PAIN: Clinical Updates

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PAIN REPORTS®

Paediatric pain education for health care professionals

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Keywords: Paediatric pain, Education, Health care professionals

1. The impact of pain in children

Both acute and chronic pain are highly prevalent in children presenting to health care, and are known to have important and detrimental impacts on recovery from illness and injury. It is also well known that poorly managed pain causes unnecessary suffering, adversely impacts quality of life, and carries a significant economic cost to society.[29,43] Moderate to severe pain in hospitalised children is nevertheless common, yet is often poorly assessed and managed. Research indicates severe acute pain is prevalent in approximately 62% of hospitalised adolescent patients. Experiences of severe acute pain during hospitalisation are primarily procedure-related and often present intermittently in concurrence with each procedure.[8,38]

The management of paediatric chronic pain also presents an increasingly recognised problem. The prevalence of paediatric chronic pain varies substantially depending on the location of the pain. For example, prevalence of chronic headache ranges between 8% and 18%, whereas musculoskeletal pain prevalence ranges from 4% to 40%. Pain prevalence increases with age, and for most conditions, it is notably higher in girls than boys.[26] Chronic paediatric pain can negatively impact emotional functioning and significantly reduce school ability.[16] The cost of treating chronic pain in adolescents in the United Kingdom has been estimated at pound 3.8 billion per annum[37] and may be as high as $19.5 billion per annum across the United States.[17] The per-person cost of treating patients with chronic pain in Canada has also been evaluated as 50% higher comparatively to the cost of treating patients without pain.[20]

Pain in paediatric cancer provides an example of where the boundary between acute and chronic pain is blurred. A systematic review of pain in adolescents with leukaemia or brain tumour found that pain may be procedure-related, treatment-related, or associated with the cancer itself, and is likely to persist chronically after treatment completion.[32] Untreated or undertreated pain in oncology patients is common along with reliance on primarily pharmacological management, although holistic management using interdisciplinary care, multimodal therapies, and family-centred treatment is necessary.

Key Points

1. Acute and chronic pain are highly prevalent in children and young people presenting to health care yet are often poorly assessed and managed.
2. Worldwide, it is clearly evident that there is a significant need for improvements in professional education of paediatric pain across disciplines.
3. The provision of online education is one feasible short-term solution to the lack of prelicensure pain education in health care professionals.
4. Further development of paediatric pain education is essential at every level along with research to determine whether such initiatives improve professional knowledge, attitudes, and clinical outcomes for patients.

2. Pain education of health professionals is limited

Despite the known impacts of paediatric pain, and that the International Association for the Study of Pain (IASP) offers 8 discipline-specific curricula plus one interprofessional curriculum (http://www.iasp-pain.org/Education/CurriculaList.aspx?navItemNumber=647), basic pain education for health care professionals is known to be inadequate.[28] Furthermore, a major obstacle to adequate pain relief is the small number of clinicians who are knowledgeable about pain. Although there have been some recent improvements (see below), there are still limited high-quality, validated pain education resources available for health care professionals who regularly work with children and who may be called upon to manage pain.[28]

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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PR9 4 (2019) e701

http://dx.doi.org/10.1097/PR9.0000000000000701

Physicians, nurses, psychologists, physiotherapists, pharmacists, child life specialists (play specialists), and other allied health professionals all have important roles in providing good pain management for children. A biopsychosocial management model involving multiple disciplines is widely acknowledged as the most appropriate as physiological, psychological, and social factors contribute to the pain experience, and hence, it is unlikely that unimodal approaches to acute or chronic pain management will be successful.[29] Barriers to implementing multimodal pain management are myriad and include inconsistent or inappropriate pain assessment, lack of knowledge of pain physiology and relevant evidence-based treatments, poor access to suitably trained professionals, and low prioritisation of pain education and training by health care providers.[14,18,19,31,33]

3. A need for professional education in paediatric pain across disciplines

It has been accepted for some time that although there is an expansive body of literature available to aid health care professionals in understanding the treatment of pain in children, this knowledge is not necessarily used in clinical practice.[25] This knowledge-practice "gap" phenomenon does not only apply to pain and is a known challenge that needs to be addressed from the earliest stages of training. Personal beliefs on how to treat health conditions such as pain are difficult to change post-qualification,[4] although interprofessional pain education delivered during undergraduate stages of training can improve interdisciplinary collaboration in practice, including within pain management.[21]

In medicine, despite gradual advances in undergraduate pain education, the investigation of undergraduate medical programmes in Canada has highlighted that some continue to lack structure in delivering proper integrated, interdisciplinary content.[13,42] These findings are corroborated internationally in the APPEAL study, a Europe-wide review of pain education for undergraduate health care professionals evaluating curricula from 242 medical schools.[1,9] It was found that 69% of medical schools across Europe have no dedicated pain teaching, with notable inconsistencies in content and a lack of practical teaching methods in pain management—only 26% of courses used placement-based teaching. The APPEAL Taskforce has called for pain education for undergraduate medical students to be made "fit for purpose" so that public health needs can be met, suggesting that a clear European framework should be outlined for pain education, and that it should be a requirement of undergraduate courses to attain a defined minimum level of competency in pain management.

In nurse education and practice, the management of pain in children is strongly emphasised, especially where nurses often directly administer pain treatments as recommended by the supervising clinician. Nevertheless, research investigating the inclusion of pain education (adult and paediatric) in preregistration nursing programmes across 71 Higher Education Institutes in the United Kingdom indicated a lack of pain-related content.[30] Nurses play a fundamental role in acute pain services that are increasingly stretched due to a blur of the boundaries between acute, chronic, and palliative pain. Similarly, research investigating nurses' knowledge of paediatric pain throughout universities and hospitals in Mexico found that undergraduate curricula do not dedicate enough time to paediatric pain management, and that this knowledge deficit continues into clinical practice.[33] One study investigating paediatric pain management in a UK children's hospital noted increased demand for pain services, which was not accompanied by an increase in training. In particular, nurses emphasised disempowerment and a lack of skills to match the change in needs.[6] Despite this, even brief education interventions can be effective, with paediatric nurses reporting increased confidence in providing pain management for children in palliative care after a 5-hour training course on pain management.[11] Researchers emphasize the need for future interdisciplinary training to improve the effectiveness of palliative pain management in children, focusing on effective therapies and patient–clinician communication.

In physiotherapy education, there has been a call for up-to-date pain education curricula for preregistration physiotherapy programmes, which includes all factors that contribute to pain.[24] Physiotherapists are becoming increasingly expected to be able to integrate biopsychosocial approaches into treatment; however, more training is required as part of continuing professional development.[18] Although the IASP provides subject-specific curricula for physiotherapy, there is no set regulatory standard for physiotherapy pain education; graduates must become better equipped in managing patients' experience of pain through structured addition of pain education into current physiotherapy courses.[40]

In psychology education, an integrated approach combining biological dimensions of pain with behavioural, cognitive, and emotional factors from psychology is required to address the multifaceted nature of pain and aid professionals in selecting appropriate pain management strategies.[22] A recent review of evidence-based psychological interventions for the management of paediatric chronic pain concluded that psychological research must continue to develop interventions that reduce biomedical biases in the management of paediatric pain. Further to developing interventions, psychologists in the field must continue to educate patients and professionals towards an in-depth understanding of the ways in which psychological interventions and interdisciplinary approaches to pain management can facilitate recovery.[12]

In addition to efforts by specialist psychologists to improve others' understanding of paediatric pain, a needs assessment of pain psychology in the United States indicates a need for feasible changes within psychology training and education to include and emphasize pain. Implementation of enhanced pain education in psychology trainees and clinicians is supported across a range of relevant professional and patient groups: psychologists, individuals with chronic pain, pain physicians, primary care physicians, nurse practitioners, and directors of graduate and postgraduate psychology training programs.[14]

However, research into education for paediatric pain psychologists indicates that currently available training programmes lack organized structure, with a central focus on clinical work that prevents professionals from defining career trajectories; furthermore, postdoctoral accreditation both of training programs and certification of individual postdoctoral trainees in pediatric pain psychology remains poorly defined.[27] Clearly, psychology training in paediatric pain would benefit from implementation of integrated training programs at all phases of professional development, from undergraduate through to postdoctoral studies.

4. Online education as a solution to improving professional knowledge of paediatric pain

Online education, as part of continuing professional development, is a possible solution to lack of prelicensure pain education in health care professionals, and has the potential to improve both

Box 1. Freely available online professional pain education resources*

Resource	Modules	Learning objectives
Online Paediatric Pain Curriculum (SickKids, Canada)[2]	Neurobiology of pain	• Differentiate between pain and nociception. • Understand the difference between adult and preterm neonate nociception and the long-term consequences of painful events in the early life.
	Development of children's pain perception	• Describe myths and misconceptions concerning pain and psychological functioning in infants, children, and adolescence. • Understand changes in pain perception of children as they go through developmental stages as well as the social, cultural, and biological influence in children's perception of pain.
	Epidemiology and taxonomy of paediatric pain	• Learn the different classification systems of paediatric pain. • Grasp problems with epidemiological studies of paediatric pain and be able to discuss the prevalence of common paediatric pain conditions.
	Assessment and measurement of paediatric pain	• Define assessment and measurement. • Describe the components of a thorough pain assessment. • Be able to choose an appropriate pain intensity scale to quantify pain.
	Paediatric pain: pharmacological therapies	• Understand developmental differences in pharmacology. • Understand the pharmacology and side effects of commonly used analgesics and be able to choose appropriate pharmacological agents.
	Treating pain in children: nonpharmacological therapies	• Make informed decision for the use of nonpharmacological pain management and identify appropriate nonpharmacological interventions for acute and chronic pain.
	Acute pain management: special considerations	• Identify types of acute pain and describe the neurophysiology and adverse effects. • Understand the principles of acute pain and management and list risk factors and preventive measures for progression from acute to chronic pain.
	Chronic pain management: special considerations	• Explain key concepts of chronic pain; understand prevalence of chronic pain and related disability. • Describe a chronic pain management plan using the "3-P's" approach.
	Management of pain in paediatric palliative care	• Define paediatric palliative pain; identify types of pain and other key symptoms experienced at different stages of palliative care trajectory including end of life. • Understand key factors to minimize suffering at the end of life.
	Ethical considerations for children with pain	• Describe key ethical concepts that should be considered when caring for children. • Outline significant ethical concerns that can arise in the paediatric context and discuss how these ethical concerns should be managed.
RCPCH Compass: Online learning for child health—pain management (Royal College of Paediatrics in Child Health, United Kingdom)[4]	Acute pain in neonates, children, and young people	• Describe nociception relevant to acute and procedural pain. • Construct an analgesic plan based on a biopsychosocial formulation of acute pain. • Describe the concept of the 'reverse pain ladder' in postoperative pain. • Select appropriate pain assessment tools. • Describe the physiological and pharmacological bases for multimodal analgesic management in acute settings. • Describe (with examples) acute and procedure pain management in neonatal intensive care unit. • Describe (with examples) acute and procedure pain management in older children in hospital settings and at home.
	The biopsychosocial assessment of chronic pain	• Describe how pain perception is modified by emotional and cognitive factors. • Explain how current knowledge of pain mechanisms supports a biopsychosocial pain model. • Describe how to assess the physical, psychological, and social dimensions of pain. • Utilise the process of case formulation to: explain the contributors to the development and maintenance of an individual's pain; plan appropriate chronic pain management.
	Neuropathic pain conditions	• Define and describe neuropathic pain. • Describe pathological mechanisms underlying neuropathic pain. • List common clinical presentations of neuropathic pain in childhood. • Describe approaches to assessment and diagnosis of neuropathic pain. • Describe pharmacological and nonpharmacological management of neuropathic pain.
	Psychological and physical therapies in chronic pain management	• Describe the concepts and methods of specific psychological interventions that can be delivered by all professionals (pain education, setting SMART goals, sleep hygiene, school support, multicomponent cognitive behaviour therapy, and pacing). • Describe the principles of physiotherapy in chronic pain management. • Describe nonpharmacological physical therapies such as massage, desensitisation, transcutaneous electrical nerve stimulation, and thermal analgesia.
	Pharmacology and prescribing in paediatric pain management	• Identify the role of medications as part of the biopsychosocial formulation of initial pain management plans for children with chronic pain. • Describe the evidence base for pharmacological treatments for paediatric chronic pain management. • Apply the existing evidence when prescribing for children with common chronic pain presentations. • Recognise clinical situations in which prescribing advice should be sought from specialist paediatric pain services.
	Case studies	• Evaluate chronic pain at the first consultation. • Formulate a multidisciplinary pain management plan for a child with chronic pain. • Identify red flags for referral to specialist services. • Identify appropriate timing of specialist referral for specific patients with chronic pain. • Monitor pain management plans, seek advice when needed, and refer to tertiary services when appropriate.

*This content has been reproduced from the original content by the Canadian organisation SickKids (www.sickkids.ca/pain-centre/Health-care-Professionals/Online%20Pain%20Curriculum/index.html) and the UK Royal College of Paediatrics in Child Health (www.rcpch.ac.uk/training-examinations-professional-development/continuing-professional-development-cpd/education-p-6).

Box 2. Useful organizations and resources regarding paediatric pain education

IASP Special Interest Group on Pain in Childhood www.childpain.org/ispp.shtml;
Resources in French https://www.pediadol.org/-Journees-Pediadol-.html;
Resources in German http://www.deutsches-kinderschmerzzentrum.de/ueber-uns/fort-und-weiterbildung;
Annual Pediatric Pain Master Class in Minneapolis http://noneedlesspain.org/ppmc/;
Pain in Child Health research training program www.sickkids.ca/PICH.

knowledge and attitudes towards paediatric pain assessment and management.[28] Guidelines in the subspecialty of paediatric pain psychology emphasise the use of novel technologies for professional training purposes.[7] Supporting this, research investigating online educational videos for paediatric needle pain found that educational videos can offer clinicians current, relevant, and accurate evidence-based techniques for acute pain management.[15]

A recent systematic review of the effectiveness of online pain resources for health professionals[28] identified 6 online resources that specifically addressed paediatric pain, and 2 resources that addressed both adult and paediatric pain education. Outcomes from 2 paediatric-specific programmes indicated increased professional competence in pain management.[2,10] Postintervention improvements in beliefs and attitudes towards paediatric pain, and improvements in clinician skills (specifically pain assessment and opioid administration), were found in 2 studies.[2,41] Improved adherence to clinical practice guidelines in paediatric palliative care was found in one Dutch study on paediatric nurse specialists.[23] Considering pain education interventions holistically, variations in instructional methods and rapid advancement of technology make it difficult to determine which elements facilitate effective online learning for health professionals. Pain education interventions require assessment coherent with developed guidelines[34] in future to determine which elements are effective at improving professional knowledge and skills, as well as whether improved professional education results in improved health outcomes for patients.

Although online resources are available for professional paediatric pain education, only 2 resources stand out as freely available and addressing factors in paediatric pain management from a biopsychosocial perspective. Modules from the UK programme[36] and the Canadian programme,[39] both of which aim to improve professional knowledge of paediatric pain, are outlined in Box 1 (additional educational resources are listed in Box 2). The clinical benefit to patients following completion of these programmes by professionals remains unknown; further assessment and development of online resources targeting paediatric pain education through integration of medical, psychological, and physiological perspectives is necessary.

5. Conclusion

Acute and chronic pain are widespread issues in children, can have negative impacts on the quality of life of individuals, and present a significant economic cost. Professional knowledge of pain, particularly paediatric pain, is limited. Education regarding the assessment and treatment of pain in children is needed across all relevant disciplines including within medicine, nursing, physiotherapy, and psychology. It is important that professionals in each discipline understand all factors in a biopsychosocial approach to addressing paediatric pain, and moreover, accessible tools need to be developed to address the issue. In addition to recognised time constraints in professional practice, interprofessional education programmes for health care providers lack an evidence base.[35] Furthermore, innovative pain education programmes are generally not well implemented; both accessibility to and assessment of these programmes must be improved to facilitate positive changes in current practice.[5] One area in which professional education has been shown to improve clinicians' confidence in managing paediatric pain is in palliative medicine[3]; nonetheless, longitudinal follow-up is still needed to assess practice patterns. Online education programmes for professionals may present an innovative solution to the lack of interdisciplinary knowledge on paediatric pain; however, there is currently a lack of available resources. Current and future online resources must be assessed to determine whether they can improve professional knowledge, attitudes, and clinical outcomes for patients.

Disclosures

The authors have no conflict of interest to declare.

Article history:
Received 4 May 2018
Accepted 5 October 2018

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