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# Pain assessment tools: A literature review

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**Abstract**

Pain is a major factor expressed by hospital patients and is the main reason they seek medical help. Evidence suggests that children experiencing pain often do not receive optimal pain assessment and relief. This article refers to a literature review discussing tools and management strategies for assessing children's pain. It concludes that implementing an

educational program for medical professionals could enhance their awareness of best practices in pain assessment and management guidelines.

**Key words:** pain assessment; analgesia; pediatric pain

## Introduction

There is a lot of research showing that children's pain is often underestimated and undertreated [1]. Some evidence indicate that children who experience pain and go to emergency departments often do not receive the best possible pain assessment and relief [2, 3, 4, 5, 6]. Inadequate postoperative pain control has been also frequently reported [7, 8]. The World Health Organization and multiple professional pain societies mandate that optimal pain management should be considered a fundamental human right [9]. It is clear that adequate pain control enhances healing and recovery, while untreated pain leads to negative physical and psychological consequences, including poor health outcomes and maladaptive behaviors [10, 11]. Additionally, it is important to note that children are more vulnerable than adults, emphasizing the need to promptly alleviate their pain while minimizing stressful situations and invasive procedures [3]. Factors contributing to insufficient quality of care for children include poor assessment skills, failure to utilize available pain-assessment tools, and a lack of creativity in applying pharmacological and non-pharmacological interventions [3]. The aim of this article is to review the literature and describes various validated pain assessment tools for use with children.

## Pain assessment tools

There are several pain assessment tools available in the literature but there is no gold standard for pain assessment identified as the best to use in all circumstances [3]. Individual and age-appropriate approach should be used to measure the type and intensity of pain [12]. A few

well-known scales to evaluate a child's pain often used by various scientific and specialist pain treatment centers around the world divided into age groups are presented below.

## Newborns and premature infants, babies

Neonates, including those born preterm, possess the anatomical and physiological substrates for pain perception [13] . However, verbal communication is not yet developed, necessitating the identification of pain by healthcare professionals through behavioral and physiological cues [14, 15, 16, 17].

### Modified Infant Pain Scale (MIPS)

The Modified Infant Pain Scale (MIPS) is a multidimensional tool for pain assessment in neonates, building upon the unidimensional Clinical Scoring System. It incorporates 13 behavioral and physiological domains, including facial expressions, cry quality, motor activity, and physiologic measures like heart rate. Each domain is scored 0-2, with higher scores indicating less pain. Subset scores (P-MIPS) exclude sleep and vital signs for quicker clinical use. Scores >12 on P-MIPS and >20 on the total scale (T-MIPS) suggest comfort. Initial studies demonstrate validity and reliability, supporting the use of P-MIPS for a rapid clinical pain assessment (Figure 1) [18, 19 ].

Figure 1. Modified Infant Pain Scale adapted from Sowmiya DK. Ramanathan R, Ramamoorthy R [20]

| Parameter and findings | Points |
|---|---|
| **Facial expression** | |
| Definite positive expression | 0 |
| Neutral expression | 1 |
| Slightly negative expression, e.g., grimace* | 2 |
| Definite negative expression i.e., furrowed brows, eyes closed tightly** | 3 |
| **Cry** | |
| Laughing or giggling | 0 |
| Not crying | 1 |
| Moaning, quiet vocalizing, gentle or whimpering cry | 2 |
| Full lunged cry or sobbing | 3 |
| Full lunged cry, more than baseline cry | 4 |
| **Movements** | |
| Usual movements/activity or resting/relaxed | 0 |
| Partial movement or attempt to avoid pain by withdrawing the limb where puncture is done | 2 |
| Agitation with complex movements involving the head, torso or the other limbs, or rigidity | 3 |
| *Slightly negative expressions include brow bulging and naso-labial furrow; **definitely negative expressions include brow bulging naso-labial furrow eyes closed tight open lips with or without a reddened face; in MBPS sum of points for all 3 parameters are interpreted as, minimum score: 0, maximum score: 10 | |

**Children <3 years of age or children without contact**

The Face, Legs, Activity, Cry, and Consolability (FLACC) scale

The FLACC scale is commonly used in infants and children to measure three types of pain: procedural pain, postoperative pain, and acute pain [21, 22]. The scale is scored on a range of 0–10, with 0 representing no pain. It consists of five criteria, each assigned a score of 0, 1, or

2 (Figure 2). The FLACC scale helps to understand pain experience by observing facial expressions and behavioural patterns to enable the provision of effective pain intervention.

Figure 2. FLACC scale adapted from BMC Oral Health [23]

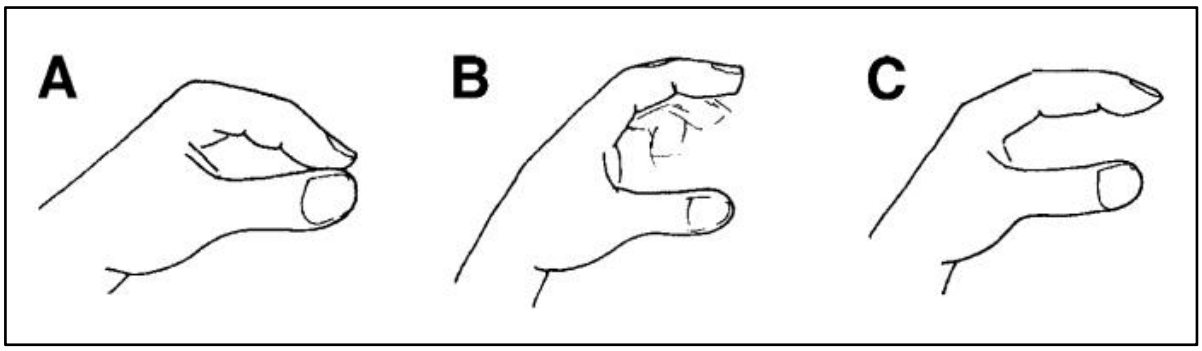
| Categories | 0 | 1 | 2 |
|---|---|---|---|
| **Face** | No particular expression or smile | Occasional grimace or frown; withdrawn, disinterested | Frequent to constant frown, clenched jaw, quivering chin |
| **Legs** | Normal position or relaxed | Uneasy, restless, tense | Kicking or legs drawn up |
| **Activity** | Lying quietly, normal position, moves easily | Squirming, shifting back and forth, tense | Arched, rigid, or jerking |
| **Cry** | No cry (awake or asleep) | Moans or whimpers, occasional complaint | Crying steadily, screams or sobs; frequent complaint |
| **Consolability** | Content, relaxed | Reassured by occasional touching, hugging, or being talked to; distractible | Difficult to console or comfort |
| **Each category is scored on the 0-2 scale, which results in a total score of 0-10.**<br>**0:** Relaxed and comfortable<br>**1-3:** Mild discomfort<br>**4-6:** Moderate pain<br>**7-10:** Sever discomfort or pain or both | | | |

**Children 3-12 years old**

Finger Pain Scale

The finger span concept is to move forefingers and thumbs apart to report the magnitude of a visual stimulus. The scale's ease of instruction and applicability across diverse populations make it particularly valuable. This includes critically ill children with comprehension difficulties, those hesitant towards other self-report tools, and situations where language barriers exist (Figure 3) [24].

Figure 3. Finger pain scale: (A) the bottom anchor of no pain, (B) the top anchor of the most pain, and (C) a pain estimation [24]




Wong-Baker FACES Pain Rating Scale

The scale, widely used with patients aged three and older, is not limited to children. This self-assessment tool requires patients to understand it so they can select the face that best represents the physical pain they are experiencing (Figure 4). It is not intended to be used by third parties such as parents, healthcare professionals, or caregivers to assess the patient's pain [25].

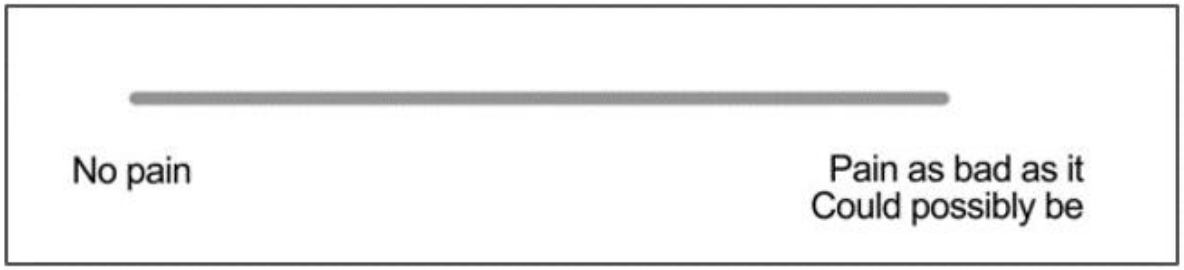
Figure 4. Wong-Baker FACES Pain Rating Scale adapted from https://wongbakerfaces.org/ [25]

**School children and teenagers**

The visual analog scale (VAS)

The visual analog scale (VAS) is a validated, subjective measure used for both acute and chronic pain. Scores are recorded by making a handwritten mark on a 10-cm line, which represents a continuum between 'no pain' and 'pain as bad as it could possibly be' (Figure 5). These values can be utilized to track pain progression in a patient or to compare pain levels among patients with similar conditions [26].

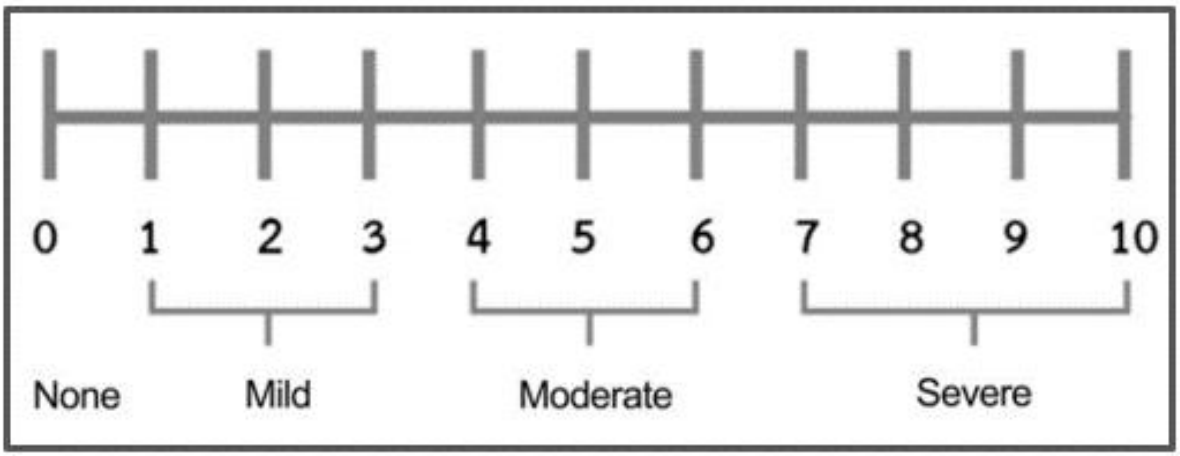
Figure 5. Visual analog scale adapted from Natthamet – Wongsirichat [27]




Numerical Rating Scale (NRS)

The numerical scale is easy to apply, and its high sensitivity and reliability compared to other pain measurement scales have been demonstrated. Consisting of 11 levels of pain intensity ranging from 0 to 10, where 0 indicates complete absence of pain and 10 represents the worst imaginable pain (Figure 6), this scale is characterized by significant result repeatability and is useful in scientific applications. Due to its clarity for patients and ease of use, it is currently recommended in clinical practice for assessing both acute and chronic pain [28].

Figure 6. Numerical Rating Scale (NRS) adapted from Natthamet – Wongsirichat [27]




In a hospital setting, pain levels and responses to treatment, including adverse effects, should be appropriately assessed, documented frequently, and clearly recorded in a visible place, such as on the vital sign sheet. This facilitates treatment and communication among healthcare professionals [2, 29, 30].

## Conclusions

Pain relief is one of the chief goals of healthcare workers. A holistic approach aims not only at alleviating suffering but also at optimizing patient outcomes and well-being. Healthcare providers have a responsibility to eliminate or alleviate pain and risk in children whenever possible. Using appropriate pain assessment tools can improve patients' outcomes. Education and training of parents and healthcare providers can positively impact the management of pain in children.

## Disclosure

## Author's contribution

Conceptualization: Aneta Michalczewska and Natalia Wierzejska;; Methodology: Justyna Dobrzańska; Software: Agnieszka Nowak; Check: Zuzanna Chmielowiec and Agnieszka

Fugas; Formal analysis: Karolina Smykiewicz and Alicja Partyka; Investigation: Magdalena Pach and Mariola Dziedzic; Resources: Mariola Dziedzic; Data curation: Alicja Partyka; Writing - rough preparation: Justyna Dobrzańska and Zuzanna Chmielowiec; Writing - review and editing, Aneta Michalczewska and Agnieszka Fugas; Visualization: Karolina Smykiewicz; Supervision: Natalia Wierzejska; Project administration: Magdalena Pach and Agnieszka Nowak; Receiving funding - no specific funding.

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