sciendo
ПРИЛОЗИ. Одд. за мед. науки, XLVI 2, 2025 МАНУ
CONTRIBUTIONS. Sec. of Med. Sci., XLVI 2, 2025 MASA
10.2478/prilozi-2025-0008 ISSN 1857-9345

CHILDREN ALSO SUFFER AND FEEL PAIN AS ADULTS

Nada Pop-Jordanova

Macedonian Academy of Sciences and Arts, Skopje, RN Macedonia

Corresponding author: Nada Pop-Jordanova, popjordanova.nadica@gmail.com

ABSTRACT

Pain and suffering are the most misunderstood, under diagnosed, and under treated/untreated medical problems, particularly in children. Therefore one of the most challenging roles of medical providers serving children is to appropriately assess and treat their pain.

Pain is truly both a physical and an emotional experience perceived and processed by the brain, and it is a real health problem as well.

Experienced pain is influenced by biological, psychological and social factors. Pain assessment in children is particularly challenging due to the wide variation in physiological responses, communication abilities and developmental stages of this group of patients.

Assessment of pain in children is linked to their level of development. Children of the same age vary widely in their perception and tolerance of pain.

Children are particularly responsive to pain-controlling strategies that involve their imaginations and senses of play.

Keywords: pain, suffering, children, management

INTRODUCTION

Pain and suffering are the most misunderstood, under diagnosed, and under treated/untreated medical problems, particularly in children. Therefore, one of the most challenging roles of medical providers serving children is to appropriately assess and treat the pain children encounter. New JCAHO regulations (The Joint Commission on Accreditation of Healthcare Organizations) regard pain as "the fifth vital sign" and require caregivers to regularly assess and address pain in children.

The current catastrophic events in Kochani (a town in North Macedonia) actualize the importance of this phenomena in youth.

From my own personal experience, many different terms are used to describe sensations which are very similar: pain, suffering, agony, distress, misery, torment, and anguish.

Pain and suffering refer to the physical and mental discomfort you experience after you are harmed due to negligence or intentional wrongdoing.

In fact, as many as 40% of children and adolescents complain of pain that occurs at least once weekly, and chronic pain affects at least 15%–20% of children worldwide. Just as chronic pain is more prevalent in women than men, girls report more pain than boys [1].

Assessment of pain in children is linked to their level of development. Children of the same age vary widely in their perception and tolerance of pain.

Pain is truly both a physical and an emotional experience perceived and processed by the brain, and it is a real health problem as well. Each child has different pain perception, and the meaning of pain is also different from child to child and proper assessment is necessary [2]. The goal of treatment is to decrease the intensity of pain and make the child feel better.

The aim of this article is to summarize the important facts related to suffering and pain in children. The review is based on more than one thousand articles published on PubMed.

HOW PAIN ARISES?

Pain sensation is a product of several interacting neural systems. Pain transmission can be modulated by descending pathways that constitute the analgesia system.

Even neonates have the same number of pain nerve endings per square millimetre of skin as adults. They are present in the foetus from the second trimester. The central nervous system tracts that subserve pain are completely myelinated within 30 weeks of intra uterine life. Cortical interconnections with the thalamus, the tracts that play a role in the higher perception of pain, are complete by 24 weeks. The descending inhibitory controllers of pain, though, are deficient in the neonate controllers of pain, and are deficient in the neonate. This leads to the likelihood that neonates, particularly preterm neonates, may be more sensitive to pain than older children and adults [3, 4].

Normal pain has a protective response. It is essential for the nervous system to learn and recognize this painful stimulus earlier and quicker with repeated exposure to avoid tissue damage. This neuronal plasticity and gain in sensitivity results in sensitization of the nervous system, both centrally and peripherally, and help in the earlier detection of the sensation of pain. However, persistent pain could become pathologic and could result in the loss of the protection pain offers to the body. Persistent pain is a disease in itself unlike pain sensation, which is a symptom of the underlying disease condition [5, 6, 7].

The three forms of neural plasticity that increase gain in the somatosensory system to produce pain hypersensitivity are illustrated in Figure 1, highlighting the changes they produce and their effects on pain transmission.

Pain (suffering) is truly both a physical and an emotional experience perceived and processed by the brain, and it must treated as a real health problem. Each child has different pain perception, and the meaning of pain is also different from child to child. However, the goal of any treatment is to decrease the intensity of pain and make the child feel better. For acute pain, this goal is often met successfully.

Pain assists us in avoiding physical harm, but unrelieved pain may be inherently harmful both psychologically and physiologically. Failure

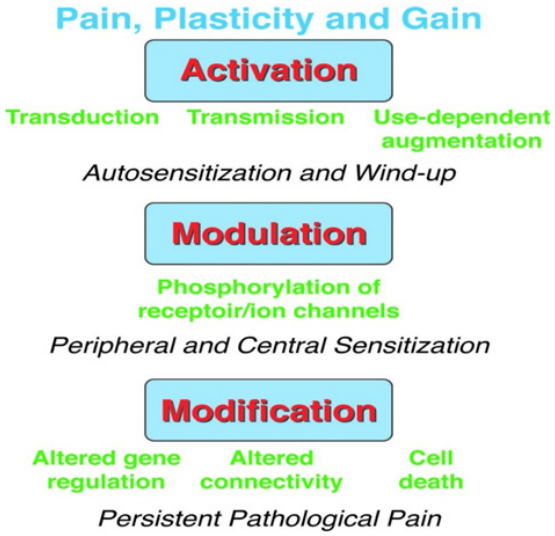

Figure 1. *Somatosensory system which produces pain*

to intervene early in a child's pain may lead to impairment in functioning and disruption in families. Unaddressed pain provokes anxiety and fear, which, in turn, increases the perception of pain.

There are several categories of pain. One of the most common is that which is associated with a disease state (e.g., arthritis, sickle-cell disease, cancer) or that which is associated with an observable physical injury or trauma (e.g., burns, fractures). Some of the most challenging conditions involve pain that is not associated with a well-defined or specific disease state or physical injury (e.g., tension headaches, recurrent abdominal pain) and is called psychosomatic pain. Pain may also be caused by the medical provider (e.g., circumcisions, injections) as well as by habits and behaviours as well (e.g., abdominal pain related to intake of alcohol or spicy foods, and so on).

THE ASSESSMENT

Several factors modify pain perceptions including age, cognition, sex, previous pain experience, temperament, cultural and family factors, and situational factors.

Assessment and Management of Children with Chronic Pain is a special issue (The 2012 American Pain Society Position Statement) which indicates that chronic pain in children results from the dynamic integration of biological processes, psychological factors, and socio - cultural variables considered within a developmental trajectory [8].

There are three widely used categories of behavioural indicators of pain: global rating scales (GRS), behavioural observation scales (BOS) and indirect measures.

GRS rely on the assessment of predictable behavioural indicators of pain such as crying, wincing, or screaming. Indirect measures of pain may be assessed by requests for medication, or "well" behaviour such as playing.

BOS focus on the documentation of specific behaviours indicative of pain.

Physiologic measures (e.g., heart rate and blood pressure) are helpful as adjuncts to behavioural observation but are neither sensitive nor specific pain indicators.

It is known, however, that requests for pain medication are not reliably linked to pain intensity.

In the neonatal period there is not an easy or scientific method to tell how much pain or suffering an infant may have. BOS and physiologic measures can be difficult to interpret. Neonates may manifest pain by crying or being silent, wiggling, or being still. The infant may make some specific faces or not. The cry of pain in the neonate is quite distinctive, and primary caregivers easily distinguish and interpret cries.

In toddlers, reports of caregivers can be also invaluable in pain assessment. The fear factor is a large contributor to experience of pain in this and in the school-age group. Toddlers may become very quiet and inactive while in pain or they may become the opposite: very active. Parents report that their child isn't acting as he/she does normally. Interpreting toddlers' behaviour may be difficult due to exacerbating factors such as separation anxiety, memory of previous painful experiences, and physical restraint. Sometimes toddlers manifest their pain and fear by aggressive outbursts.

School-age children are more accurate in communicating about their pain. By age 8 years, children can describe location of pain very reliably. Symptom scales and self-report tools are appropriate for most children 4 years of age and older. Children older than 8 years who understand the concept of order or number can use a Numeric Rating Scale or a Horizontal Word – Graphic Rating Scale. Additionally, pain diaries may be helpful in the school age group. School-age children also exhibit self-control when they are experiencing pain. They may not report pain in an attempt to show bravery. Figure 2 shows two numeric and visual analogue scales which are appropriate for children over 8 years.

Figure 2. *Scales for pain assessment*

Current research of pain in children and adolescents conducted in Serbia showed that most participants in the survey (N=105), 47.9 %, feel pain sometimes (monthly). Then follow participants that feel pain more often – weekly (41.7 %). 11% of the participants in the study feel pain every day.

The same study showed that when children and adolescents have options from 0 to 10 points based on the level of pain intensity nobody had a feeling that pain intensity could be 1 or 2, not even the youngest children. Most of the children and adolescents had (point on pains scale) pain intensity 7 (32.9 %) or 8 (38.4 %). 8.2 % of the participants pointed to 10 on the pain scale as their estimated own pain intensity, while 16.4 % believed that their pain intensity was 6. [9]

It must be pointed out that experienced pain is influenced by biological, psychological and social factors. Pain assessment in children is particularly challenging due to the wide variation in physiological responses, communication abilities and developmental stages of this group of patients. For example, their limited verbal repertoire can lead to an under-recognition of pain as compared to adults who may be better able to articulate their pain.

Childhood pain has an effect in the short-term not only on child development but on their future careers. Long-term effects of unrecognized, undertreated or poorly managed pain and suffering can lead to important cognitive and behavioural consequences. This can lead to anticipatory anxiety and can lead to more difficulty in the management of pain during future episodes of illness or future treatments. Well-managed pain is associated with faster recovery, fewer complications and decreased health care resources. Regular assessment and documentation of pain, using the appropriate tools for development age and ability, is essential in order to assess efficacy of pain treatments [10].

Pain experience is a negative, complex phenomenon influenced by several mechanisms. Attachment processes especially may affect the way in which individuals experience and signal pain. Hence, in the last two decades, the role of attachment quality has drawn attention in pain research and practice.

The results of many articles highlight the following: (a) children and adolescents with chronic idiopathic pain showed low rates of attachment security compared to control groups; (b) pain conditions are consistently associated with elevated rates of at-risk pattern of attachment and information processing; and (c) the presence of unresolved trauma or loss is higher in children and adolescents who experienced pain compared to healthy controls.

Despite the significance of this empirical evidence, the impact of the caregiving environment and interpersonal context on pain experience in infancy and preschool age is poorly investigated compared to adulthood. Experimental research on the pattern of attachment has found a significant link between attachment security and positive developmental trajectory. By contrast, empirical data also support the significant association between attachment insecurity and the increased risk for psychopathology in childhood and adolescents.

Research on pain and attachment needs to be furthered since the majority of the studies are limited to specific pain conditions. Future research should investigate the role of anxious attachment on procedural pain and the transition from acute to chronic pain, thereby testing new conceptual models. In this context, a developmental perspective is needed to integrate the familial and relational contribution into a multimodal assessment and treatment of pain.

Indeed, in infancy, attachment behaviours embrace a wide repertoire of signals (such as crying, body postures, facial expressions, and vocalizations) which are usually considered as meaningful cues to assess pain in this developmental stage. Specifically, insecure attachment in early childhood is connected to two opposite types of functioning: inhibitory (Type A, avoidant) versus excitatory (Type C, ambivalent). In general, it is essential to consider that within Types A and C, there are also specific sub-strategies associated with different developmental pathways related to pain experience, including a distinction between normative and at-risk pattern [11].

NEUROPHYSIOLOGY

This article provides an illustrative overview of the neurophysiological changes related to acute and chronic pain and suffering involving structural and functional brain changes, which might be the targets of psychological interventions.

A number of psychological pain treatments have been examined with respect to

their effects on brain activity, ranging from cognitive and operant behavioural interventions, meditation and hypnosis to neuro- and biofeedback, discrimination training, imagery and mirror treatment, as well as virtual reality and placebo applications. These treatments affect both ascending and descending aspects of pain processing and act through brain mechanisms that involve sensorimotor areas as well as those involved in affective-motivational and cognitive-evaluative aspects [12].

The needed understanding and management of paediatric pain, according to Friedrichsdorf et al., 2020) comprises multimodal approach (Figure 3)

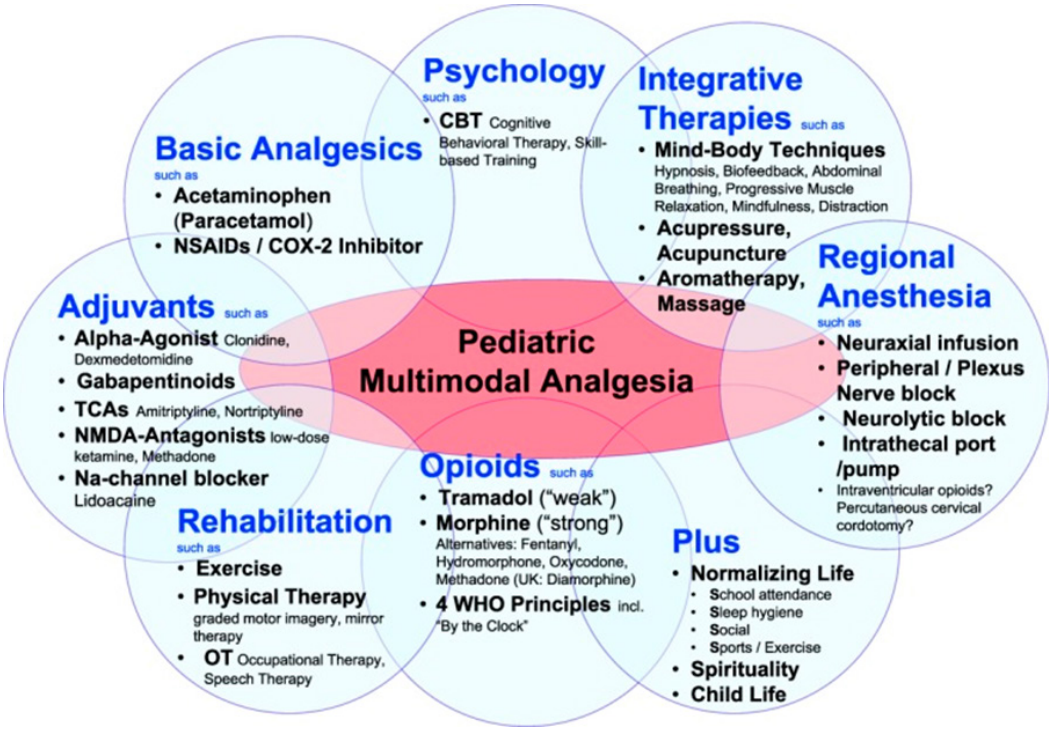

Figure 3. *Paediatric Multimodal Analgesia: Implementing some or, depending on the clinical scenario, all modalities in the treatment of acute pain acts synergistically for more effective (opioid-sparing) paediatric pain control with fewer side effects than single analgesic or modality*

The analysis of neurophysiological changes related to effective psychological pain treatment can help to identify subgroups of patients with chronic pain who might profit from different interventions. This analysis can also aid in predicting treatment outcome, and can assist in identifying responders and non responders, thus enhancing the efficacy and efficiency of psychological interventions. Moreover, new treatment targets can be developed and tested. Finally, the use of neurophysiological measures can also aid in motivating patients to participate in psychological interventions and can increase their acceptance in clinical practice.

Cognitive modulations of pain are related to activation of the prefrontal brain areas such as the dorsolateral prefrontal cortex (DLPFC), ventrolateral prefrontal cortex (VLPFC), and to the anterior cingulate cortex (ACC). These regions may modulate activation in afferent pain regions in the cortex (ACC, primary and secondary somatosensory cortex, insula and thalamus), as well as the periaqueductal grey (PAG) and dorsal horns of the spinal cord. The DLPFC and VLPFC are connected to the ACC, which, in turn, projects to the thalamus and the PAG, a core component of the descending pain modulatory system. This system eventually facilitates and/or inhibits pain processing at the level of the spinal cord dorsal horn. Direct cortico–cortical modulations from VLPFC and DLPFC to pain-associated cortical areas are probable but have not been directly shown yet (broken lines). Areas most closely associated with afferent pain processing are densely interconnected, as indicated by the connecting circle (Figure 4) [13].

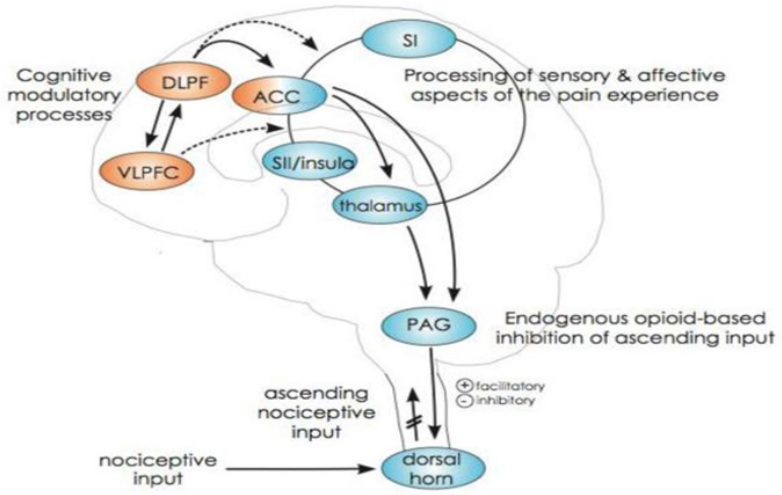

Fig. 4. *Possible neural pathways of cognitive pain modulation (adapted from Wiech, Ploner and Tracey, 2008)*

The advances in modern neuroimaging techniques hold promise for more such studies in the future, but currently, only a few studies have used functional neuroimaging to evaluate psychological and other non-pharmacological treatments for pain. Up to now, most neuroimaging methods were optimized for experimental pain paradigms, and the ability to assess clinical improvements of naturally occurring pain have been limited. Nevertheless, new neuroimaging techniques are being developed, such as Arterial Spin Labelling, which could become a useful tool for measuring slow fluctuations of chronic pain [14].

Evaluations of treatment-related brain changes (functional and structural) might also allow for sub-grouping of patients and help to develop individualized treatments.

Compared to pharmacological treatment, psychological and non-pharmacological treatments for pain often require more personal and economic resources. Therefore, it would be valuable to develop standardized neuroimaging assessments for predicting responders to certain treatment modalities. Moreover, it is possible that neuroimaging will become a standardized method for acquiring biomarkers/objective correlates to pain ratings in clinical trials. Finally, while the translation from the neuroimaging-lab to the clinic could lead to some clear benefits, it is also likely that the understanding of how psychological treatments change the brain will increase our general understanding of the role of the brain in chronic pain [14, 15, 16]. Still, these neuroimaging techniques are not applicable in children.

As an example, Figure 5 shows statistical maps of the fMRI activations during subjectively calibrated pressure pain in fibromyalgia patients.

Figure 5 shows statistical maps of the fMRI activations during subjectively calibrated pressure pain. All maps represent brain activations after treatment with CBT minus before treatment, contrasting with control group. The top panel: significantly increased pain-evoked brain activity in the left lateral prefrontal cortex in the CBT group after treatment, compared to controls. The lower panel: significantly increased connectivity between the left lateral prefrontal cortex and the thalamus in the CBT group, compared to controls, measured by Psychophysiological Interaction effects. All anatomical locations are given in Montreal Neurological Institute coordinates (MNI).

TREATMENT OF PAIN AND SUFFERING IN CHILDREN

Children are particularly responsive to pain-controlling strategies that involve their imagination and senses of play. Sensory and procedural information coupled with behavioural techniques can be used to distract children away from painful procedures and to decrease fear and anxiety.

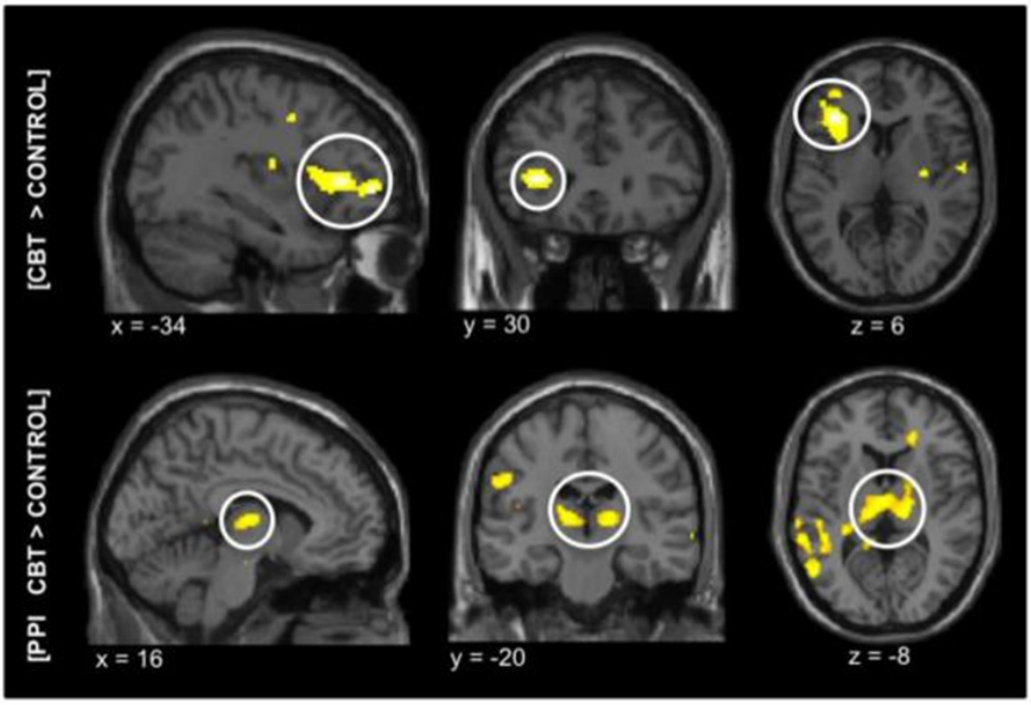

Figure 5. *Results from an fMRI evaluation of cognitive-behavioural therapy (CBT) in Fibromyalgia patients (FM) (Jensen et al. 2011)*

All patients with pain and suffering can benefit from a well-chosen use of psychological techniques. This approach in children must consider the developmental level of the child. Approaches as simple as covering the wound or as involved as play therapy may be used. It is wise to keep children with their caregivers, if at all possible. With proper guidance, parents assist with distracting the child and reinforcing the suggestions of the medical team. Developing a calm, patient, understanding approach to the needs of the child and his or her caregivers can markedly enhance the encounter.

In spite of so much understanding about paediatric pain management, the sad reality is that paediatric pain management research has not been effectively translated into routine clinical practice. Systematic reviews have shown that pain can lead to anxiety, sleep disturbance, and have deleterious effects on daily life.

Appropriate treatment for these conditions depends on the physical/psychological causes of pain or suffering. If some physical cause is detected, the first option is pharmacological treatment. Pharmacological approaches to pain management are based on the location in the nervous system. Still, strategies for cognitive control are more important. Fig. 6 shows a model of the cognitive control of emotion (MCCE). (A) Diagram of the processing steps involved in generating an emotion and the ways in which cognitive control processes (blue box) might be used to regulate them. The effects of different emotion regulation strategies (the red arrows descending from the cognitive control processes box) can be understood in terms of the stages of the emotion generation sequence that they influence. The pink box seen at the appraisal stage is meant to indicate that neural systems involved in generating emotion support this process. (B) Neural systems involved in using cognitive strategies, such as reappraisal, to regulate emotion (left, blue boxes), systems involved in generating those responses (left, pink boxes), and systems with an undefined or intermediary role in reappraisal (left, yellow boxes; adapted from Ochsner et al., 2012 with permission) [16]. Brain schematic representations were provided by Servier Medical Art [17].

Psychotherapy is a general term referring to a process of treating psychological pain and functional ineffectiveness. Thus, it is related to one's individual, subjective experience and focuses on such forms of distress as depression, anxiety, disruptions of thinking, dissatisfaction with one's body, compulsive repetition that

seems out of control, psychosis, and extreme mood disturbance [18].

The psychotherapeutic model used in young children includes play therapy, cognitive-behaviour therapy or gestalt therapy for older children. Meditation, visualisation, relaxation techniques as well biofeedback modalities are proposed too.

The box below presents an algorithm for pain management during procedure. [19].

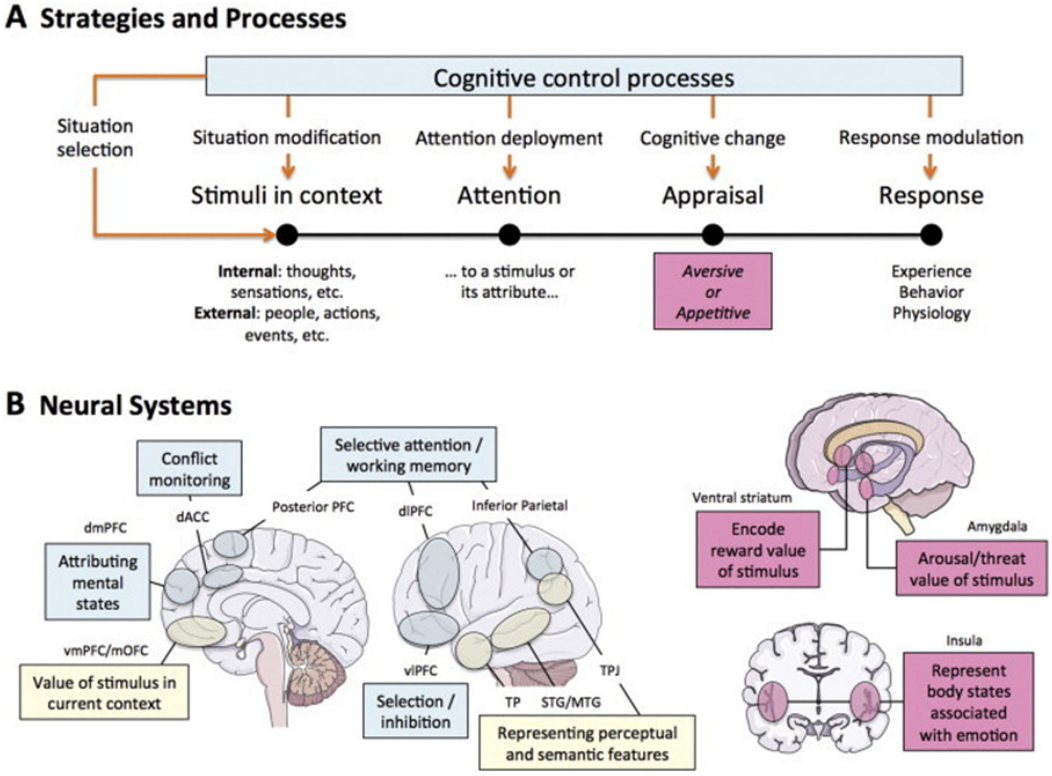

Figure 6. *A model of the cognitive control of emotion*

Algorithm for pain management during procedures:

Firstly, an individualized preparation and parental presence is required in order to reduce pain intensity, anxiety and distress. It is useful to consider that any medical procedure essentially consists of three main phases: anticipatory/preparatory, procedural, recovery.

1. Prior to the procedure the information concerning parents/caregivers and children/teens to reduce anxiety and pain should be discussed. Allow parent to stay during the entire procedure.

2. During the procedure, we should manage pain and anxiety by the most effective combination of pharmacological and psychological techniques. Do not perform these tasks mechanically.

3. At the end of the procedure monitoring is crucial to encourage the child to use his/her own coping skills and to praise the child and the

parents for their coping efforts and their contribution to a successful procedure.

I will finish this review by citing Urie Bronfenbrenner, a Russian-born American psychologist:

'All we do and say, not only to children, but to any other person too, have impact on child development and change child environment'.

CONCLUSION

– Pain and suffering are frequent situations in children.

– Generally, physical and more often psychosomatic causes are involved.

– Verbalisation of pain and suffering in children depends on the child's developmental stages.

– How the family functions and especially attachment quality must be taken into account.

– Therapeutic approaches differ according to the cause of pain and suffering.

– To recognize pain and suffering in children is of crucial importance.

REFERENCES

1. Goodman JE, McGrath PJ. The epidemiology of pain in children and adolescents: A review. Pain. 1991; 46: 247–64.
2. Mathews L. Pain in children: neglected, unaddressed and mismanaged. Indian J Palliat Care. 2011 Jan;17(Suppl): S70–3.
3. Scanlon JW. Appreciating neonatal pain. Adv Pedi. 1991; 38: 317–31.
4. Davina Wong, Pain assessment in children, Anaesthesia & Intensive Care Medicine, 2025, ISSN 1472–0299.
5. A Child in Pain: What Health Professionals Can Do to Help by Leora Kuttner,2010, Crown House Publishing Ltd.
6. Friedrichsdorf SJ, Goubert L. Paediatric pain treatment and prevention for hospitalized children. Pain Rep. 2019 Dec 19; 5(1): e804.
7. Khalid S, Tubbs RS. Neuroanatomy and Neuropsychology of Pain. Cureus. 2017 Oct 6; 9(10): e1754.
8. Herr K, Coyne PJ, Ely E, Gélinas C, Manworren RCB. ASPMN 2019 Position Statement: Pain Assessment in the Patient Unable to Self-Report. Pain Manag Nurs. 2019 Oct; 20(5): 402–403. doi: 10.1016/j.pmn.2019.07.007. Epub 2019 Sep 7. PMID: 31506238.
9. Cirkovic O., 2025, Doctoral thesis, European Accredited Psychotherapy Training Institute, Gestalt Psychotherapy Training Institute Malta.
10. Flor H. Psychological pain interventions and neurophysiology: implications for a mechanism-based approach. Am Psychol. 2014 Feb-Mar; 69(2): 188–96.
11. Failo A, Giannotti M, Venuti P. Associations between attachment and pain: From infant to adolescent. SAGE Open Med. 2019 Sep 19; 7: 2050312119877771.
12. Flor H. Psychological pain interventions and neurophysiology: implications for a mechanism-based approach. Am Psychol. 2014 Feb-Mar; 69(2): 188–96.
13. Wiech K, Ploner M, Tracey I. Neurocognitive aspects of pain perception. Trends Cogn Sci. 2008 Aug; 12(8): 306–13.
14. Iutaka T , Bellintani de Freitas M, S, Alba Scortegagna F, Nael K, Hoffmann Nunes R, Torres Pacheco F, Carlos Martins Maia A.Júnior, Luís Faria do Amaral L, Antônio Jose da Rocha A. Arterial Spin Labeling: Techniques, Clinical Applications, and Interpretation, Euro radiology Published Online: Nov 11 2022 https://doi.org/10.1148/rg.220088
15. Jensen KB, Berna C, Loggia ML, Wasan AD, Edwards RR, Gollub RL. The use of functional neuroimaging to evaluate psychological and other non-pharmacological treatments for clinical pain. Neurosci Lett. 2012 Jun 29; 520(2): 156–64.
16. Ochsner KN, Silvers JA, Buhle JT. Functional imaging studies of emotion regulation: a synthetic review and evolving model of the cognitive control of emotion. Ann N Y Accad Sci. 2012 Mar; 1251: E1–24.
17. Servier Medical Art, Banque d'images médicales de SMART Servier Medical Art Eric Jourdan 25 mai 2020 Actualités, Brèves, Images, (http://www.servier.fr).
18. Brownell, P. (2010). Gestalt therapy: A guide to contemporary practice. Springer.
19. Rook S and Gauntlett-Gilbert J. Parent involvement in paediatric pain interventions. Pediatric Pain Letter 2016; 18: 9–13.

Резиме

ДЕЦАТА, ИСТО ТАКА, СТРАДААТ И ЧУВСТВУВААТ БОЛКА КАКО ВОЗРАСНИТЕ

Нада Поп-Јорданова

Македонска академија на науките и уметностите, Скопје, РС Македонија

Болката и страдањето се многу погрешно разбрани, недоволно дијагностицирани и нетретирани медицински проблеми, особено кај децата. Во овој контекст, една од најпредизвикувачките улоги на медицинските работници е соодветно да ја проценат и да ја третираат нивната болка.

Болката е и физичко и емоционално искуство, кое го перципира и го обработува мозокот, а исто така, претставува вистински здравствен проблем.

Доживеаната болка е под влијание на биолошки, психолошки и социјални фактори. Проценета на болката кај децата е особено важна поради широката варијација во физиолошките одговори, комуникациските способности и развојните фази на оваа група пациенти. Проценета на болката кај децата е поврзана со нивното ниво на развој. Децата на иста возраст се разликуваат многу во нивната перцепција и толеранција на болка.

Децата особено реагираат на стратегиите за контрола на болката, кои ги вклучуваат нивната имагинација и способноста за игра.

Клучни зборови: болка, страдање, деца, менаџирање