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Evaluation of nurse accuracy in rating procedural pain among pediatric burn patients using the Face, Legs, Activity, Cry, Consolability (FLACC) Scale

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ABSTRACT

Background: Accurate pain assessment is essential for proper analgesia during medical procedures in pediatric patients. The Faces, Legs, Activity, Cry, and Consolability (FLACC) scale has previously been shown to be a valid and reliable tool for assessing pediatric procedural pain in research labs. However, no study has investigated how rater factors (gender, number of dressing changes performed/week, burn history, having children, nursing experience, stress at home/work) and patient factors (pain intensity) affect the accuracy of FLACC ratings for procedural pain when implemented by bedside care providers.

Method: Twenty-four nurses in an ABA verified Pediatric Burn Center watched four videos of dressing changes for pediatric burn patients in random order three times and rated the children's procedural pain using the FLACC scale. The four videos had standard FLACC scores established by an interdisciplinary panel.

Results: Descriptive and mixed modeling analysis was conducted to explore nurse rating accuracy and to evaluate the rater and patient factors that influenced the rating accuracy. The highest accuracy was reached when rating high procedural pain (with a FLACC of 6). Nurses underrated both mild and severe procedural pain. Nurses who had less nursing experience demonstrated significantly higher accuracy than those with more experience.

Conclusions: The present study is the first study in the literature to systematically examine the factors influencing the accuracy of FLACC rating for pediatric procedural pain among

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bedside care providers. The findings suggest that nurse clinical experience and patient pain intensity are two significant contributors to rating accuracy.

1. Introduction

According to the Centers for Disease Control and Prevention, burns are ranked as one of the ten leading causes of unintentional injuries in the pediatric population [1]. Burns are seen most often in pre-school children; more than 70,000 children younger than six years old had burns in 2013 [1]. Dressing changes have been identified as one of the major contributors to perceived pain during wound care [2,3]. Although a significant amount of effort has been devoted to the development of various pain reduction interventions using pharmaceutical and non-pharmaceutical (e.g., distraction) strategies, the evaluation of the effectiveness of these strategies is heavily dependent on the accuracy of the tools used to assess procedural pain.

Researchers and clinicians typically utilize three approaches to assess procedural pain intensity: self-reports from patients on the perceived intensity of pain; behavioral scales completed by the medical staff regarding the observed intensity of pain; and physiological measures such as heart rate and/or respiration rate [4]. For pediatric burn patients (especially among preschool children due to their immature physical/mental development), physiological fluctuations may be more varied from child to child independent of the pain incurred by dressing changes [5]. Additionally, self-reported intensity of pain may not be reliable given the underdeveloped cognitive and language abilities in this young population when they are asked to report on their subjective experiences using standard measurement tools. Therefore, observed measures of pain via bedside care providers' (i.e., nursing staff) reports using behavioral scales are considered more reliable for young pediatric patients. A recent systematic review revealed that, in the past few decades, numerous behavioral measures of pediatric pain have been developed, among which the Face, Legs, Activity, Cry, Consolability (FLACC) Scale has been identified as a recommended measurement tool for assessing pain in children from 0 to 18 years old [6]. Developed by Merkel et al. (1997), the FLACC scale was originally designed to measure post-operative pain in pediatric population [7]. The FLACC utilizes an easy-to-understand 0–10 metric and exerts a relatively low burden on the medical staff. Additionally, the FLACC scale can be applied to pediatric patients of all ages, including the very young, thus it provides a standard assessment for all of the patients in our pediatric burn center. It has previously demonstrated a high level of inter-rater reliability and concurrent validity with other existing scales such as the Visual Analogue Scale (VAS) [8]. See Appendix 1 for details on the FLACC scale.

More recently, the FLACC scale has been recommended for use in assessing procedural pain and distress among pediatric patients [6,9]. When making this recommendation, researchers cite existing empirical data which establishes high intra- and inter-rater reliability of the FLACC for pediatric procedural pain in patients as young as 12 months old up to 16 years old [10,11]. While favorable psychometric properties of the FLACC scale for procedural pain assessment have been established by academic researchers, it is still unknown how accurate care providers are when implementing the FLACC scale in their daily care for pediatric patients. It also remains unknown what individual factors might affect rating accuracy for procedural pain in real medical settings, even though behavioral assessment research has long regarded both rater and ratee factors as critical contributors to potential assessment bias in daily practice [12,13]. Specifically, in the case of assessing procedural pain, individual rater factors such as clinical and life experiences may influence the interpretation of a child's behaviors during pain assessment when using the FLACC scale. In addition, rating accuracy using the FLACC may also be influenced by patient (ratee) factors such as perception/reaction of pain, since the FLACC rating is largely based on raters' observation of external behaviors of patients.

Our literature search revealed that there has been no previous research systematically investigating the accuracy of FLACC ratings for procedural pain assessment and how rater/patient factors influence rating accuracy among direct care providers routinely utilizing the FLACC to measure procedural pain. The present study aimed to address this gap. We hypothesized that the accuracy of FLACC rating by nurses would depend on both rater factors and patient factors (i.e. pain intensity).

2. Methods

2.1. Overview

Institutional Review Board (IRB) approval was obtained prior to the start of the study. An interdisciplinary panel, including a burn nurse, a psychologist and an advanced practice nurse from the pain service established standard FLACC scores for 4 videos that demonstrated pain ratings from mild pain to severe pain (see details in Section 'Videos'). Twenty-four nurses then watched all four videos in randomized order three times (on separate days), and rated the children's procedural pain in each video using the FLACC scale.

2.2. Participants

Informed consent was obtained from each nurse participant prior to the study. A total of 24 nurses (Mean age = 33.03 years old, SD = 12.66, Median = 30.5; female/male ratio = 11:1) from an ABA-verified Pediatric Burn Center in the Midwestern United States participated as raters in the present study. The nurses reported an average of 1.58 dressing changes per week prior to the study.

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