

Pain Management in Children with Collaborative Parents and Healthcare Team

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Abstract

Most children in hospital have pain. Seeing your child in pain or discomfort is incredibly difficult. Pain in children is a public health concern of major significance in most parts of the world. We have learned that unrelieved pain causes the body to release certain chemicals that may actually delay healing, so it's important to work with child's nurses and doctors to help children for control the pain. On the other side, medication is not the only way to relieve pain. Pain in children should always be managed and pain expression is dependent on the child's age, cognitive development, and socio cultural context and it is important to pay particular attention to developmental variations in any behavioural manifestations of pain. In this study to explain some ways for parents and healthcare team to manage pain in children.

Key Words: Children, Healthcare, Manage, Pain, Parents.

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Introduction

The International Association for the Study of Pain (IASP) defines pain as, “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (1). The definition emphasizes both the physical and emotional nature of pain. An additional note is pertinent to pain experienced by children: “The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of

appropriate pain-relieving treatment. Pain is always subjective” (2, 3).

Pain is a multidimensional phenomenon with sensory, physiological, cognitive, affective, behavioural and spiritual components. Emotions (affective component), behavioural responses to pain (behavioural component), beliefs, attitudes, spiritual and cultural attitudes about pain and pain control (cognitive component) all alter the way that pain is experienced (sensory component) by modifying the transmission of noxious (unpleasant) stimuli to the brain (physiological component) (4) (Figure.1).

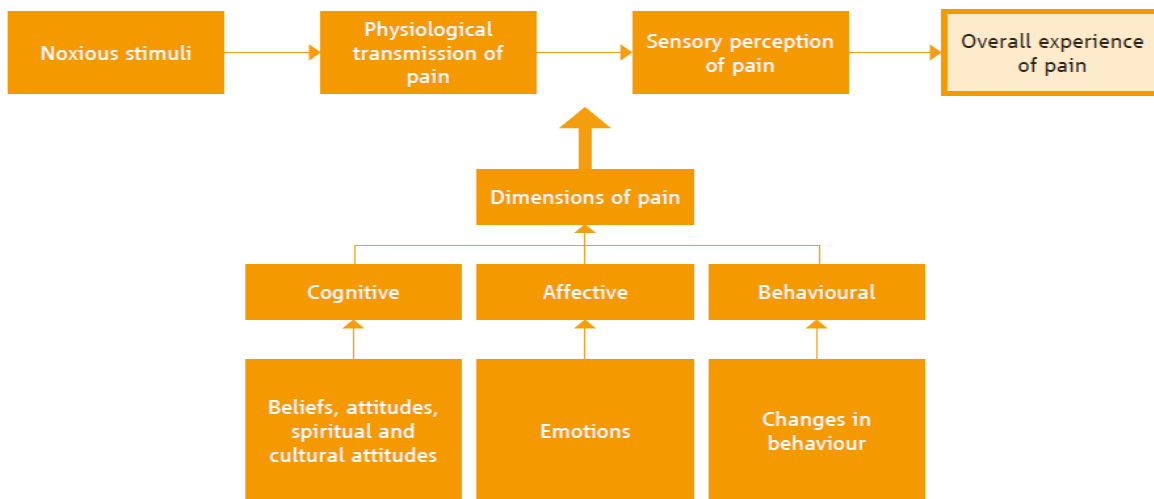


Fig. 1: Diagram showing the many dimensions of pain modifying the transmission of noxious stimuli to the brain (1)

The four most commonly used systems are:

- The pathophysiological mechanism of pain (nociceptive or neuropathic pain);
- The duration of pain (chronic or acute, breakthrough pain);
- The etiology (malignant or non-malignant);

- The anatomic location of pain (4).

Some causes of persisting pain in children may result from:

1. Chronic diseases such as arthritis, sickle cell disease and rheumatologic disorders constitute important causes of

musculoskeletal pain and chronic conditions such as inflammatory bowel disease can cause recurrent abdominal pain.

2. Trauma – physical, thermal, electrical and chemical injuries (e.g. burns) and lead to, for instance, phantom limb pain or lower back pain.

3. Life threatening diseases and their treatment such as simultaneous acute and chronic pain in cancer and HIV/AIDS.

4. Idiopathic pain has no identifiable etiology. Examples are most headaches and recurrent abdominal pain (Several types of headaches can affect children including migraine, tension, and cluster headaches).

Classification based on pain duration

A commonly used definition of *acute* pain is pain lasting less than 30 days, and a commonly used definition of *chronic* pain is pain lasting more than three months. However, these definitions are arbitrary and not essential for deciding on treatment strategies. Symptoms and causes of the two types of pain may overlap and pathophysiological factors can be independent of duration. Therefore, this division between acute and chronic pain based on duration may be problematic.

Acute pain: is of sudden onset, is felt immediately following injury, is severe in intensity, but is usually short-lasting (5). It arises as a result of tissue injury stimulating nociceptors and generally disappears when the injury heals.

Chronic pain: is continuous or recurrent pain that persists beyond the expected normal time of healing (6). Chronic pain may begin as acute pain and persist for long periods or may recur due to persistence of

noxious stimuli or repeated exacerbation of an injury. Chronic pain may also arise and persist in the absence of identifiable pathophysiology or medical illness. Chronic pain can negatively affect all aspects of daily life, including physical activities, school attendance, sleep patterns, family interactions and social relationships and can lead to distress, anxiety, depression, insomnia, fatigue or mood changes, such as irritability and negative coping behaviour. As pain is an outcome of an interaction of many factors, the child as a whole must be considered when evaluating the clinical features of pain. Therefore, a holistic approach may be required to relieve pain.

Episodic or recurrent pain: occurs intermittently over a long period of time and the child can be pain free in between each painful episode. Painful episodes can often fluctuate in intensity, quality and frequency over time and are consequently unpredictable. This type of pain may be indistinguishable from recurrent acute pain but might be associated with a more severe impact on the affected child's physical and psychosocial life. Examples of this type of pain include migraine, episodic sickle cell disease pain, recurrent abdominal pain. Persisting and recurrent pain can coexist, especially in conditions such as in sickle cell disease.

Breakthrough pain: is characterized as a temporary increase in the severity of pain over and above the pre-existing baseline pain level, e.g. if a child is taking pain medicines and has good pain control with a stable analgesic regimen and suddenly develops acute exacerbation of pain. It is usually of sudden onset, severe, and of short duration. A number of episodes of breakthrough pain can occur each day. It is a well-known feature in cancer pain but it is

also seen in non-malignant pain conditions (4). Breakthrough pain can occur unexpectedly and independently of any stimulus, i.e. without a preceding incident or an obvious precipitating factor.

Incident pain or pain due to movement: has an identifiable cause. The pain can be induced by simple movements, such as walking, or by physical movements that exacerbate pain, such as weight bearing, coughing or urination. Diagnostic or therapeutic procedures can also cause incident pain.

End of dose pain: results when the blood level of the medicine falls below the minimum effective analgesic level towards the end of dosing interval (4).

Materials and Methods

The current study is a review survey which was conducted to evaluate of children's pain by studying WHO website, UNICEF website and scientific texts about this subject. To evaluate the texts, the singular or combination forms of the following keywords were used: "Pain", "Management", "Children", "Parents" "Collaborate" and "Healthcare".

To evaluate the electronic databases the following websites were searched: Google, Ministry of Healthcare, Google Scholar, Scopus and PubMed. Also, library search was performed by referring to the journal archives of libraries, and evaluating the available Persian and English references, and also articles of research-scientific journals, and articles of the annual seminar of Medicine, Pediatrics and Public health.

Results

Pain is an uncomfortable sensation, or feeling. It is such an important factor in

health that it has been called the "fifth vital sign (1, 7)". It can be constant (always there) or intermittent (coming and going). Pain can be dull and aching, sharp, or throbbing. It can be both physical and mental, and every child experiences it differently. It is important to know that no one can describe what your child's pain feels like except your child. Pain may be just a nuisance, or it may interfere with your child being able to get through their normal daily activities.

We feel pain when our brain sends out special signals to our bodies. Usually, we are sick or injured when our brains send these signals. Feeling pain usually serves a purpose—it is a signal that something is wrong. Pain can be acute (lasting for a short time) or chronic (lasting for a much longer time, perhaps months or years). Chronic pain often goes misdiagnosed. Unlike acute pain, it serves no useful purpose, but rather causes needless suffering if it goes untreated. Untreated or under-treated chronic pain can disrupt family routine, and interfere with your child's daily activities, which can in turn lead to long-term disability. The key to treating chronic pain is doing a good job of recognizing and describing it frequently along the way to ensure that treatment is working as it should (8).

Expression of pain by children and appropriate pain assessment measures

Pain expression is dependent on the child's age, cognitive development, and sociocultural context and it is important to pay particular attention to developmental variations in any behavioural manifestations of pain. Young children usually use the simple words that they learn from their parents to express pain (such as "ouch") and

may point to the part of their body in which they feel the pain. The ability to indicate the presence of pain verbally emerges between two and four years old. Gradually they learn to distinguish three levels of pain such as “a little”, “some”, and “a lot”. By five years old, children can describe pain and define its intensity. At six years old, they can clearly differentiate the levels of pain intensity. Children from seven to ten years of age can explain why it hurts. In children unable to talk, pain reporting is reliant on parents and/or caregivers (4). Parents usually know their child’s typical behavioural response to pain and this can be included in the pain assessment.

Observation of behaviour in relation to pain is a valid approach for pain assessment in children below three years old, and in children with limited verbal and cognitive skills. Such behavioural responses may vary depending on whether the pain is acute or persisting.

The main **behavioural indicators of acute pain** are:

- facial expression
- body movement and body posture
- inability to be consoled
- crying
- groaning.

These behavioural responses may be reduced in persisting pain, except during acute exacerbation.

Behaviour in children with chronic pain can include:

- abnormal posturing
- fear of being moved
- lack of facial expression
- lack of interest in surroundings
- undue quietness
- increased irritability
- low mood

- sleep disruption
- anger
- changes in appetite
- poor school performance (9).

However, children may display none of the expected cues. They may deny their pain for fear of more painful treatment, for example, they may be fearful of injections. Absence of these signs does not mean absence of pain and care should be taken to avoid underestimating pain.

Caregivers are often the primary source of information, especially for **preverbal children**, as they are best aware of the child’s previous pain experiences and behaviour related to pain. Also their behaviour, beliefs and perceptions can have a significant impact on the child’s response to pain (10).

The approaches used by parents and caregivers to console the child, such as rocking, touch and verbal reassurance must be considered when observing distressed behaviour.

Pain expression can differ markedly in **children with severe malnutrition** who are often understimulated and developmentally delayed due to malnutrition and/or concomitant chronic conditions. Such children often respond differently to pain compared to well-nourished children. Undernourished children may not express pain through facial expressions and crying, but may whimper or faintly moan instead and have limited physical responses because of underdevelopment and apathy (11).

Documentation of pain: the use of pain measurement tools

Several pain measurement tools have been developed to assess and document pain in children. There is need to recognize,

evaluate, measure and monitor pain, and pain control strategies, using pain tools that are appropriate to the child's age, culture and condition. A number of tools have also been developed to address pain assessment in children unable to talk and in cognitively impaired children. Some degree of pain assessment is always possible, even in the critically-ill or cognitively-impaired child.

It is important to select psychometrically validated tools for the specific paediatric population and for persisting pain. No single pain intensity tool is appropriate across all ages or all types of pain. The majority of pain measurement tools have been developed and validated for acute pain (4, 9). The most common pain measurement tools – **pain intensity scales** – rely on the capacity to quantify pain. They are often based on the concept of counting. Pain

severity can be determined by teaching children to use quantitative pain scales. Practical tools based on the concept of quantifying and counting are appropriate for all cultures. The capacity of quantifying and counting depends on the age and developmental level of the child (4, 12, 13). The following self-report pain scales (Faces Pain Scale-Revised, Poker Chip Tool, the Visual Analogue Scale (VAS), and the Oucher Photographic and Numerical Rating Scale (NRS) have been recommended to measure pain intensity in children with acute and persisting pain by both the Ped-IMPACT and SPP-ATF reviews. Table.1 provides comprehensive information about these tools including the applicable age range. These different tools are validated for measurement of pain intensity in children above three to four years old or above eight old.

Table 1: List of self-report measuring tools for pain intensity

Tool and acronym (original citation)	Applicable age range and method	Comments (strengths, weaknesses and limitations, cultural validation)	Language	Ease of use	Availability, cost, source
Faces Pain Scale-Revised (FPS-R)	4–12 years – self-report by child	Faces are line drawings with no ethnicity distinctions ranging from a neutral expression to one of intense pain but without tears. Simple, quick to use and requires minimal instructions.	Available in 47 languages	Easy to administer and score, readily reproducible by photocopying.	All translations available at no cost at: http://www.iasp-pain.org/fpsr/
Pieces of Hurt tool/ Poker Chip tool	3–12 years – self-report by child	Based on concrete ordinal rating scale. Require confirmation that size-sorting task is developed in children. Weaknesses include cleaning the chips between patient use, the potential for losing chips and the limited number of response options (0–4). Only modest evidence of reliability and validity in preschool children between 3 and 4 years.	Arabic, English, Spanish, Thai	Simple, quick to use, require minimal instruction, easily reproducible, transported and disinfected.	Instructions in English available at: http://painresearch.utah.edu/cancerpain/ch14.html

Tool and acronym (original citation)	Applicable age range and method	Comments (strengths, weaknesses and limitations, cultural validation)	Language	Ease of use	Availability, cost, source
Visual Analogue Scale (VAS)	Above 8 years – self-report by child	Sensitive to change, correlates significantly with parents' and/or caretakers' ratings of children's pain. Retrospective self-report has more recall bias, requires a high degree of abstraction to indicate, on a line, the different verbal expressions for varying pain intensity and unpleasantness.	Chinese, English, French, Italian, the main Nigerian languages (Hausa, Igbo, Yoruba) (44), Portuguese, Spanish	Easy to administer and score, readily reproducible, but photocopying may alter the scale by increasing or decreasing the length of the line.	Available at no cost at: http://www.partnersagainstpain.com/printouts/A7012AS1.pdf
(a) The Oucher Photographic (b) 0–10 Numerical Rating Scale	(a) 3–12 years (b) Above 8 years – self-report by child	(a) A colour photographic scale of a child's face with different pain expressions for younger children and a NRS of 0–10 for older children. There are four versions of the photographic scale: African-American, Asian, Caucasian and Hispanic child populations. (b) The NRS can be administered verbally by asking the child to verbally estimate his/her pain level on a 0–10 pain scale, with 0 representing no pain and 10 representing the worst pain.	English	Simple to use. (a) The Oucher photographic NRS requires costly colour printing. (b) The NRS can be administered verbally without any printed material.	Available at: (a) http://www.oucher.org/differences.html (b) http://painconsortium.nih.gov/pain_scales/NumericRatingScale.pdf

Sources: adapted from (4).

The tools that measure pain in children unable to talk and cognitively-impaired children do so by quantifying and rating behavioural signs. Currently, all the observational tools to measure behavior have been developed for acute pain related to diagnostic procedures, such as bone marrow aspiration, lumbar puncture or post-operative pain.

No validated tool can support pain measurement in persisting pain settings (4, 9). There is also variability among the expressions of pain in preverbal children and cognitively impaired children. This can additionally be influenced by the disease and condition of the child, such as in malnourished children. The individual child should be observed to detect behaviour that expresses pain.

Defining criteria and selecting a pain measurement tool in clinical settings

In a clinical setting, the selection of pain scales and pain measurement tools should be guided by the following criteria:

- appropriate for the age group, developmental level and sociocultural context, and covers all dimensions of persisting pain in children;
- easy to understand and to explain to a child, the parents/caregivers and health-care providers;
- process of scoring is easy, short and quick;
- the data obtained is recordable and easy to interpret;
- readily available and inexpensive;
- require minimal material or equipment in terms of paper, pencil, colours, etc.;
- if reusable, easy to disinfect;

- easy to carry;
- evidence-based (validity, reliability, responsiveness to change, interpretability and feasibility established by research);
- tested in many languages and cultures and widely used (12).

Assessing your child's pain

There are a number of ways to figure out how much pain a child is having:

Ask the child, if they are able to talk. Children as young as 3-4 years can often tell us that they are hurting. Younger children may be able to point to FACES to tell us how much pain they have. Older children can usually tell us how much pain they have by using numbers (0-10, where 0 = no pain and 10 = worst possible pain).

Observe behaviors. Babies, young children and some children with disabilities cannot tell us about their pain. These children usually have behavior changes that tell us they are hurting. We look for facial expression, movement of the body or legs, verbal expressions (e.g., crying), and response to comfort measures.

Measuring your child's pain using the pain scale

Your doctors and nurses will rate pain on a scale from 0 to 10 (0 being no pain, 10 being the worst pain that can be imagined). Older children can understand this scale, but younger children can use cartoon faces or will be observed frequently for behavioral and physical signs of pain or discomfort (Figure.2).



Fig2: Pain scale (0 being no pain, 10 being the worst pain)

Explain to your child that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain. Face 0 is very happy because he doesn't hurt at all. Face 2 hurts just a little bit. Face 4 hurts a little more. Face 6 hurts even more. Face 8 hurts a whole lot. Face 10 hurts as much as you can imagine, although you don't have to be crying to feel this bad. Ask your child to choose the face that best describes how he is feeling. Rating scale is recommended for people age 3 years and older (7, 8, 12).

Why is treating pain important?

Kids in pain do not do as well as kids who keep their pain under control. Pain can slow down your child's recovery. Also, pain is easier to treat before it gets really bad. So it's a good idea for your child to keep close tabs on how they feel, so pain can be "nipped in the bud." If we treat pain right away—before it gets out of control—we find that we actually need less medication overall to get it and keep it under control (7, 8).

Preventing and managing side effects

Most patients undergoing surgical procedures receive morphine or morphine-like medications. These medications can have side effects that become more common as doses are increased. Your child will be

checked frequently for these side effects to keep them safe and comfortable.

Side effects include:

- Nausea and vomiting
- Constipation
- Itching
- Confusion
- Excessive sleepiness
- Slowed breathing.

Managing these side effects is an important part of your child's plan of care and can include:

- Treating the side effect with medicines like Zofran® (for nausea, vomiting and itching),
- Decreasing the dose of morphine or switching to a different medication
- Adding Tylenol® or Motrin® for pain relief so that the morphine dose can be reduced.

Non-Drug therapies for pain management and comfort

Pain is complex and there are many non-drug therapies that can be used to manage pain and help decrease a child's anxiety. These techniques also can become coping skills that you / your child can use in future life experiences.

Distraction: Giving your child something else to focus on is a very effective way to help him/her cope with pain. Interactive toys, blowing bubbles, singing or music, deep breathing, story telling, video games, computer activities and TV are useful distractions for children in the hospital and clinics.

Relaxation: Simple things such as imagining a favorite place can relax even very young children during painful moments. Child Life Specialists can help you and your child learn more about relaxation methods.

Music: A child's favorite music may be comforting during stressful times in the hospital or during a painful moment.

Tactile Methods: The use of cold, heat, massage, gentle touch and positioning can help soothe pain.

Positions of Comfort: A young child often feels more in control when sitting up. Older children often prefer to choose the position of comfort. A nurse can help you and your child decide what positions might be comfortable for procedures.

Environment: Lowering lights, decreasing noise and limiting visitors may help some children. Favorite blankets, toys, and pictures are also comforting.

Oral Sucrose: Oral sucrose (sweet water) and sucking can soothe newborns and infants during pain procedures. Learn more about oral sucrose.

Parent Presence: Children have reported that having a family member present during a painful procedure helps them feel better. Ask your nurse or doctor how you can help

and coach your child through a painful moment.

How you can help manage your child's pain

- Ask the doctors and nurses how much pain to expect and how long it should last. Being prepared helps put you and your child in control.
- Talk with the doctors and nurses about pain control methods that have or have not worked for your child in the past.
- Tell the nurses what words and signs your child uses to tell you that he or she is hurting.
- Tell your doctors and nurses about any allergies your child may have.
- Ask about any possible side effects with pain medicines your child might be receiving. Sedation is a common side effect.
- If you think your child is in pain or the pain is getting worse, tell the nurse so it can be addressed quickly. Relief is easier to obtain if acted upon early. This is a key step in proper pain control.
- Consider the non-drug methods listed above that you can do with your child to help relieve the pain.
- Don't tell your child that the nurses will give him a "shot" if he misbehaves. This may create unnecessary fear of something that might be a very important part of your child's recovery. Injections are only given when other methods are not available (3, 4, 14).

Conclusion

Pain assessment

Optimal pain management begins with accurate and thorough pain assessment. Pain assessment enables health-care providers to treat pain and alleviate needless suffering. It should be carried out at regular intervals because the disease process and the factors that influence it may change over time and regular assessment permits the measurement of the efficacy of different treatment strategies in relieving pain. The pain assessment process involves the child, the parents or caregivers and the health-care providers. Pain assessment should be integrated into all clinical care. The way a child perceives pain is an outcome of biological, psychological, social, cultural and spiritual factors. Therefore, a comprehensive approach to pain assessment is required.

The initial pain assessment of a child reporting or presenting behavioural signs of pain includes a detailed pain history, a physical examination, the diagnosis of the causes, and the measurement of pain severity using an age-appropriate pain measurement tool. Pain assessment involves obtaining information about the location,

duration and characteristics of the pain, as well as the impact of persisting pain on various aspects of the child's life such as sleep, emotional state, relationships, development and physical function (15) (Figure.3).

The health-care provider should try to investigate the pain's association with any triggering factors by asking about any known aggravating and relieving factors. The health-care provider should ask what pain management treatments have previously been used, as well as the efficacy of any treatments.

Following this assessment, a detailed pain management plan, including pharmacological and nonpharmacological interventions, can be formulated and implemented together with the child's primary caregiver. Pain measurement should be performed at regular intervals during the implementation of the pain management plan. This permits the measurement of changes in the severity of pain over time, and the assessment of the adequacy and efficacy of the chosen treatment, and enables adjustments to be made, as necessary (Figure.4).

Conflict of interests: None.

- *High:* further research is unlikely to change confidence in the estimates of the effect.
- *Moderate:* further research is likely to have an important impact on confidence in the estimate of the effect and may change the estimate.
- *Low:* further research is very likely to have an important impact on the confidence of the effect and is likely to change the estimate.
- *Very low:* any estimate of effect is very uncertain.

Fig. 3: Definition of quality of evidence according to GRADE

- What words do the child and family use for pain?
- What verbal and behavioural cues does the child use to express pain?
- What do the parents and/or caregivers do when the child has pain?
- What do the parents and/or caregivers not do when the child has pain?
- What works best in relieving the pain?
- Where is the pain and what are the characteristics (site, severity, character of pain as described by the child/parent, e.g. sharp, burning, aching, stabbing, shooting, throbbing)?
- How did the present pain start (was it sudden/gradual)?
- How long has the pain been present (duration since onset)?
- Where is the pain (single/multiple sites)?
- Is the pain disturbing the child's sleep/emotional state?
- Is the pain restricting the child's ability to perform normal physical activities (sit, stand, walk, run)?
- Is the pain restricting the child's ability/willingness to interact with others, and ability to play?

Fig.4: Summary of Question by the health-care provider clinical evaluation

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