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Implementation of a Nurse Driven Pathway to Reduce Incidence of Hospital Acquired Pressure Injuries in the Pediatric Intensive Care Setting

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ABSTRACT

Purpose: A large, freestanding pediatric hospital in the southern United States saw a 117% increase in reported hospital acquired pressure injuries (HAPI) between 2013 and 2015, with the intensive care units being the units of highest occurrence.

Design and Methods

A quality improvement project was designed and implemented to assist with pressure injury prevention. Literature review confirmed that pediatric HAPIs are a challenge and that usage of bundles and user-friendly guidelines/pathways can help eliminate barriers to prevention. The aim of this quality improvement project had two aims. First, to reduce HAPI incidence in the PICU by 10%. Second, to increase consistent usage of pressure injury prevention strategies as evidenced by a 10% increase in pressure injury bundle compliance. The third aim was to identify if there are differences in percentage of interventions implemented between two different groups of patients. Donabedian's model of Structure, Process, and Outcomes guided the development and implementation of this quality improvement project. Interventions focused on risk assessment subscale scores have the opportunity to mitigate specific risk factors and improve pressure injury prevention.

Results: Through implementation of the nurse driven pathway there was a 57% decrease in reported HAPIs in the PICU as well as a 66% increase in pressure ulcer prevention bundle compliance.

Conclusions: Implementation of the nurse driven pressure injury prevention pathway was successful. There was a significant increase in bundle compliance for pressure ulcer prevention and a decrease in reported HAPIs.

Practice Implications: The pathway developed and implemented for this quality improvement project could be adapted to other populations and care settings to provide guidance across the continuum.

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Introduction

Development of a pressure injury in the inpatient setting is a costly epidemic in healthcare costing between \$9.1 and \$11.6 billion per year in the United States (Agency for Healthcare Research & Quality (AHRQ), 2014). Literature supports prevention of pressure injuries being more cost effective and beneficial to the patient since pressure injuries can increase length of stay, increase risk for infection, and complicate treatment (Institute for Healthcare Improvement, n.d.). Development of a pressure injury comes as a result of pressure and/or shear to the skin (The National Pressure Ulcer Advisory Panel (NPUAP), 2016). There are many factors that put patients at increased risk of Hospital Acquired Pressure Injuries (HAPI). To identify patients at risk, clinicians can utilize pressure injury risk assessment tools. In 1996, the Braden Q Scale for Predicting Pediatric Pressure Ulcer Risk was modified from the Braden Scale for Predicting Pressure Sore Risk

and developed for the pediatric population. The Braden Q risk assessment tool has proven valid and reliable for patients 21 days to 8 years of age with a sensitivity of 0.88 and specificity of 0.58 at a score of 16 (Curley, Razmus, Roberts, & Wypij, 2003). The Braden Q tool consists of seven subscales—mobility, activity, sensory perception, moisture, friction-shear, nutrition, and tissue perfusion/oxygenation. Each of these subscales is scored from 1 (very limited/comprised/poor) to 4 (no problems/limitations/impairment) to arrive at a total score which ranges from 7 to 28. A score of 16 or less is considered at high risk for pressure injury development (Curley et al., 2003).

Utilization of risk assessment tools such as the Braden Q can assist care providers with identification of pediatric patients at risk for developing a HAPI. However, even after patients are identified, nurses are often unsure and do not feel empowered to prevent pressure injuries. Instead of relying on their clinical knowledge and judgment, nurses frequently rely on their interdisciplinary team members for interventions and treatment options (Samuriwo, 2012). Moreover, secondary to an increased number of higher acuity patients, higher patient to nurse ratios, and competing priorities in patient care, skin care and pressure

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injury prevention is often not implemented (Carnevale, 2003). Clinical practice guidelines that are user-friendly with standardized interventions that can be individualized based on patient condition can assist nurses in pressure injury prevention and help eliminate barriers such as knowledge deficits (Drake, Redfern, Sherburne, Nugent, & Simpson, 2012; Kiss & Heiler, 2014).

Local Problem

HAPIs have long been thought of as a problem that only adults and adult institutions face, however, HAPIs are a very real problem in the pediatric patient population for reasons that differ from adults (Schindler et al., 2011). In 2010 a research study by Kottner and colleagues showed that the pressure injury prevalence rate was approximately 7% in the general hospitalized pediatric patient population and closer to 26% in pediatric intensive care (Kottner, Wilborn, & Dassen, 2010).

A large, freestanding pediatric hospital in the southern United States saw a 117% increase in reported HAPIs between 2013 and 2015, with the intensive care units being the units of highest occurrence. During 2013, there were 80 reported HAPIs including Stage I–IV, unstageable, and Deep Tissue Injuries. In 2014 this increased to 110, and in 2015 there were 174 reported HAPIs. Moreover, in 2015, 20% of the Serious Safety Events at this organization were secondary to pressure injuries due to the level of harm caused to the patient (stage III, stage IV, and unstageable). In addition, the hospital and the Pediatric Intensive Care Unit (PICU) frequently performed below the benchmark on HAPIs reported to the National Database of Nursing Quality Indicators (NDNQI) when compared to peer organizations.

Aims

A quality improvement project was designed and implemented to assist with pressure injury prevention as part of the author's Doctorate of Nursing Practice Scholarly Project requirement. The first aim was to reduce HAPI incidence in the PICU by 10%. Second was to increase consistent usage of pressure injury prevention strategies as evidenced by a 10% increase in pressure injury bundle compliance. The third aim was to identify if there are differences in percentage of interventions implemented between two different groups of patients.

PICOT question format was utilized to frame the research questions. The population, intervention, comparison, outcome, and time element of the three research questions were defined and addressed.

1. Will the implementation of a nurse driven pathway based on Braden Q subscale scores (I), compared to current practice (C), lead to a decrease in hospital acquired pressure injury incidence in (O) in hospitalized pediatric patients in the PICU (P) within six weeks of implementation (T)?
2. Will the implementation of a nurse driven pathway based on Braden Q subscale scores (I), compared to current practice (C), lead to an increase in pressure injury bundle compliance (O) in hospitalized pediatric patients in the PICU (P) within six weeks of implementation (T)?
3. Will patients identified as high risk for HAPI development (Braden Q \leq 16) (P), have a lower percentage (O) of implemented pathway interventions (I) when compared to patients identified as at moderate risk for HAPI development (Braden Q 17–21) (C) during the six weeks after implementation (T)?

Methods

Setting and Ethics

The quality improvement project took place in a 26-bed PICU, at a large, tertiary care, free-standing children's hospital in the southern United States. The project received administrative review and was

deemed not human subjects research by the university-affiliate institutional review board and was approved by the University of Alabama institutional review board. Risks to participants was minimal. There were no conflicts of interest identified by the author. Project activities were part of quality improvement activities; identifiable information about patients was not collected. The project was carried out over a 12-week period from August 31, 2016 to November 20, 2016.

Planning and Implementation

Donabedian's model of Structure, Process, and Outcomes guided the development and implementation of this quality improvement project. Donabedian's model of Structure, Process, and Outcomes suggests that clinical outcomes are impacted by the structure (i.e. physical and organizational elements) and process (i.e. the provision of care and process characteristics) (Naranjo & Kaimal, 2011). For this quality improvement project Structure was the care environment at the hospital, Process was the nurse driven pathway, and the Outcomes evaluated include HAPI incidence, bundle compliance, and usage of the nurse driven pathway. Evaluation of bundle compliance, implementation of interventions in the nurse driven pathway, and HAPI incidence and description were collected via the electronic health record.

Intervention

Development and implementation of bundles has proven effective in many fields of healthcare delivery to assist clinicians with translating research into practice, (Institute for Healthcare Improvement, 2016). A bundle is a collection of evidence-based interventions that should be implemented on each applicable patient on every occasion. The purpose of a bundle is to help improve the process and cement the components into a single unit of care (Berenholtz et al., 2004; Downie, Perrin, & Kiernan, 2013; Pronovost, 2008). Many bundles focus around care to be provided based off a cumulative pressure injury risk assessment score.

As part of the organization's involvement in the Solutions for Patient Safety collaborative, a pressure injury prevention bundle was implemented in 2014 (see Table 1). The bundle consisted of several evidence-based interventions to assist with pressure injury prevention and was implemented on patients deemed high risk, defined as those scoring \leq 16 based on the Braden Q risk assessment scale. There was no bundle or pathway to guide interventions for patients identified as moderate (Braden Q score of 17–21) or low (Braden Q score of 22–26) risk. Compliance with the pressure injury prevention bundle was monitored monthly by the organization. During 2015 and early 2016, bundle compliance was consistently below the organizational goal of 90%. Despite implementation of risk assessment scales and a prevention bundle, pressure injury development continued to be a challenge in the PICU.

Recent literature suggests focusing interventions based on risk assessment subscale scores may prove more effective in pressure injury prevention (Gadd, 2014). By developing a pathway to assist nurses to implement interventions based on subscale scores may enhance pressure injury prevention and improve the plan-to-intervention time (Gadd, 2012). Utilizing the 2014 Clinical Guidelines from the National Pressure Ulcer Advisory Panel, a nurse driven pathway was developed that expanded upon the previously implemented pressure injury prevention bundle. Interventions were chosen based on the level of evidence, strength of recommendation, and feasibility for implementation as outlined in the guidelines. The pathway included interventions to mitigate each of the risk factors outlined in the Braden Q risk assessment scale. For all patients with a Braden Q subscale score of 3 or under, nurses implemented the interventions as indicated by the pathway (see Fig. 1 and Table 1).

Nurses in the PICU received education regarding the pathway and interventions for three weeks prior to implementation of the pathway. Education was provided via staff meetings, online training module, and electronic just-in-time teaching handout. Copies of the pathway

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