Paediatric pain education for health care professionals

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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. 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.

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. Chronic paediatric pain can negatively impact emotional functioning and significantly reduce school ability. The cost of treating patients without pain has also been evaluated as 50% higher comparatively to the cost of treating patients with chronic pain in Canada.

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. 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.

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. 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.
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.35 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)<sup>2</sup> | 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.  
• Understand developmental differences in pharmacology.  
• Understand the pharmacology and side effects of commonly used analgesics and be able to choose appropriate pharmacological agents. |
| | Pediatric pain: pharmacological therapies | • Make informed decision for the use of nonpharmacological pain management and identify appropriate nonpharmacological interventions for acute and chronic pain.  
• Identify types of acute pain and describe the neurophysiology.  
• Understand the principles of acute pain and management and list risk factors and preventive measures for progression from acute to chronic pain.  
• 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. |
| | Treating pain in children: nonpharmacological therapies | • Define chronic pain management plan using the “3-P’s” approach.  
• Describe a chronic pain management plan using the “3-P’s” approach.  
• 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. |
| | Acute 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.  
• 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.  
• Outline significant ethical concerns that can arise in the paediatric context and discuss how these ethical concerns should be managed. |
| | 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.  
• 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.  
• Outline significant ethical concerns that can arise in the paediatric context and discuss how these ethical concerns should be managed. |
| | 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 | • 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. |
| RCPCH Compass: Online learning for child health—pain management (Royal College of Paediatrics in Child Health, United Kingdom)<sup>4</sup> | 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 | • Explain 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.  
• 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). |
| | Psychological and physical therapies in chronic pain management | • Describe the principles of physiotherapy in chronic pain management.  
• Describe nonpharmacological physical therapies such as massage, desensitisation, transcutaneous electrical nerve stimulation, and thermal analgesia.  
• 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. |
| | Pharmacology and prescribing in paediatric pain management | • 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. |

<sup>*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).</sup>
knowledge and attitudes towards paediatric pain assessment and management.\textsuperscript{26} Guidelines in the subspecialty of paediatric pain psychology emphasise the use of novel technologies for professional training purposes.\textsuperscript{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.\textsuperscript{15}

A recent systematic review of the effectiveness of online pain resources for health professionals\textsuperscript{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.\textsuperscript{8,10} 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.\textsuperscript{2,41} Improved adherence to clinical practice guidelines in paediatric palliative care was found in one Dutch study on paediatric nurse specialists.\textsuperscript{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\textsuperscript{29} 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\textsuperscript{38} and the Canadian programme,\textsuperscript{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.\textsuperscript{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.\textsuperscript{16} One area in which professional education has been shown to improve clinicians’ confidence in managing paediatric pain is in palliative medicine\textsuperscript{36}; 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

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References

[1] A Blueprint for Pain Education – the APPEAL (Advancing the Provision of Pain Education and Learning) study, 2013.
[2] Ameringer S, Fisher D, Sreedhar S, Ketchum JM, Yanni L. Pediatric pain management education in medical students: impact of a web-based module. J Palliat Med 2012;15:978–83.
[3] Bagatell R, Meyer R, Herron S, Berger A, Villar R. When children die: a seminar series for pediatric residents. Pediatrics 2002;110:348–53.
[4] Barr H, Freeth D, Hammick M, Koppel I, Reeves S. The evidence base and recommendations for interprofessional education in health and social care. J Interprof Care 2006;20:75–8.
[5] Barreveld AM. The power of pain education: a call for robust research. Pain Med 2017;18:1834.
[6] Beckett K, Henderson EM, Parry S, Stoddart P, Fletcher M. A mixed-method study of pain management practice in a UK children’s hospital: identification of barriers and developing strategies to maintain effective in-patient paediatric pain management. Nurs Open 2016;3:19–29.
[7] Benore E, Bhandari R, Harbeck-Weber C, Logan DE, Banez G. Pediatric pain psychology: guidelines for advanced subspecialty training. Clin Pract Pediatr Psychol 2017;5:17–35.
[8] Bimle KA, Chambers CT, Fernandez CV, Forgeron PA, Latimer MA, McGrath PJ, Cummings EA, Finley GA. Hospitalized children continue to report undertreated and preventable pain. Pain Res Manag 2014;19:198–204.
[9] Briggs EV, Battell D, Gordon D, Kopf A, Ribeiro S, Puig MM, Kress HG. Current pain education within undergraduate medical studies across Europe: advancing the provision of pain education and learning (APEAL) study. BMJ Open 2015;5:e006984.
[10] Chan S, Pietak K, McIntyre C, Deeter B, Taddio A. Implementation of a new clinical practice guideline regarding pain management during childhood vaccine injections. Paediatr Child Health 2013;18:367–72.
[11] Chen YC, Peng NH, Chen CH, Lu FL, Chang YC, Liu HL, Yeats M. Effectiveness of pain and symptom management training for paediatric clinicians. J Res Nurs 2017;22:405–15.
[12] Coakley R, Wihak T. Evidence-based psychological interventions for the management of pediatric chronic pain: new directions in research and clinical practice. Children 2017;4:9.
[13] Comer L. Content analysis of chronic pain content at three undergraduate medical schools in Ontario. Can J Pain 2017;1:75–83.
[14] Darnall BD, Scheman J, Davin S, Burns JW, Murphy JL, Wilson AC, Kerns RD, Mackey SC. Pain psychology: a global needs assessment and national call to action. Pain Med 2016;17:250–63.
[15] Farkas C, Soloduk L, Taddio A, Franck L, Berberich FR, LoChiatto J, Soloduk JC. Publicly available online educational videos regarding pediatric needle pain: a scoping review. Clin J Pain 2015;31:591–8.
[16] Gold J, Yetwin AK, Mahner NE, Carson MC, Griffin AT, Palmer SN, Joseph MH. Pediatric chronic pain and health-related quality of life. J Pediatr Nurs 2009;24:141–50.
[17] Groenewald CB, Essiner BS, Wright D, Fesimeyer MD, Palermo TM. The economic costs of chronic pain among a cohort of treatment-seeking adolescents in the United States. J Pain 2014;15:925–33.
[18] Hansen Z, O’Sullivan K, Moseley L. Addressing psychosocial issues in low back pain—can physiotherapists do it? Man Ther 2016;25:e23–4.
[19] Henderson R, Mentz M, Rourke N, Kim M, Kloker K, Swanson M. Selection and use of pain assessment instruments by physical therapists in paediatric practice, and their attitudes towards pain in children. Physiotherapy 2015;101:e556.
[20] Hogan ME, Taddio A, Katz J, Shah V, Krahn M. Incremental health care costs for chronic pain in Ontario, Canada: a population-based matched cohort study of adolescents and adults using administrative data. PAIN 2016;157:1626–33.
[21] Hunter J, Watt-Watson J, McGillion M, Choiniere M, Clark A, Dewar A, Johnston C, Kremer LCM, Verhagen AAE, Palermo TM. The epidemiology of chronic pain in children and adolescents revisited: a systematic review. PAIN 2011;152:2729–38.
[22] Law EF, Palermo TM, Walco GA. The making of a pediatric pain psychologist: education, training and career trajectories. Pain Manag 2012;2:499–507.
[23] Liossi C, Failo A, Schoth DE, Williams G, Howard R. The effectiveness of online pain resources for health professionals: a systematic review with subset meta-analysis of educational intervention studies. PAIN 2018;159:631–43.
[24] Liossi C, Howard RF. Pediatric chronic pain: biopsychosocial assessment and formulation. PAIN 2016;138:e20160331.
[25] Mackintosh-Franklin C. Pain: a content review of undergraduate pre-registration nurse education in the United Kingdom. Nurse Educ Today 2017;48:84–9.
[26] Nuseir K, Kassab M, Almoman B. Healthcare providers’ knowledge and current practice of pain assessment and management: how much progress have we made? Pain Res Manag 2016;2016:1–7.
[27] Olson K, Amari A. Self-reported pain in adolescents with leukemia or a brain tumor: a systematic review. Cancer Nurs 2015;38:E43–53.
[28] Ortiz MJ, Ponce-Monter HA, Rangel-Flores E, Castro-Gamez B, Romero-Quezada LC, O’Brien JP, Romeo-Hernández G, Escamilla-Acosta MA. Nurses’ and nursing students’ knowledge and attitudes regarding pediatric pain. Nurs Res Pract 2015;2015:1–8.
[29] Phillips AC, Lewis LK, McEvoy MP, Galipeau J, Glasziou P, Moher D, Tilson JK, Williams MT. Development and validation of the guideline for reporting evidence-based practice educational interventions and teaching (GREET). BMC Med Educ 2016;16:237.
[30] Reeves S, Perrier L, Goldman J, Freeth D, Zwarenstein M. Interprofessional education: effects on professional practice and healthcare outcomes (update). Cochrane Database Syst Rev 2013:CD002213.
[31] Royal College of Paediatrics and Child Health. Recognising neuromuscular disorders—a practical approach. UK Royal College of Paediatrics in Child Health, 2018.
[32] Steed M, Eccleston C, Beecham J, Knapp M, Jordan A. The economic impact of chronic pain in adolescence: methodological considerations and a preliminary costs-of-illness study. PAIN 2005;119:183–90.
[33] Taylor EM, Boyer K, Campbell FA. Pain in hospitalized children: a prospective cross-sectional survey of pain prevalence, intensity, assessment and management in a Canadian Pediatric Teaching Hospital. Pain Res Manag 2008;13:25–32.
[34] The Hospital for Sick Children (SickKids). Online paediatric pain curriculum. 2014. Available at: http://www.sickkids.ca/pain-centre/Health-care-Professionals/Online%20Pain%20Curriculum/index.html.
[35] Thompson K, Milligan J, Johnson M, Briggs M. Pain education in professional health courses—a scoping review of standards, protocols and frameworks. The 4th European Congress of the ER-WCPT/Physiotherapy, 2016. J Physio 2016;102:e337–e38.
[36] Van Hulle Vincent C, Wikie DJ, Wang E. Pediatric nurses’ beliefs and pain management practices: an intervention pilot. West J Nurs Res 2013;35:825–45.
[37] Watt-Watson J, McGillion M, Hunter J, Choiniere M, Clark A, Dewar A, Johnston C, Lynch M, Morley-Forster P, Moulin D, The N, von Baeyer C, Webber K. A survey of prevalence pain curricula in Health Science Faculties in Canadian Universities. Pain Res Manag 2009;14:439–44.
[38] Williams G, Howard RF, Liossi C. Persistent postsurgical pain in children and young people: prediction, prevention, and management. PAIN 2017;e616.