Assessment of medical students' competencies in pain medicine – a focused review

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Introduction

Unrelieved pain is a major public health challenge in terms of the significant prevalence of pain and the negative biomedical, psychological, social and economic consequences of poor management[1]. Medical practitioners play and essential role in the management of acute, chronic and non-cancer pain[1]. It is critical, therefore, that medical students are equipped with competencies in the field of pain medicine and that these competencies are adequately assessed so that the students are prepared for the clinical environment upon graduation. Pain medicine competencies may be defined as the observable abilities of medical students (and practitioners) to integrate knowledge, skills and attitudes related to pain medicine, into effective clinical practice[2, 3]. Desired outcomes of pain medicine education emphasize the learner's capacity to successfully and compassionately carry out tasks in the real world, such as pain assessment, collaborative approaches to treatment options, and application of pain competencies across the lifespan in the context of various settings, populations, and care-team models[4]. The International Association for the Study of Pain (IASP) is the leading global professional forum for science, practice, and education in the field of pain [5]. The objective of the IASP Curriculum Outline on Pain for Medicine is to provide the knowledge and skills necessary for new graduates to advance the science and management of pain as part of an interprofessional team[4]. More recently, core competencies for pain management with measurable learning outcomes were developed by an Expert Interprofessional Pain Competencies Consensus Group to provide guidance related to pre-licensure health professional education [3].

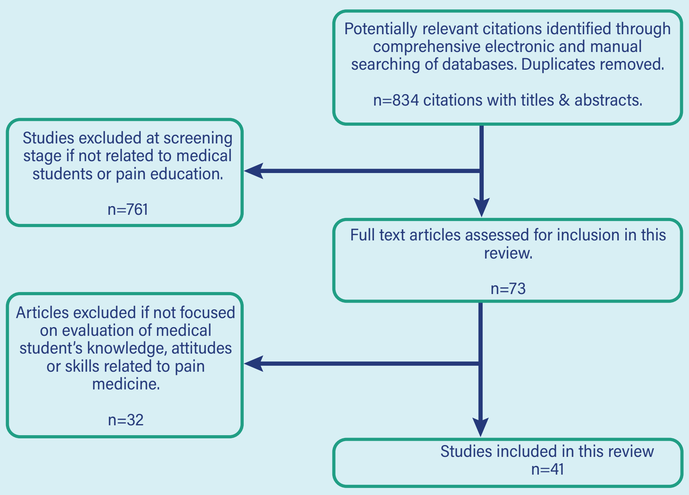
This focussed review examines the literature regarding methods for assessing pain medicine competencies in medical students with particular reference to the documentation of the following:

- What was the purpose of the assessment? (e.g., was it to evaluate the effectiveness of a course or to evaluate students' performance in an examination?)
- How were the assessment instruments developed? (e.g., were they developed with attention to specific learning objectives/competencies; with reference to the IASP curriculum and/or interprofessional learning?)
- What level of clinical competency was assessed (e.g. knows, knows-how, shows-how and does[6])
- What type of assessment methods were used? (e.g., Multiple Choice Questions [MCQ], Objective Structured Clinical Examination [OSCE])

Method

- PubMed, Medline, EMBASE, ERIC, and Google Scholar, and BEME data bases (January 1997 – December 2016) were searched for relevant studies that examined the assessment of medical students' competencies related to pain medicine. Figure 1 illustrates the search strategy for the review and exclusion criteria.
- Key search terms were "pain, medical, education, student, undergraduate, knowledge, attitudes, skills and curriculum". The term "pain" was included in all of the searches.

Figure 1 Flow diagram of the search and selection process



The Pain Medicine Assessment Framework

	IASP Medical Curriculum content topics[4]	Pain Core Competency (Fishman et al)[3]	Context of Care								Level of Assessment				Self assess ment	
			Emergency	Postoperative	Cancer	Neuropathic	MSK	Headache	Chronic 1°	Visceral pain	Knows	Knows how	Shows how	Does		Indicate type of assessment conducted, e.g. MCQ, online assessment, OSCE, portfolio. Team exercises or interprofessional learning can also be highlighted.
CLINICAL SKILLS AND ATTITUDES Pain assessment and measurement	**A. The measurement of pain, disability, associated distress, and suffering**	Use valid & reliable tools for measuring pain and associated symptoms to assess and reassess related outcomes as appropriate for the clinical context and population.														
	B. Quantitative sensory testing in relation to specific mechanisms	Assess patient preferences and values to determine pain-related goals and priorities.														
	C. Assessment of pain relief and functional improvement (sleep, work, self-care, etc.)	Demonstrate empathic and compassionate communication during pain assessment.														
KNOWLEDGE AND CLINICAL SKILLS Management of Pain	**A. General principles** • The measurement, quantification, and recording of pain • The multimodal approach (multidisciplinary pain clinics) • The clinician-patient relationship	Demonstrate the inclusion of patient and others as appropriate, in the education and shared decision-making process for pain care.														
		Identify pain treatment options that can be accessed in a comprehensive pain management plan.														
		Implement an individualized pain management plan that integrates the perspectives of patients, their social support systems, and health care providers in the context of available resources														
	B. Clinical pharmacology • Nonsteroidal anti-inflammatory agents and antipyretics • Systemic and spinal opioids, endorphins • Local anaesthetics • Other medicines (e.g., anticonvulsants, antidepressants)	Develop a pain treatment plan based on benefits and risks of available treatments.														
	C. Psychotherapeutic and behavioural approaches • Individual, family, and group psychotherapy • Cognitive-behavioural therapy • Relaxation techniques (biofeedback, etc.) • Hypnotherapy, operant approach, stress management	Monitor effects of pain management approaches to adjust the plan of care as needed.														
		Develop a treatment plan that takes into account the differences between acute pain, acute-on-chronic pain, chronic/persistent pain, and pain at end of life.														
	D. Physical therapy • Exercise and other active treatments • Manual therapy and other physical medicine treatments	Differentiate physical dependence, substance use disorder, misuse, tolerance, addiction, and non-adherence and how these conditions impact pain and function.														
	E. Neuromodulation techniques • Transcutaneous nerve stimulation • Brain and spinal cord stimulation • Acupuncture • Pulsed radiofrequency	Explain how health promotion and self-management strategies are important to the management of pain.														
		Explain how to assess and manage pain across setting and transitions of care.														
	F. Nerve blocks (image guided) • Local anaesthetics • Neurolytic solutions • Ablative Radiofrequency	Describe the role, scope of practice, and contribution of the different professions within a pain management care team.														
		Describe the role of the clinician as an advocate in assessing patients to meet treatment goals.														
	G. Surgical techniques • Nerve decompression • Neurosurgical and orthopaedic techniques	Describe the unique pain assessment and management needs of special populations, such as children/infants; elderly; developmentally challenges, pregnancy, childbirth and breastfeeding; the opioid tolerant patient; substance abuse disorders.														
KNOWLEDGE AND ATTITUDES Multidimensional Nature of Pain	A. **Definition of pain** (biological significance, relationship of acute and chronic, distinction between types of pain, pain as a public health problem, epidemiology)	Explain the complex, multidimensional, individual-specific nature of pain														
		Present theories and science for understanding pain.														
		Define terminology for describing pain and associated conditions.														
	B. **Ethical issues** (right to receive treatment, pain disability and litigation, pain and opiate dependence, pain research)	Describe the impact of pain on society.														
		Explain how cultural, institutional, societal, and regulatory influences affect assessment and management of pain.														
	C. **Basic sciences** (neuroanatomy and neurophysiology of pain, pharmacology of pain, psychology of pain)	Describe patient, provider, and system factors that can facilitate or interfere with effective pain assessment and management.														

Results

- A total of 41 studies described 53 assessment instruments used to examine pain medicine competencies of 7599 medical students.
- Twenty-two studies (54%) were from North America (United States of America 44%; Canada 10%); twelve (29%) from Europe; three (7%) from Australia and one each from Saudi Arabia, Philippines, Thailand and Taiwan.
- More than half of the studies (56%) assessed medical students who were exposed to a specific pain medicine module. Most assessments were performed for low-stakes summative purposes and did not reflect contemporary theories of assessment.
- Most studies based assessment content on the literature (34%) or in consultation with faculty experts (29%) rather than on defined learning objectives or competencies.
- Most studies (80%) assessed the learning domains "knows" and "knows how" using written assignments and via the development of management plans. Eight studies (20%) focused on "shows how" examining integration of learning skills with a standardised patient (SP) or simulated experience.

Conclusion

There is a critical need for more robust assessment tools that effectively measure the abilities of medical students to integrate pain-related competencies into clinical practice.

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