no impact on the outcomes of new graduate nurses in their first year of practice, there would be no difference in the outcomes of these three groups. Alternatively, if transition programs do play a role, there should be statistically significant differences among the three groups.

Patient safety

Using the multilevel modeling analyses, the researchers assessed the reports of patient-care errors and safety practices. The total patient errors over time were lowest in the established program group ($p = 0.014$). See Table 2 for the means of errors and safety practices and Figure 2 for these trends over the four time points. Interestingly, the established and TTP programs showed a peak

in errors at 6 months, which is typically when new graduates become more independent. Then, reported errors began to decline at 9 months. However, the limited group maintained a relatively high level of errors until 9 months, when the level began to decrease. Though the use of positive safety practices is consistently higher at all time points for the established programs (Table 2 and Figure 3), those results were not statistically significant. Figure 4 and Table 2 show the gains made by the established programs regarding negative safety practices. New nurses in established programs began with fewer negative safety practices and ended with statistically significantly fewer than the TTP and limited groups ($p = 0.016$). The TTP group remained in the middle, with some increases and decreases in negative safety practices. The limited group had the highest mean percentage of negative safety practices at 6, 9, and 12 months.

Competency

Using multilevel modeling, researchers found statistically significant improvement in overall competence in all three groups. See Table 2 for the means across the three groups on Overall Competence and Figure 5 for an illustration of the trends. The established group was consistently higher at all four time points when compared with the TTP and limited groups ($p = .018$). The TTP group began lower at baseline, but by 9 months it was in the middle. The limited group starting slightly higher than the TTP group at baseline, but overall competence began to decrease around 6 months and remained lower than the other two groups for the rest of the year.

As with the overall competence, the specific competencies showed statistically significant improvement over the 12 months for all three groups. Of the four specific competencies (see Table 2 and Figures 6 to 9), there was one statistically significant difference among the three groups: The TTP group showed statistically significant improvement in the use of technology (interaction effect). The difference is small and may not have practical or clinical significance. No statistically significant differences existed in communication and teamwork, patient-centered care, quality improvement, and evidence-based practice among the three groups.

Work stress

New nurses responded to four questions related to their work stress, and multilevel modeling was used to compare the three groups over time. See Table 2 for the means of the three groups related to work stress over the four time points and Figure 10 for the trend over time. New nurses in the established programs experienced the least amount of work stress across the four time periods ($p = 0.029$). The TTP group was in the middle. Stress increased at 6 months for all three groups and then began to decrease. This result makes sense because most new graduates begin to be more independent at about 6 months.

FIGURE 2

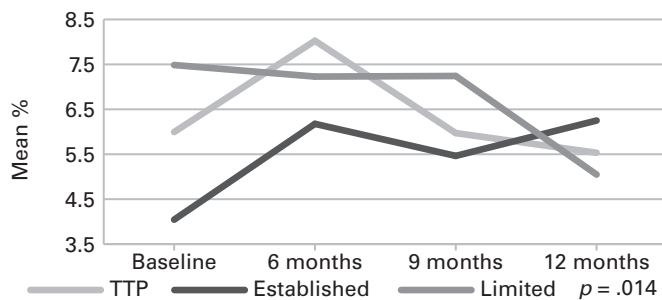
Total Patients Errors Over Time

FIGURE 3

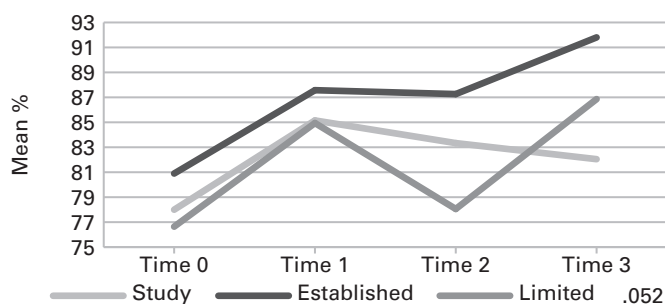
Positive Safety Practices Over Time

FIGURE 4

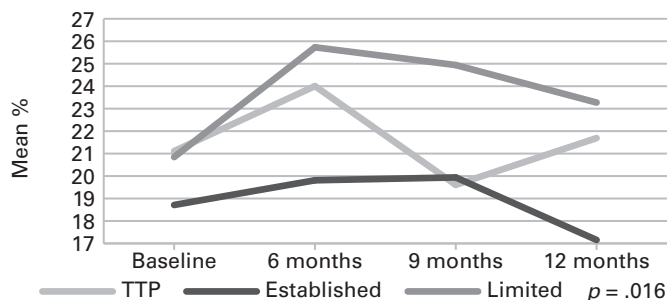
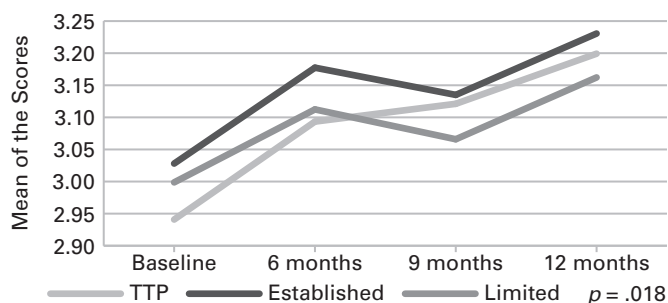
Negative Safety Practices Over Time

FIGURE 5

Overall Competence Over Time**Job satisfaction**

When comparing the TTP, established, and limited groups across time using multilevel modeling analyses, the researchers found that new nurses were less satisfied in all groups at 6 and 9 months than they had been at baseline. New nurses in the established programs remained the most satisfied over time ($p = 0.031$) and rose to the highest level of satisfaction between 9 and 12 months, where all three groups began having an increase in job satisfaction. (See Table 2 and Figure 11.)

Voluntary turnover

All new nurses hired by the hospitals were tracked by the site coordinators to determine whether they were retained through the end of the year. Data regarding turnover were available for 1,464 new nurses in 97 hospitals. Overall, 83% were still employed at the hospital at the end of the first year. Voluntary turnover was 16%, and involuntary turnover (termination, illness, or injury) was 1%. Established programs had the lowest rate of turnover at 12% ($p < .001$). The TTP programs had a rate of 14.7%, and the limited programs had nearly a 25% turnover rate.

Discussion

NCSBN's TTP study provides substantial evidence that a standardized transition to practice program does improve safety and quality outcomes. New nurses in the established transition programs, which were standardized, evidence-based, and in existence for at least 2 years, reported the best outcomes over time. They reported fewer errors, fewer negative safety practices, higher overall competence, less stress, and more job satisfaction, and they were less likely to leave their positions. The TTP program, also evidence-based but in its first year, was in the middle of the three groups on the same variables. New nurses in hospitals with a limited onboarding experience had more errors and more negative safety practices, felt less competent, experienced more stress, reported less job satisfaction, and had twice the turnover at the end of a year when compared with the established and TTP groups. All three groups improved over time on the specific competencies, with little difference among them. Although nurses in the established group reported across all time points that they used more positive safety practices, this was not statistically significant.

The elements of a strong transition program identified in the literature were used to construct the NCSBN TTP program and to evaluate the existing programs in the control hospitals. These elements included patient safety, clinical reasoning, patient-centered care, communication, teamwork, quality improvement, evidence-based practice, informatics, clinical reasoning, feedback, reflection, and specialty knowledge in an area of practice. The TTP program included online learning modules that covered these evidence-based areas and trained preceptors. The length of the TTP program was 6 months, with an additional 6 months of institutional support. The control hospitals continued to use their existing transition programs and schedules.

There were few differences between the TTP study group and the entire control group. Because researchers had descriptive data on the control hospital programs, they were able to split the control hospitals into two groups. One group had substantial transition programs with six or more of the evidence-based criteria, and the other group had programs that were unstructured and had fewer than six of the evidence-based criteria. Clearly, the evidence shows that new nurses who do not have the support of an evidence-based, structured institutional program are at a disadvantage during their first year of practice. Not only did these nurses experience more errors and negative safety practices, but they reported lower overall competence (verified by their preceptors), had increased stress, decreased job satisfaction, and decreased retention.

Interestingly, the new nurses' self-ratings on the specific competencies (corroborated by their preceptors) increased significantly over the 12-month period in all nurses across all hospitals, with slight differences between either the study and control group or among the three groups. This may reflect either the acquisition of this knowledge in undergraduate programs or the growing emphasis on it in practice.

Many of the research findings were supported by the literature. The UHC/AACN residency program study (Goode et al., 2013) also found a statistically significant decrease in satisfaction at 6 months and satisfaction scores that stabilized and remained close to the 6-month levels at the 12-month point. The Versant program (Ulrich et al., 2010) found that total nurse satisfaction improved in a stepwise fashion from the end of the residency to month 12 and month 24 following the residency. Further, both the UHC/AACN and the Versant residency programs found that established programs with staff and institutional support have lower turnover rates. Not only are lower turnover rates related to cost savings, but studies have found increased turnover is related to adverse patient outcomes (Bae, Mark, & Fried, 2010; Duffield, Roche, O'Brien-Pallas, & Catling-Paull, 2009).

Work stress, which research suggests adversely affects patient safety (Elfering, Semmer, & Grebner, 2006; Nielson, Pedersen, Rasmussen, Pape, & Mikkelsen, 2013; Park & Kim, 2013), started out relatively high, increased even more at 6 and 9 months, and then decreased at 12 months. The UHC/AACN 10 years of research on their residency program (Goode et al., 2013) found no statistically significant changes in stress, though the means decreased at mid-program and then increased at 12 months. In the current study, as the new nurses' stress increased at 6 and 9 months, their satisfaction decreased. Then, as stress decreased at 12 months, satisfaction began to increase.

This is the first study of transition programs to randomize the sites to control or study groups (Anderson et al., 2012; Theisen & Sandau, 2013). Until now, studies have looked at outcomes before and after a program was in place, looked for improvement across time during a program, or attempted with little success to use comparable nonstudy groups (Anderson et

FIGURE 6

Patient-centered Care Over Time

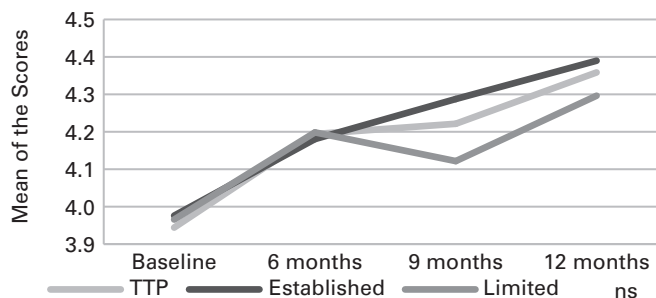


FIGURE 7

Evidence-based Practice/Quality Improvement Over Time

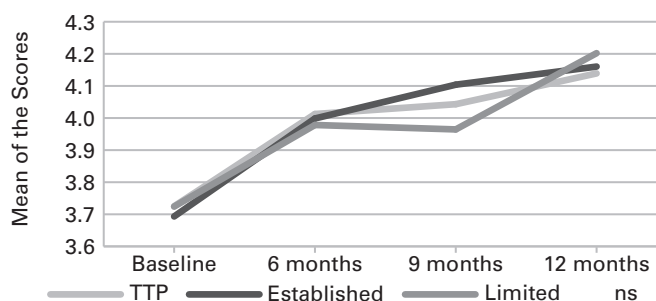


FIGURE 8

Technology Use Over Time

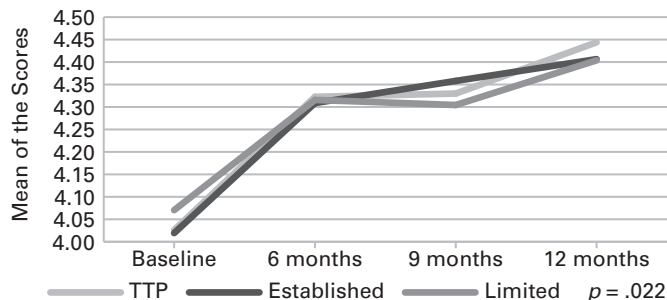


FIGURE 9

Teamwork and Communication Over Time

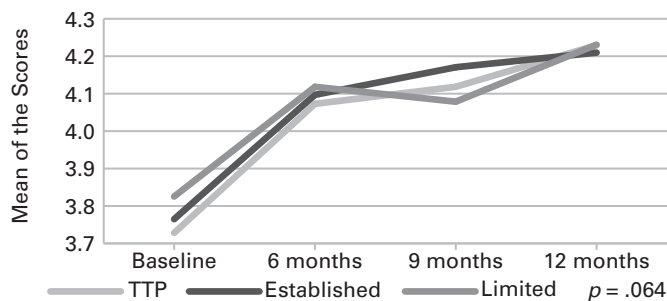


FIGURE 10

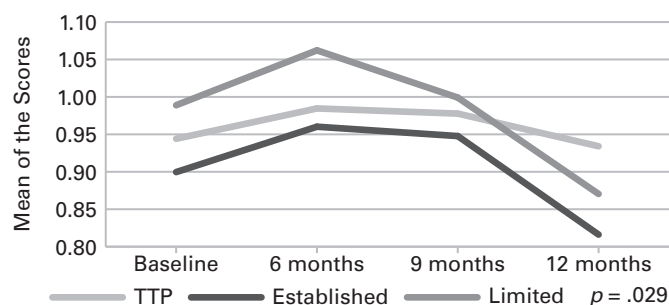
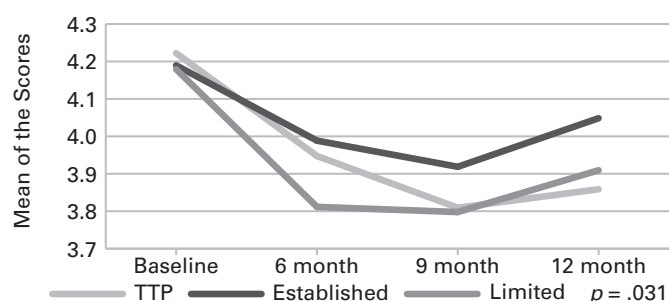
Work Stress Over Time

FIGURE 11

Job Satisfaction Over Time

al., 2012; Banks et al., 2011 ; Goode et al., 2013; Theisen & Sandau, 2013; Ulrich et al., 2010). This was a direct comparison study, examining various transition methods side by side during the same time period. This study also provides nursing with some beginning information on the diverse settings that hire new graduate nurses. Though some studies have been conducted in small rural or community hospitals (Bratt et al., 2012), according to Theisen & Sandau's (2013) critical review of studies of new nurses, most have been conducted in large hospitals. NCSBN's study included all sizes of hospitals, with an even split among urban, suburban, and rural hospitals.

Limitations

The primary aim of this study was to determine the effectiveness of a new NCSBN TTP program. Development of the program was based on evidence acquired through a systematic review and the IOM/QSEN competencies. The design depended on institutions in three states (Ohio, North Carolina, and Illinois) volunteering to participate in the study. All institutions that volunteered were enrolled and randomized into one of two groups: the intervention group (institutions adopting NCSBN's TTP program) or the control group (institutions maintaining their normal onboarding process).

Typical of studies that rely on institutions or individuals to volunteer, a selection bias called volunteer bias may have affected the results. It is possible that the volunteers may in some way be

different from those that did not volunteer to participate in the study and that they are not representative of the entire population. In the case of the TTP study, the institutions that volunteered may have had a greater interest in transition than those that did not volunteer. Institutions in the control group may have been highly motivated not only to participate in the study, but also to demonstrate that their programs were effective when compared with the NCSBN TTP program. In this study, volunteer bias could not have been prevented because the only way of enrolling institutions was to ask for volunteers.

The second limitation is common among studies that attempt to measure the effectiveness of a public protection/prevention program. One of the aims of the study was to examine the occurrence of errors among new nurses and how they affect public safety. The best way to answer this question would be to have institutions report the number and types of errors made by new nurses enrolled in the study and compare these responses with the control group. (This method also has some limitations, but it would have provided objective data on errors.) However, this was impossible because errors committed by a nurse are protected information, and no institution would be willing to disclose these data, especially to study investigators from a national organization representing state BONs.

Thus, the study had to approach this issue more subjectively by asking the new nurses about the number of errors made and their use of safety practices. This is an acceptable way to collect these data; however, it is a limitation because the accuracy of the information may be prone to recall bias and other factors that may influence the responses from the new nurses. The use of a control group was helpful for this limitation as any recall bias or hesitancy to report errors theoretically was equally distributed between the study and control group.

Though part of the original study design was to have study sites in the western region of the country, we did not receive any applications for study participation from those jurisdictions. Only states in the South, Midwest, and East are represented in this study. We are not aware of significant diversity between hospitals east and west of the Mississippi River; therefore, we assume that the findings of this study apply to new graduates across the United States.

As with many longitudinal studies, our attrition rate increased over the four time periods. We acknowledge that having all participants in the study for the 1-year period would have been ideal; however, our comparison data of the control and TTP groups at baseline and at 12 months do not give us reason to believe there was any selection bias or that those who dropped out of the study would have given us data that would have changed the results. Also, we used a highly sophisticated statistical method, multilevel modeling, that not only assesses variation across time and accounts for differences among the groups, but also uses predictive equations to account for missing data. Despite the attri-

tion, our sample was large enough through all phases of the study to indicate statistically significant differences among the groups.

Implications

This study provides evidence that structured transition to practice programs that include the outlined evidence-based components can improve quality and safety practices in new graduate nurses and increase job satisfaction, reduce work stress, and decrease turnover.

On the basis of the results of this research study and previous research in this area, transition programs should have the following characteristics:

- Be formalized in the institution and have the support of chief nursing officers and other administrators
- Be at least 6 months in length
- Have a preceptorship program integrated into the program
- Include patient safety, teamwork, evidence-based practice, communication, informatics, quality improvement, clinical reasoning, and patient-centered care
- Be customized so the new graduate learns the specialty knowledge needed to work on the unit
- Allow time for the new graduates to learn and apply the content, obtain feedback, and share their reflections.

Conclusions

The evidence from this study shows that strong, evidence-based transition programs do improve outcomes for new nurses in their first year of practice and increase their retention.

Data collected from the new graduate nurses enrolled in the TTP study indicate that structured transition programs established in hospitals decrease errors and negative safety practices in new graduate nurses. These data also indicate that new graduates and their preceptors in established programs rate themselves as more competent than new graduates in limited onboarding programs. New graduates in established programs also have less work-related stress, have increased job satisfaction, and are less likely to leave their position during the first year of practice.

Results of the study provide some evidence that NCSBN's TTP program may offer improved outcomes for transitioning new graduate nurses, but as this study shows, a program may need to be established for longer than 1 year to have a major impact on new graduate outcomes. Certainly there is room for further study here. We also looked at evidence-based elements essential to TTP, but we do not know the exact combination of these elements or whether there are other existing elements that are important for transition. Research is also needed regarding transition to practice in nonhospital institutions

From our data and that of other studies, we believe well-structured, evidence-based transition to practice programs that are individualized, supported by the institutions, and include specialty knowledge are important for new graduates. We encourage BONs to disseminate our findings and support employers in

the development of transition programs. However, more rigorous research is needed in this area to answer some of the questions emerging from this study.

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