

Focus Article

A Blueprint of Pain Curriculum Across Prelicensure Health Sciences Programs: One NIH Pain Consortium Center of Excellence in Pain Education (CoEPE) Experience

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Abstract: To improve U.S. pain education and promote interinstitutional and interprofessional collaborations, the National Institutes of Health Pain Consortium has funded 12 sites to develop Centers of Excellence in Pain Education (CoEPEs). Each site was given the tasks of development, evaluation, integration, and promotion of pain management curriculum resources, including case studies that will be shared nationally. Collaborations among schools of medicine, dentistry, nursing, pharmacy, and others were encouraged. The John D. Loeser CoEPE is unique in that it represents extensive regionalization of health science education, in this case in the region covering the states of Washington, Wyoming, Alaska, Montana, and Idaho. This paper describes a blueprint of pain content and teaching methods across the University of Washington's 6 health sciences schools and provides recommendations for improvement in pain education at the prelicensure level. The Schools of Dentistry and Physician Assistant provide the highest percentage of total required curriculum hours devoted to pain compared with the Schools of Medicine, Nursing, Pharmacy, and Social Work. The findings confirm the paucity of pain content in health sciences curricula, missing International Association for the Study of Pain curriculum topics, and limited use of innovative teaching methods such as problem-based and team-based learning.

Perspective: Findings confirm the paucity of pain education across the health sciences curriculum in a CoEPE that serves a large region in the United States. The data provide a pain curriculum blueprint that can be used to recommend added pain content in health sciences programs across the country.

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Key words: Pain education, curriculum, health sciences, prelicensure, teaching methods, WWAMI.

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More than 100 million Americans experience serious acute pain, cancer pain, and chronic noncancer pain. Multiple reports indicate that there is room for significant improvements in pain care, and the U.S. Institute of Medicine has called for a "cultural transformation" in how pain is assessed and treated.¹⁶ According to the National Institutes of Health (NIH), pain is one of the nation's most pressing national public health problems and is now considered a "grand challenge."²² A grand challenge has been described as an important problem that could be solved with a specific scientific or technological innovation that would

have a high likelihood of global impact and feasibility.¹⁰ The barriers to improvements in pain care have been well documented and include knowledge deficits of health care professionals, yet there persists a paucity of pain content in most prelicensure curricula across the health sciences clinical programs. Education is an essential part of the necessary cultural transformation in pain care; improvements in curriculum are needed for generalists and pain specialists particularly at the undergraduate and prelicensure levels.^{2,16,18,28,34}

More specifically, education in pain medicine has been characterized as inadequate and fragmented, needing improvements in scope, content, and duration.^{3,5,19,29,33} A survey of 117 U.S. and Canadian medical schools²¹ found that although most provided some pain content embedded in general courses, many topics recommended in the International Association for the Study of Pain (IASP) core curriculum¹⁵ received little to no coverage. In general, Canadian schools provided more extensive pain education than did their U.S. counterparts. Similarly, a study of Finnish undergraduate medical school education reported that conventional topics such as anatomy and physiology were well covered but found a lack of teaching about the concept of multidisciplinary care in pain management and a need for improvement in teaching quality and methods.²⁴ Indeed, many practicing physicians in the United States, including community family practitioners and internists and academic attending physicians for medical residents, report their own training as inadequate to manage chronic pain.^{6,7,31}

Training for pain management has also been found to be inadequate in undergraduate nursing,⁸ physician assistant,³² pharmacy,^{12,35} physical and occupational therapy,²⁷ and dentistry¹ programs. A survey of undergraduate pain curricula³ in 108 programs in the United Kingdom across dentistry, medicine, midwifery, nursing, occupational therapy, pharmacy, physiotherapy, and veterinary science found that pain education accounted for less than 1% of program hours for some disciplines, and only 1 school had fully implemented the IASP core curriculum.

In order to improve pain education and promote inter-institutional and interprofessional collaborations, the NIH Pain Consortium awarded funding to 12 sites across the United States to develop Centers of Excellence in Pain Education (CoEPEs). Each CoEPE is given the tasks of development, evaluation, integration, promotion, and distribution of pain management curriculum resources for medical and other health sciences schools. Collaborations among schools of medicine, dentistry, nursing, and/or pharmacy are encouraged, as are interinstitutional collaborations. CoEPEs are encouraged to support inter-professional education, with medical, dental, nursing, and/or pharmacy students, for example, being taught within the same classes, where collaboration across disciplines during management of patients' pain could be one topic of education (eg, how communication among doctors, nurses, dentists, and pharmacists is important in effective pain treatment). Integrating and sharing case-based scenarios that cover the breadth of pain knowledge serves as the core component of the program.

The purpose of this study was to develop an assessment of pain content and teaching methods across the 6 health sciences schools at the University of Washington (UW) to discover gaps and opportunities for improvement. The UW represents a unique and extensive regionalization of health sciences education in Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI).³⁰ The WWAMI program connects students across a 5-state region, offering great potential for pain management learning and multisite teaching of interprofessional team training using portable, case-based curriculum materials that can further be incorporated into prelicensure programs across the country.

Methods

Setting

At the UW, courses are executed according to a quarter system. Each quarter represents 10 weeks of instruction. Excluding credits and hours for clinical experience where pain content would be variable and difficult to measure, the total number of available hours of instruction for any topic in each profession is as follows. The School of Dentistry offers a 4-year program encompassing a total of 213 credits. The School of Nursing offers a 2-year course of study encompassing a total of 65 credits. The School of Medicine offers a 4-year prelicensure program encompassing a total of 149 credits. The School of Pharmacy offers a 3-year program encompassing 124 credits. The School of Physician Assistant offers a 2-year program encompassing 85 credits. The School of Social Work offers a 2-year graduate program encompassing a total of 49 credits.

Procedure

An e-mail with a link to a Catalyst WebQ survey was sent to the CoEPE's contact person at the UW Schools of Dentistry, Nursing, Medicine, Pharmacy, Physician Assistant, and Social Work. The e-mail included an information statement about the study and asked the contact person to complete a survey regarding the school's curriculum. The survey included 9 questions for each required preclinical course, including the school, the course name, which year in the program the course was offered, the total number of hours for all pain content provided in each course, a checklist for pain topics covered, and a checklist for teaching methods including definitions (Table 1). The checklist of pain topics included 15 major topic areas with 62 subtopics. This checklist was modified from a previously established list used by the Johns Hopkins curriculum development team to assess pain education in U.S. and Canadian medical schools.²¹ The modified checklist was reviewed by pain experts for content and face validity. The following teaching methods were evaluated: case-based learning,²⁶ didactic teaching,⁴ problem-based learning,⁹ simulation-based learning,¹⁷ team-based learning,²³ clinical experiences,²⁰ and other. The survey was administered in August and October 2012. Each contact person completed the individual school's assessment with input from course

Table 1. Checklist of Definitions of Teaching Methods

TEACHING METHOD	DESCRIPTION
Case-based learning	Use of real or simulated stories that include patient problems/symptoms. Students analyze these, and working in small groups, arrive at a solution by applying course concepts and evidence found in the literature.
Didactic	A Power Point presentation or lecture that may include brief question-and-answer sessions.
Problem-based learning	Focused, experiential learning that is organized around the investigation of clinical problems. Learner groups are presented with a case and set their own learning objectives, often dividing the work, teaching each other, guided.
Simulation-based learning	Simulations (low tech or high tech) duplicate clinical scenarios and allow learners to engage in activities that approximate realistic situations.
Team-based learning	Teacher-directed method for incorporating small-group active participation in large-group educational setting. Learners must actively participate in and out of class (preparation and discussion). Shift away from facts to application.
Clinical experiences	Observation of and practice in inpatient and/or outpatient healthcare.
Other	

directors and instructors. The results were reviewed for face content validity, prompting, in some cases, follow-up by telephone or e-mail to the school’s contact person. The UW institutional review board approved this study.

Data from the WebQ survey were transferred to a Microsoft Excel (Microsoft, Redmond, Washington) file and descriptive statistics were performed. To ensure that calculations represented the pain content received by all students, the frequency of pain management teaching was calculated only from required courses and did not include clinical time or elective courses; pain content covered during clinical time or elective courses would vary among students. The percent of time spent covering pain topics was calculated by dividing the pain curriculum hours by the total curriculum hours for each health sciences school.

Results

Across 6 different UW health sciences schools, pain teaching hours ranged from 0 to 145 hours: Social Work, 0 hours; Nursing, 8 hours; Pharmacy, 21 hours;

Medicine, 28 hours; Dentistry, 117 hours; Physician Assistant, 145 hours. Figure 1 shows each health sciences school and the percentage of total (required) curriculum dedicated to covering pain topics. Identifiable pain content appears to be largely integrated in pharmacotherapeutics and human behavior courses with little to no pain content provided in ethics, community health, and clinical introduction courses.

The teaching methods used to deliver pain content varied. Figure 2 demonstrates how the total amount of time spent teaching pain topics (303 hours) was delivered to students across all health sciences schools. Faculty reported that didactic lectures (36%) were the dominant format used to deliver pain management education. Case-based learning (26%) was the second most common format used, and there were no faculty who reported using problem-based learning.

The 20 pain subtopics most commonly covered by the UW health sciences schools are listed in Table 2. The subtopics are listed in order of decreasing frequency of representation. The pain subtopics most commonly included in curricula included pain-/symptom-focused

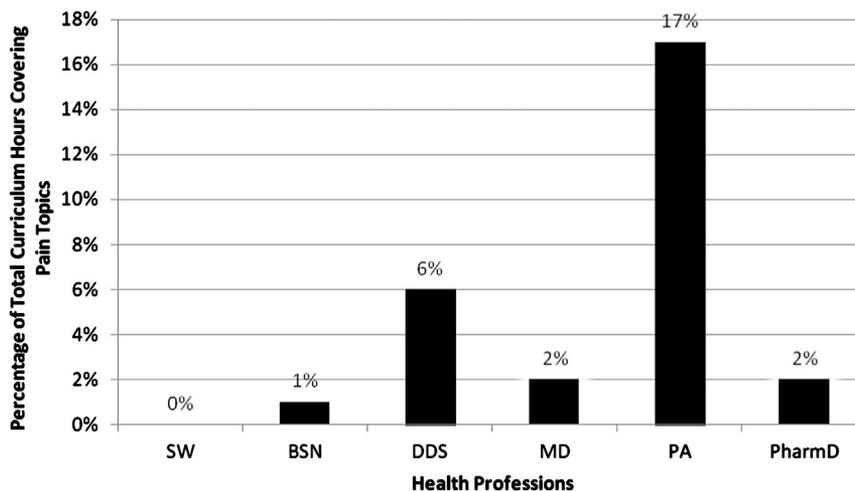


Figure 1. Frequency histogram of pain teaching hours, showing the percentage of the total required curriculum in each UW health sciences school that is dedicated to covering pain topics. Abbreviations: SW, Master of Social Work; BSN, Bachelor of Science in Nursing; DDS, Doctor of Dental Surgery; MD, Doctor of Medicine; PA, Physician Assistant; PharmD, Doctor of Pharmacy.

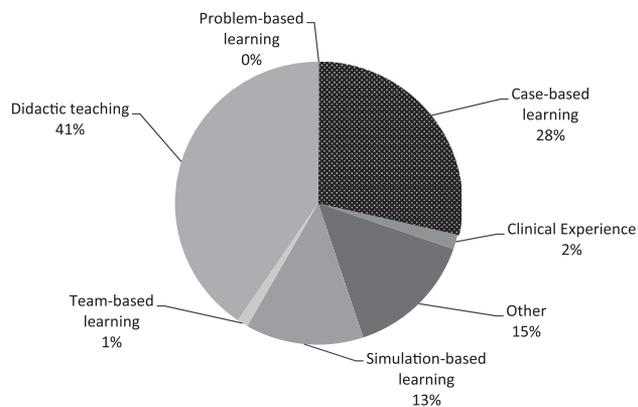


Figure 2. Graph of teaching methods used to deliver required pain content at UW health sciences schools, showing the percentage of the total amount of time spent teaching pain topics (total 303 hours) by delivery method.

interviews; principles of analgesia and mechanisms of placebo effects; clinical psychological approaches to care; counseling and shared decision making; conservative pain treatments; evidence-based complementary and alternative medicine; nonsteroidal anti-inflammatory drugs/cyclo-oxygenase inhibitors; nociceptive pain; inflammatory pain; rehabilitation for pain problems; neuromodulation; and neuropathic pain.

Table 2. The 20 Most Frequently Reported Pain Subtopics Across the Curriculum of 6 Health Sciences Schools

SUBTOPIC IN PAIN	NO. OF COURSES WITH SUBTOPIC AS A REQUIRED TOPIC
Pain/symptom-focused interviews (QRST approach)	12
Principles of analgesia and mechanisms of placebo effects	11
Clinical psychological approaches to care	10
Counseling and shared decision making	9
Conservative pain treatments and evidenced-based CAM	9
NSAIDs/COX inhibitors	9
Nociceptive pain	8
Inflammatory pain	8
Rehabilitation for pain problems	7
Neuromodulation	7
Neuropathic pain	7
Pain incidence and causes	6
Pain, disability, and pain economics	6
Opioids	6
Headache	6
Pain emergencies	6
Interpretation of pain and disease	6
Orofacial pain	6
Musculoskeletal pain and arthritis	6
Other	6

Abbreviations: QRST, quality, radiates, severity, time; CAM, complementary and alternative medicine; NSAIDs, nonsteroidal anti-inflammatory drugs; COX, cyclo-oxygenase.

Discussion

This study of curriculum in a large, regional health sciences program showed wide variation in the amount and focus of pain education in the current curriculum, with the Physician Assistant curriculum most likely to cover pain management topics. The relatively high proportion of pain education material in the Physician Assistant curriculum was related to recent Physician Assistant student requests to increase instruction in pain-related topics and integration of material into a strong behavioral science curriculum, making identification of pain-specific hours difficult. These findings demonstrate the fragmentation and lack of depth in pain education across multiple health sciences schools.

New approaches to pain education in U.S. health sciences schools need to be developed in response to the increasing evidence of inadequate and insufficient pain education and outcomes. Decisions about curriculum content and structure best follow a structured assessment of current pain curriculum. Prelicensure interprofessional pain education is a critical step to ensuring that health professionals entering practice are competent in patient-centered collaboration.¹³ Thus, it is crucial to evaluate pain management curricula across the broadest range of health sciences schools. Faculty educators from the UW's Schools of Dentistry, Nursing, Medicine, Pharmacy, Physician Assistant, and Social Work participated in this CoEPE curriculum blueprint assessment, which aims to strategically direct its pan-institutional pain education quality improvement effort.

In the current era of information overload and high competition for limited curriculum time and resources, the quality and character of pain education, rather than just the quantity of didactic hours of instruction, is increasingly important. This assessment of UW health sciences schools adds new information to the Johns Hopkins report²¹ about other health sciences programs and teaching methods used to deliver pain content. Based on these findings, increased pain education in the form of *problem-* and *team-*based learning is needed. The IASP long ago published curriculum topic outlines for first professional programs (prelicensure/undergraduate/entry-practice level) to facilitate dentistry, medicine, nursing, occupational therapy, pharmacy, physical therapy, psychology, and social work pain education. In 2012, the IASP released a first-ever interprofessional pain curriculum outline based on 4 core domains of its previously recommended discipline-specific curriculum: 1) multidimensional nature of pain, 2) pain assessment and measurement, 3) management of pain, and 4) clinical conditions.¹⁴ A review of this study's findings reveals significant gaps across and within schools' pain content in this regard. For example, there is very limited coverage on the ethics of pain in any of the health sciences schools, although this is suggested in the IASP's multidimensional nature of pain domain. The pain curriculum across the 6 health sciences schools provides limited interprofessional learning experiences to students, despite the IASP's recommendation for such collaboration in the domain of pain assessment and measurement. There is

also limited course content on the specialty topics of geriatric, pediatric, acute, visceral, and cancer pain despite IASP recommendations for coverage in the clinical conditions domain.

Although the specific time and methods required to effectively deliver the IASP curriculum have yet to be identified, an implementation model that balances core content with small-group work including case studies can be recommended. It is noteworthy that case-based learning was the second most common teaching method, following traditional didactic lectures. CoEPE cases are being designed to fill gaps in topic coverage including integration of case studies in didactic courses as well as interprofessional team simulation labs.

There are many frameworks that could be used to categorize pain content. We chose one previously used by the Johns Hopkins curriculum development team to assess North American Medical Schools for comparison.²¹ However, this may be inadequate to address other health sciences programs and disciplines. The Johns Hopkins report relies on use of a centralized repository of curricular information, whereas our data came from voluntary personal surveys of key personnel in each school and may be incomplete. Another limitation to the current study is that data were collected at a single university.

In this study, no evaluation data were collected regarding the impact of the current curriculum on the practice of graduates. Although outcomes are not yet known regarding the optimal scope, content, and duration of pain education, it is evident that considerable deficits remain. One area that appears to need improvement is content that is focused on team-based, interprofessional, problem-based learning to facilitate competent

professionals who can work together effectively in teams in real-world, complex clinical situations and environments. Future studies are planned to evaluate outcomes so that recommendations about the optimal amount and type of pain content can be made.

As educators, clinicians, and researchers move forward to improve the pain content in health sciences schools, it is important to first ascertain what the content and teaching strategies are within an institution, so a plan for improvements in content and teaching strategies can be made. Current trends in health sciences education^{10,25} suggest that relying too heavily on the didactic lecture format is not a good way to facilitate either retention of materials or development of problem-solving skills.¹¹

Incorporating significant changes in pain education, including use of new CoEPE case materials, requires ongoing collaboration among a university's interprofessional educators, a process now informed by detailed, multidimensional curriculum survey data. Individual educators and curriculum planners and reviewers at the UW and elsewhere can now team together with any or all of the NIH CoEPEs to facilitate and sustain the changes needed to better prepare new generations of health professionals to be competent in pain management.

We believe that a blueprint of existing curricula can serve as a starting point for the changes that must be undertaken if pain management is to improve in our country. The existence of a blueprint permits us to focus on areas of weakness and deliver resources in a targeted fashion. At a future date, data for another blueprint can be collected and contrasted to the blueprint documented in 2012.

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