

Rural Nursing and Evaluation of Pediatric Outreach Program

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Abstract

Introduction: Rural nurses face barriers and challenges in obtaining continuing education, which contribute to the challenge of maintaining competency while working in a setting that expects proficiency in low volume, high risk procedures.

Purpose: The purposes of this project were to 1) examine the literature related to pediatric care delivery in rural health care settings and continuing education needs of rural nurses and effective education strategies and 2) analyze the effectiveness of a pediatric outreach program's educational and professional development interventions (Transforming Inpatient Care and Culture [TICC]) in a rural hospital in Washington State.

Methods: The literature review employed key words to search databases on the topics of "rural nursing", "continuing education", "outreach", "pediatrics", and related concepts. Evaluation of

the TICC project consisted of comparing pre and posttest results from a 40 item questionnaire for those who participated in the TICC project following an 8 hour training session. Participants included 66 nurses who participated in the training at the hospital and completed the post test. The means of overall and topic specific pre and post test results were examined.

Results: There was statistically significant improvement in overall pre to post test performance ($p = .005$) and in one of the three priority areas, synthesis of care decisions ($p = .028$). There was also improvement in test performance on the two remaining priority areas, knowledge of equipment and interventions and pediatric specific assessment, although the improvement did not reach statistical significance.

Conclusion: A rural pediatric outreach program can be an efficient and effective way to address the continuing education needs of rural nurses in a hospital setting. The project serves as a guide for identifying and addressing the pediatric educational needs of nurses, while empowering the very nurses who care for patients in the facility to be part of the leadership and innovation process. The implementation of a pediatric outreach program could be instrumental in improving pediatric patient care in the rural setting.

Keywords: Rural nursing, Continuing education, Nursing competency, Pediatrics, Change leadership.

Rural Nursing and Evaluation of Pediatric Outreach Program

Significant differences exist between urban and rural communities that have a direct impact on health care. According to the United States (U.S.) Census Bureau, urban is defined as areas that house populations of 50,000 or more people and urban clusters are described as areas that house populations of at least 2,500 and less than 50,000 people. Rural is defined as all population, housing, and territory not included within urban areas (U.S. Census Bureau, 2010).

Approximately 20% of the US working nurse force is employed in rural settings, accounting for more than 2.6 million nursing positions (U.S. Bureau of Labor Statistics, 2011). Rural hospital nurses function in a generalist role and require an extensive skill set since they have the potential to work in all healthcare disciplines and provide care for all age groups and acuity levels during a work day (Molinari, Monserud, & Hudzinski, 2008). It is important that hospital nurses in rural settings possess wide-ranging assessment skills, the ability to identify potential issues, and the ability to respond to emergencies with proficiency (Jukkala, Henly, & Lindeke, 2008). Hospital nurses in rural settings have the responsibility of maintaining competency while working in an environment that expects proficiency in low volume, high risk procedures (Banks, Gilmartin, & Fink, 2010).

Continuing education that is accessible and appropriately matched to the health care setting is important for rural nurses (McCoy, 2009). Access to educational activities is a crucial element that contributes to nurse retention in remote and rural regions (Mbemba, Gagnon, Pare & Cote, 2013; Baernholdt & Mark, 2009). Educational support can cultivate clinical competence and enhanced patient outcomes (Schmalenberg et al., 2008). Developing and delivering continuing education to the rural nursing community is vital to safe patient care (Wolf & Delao, 2013).

Rural nurses face barriers and challenges in obtaining continuing education beyond those facing urban and suburban nurses. Recent studies identified (a) long travel times, (b) expense of overnight stays, (c) issues with staff scheduling, and (d) general cost and lack of time for on-site educators to address advanced staff education beyond mandatory agency requirements as barriers to continuing education by nurses in rural hospitals (Jukkala et al., 2008; Fitzgerald & Townsend, 2012; McCoy, 2009). In addition to the barriers inherent to rural nurses' general educational needs, responsibility of caring for all ages of clients, including infants and children,

adds another competency challenge. Pediatric patients have very different diseases, injuries, and distinctive physiologic and emotional responses to illness and injury, requiring unique approaches to care compared with adults. Nurses who have the potential to work with pediatric patients must retain an appropriate level of expertise when caring for this unique population.

Nurses are uniquely positioned to observe and interpret the impact of systems, policies, and practices on patient care. In order for nurses to effectively lead efforts to improve patient care, they need educational opportunities on the topic of change and health care transformation. This type of work requires a new professional skill set that will allow nurses to be effective leaders of change. This skill set requires special training, which poses an issue for rural nurses since they practice in an environment that contains many barriers to educational and professional development.

In an attempt to grow staff nurses' leadership to optimize outcomes in their hospitals in Washington State, an initiative, titled "Transforming Inpatient Care and Culture" (TICC), was created and piloted in 2011. The project was proposed to the Northwest Organization of Nurse Executives (NWONE) board by their Chief Executive Officer (CEO). The project was modeled after the *Transforming Care at the Bedside* (TCAB) campaign, which was developed by the Robert Wood Johnson Foundation (RWJF) and Institute for Healthcare Improvement (IHI) to support front-line nurses to create and carry out inventive new practices on their units. TCAB encourages nurses to identify the needs in their own work units and to create and implement site appropriate solutions. Anticipated outcomes of the "bottom up" approach include improved patient safety *and* nurse job satisfaction (RWJF, 2011).

The CEO of NWONE worked with representatives from Washington State Hospital Association and formed a partnership with multiple hospitals, including rural, critical access

hospitals. This partnership created the TICC project, which was formed to evaluate and address priority change initiatives to optimize outcomes in care. The nurses and administrators of one rural hospital identified pediatric care as their priority initiative, since 45% of their patient population were pediatric clients. With the collaboration and guidance of clinical nurse specialist consultants, staff nurses conducted an assessment of their hospital's policies and procedures and surveyed providers and staff nurses regarding their confidence/comfort in nurses' abilities. Based on findings, they identified the specific educational needs of the staff nurses who care for pediatric patients. The TICC project included an educational needs assessment, development of education interventions based on the results of the needs assessment, and pre and post knowledge testing in order to measure the effectiveness of the educational interventions. Integral to the process was engaging and empowering the hospital nurses to be part of the needs assessment process and the creation of educational interventions. This TICC project was piloted with the intention of using lessons learned to create a professional outreach program that could enhance pediatric nursing skills and competency for use in rural healthcare settings in Washington State. NWOE did not seek human subjects review for the project as it was an evaluation of the transformation project and was not a research project. The evaluation reported here was a secondary analysis of aggregated data with no identifiers or demographic information.

Purpose Statement

The purpose of this paper is to analyze the effectiveness of the TICC Project's educational and professional development interventions implemented in the rural hospital setting.

Conceptual Framework

The American Association of Critical-Care Nurses (AACN) Synergy Model for Patient Care is a patient-centered model that concentrates focus on the needs of the patient, the

competencies of the nurse, and the synergy created when those needs and competencies align (AACN, n.d. a). An important belief of this model is that the patient characteristics are essential to nurses, and nurse characteristics are essential to patients (Kaplow, 2003). This model was originally formulated by a group representing the AACN to provide a theoretical framework for certified practice (Swickard, Swickard, Reimer, Lindell, & Winkleman, 2014). Since its inception in the 1990s and publication by Dr. Martha Curley, the model has been applied to a variety of clinical and academic environments and used in various circumstances and for a range of purposes (Curley, 1998; Kaplow, 2003; Swickard et al., 2014). The model seeks to define nursing beyond a set of tasks and instead describes nursing through more complex characteristics and competencies (Swickard et al., 2014).

Synergy is a process that occurs when individuals interact in ways that promote positive outcomes. The core idea involved in the AACN Synergy Model for Patient Care is that the needs or characteristics of patients and families inspire and steer the characteristics or competencies of nurses (Kaplow & Reed, 2008). When the needs of the patient are matched with the characteristics and skills of the nurse, synergy occurs and patient outcomes are optimized. See Figure 1 for a visual representation of the rural nurse patient synergy model.

Search Strategies

A literature search was conducted by using the computer databases CINAHL and PubMed. The key words included “rural nursing”, “continuing education”, “professional development”, and “pediatrics”. The articles were assessed for applicability to the problem statement and purposes of the paper. The search yielded 20 articles from peer reviewed journals, most within the last eight years.

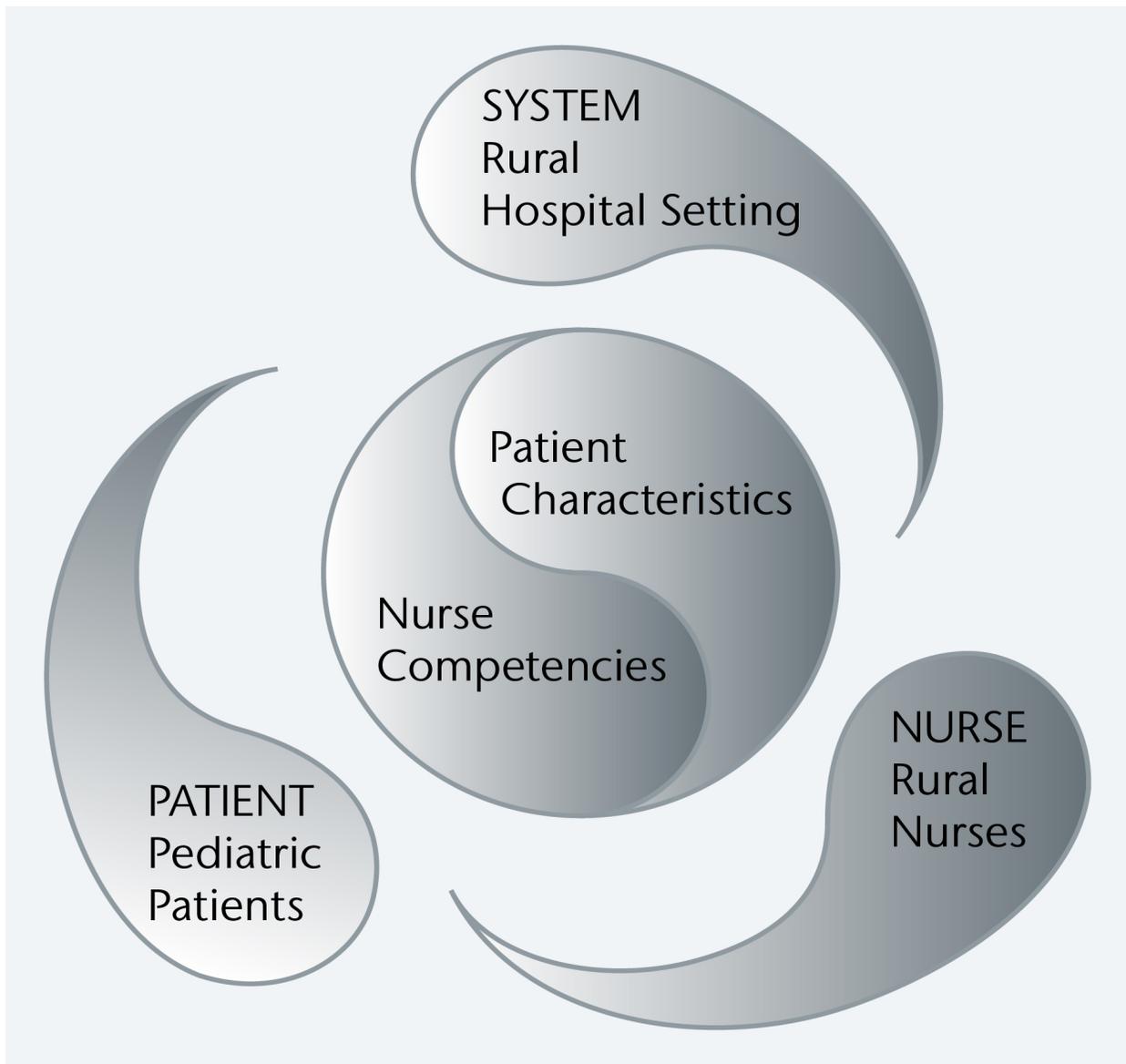


Figure 1 Rural Nurse Patient Synergy Model Originally published in: Curley, M. A. (1998). Patient-nurse synergy: optimizing patients' outcomes. *American Journal of Critical Care: An Official Publication, American Association Of Critical-Care Nurses*, 7(1), 64-72. Modified with permission from the American Association of Critical-Care Nurses (AACN).

Literature Review

Issues with Pediatric Care Delivery in Rural Health Care Settings

Equipment and policies. Rural health care settings that offer services to pediatric clients must have both adequately trained staff and a work environment that is prepared to meet the needs of pediatric patients. Adherence to guidelines for pediatric emergency department

policies, procedures, supplies, and equipment was evaluated in a survey of 70 urban and rural hospitals in Kentucky (Costich, Fallat, Scaggs, & Bartlett, 2013). The authors reported that about half of Kentucky healthcare facilities had most ($\geq 85\%$) of the recommended sized catheters and endotracheal tubes. Rural facilities did not stock the smallest equipment sizes (i.e. of masks and endotracheal tubes) because of a reportedly low volume of pediatric patients, and less than 25% of responding hospitals had policies in place to guide pediatric Emergency Department admissions.

Pain management. Another common pediatric issue occurring in rural health care settings is the non-adherence to pain management protocols. The frequency with which Evidence-based Pediatric Pain Management (EBPPM) is practiced in Emergency Departments (ED) was evaluated in the rural state of Iowa (Kleiber, Jennissen, McCarthy, & Ansley, 2011). Kleiber et al. surveyed 259 licensed medical providers and 1,117 nurses from 118 EDs to determine the frequency of application of EBPPM in emergency departments and differences based on type of facility (critical access (CA), rural, and urban hospitals) across the state. The authors noted that nurses from urban EDs used significantly more EBPPM ($P < .001$) than nurses practicing at rural hospitals or critical access facilities.

Continuing Education Needs of Rural Nurses and Effective Education Strategies

Important continuing education topics. An investigation involving both novice and expert nurses ($N = 106$) who practiced in a rural setting revealed common feelings of unpreparedness regarding patient care, specifically in the areas of trauma, neurology and pediatrics (Molinari, Jaiswal, & Hollinger-Forrest, 2011). In the same study, nurses who felt unprepared to manage crises were also significantly more likely to report planning to move away from the rural setting (an indicator for nurse turnover) ($p < 0.03$). A similar study found that

rural hospital nurses (N=302) working in both hospitals and long term care facilities (LTC) in the Midwest US reported a need for enhancing their knowledge of commonly treated clinical conditions, including pediatric related conditions such as diabetes, infectious diseases, pulmonary conditions and fluid balance (Fairchild et al., 2013). The nurses also identified continuing education topics, including drug therapy, physical assessment, medication administration, mental status assessment, communication skills, environmental safety assessment, and health history.

Continuing educational delivery strategies. Simulation is an increasingly popular mechanism to use in health professional continuing education, and is especially useful in rural settings. An example is the American Heart Association Pediatric Emergency Assessment, Recognition, and Stabilization (PEARS) course. Registered nurses (n = 19) working in a metropolitan Magnet hospital, who participated in a PEARS course had a statistically significant improvement ($p = .012$) in respiratory-focused skill performance using the PEARS High Fidelity Simulation Modified Behavioral Check-off Tool compared to nurses (n = 14) who participated in the usual PEARS course (Bultas, Hassler, Ercole, & Rea, 2014). Another example was a high fidelity simulation developed to increase nursing competency regarding pediatric respiratory distress assessment for nurses in a 58 bed rural hospital. Pre and posttest change demonstrated significant improvement in self-reported nursing competence and confidence ($p = .000$) following nurses' participation in the simulation exercise (Wodrich, Gilmartin, & Fink, 2013).

Multifaceted educational intervention, using a combination of didactic and clinical learning methods offers an array of teaching/learning experiences which may better serve individual learning styles. For example, Banks et al. (2010) studied 146 nurses who worked in a 58-bed U.S. rural hospital. An educational intervention developed to improve competence with central

venous access device (CVADs) care, utilized: 1) self-study modules; 2) mini lectures and hands on practice in the skills lab; 3) attendance at nursing grand rounds; 4) access to CVAD hospital policy and procedure materials; and 5) optional participation in a journal club. Performance test scores (higher = better) on the pre-test were 69.83% (SD = 10.91%). The 1st posttest (immediately after the intervention) was 79.93% (SD = 10.19%) and the 2nd posttest (1 month after the intervention) was 84.95% (SD = 8.75). Statistically significant improvements in test scores were shown between the pretest and 1st posttest ($p < .001$) and between the 1st and 2nd posttest ($p < .037$).

Educational Programs Aimed to Support Rural Nurse Continuing Education

Evaluating and learning from preexisting educational programs can help us understand how to plan and implement continuing education to most efficiently meet the needs of rural nurses. The Emergency Nurse Partnership Program (ENPP) of West Virginia University (WVU) was created to bring continuing education to rural hospital emergency department nurses (Paulson, 1996). ENPP Program members and WVU Hospital leaders collaborated with rural hospital staff and performed a needs assessment of priority staff learning needs, which led to the development and delivery of a specific curriculum for staff nurses on the topics of cardiology, drug calculations, medicolegal, pediatric respiratory disorders, trauma, and triage. Pre and posttests were used to assess change in nurse knowledge on the topics; pretest average was 63%, compared to average post test scores of 81%, documenting improved nursing knowledge.

Another successful program is the Partners in Nursing (PIN) program that was supported by a the RWJF and Northwest Health Foundations grant, intended to address issues related to the nursing shortage in local communities located in Maryland (Cottingham, DiBartolo, Battistoni, & Brown, 2011). Clinical and academic partners created a program that paired new graduates

with experienced nurse mentors in order to help the new graduate nurse transition to the professional role, as well as to establish leadership training. 100% retention rate of all PIN participants in the second year of the program was a positive finding.

Staff Nurses Identifying and Leading Change Initiatives to Impact Patient Care

Staff nurse involvement and leadership is an important component of the synergy that can affect patient outcomes. One example of an effective program is the aforementioned TCAB, which was funded by the RWJF and the IHI. Through the TCAB process, nurses gain the skill set needed to be future implementers of the TCAB process, which encourages the sustainability of the program. Curriculum is framed in four principles: safe and reliable care, vitality and team work, patient-centered care, and value-added processes. Successful projects from TCAB hospitals include rapid assessment teams, preceptor programs, and liberalized patient diet plans.

TCAB inspired change in the University of Pittsburgh Medical Center (UPMC) Shadyside in Pittsburgh, Pennsylvania resulted in a ripple effect that spread to other hospital systems (Martin et al., 2007). TCAB initiatives have focused on improving patient/client/staff communication by writing staff names at the bedside each shift, extending hours/options for dietary services, offering a free discharge van transportation service, and medication room redesigns. These and other TCAB initiatives have resulted in documented positive outcomes including reduced voluntary RN and advanced practice nurse turnover, decreased patient harm from falls, and increased direct nursing care to patients.

Understanding the key learning needs of rural nurses and understanding interventions and approaches to improve nursing care delivery is important for improving patient care. The array of issues with pediatric care delivery in rural health care settings exemplifies the need for educational intervention. Identifying effective educational strategies is crucial in order to plan

meaningful and efficient continuing education activities. Educational programs and processes that use nursing staff to identify and lead change initiatives can be helpful to use as a guide to make patient care improvements. The evidence presented in this literature review supports the efforts made by the TICC Project in a rural hospital in Washington State and will be further discussed.

Transforming Inpatient Care and Culture (TICC) Project

As mentioned previously, in 2011, nurses at a rural hospital in Washington State voiced their concern about the competence and confidence of nurses caring for pediatric patients. Hospital administrators reported that the pediatric population comprised 45% of the total patient population in the prior year, providing evidence for the significant need to assure nursing staff competence with the population. Hospital administrators sought guidance from representatives from NNONE and the Washington State Hospital Association (WSHA) to support the development of pediatric competencies in their nursing staff. The project was supported by grant funding from WSHA, NNONE, and the Washington Workforce. A team of Pediatric Clinical Nurse Specialists recruited by NNONE and WSHA collaborated with staff nurses and administrators from the hospital Transforming Inpatient Care Culture (TICC) team. The purpose of the team was to assess, design, implement, and evaluate a plan to enhance nurses' knowledge and comfort with pediatric patients. With guidance from the Clinical Nurse Specialists, the TICC team staff nurses were the unit champions to design, survey, and plan interventions to optimize pediatric care in their areas.

Setting

The 25-bed critical access hospital is located in a town in south central Washington, and has an estimated population of 16,140 (U.S. Census Bureau, 2015). The hospital offers

emergency care, intensive care, a family birth center, surgical services, magnetic resonance imaging, laboratory, 3-D obstetrical ultrasound, cardiopulmonary services, registered dietician services, and diabetic education services. The hospital accepts pediatric patients aged one day, including newborns, to 18 years of age. Pediatric patients are cared for in the emergency department, medical-surgical units, and intensive care unit. Approximately 45% of the hospital's patients were aged 18 or younger during the 2010 year.

Intervention Design and Development

The TICC team started its work by developing and conducting two surveys. The first assessed provider's confidence in nurses' knowledge and competency with specific types of pediatric patient care, and the second assessed staff nurses' comfort level and knowledge of pediatric care. The TICC team evaluated survey data and identified priority areas of concern including pediatric specific assessment skills, knowledge of equipment and interventions, and synthesis of care decisions (putting it all together). The Pediatric Basic Knowledge Assessment Test (BKAT) and Pediatric Emergency Assessment, Recognition and Stabilization (PEARS) tests were revised and combined to create an assessment of nursing knowledge regarding the priority areas (Runton & Toth, 1998; Famolare & Romano, 2013). The test consisted of 40 multiple choice questions in the three general areas of focus identified above. Examples of test questions by priority area are included in Table 1. The test was administered to 44 staff nurses to establish baseline pediatric knowledge and further guide educational intervention development.

An 8-hour educational day was constructed and delivered with the assistance of hospital physicians, a medical resident, staff nurses, the nurse educator, pharmacists, respiratory therapists, and external pediatric consultants. The education day consisted of both large group lectures and small group breakout sessions. The large group lectures addressed the topics of

Pediatric Assessment, Trauma/Shock, Pain/Medications, Children with Special Health Care Needs, and Putting It All Together (Synthesis). The small group breakout sessions focused on the topics of Respiratory, Circulation, Pain, and Trauma issues.

Table 1

Example Knowledge Test Questions

Priority Area	Test Question Number and Stem Text
Pediatric Specific Assessment	6. Which are components of increased work of breathing in a child with respiratory distress?
	23. Which of the following signs and symptoms is a possible indication of hypoglycemia in an infant?
Knowledge of Equipment and Interventions	10. A child has a 3.0 mm tracheostomy tube in place. What size catheter should be used to suction the tracheostomy tube?
	16. Which needle and site is recommended for administering intramuscular immunizations to a 4 month old infant?
Synthesis of Care Decisions (Putting it All Together)	29. An infant's parents tried to treat her gastroenteritis at home by feeding regular tap water before bringing her to the hospital. Which associate electrolyte imbalance would most likely be observed in the laboratory analysis?
	35. A pale and obtunded 3-year-old child with a history of diarrhea is brought to the hospital, Respirations are 45 breaths/min. with no distress and good breath sounds bilaterally. Heart rate is 150 bpm and BP is 88/64 mm Hg. Capillary refill time is 5 seconds, and peripheral pulses are weak. After placing a 10 L/min flow of 100% oxygen and obtaining vascular access, which of the following is the most appropriate immediate intervention for this child?

Educational approaches in the small group breakout sessions included use of low and medium fidelity simulation scenarios, educational posters, equipment training, and hands-on skill practice. Hospital specific equipment and patient scenarios were incorporated into the training sessions. The training was offered two different days, to ensure participation by all the nursing staff. Sixty-six attendees completed a post-test at the end of the educational intervention.

The assessment of the educational priorities not only informed the development of the training, but also identified administrative and policy issues. In response, the TICC team purchased the AACN Procedure Manual for Pediatric Acute and Critical Care for each unit and helped the team revise and/or create pediatric policies and procedures, identify equipment needs, and develop recommendations for pediatric quality improvement projects for the rural hospital. Some of the recommendations are summarized in Table 2.

Table 2

Pediatric Quality Improvement Project Recommendations

1. A mandatory Skills Day to be held twice a year, with one of the stations being related to pediatric competencies.
 2. A monthly pediatric competency to be posted on the rural hospital intranet for nursing staff to complete.
 3. A pediatric module to be completed on the rural hospital's computer learning system annually.
 4. The Emergency Nursing Pediatric Course (ENPC) to be required for all intensive care unit, surgical, and emergency department nurses. Charge nurses on the medical- surgical unit will also be required to pass the course. Family birth center nurses will be required to complete the Neonatal Resuscitation Program (NRP).
 5. Pediatric "Lunch and Learns" to be offered periodically for nursing staff on topics such as asthma management, respiratory disorders, and diabetes.
 6. A mandatory Skills Day to be held twice a year, with one of the stations being related to pediatric competencies.
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Recommendations also included an annual survey of providers and staff nurses which would be used to identify emerging educational topics that would help to sustain staff knowledge, competency, and confidence regarding provision of pediatric patient and family care.

Evaluation

The goals of the hospital staff and leadership, along with the project partners, were to use the pretest and posttest data to inform immediate education plans and to improve existing policies and future training. The differences between pre and posttest scores were used, along with qualitative data, to assess the effectiveness of training. As stated earlier, the pretest included 40 questions, and was completed by 44 staff nurses prior to the educational intervention. The posttest, consisting of the same questions, was completed by 66 nurses after the educational intervention. Analyses were limited to 38 of the 40 questions, as two questions were miscoded. No demographic data or identifiers were collected with the pre or posttest, and only the aggregated data for the number of respondents answering each question correctly were recorded and available for analysis. Therefore, the unit of analysis for the comparison of the pre and posttest results was the percentage of respondents who correctly answered each question. Averaging across the 38 questions, the percentage of correct responses before and after the intervention was compared. Analysis utilized Excel and SPSS Version 23. To compare the pretest to posttest change in the average percentage of correct responses for the 38 questions (all questions and by priority area), a paired t-test was used.

Approximately 55% of the questions were answered correctly on the pretest, and 70% answered correctly on the posttest, constituting a significant difference in the overall pretest mean score ($t_{(78)} = -2.89, p = .005$). Some of the documented improvement was modest; for example, the average response increased by only 2.3 percentage points (from 97.7% to 100%) on a question regarding the nursing assessment of growth and development in an 8-year-old child. Another documented improvement was more dramatic, with an increase of 64.2 percentage points (from 19.1% to 83.3%) on a question regarding safe and accurate pediatric administration

of medication by nurses. The questions with the greatest improvement were primarily from the synthesis or “putting it all together priority area”, which was featured in both the large group lecture and simulation content.

The change in scores was also examined based on the three priority areas targeted by the educational intervention. The percent of change between the pre and posttest averages were determined by calculating the difference between the two numbers, then dividing that number by the pretest average and multiplying the answer by 100 (Skills You Need, 2016). Improvement was seen in all three of the priority areas, but only the difference between pretest and posttest scores on the “putting it all together” priority area were significant ($t_{(18)} = -2.39, p = .028$) with a pretest average of 51% correct to a posttest average of 73%, constituting a 43% improvement. Measurement of knowledge regarding pediatric equipment and interventions increased by 33% ($p = .128$) and knowledge regarding pediatric assessment by 14% ($p = .106$). See Table 3 for a summary of priority area knowledge test scores.

Limitations to this analysis were the lack of identifiers and demographics on the pre and posttests. Due to the unavailability of respondent level data, statistical analyses were based on comparing the average percentage of respondents answering correctly for the 38 questions. We were unable to examine changes in individuals or determine if the training approach benefited any particular subgroups of the participants. Since the posttest was conducted immediately after the educational training, it is uncertain how long the educational intervention will be retained.

Significance

The goal of this TICC project was to address the educational needs of nursing staff aimed at improving pediatric care in a rural hospital setting. Based on the evaluation of the pre and post knowledge tests, the TICC project succeeded in improving the pediatric nursing knowledge

in the nurses at this rural hospital. The TICC project eliminated many of the barriers to continued education in rural hospital settings identified in the literature review (Jukkala et al., 2008; McCoy, 2009; Wolf & Delao, 2013). Barriers such as long travel distance, professional isolation, lack of educational guidance, and lack of resources to carry out educational activities were overcome through the implementation of the TICC project. The literature review also identified that educational issues facing rural nurses are diverse and plentiful, which was also evident in the TICC project (Fairchild et al., 2013; Molinari et al., 2011).

Table 3

Summary of Priority Area Knowledge Test Scores

Priority Area	Pretest Percent (%) of Correct Answers	Posttest Percent (%) of Correct Answers	Overall Percentage (%) Improvement	p value
Synthesis of Care Decisions (Putting It All Together)	51%	73%	43%	.028 *
Knowledge of Equipment and Interventions	51%	68%	33%	.128
Pediatric Specific Assessment	63%	72%	14%	.106

A key idea behind this TICC project was the thorough educational needs assessment orchestrated by the TICC team through quantitative and qualitative surveys and knowledge testing that allowed the identification of priority educational topics specific to this rural hospital nursing staff. The TICC project used a variety of educational activities in the 8-hour educational training day to address educational needs, such as lecture, simulation, hands-on skill training,

and equipment practice. The review of literature documents the effectiveness of the educational approaches used in the TICC project (Banks et al., 2010; Yacoub et al., 2015). The pre and posttest analyses of the TICC project suggest that these educational approaches were effective in the TICC project. The inclusion of hospital nursing staff as integral members of the TICC team provided great insight into the needs of the nurses and facility as a whole and promotes sustainability for continued innovations to improve patient care. The literature supports the use of nurses guiding and being key players in the development of patient care improvement and being progressive leaders of change in their work units (AACN, 2014; Dearmon et al., 2013; Klinger, Lacey, Olney, Cox & O'Neil, 2010; Martin et al., 2007).

Implications for Nursing

This TICC pediatric project can be used as a template for a continuing education and professional development program at other rural hospitals. It combines evidence-based approaches to address educational needs that aim to ultimately improve patient care. The steps of forming a staff nurse-led team, identifying specific issues and needs, planning educational activities and policy/administrative changes, and evaluating outcomes is well outlined in the TICC project and could be replicated in another facility. While limitations exist in regards to the TICC project, the evaluation showed strong support for the interventions and activities that aim to improve pediatric nursing knowledge in a rural hospital setting. The TICC project can serve as a guide for other rural hospitals wanting to identify and systematically address educational issues, by using a team of clinical nurse specialists, along with front line staff nurses who can be empowered to be the leaders of innovation on their own work environments.

Recommendations

Future project evaluations of TICC like projects should include demographic data and identifiers for participants in order to improve analytics. The TICC project also conducted the posttest immediately after the 8-hour educational training; an additional posttest at a later time could provide valuable data regarding knowledge retention, a practice well documented in CPR demonstration studies (Aqel & Ahmad, 2014; Madden, 2006). Additionally, follow-up to address sustainability and redosing of education would enhance staff nurse confidence and promote optimal patient outcomes. Further research is also needed to investigate the impact of the business case for quality and to examine cost savings and revenue generation.

The TCAB is no longer an active RWJ program, but a report describing TCAB projects, outcomes, and lessons learned is available from RWJ, and is available to guide nurses in rural hospitals to envision their own projects (Brown, 2011). The American Association of Critical-Care Nurses (AACN) has also developed their CSI Academy, which is a 16-month nursing program that supports hospital-based nurses as leaders and change agents (AACN, n.d. b). Tools like these can help nurses in rural settings be more connected and empowered.

Conclusion

A rural pediatric outreach program, such as the TICC project, can be an efficient and effective way to address the continuing education needs of rural nurses in a hospital setting. The TICC project serves as a guide for identifying and addressing the pediatric educational needs of nurses, while empowering the very nurses who care for patients in the facility to be part of the leadership and innovation process. The implementation of a pediatric outreach program could be instrumental in improving pediatric patient care in the rural setting.

Supporting Agency

Washington State University

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