



Become the PPUPET Master: Mastering Pressure Ulcer Risk Assessment With the Pediatric Pressure Ulcer Prediction and Evaluation Tool (PPUPET)

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Hospital acquired pressure ulcers (HAPU) are serious, debilitating, and preventable complications in all inpatient populations. Despite evidence of the development of pressure ulcers in the pediatric population, minimal research has been done. Based on observations gathered during quarterly HAPU audits, bedside nursing staff recognized trends in pressure ulcer locations that were not captured using current pressure ulcer risk assessment tools. Together, bedside nurses and nursing leadership created and conducted multiple research studies to investigate the validity and reliability of the Pediatric Pressure Ulcer Prediction and Evaluation Tool (PPUPET).
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NOSOCOMIAL PRESSURE ULCERS are a serious, debilitating, and preventable complication in all inpatient populations. Similar to adult patients, acutely ill infants and children are at risk for pressure ulcers (Bernabe, 2012; Kottner, Wilborn, & Dassen, 2010; Parnham, 2012; Quigley & Curley, 1996). However, because of the anatomical and physiological differences in infants and children, the most common sites for pressure ulcer development are different than the adult population. For example, the head makes up a greater proportion of the total body weight and surface; thus, the occipital region of the scalp is the most common site of ulceration for infants and children (Willock, Harris, Harrison, & Poole, 2005). Infants and children are also prone to develop pressure ulcers on other bony prominences as well as any area where external medical devices (such as

pulse oximetry probes, oxygen tubing, intravenous hubs, braces or other tubes) are placed (Kottner et al., 2010; Waterlow, 1997; Willock, Baharestani, & Anthony, 2009). Some conditions that place children at greater risk for pressure ulcer development include extracorporeal membrane oxygenation (ECMO), paraplegia, myelomeningocele, large head size, kyphosis, developmental delay, and chronic fecal and urinary soiling (Noonan, Quigley, & Curley, 2006). Despite evidence of the development of pressure ulcers in the pediatric population, relatively minimal research has been done to develop pediatric pressure ulcer risk assessment tools. The purpose of this article is to introduce and report testing of the Pediatric Pressure Ulcer Prediction and Evaluation Tool (PPUPET), a pediatric-focused skin risk assessment instrument developed by bedside nurse leaders in response to finding pressure ulcers in our patient population.

The use of standardized tools in nursing promotes consistency among caregivers and facilitates communication

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regarding evaluation and management of clinical decisions and treatments for various clinical conditions. In pediatrics, however, standardized tools are often modifications of adult tools and do not always address the unique considerations of the pediatric patient. Standardized tools must also be re-evaluated and revised periodically as healthcare changes and the language used to describe clinical conditions becomes more uniform. Standardized tools must be easy to use and intuitive for the bedside nurse; otherwise, the tool can add burden which takes away from patient care.

Evaluation testing of standardized tools is also important to ensure that the tool consistently measures the clinical condition and that appropriate assessment criteria are being considered. Inter-rater testing, which assesses the degree to which different raters independently concur in their observations of what is being measured, is used to report a tool's reliability (Polit & Beck, 2013). Validity—the degree to which an instrument measures what it is intended to measure—can be established by comparing the items in a tool to another reliable, valid instrument measuring similar concepts (Polit & Beck, 2013). When a tool is used in clinical practice at a time when outcome conditions can also be assessed, calculations of sensitivity—the tool's ability to identify patients who have a true positive condition—and specificity—the tool's ability to identify patients who have a true negative condition—help clinicians appraise the usefulness of the standardized tool (MedCalc Software, 2014). For the PPUPET, sensitivity measures the proportion of children rated at risk who actually have a pressure ulcer, while specificity measures the proportion of children rated not at risk who actually have no pressure ulcers. Lastly, positive and negative predictive value can also be calculated for an instrument (MedCalc Software, 2014). For the PPUPET, the positive predictive value measures the probability that the risk for pressure ulcer development is present when the child is assessed as being at risk for pressure ulcer development. Negative predictive value measures the probability that the risk for pressure ulcer development is not present when the child is assessed as not being at risk.

Purpose and Background

The purpose of this article is to report the results of recent retrospective and prospective studies of the PPUPET which have evaluated its usefulness as a risk assessment tool for the development of pressure ulcers in the pediatric population. As background, we will describe the development and initial reliability/validity testing of the PPUPET and then discuss the more recent studies.

Bringing the PPUPET to Life

In the fall of 2004, members of the children's hospital nursing leadership team began a conversation regarding the prevalence of pressure ulcers in our pediatric patient population. Our adult hospital colleagues already had been performing hospital acquired pressure ulcer (HAPU) audits to develop strategies for the prevention and treatment of

pressure ulcers. In order to establish a baseline for prevalence of pressure ulcers, our first skin audit was completed in November 2004. A complete head to toe skin assessment was conducted on 49 hospitalized pediatric patients on a single day. Results of our audit demonstrated a prevalence of pressure ulcers in 9% of these patients.

In May 2005, the next skin audit was performed on 59 patients. Results of the audit demonstrated that 15% of the patients had a pressure ulcer. At this time the nursing leadership team realized that pressure ulcers were indeed a problem at the children's hospital and began to formulate a strategy to address the issue. Nursing leadership recruited bedside nurses from each clinical unit to form a team to address the prevalence of pressure ulcers in our pediatric patient population. Members of the "Skin Team" were assigned to conduct biannual skin audits.

Following the January 2006 skin audit of 74 pediatric patients—which yielded an alarming 11% prevalence of stage 1 (n = 8) and 1% stage 2 (n = 1) pressure ulcers¹ and several patients having >1 pressure ulcer—the skin team identified the following concerns:

- No standardized tool was being used to identify patients at risk for pressure ulcer development.
- No pediatric plan of care had been developed for the prevention and management of pressure ulcers in children.
- The nursing Kardex² did not reflect nursing orders for turning and basic skin care.
- Nurses were unaware that they could initiate nursing orders/interventions to prevent the development of pressure ulcers.
- Documentation regarding nursing interventions (e.g., turning and positioning) for the prevention of pressure ulcers was lacking or inconsistent.
- Nurses were unaware of where or how to document positioning in new electronic nursing documentation.
- Care related to devices (e.g., repositioning pulse oximetry probes) was inconsistently documented.

Based on the identified concerns, the team decided to review standardized pressure ulcer risk assessment tools and develop a standard of practice for assessment and intervention to prevent pediatric pressure ulcers.

Starting in March 2006, skin team members began reviewing the existing evidence. We first reviewed the Braden Scale for Predicting Pressure Sore Risk (Bergstrom, Braden, Laguzza, & Holman, 1987) [Braden], which was the tool used by our

¹ Pressure ulcer staging is based on the National Pressure Ulcer Advisory Panel's (NPUAP) definitions of stages 1 through 4. Stage 1 is the least severe (non-blanchable erythema), and stage 2 is a partial-thickness ulcer. The current version of the Quick Reference Guide (European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2009), now includes stages 1 to 4 and deep tissue injury and unstageable categories.

² The paper Kardex was a primary tool utilized by bedside nursing staff to communicate pertinent patient-specific information, direct nursing care based on physician orders, facilitate nurse-to-nurse communication, and track patient significant events (VanderKooi, Blackport, & Vander Laan, 2011).

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