

Original Research Article

# Identifying gaps in chronic pain-centered medical education through an analysis of student perspectives

Myles Benayon<sup>1</sup>, Lekhini Latchupatula<sup>1</sup>, Shawnee Amar<sup>2</sup>

<sup>1</sup> Michael G. DeGroote School of Medicine, McMaster University

<sup>2</sup> Western University

## Abstract

Chronic pain (CP) is one of the most common reasons for seeking medical care in Canada and the United States, yet the Canadian Pain Task Force reports there are still insufficiencies in health care pain curricula. Given that one in five Canadians suffer from CP and 40-80% of CP patients are misdiagnosed, a voluntary survey was conducted on McMaster undergraduate medical students to gain insight into how these students perceive CP-specific curricula and their confidence in managing CP patients. A total of 168 students completed the survey. Results demonstrated that, on average, participants had low confidence in their CP-related skills. Students generally supported additional education in this area through CP workshops (54%), pain-focused tutorial objectives (52%), and more CP-dedicated lecture time (51%). Given the results of this study, we recommend that additional CP-related lecture time, online teaching modules, and virtual workshops be incorporated into McMaster's undergraduate medical education to improve medical students' ability to confidently assess, diagnose, and manage CP patients.

**Keywords:** Chronic pain; curricula; UGME; McMaster; education

*Corresponding author:* [myles.benayon@medportal.ca](mailto:myles.benayon@medportal.ca)

## Introduction

Chronic pain (CP) is one of the most common reasons for seeking professional health care in Canada and the United States, yet it remains frequently misdiagnosed and dismissed (1). CP is defined as pain lasting longer than six months, typically continuing long after the underlying source of the pain has healed (2). Approximately 20% of Canadians live with CP, with two-thirds of this population describing their pain as moderate to severe (1). Furthermore, 50% of Canadians with CP have experienced it for more than 10 years, posing a significant barrier to daily life (1). While CP affects individuals of all ages, races/ethnicities, and classes, there is increased risk and worsening severity in Indigenous peoples, women, and those living in poverty (1). In Canada, up to 38% of children and adolescents and 33% of adults 65 and older have CP (1). Experiencing CP at a young age may cause developmental delays and increase risk of substance abuse and psychological disorders. In such populations, individuals tend to suffer longer without proper diagnosis and treatment due to a lack of available resources (1).

CP often impacts the lives of a patient's friends and family by incurring extreme financial costs and placing strain on familial and social relationships (1). Additionally, CP can be a major source of psychological distress. Those with CP have an increased likelihood of experiencing anxiety, even when pain is not present or at its worst, and they are three times more likely to develop depression (3). Although the nature of the relationship between psychological distress, substance abuse, and CP is not fully understood, there is compelling evidence that psychiatric effects are strongly linked to CP. Psychological distress can exacerbate one's pain levels and impair the treatment and healing process (4).

At the Michael G. DeGroot School of Medicine, the McMaster Undergraduate Medical Education (UGME) program provides students with a three-year general medical education (5). In the preclinical phase, which takes place during the first 15 months of the program, students learn the fundamentals of medicine and patient care. Once a week during Professional Competencies sessions (three hours/week), they gather in small and large groups to discuss social and ethical issues of medicine. In Clinical Skills sessions (three hours/week), students learn to perform physical exams in small groups. In tutorials, students learn medical topics through small-group, case-based learning (six hours/week). Lastly, in large-group sessions (four hours/week), students further their knowledge of various medical topics via primarily didactic learning. In their preclinical phase, the Class of 2022 spent two three-hour tutorial sessions, one Clinical Skills session, and two large-group sessions focusing on CP throughout their 15 months in preclinical education, totaling approximately 21 hours of CP education. The approximate total hours of education during the 54 preclinical weeks is 864 (6).

The Canadian Pain Task Force reports the need for pain curricula implementation for pre-licensure and post-licensure health care professionals in a format that allows application of their CP education in real world situations (7). Additional research highlights that only one-third of prelicensure students in medicine, nursing, dentistry, occupational therapy, and physical therapy could identify the amount of time dedicated to learning CP-related content (8). Numerous students

expressed their desire for more CP-related curriculum resources (cases, modules, presentation content, and directories of experienced pain health professionals), emphasizing the need for improvement in prelicensure pain curricula across Canada (8).

The objectives of this study were (i) to identify how McMaster medical students, across all three years of training, perceive CP learning opportunities, and (ii) to determine students' confidence in managing CP patients. This study hopes to identify gaps in McMaster's chronic pain education in order to improve students' confidence in managing CP patients and ultimately benefit patient care.

## Methods

A survey was created in Google Forms to collect primary data about CP education in the McMaster UGME program. A link to the survey was posted in Facebook groups which are accessible to all McMaster UGME students and are a primary means of advertising research projects. A link to the survey was also sent by email to UGME students who were personally known to the study authors. To be included in the survey, participants must have received the email sent to them or have access to the McMaster UGME Facebook groups, implying active enrollment. There are approximately 203 students in each year of study (9). Given that this study focused on current UGME students, participants were excluded if their self-declared anticipated graduation date was not in the Classes of 2021, 2022, or 2023, since students in other cohort years could still have had access to the Facebook groups. No students outside of these class years responded to the survey.

The survey consisted of 26 items pertaining to CP-related personal experiences, knowledge, confidence in management, education, and career goals (Appendix 1). Eleven items were multiple-choice, including one item which also included an "Other" free-text field where participants could type a response for suggestions to improve the CP curriculum. Thirteen items used a five-point Likert scale. Two items used a seven-point Likert scale to assess, with greater granularity, participants' confidence in various CP-related skills and knowledge of different CP pathologies. Five items were specific to clerks, who practice medicine under supervision and have direct experience with patients. In the McMaster UGME program, clerkship typically begins during the second year of study. Descriptive statistics for the survey data were reported.

## Results

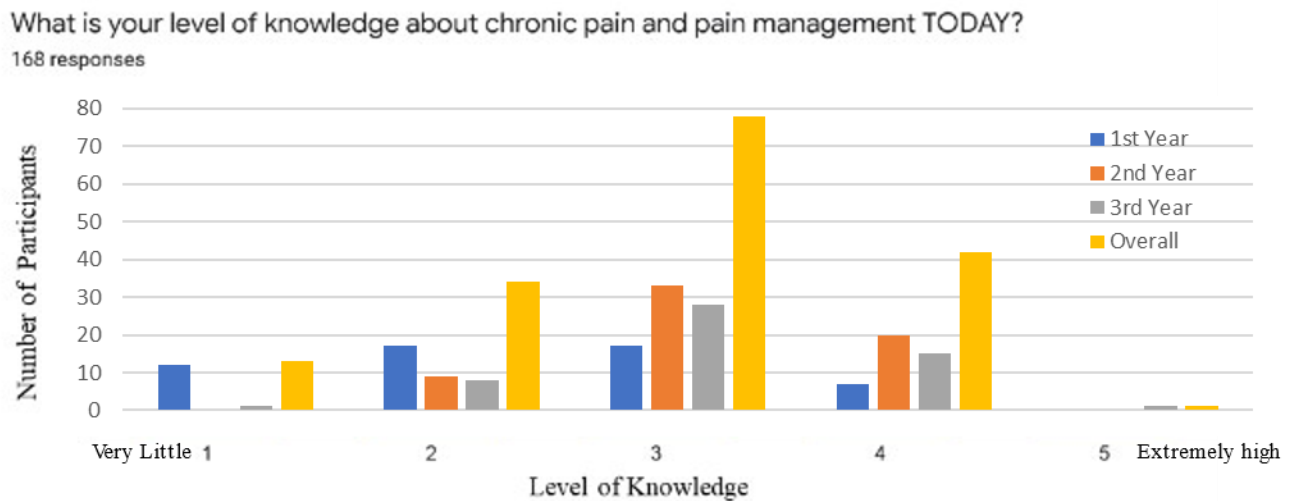
The survey was voluntarily completed by 168 McMaster UGME student participants between October 29<sup>th</sup>, 2020, and November 4<sup>th</sup>, 2020. The participant pool comprised of first-year (n=53, 26% of the class), second-year (n=62, 31% of the class), and third-year (n=53, 26% of the class) undergraduate medical students. Participants were representative of all three sites, with students from the Hamilton (n=111), Niagara Regional (n=23) and Waterloo Regional (n=34) campuses.

Over 6% of the participants identified as having been diagnosed with a form of CP. More than one-third (36%) reported having lived with someone who had CP, and more than half reported

knowing a family member or friend who currently or previously had CP. Furthermore, two-thirds (67%) of participants reported having encountered a CP patient, including all (100%) third-year medical students who completed the survey.

There was an average rating of 1.9 (on a five-point scale) for knowledge of CP prior to entering medical school. When asked to rate their knowledge of CP at the time of survey completion the average response was 2.9 (on a five-point scale) for all medical students across all three years, comprising of 3.1, 3.2 and 2.4, for third-year, second-year and first-year students, respectively (Figure 1).

On average, medical students reported low confidence in specific CP-related skills (Table 1). Among final-year medical students, the lowest rating was for confidence in pain diagnoses, an average of 2.7 (on a seven-point scale).



**Figure 1:** Survey results on level of knowledge about chronic pain and pain management at time of survey for each year of study and overall

**Table 1.** Average reported level of confidence in specific CP-related skills for each year of study and overall, on a seven-point scale

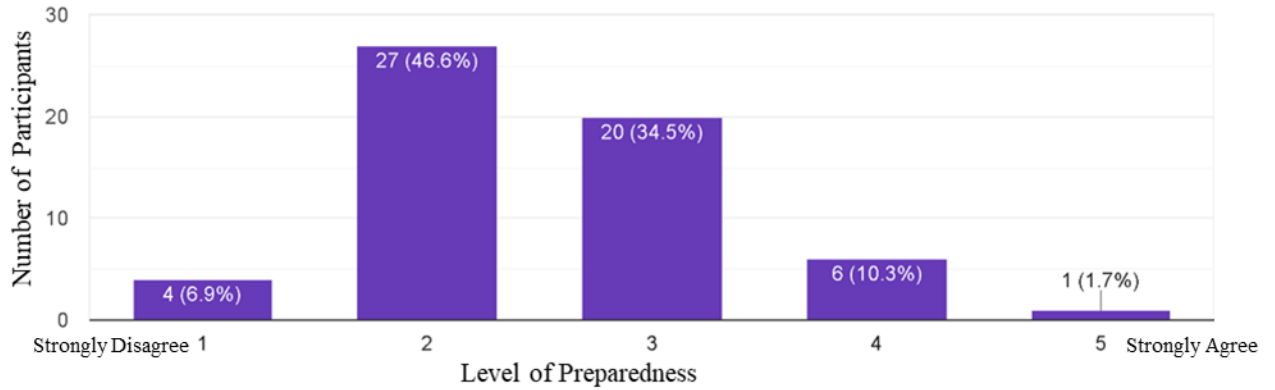
Skill	First Year	Second Year	Third Year	Overall
Pain mechanisms	1.4	2.7	2.9	2.4
Pain diagnoses	0.9	2.3	2.7	2.0
Pain assessment	1.2	2.5	3.2	2.3
Approach to pharmacological pain management	1.4	2.7	3.1	2.4
Approach to physical and psychological pain management	1.3	2.8	2.9	2.3
Addressing psychosocial aspects of chronic pain such as depression, anxiety, etc.	1.8	3.4	3.0	2.8
Having a difficult conversation with a patient with chronic pain regardless of their disease course	1.4	2.7	2.9	2.4
Working respectfully and appropriately in an interprofessional and multidisciplinary setting	2.6	3.8	4.1	3.5
Identifying barriers to treating chronic pain patients (i.e. gaps in access to care, underfunded research, etc.)	1.7	3.1	3.1	2.7

Overall, clerks rated their preparedness to manage CP patients following pre-clerkship as 2.6 (on a five-point scale). When asked how content in each type of learning session prepared them to manage CP patients (using five-point scales), the average response from clerks was 2.5 for case-based tutorials (Figure 2), 2.5 for Professional Competencies sessions (Figure 3), and 2.1 for Clinical Skills sessions.

When asked to rate satisfaction with their pre-clerkship CP curriculum, the average response from all survey participants was 2.7 (on a five-point scale) (Figure 4). Furthermore, participants supported additional learning opportunities in the field of CP and pain management, with an overall rating of 3.7 (on a five-point scale).

If you are a clerk, rate your agreement with this statement: Content in case-based tutorials prepared me to better manage chronic pain in patients during my rotations.

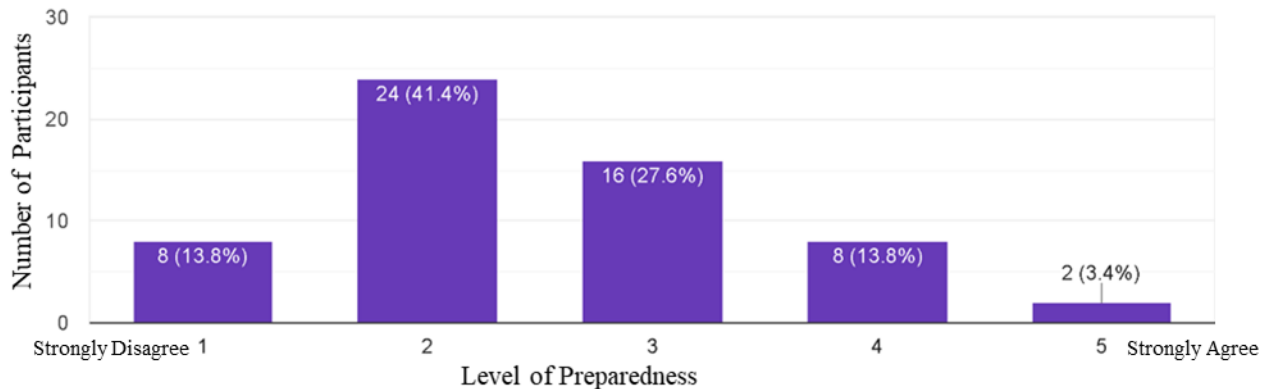
58 responses



**Figure 2:** Clerks' survey results on preparedness from case-based tutorials to better manage chronic pain patients

If you are a clerk, rate your agreement with this statement: Content in Professional Competency prepared me to better manage chronic pain in patients during my rotations.

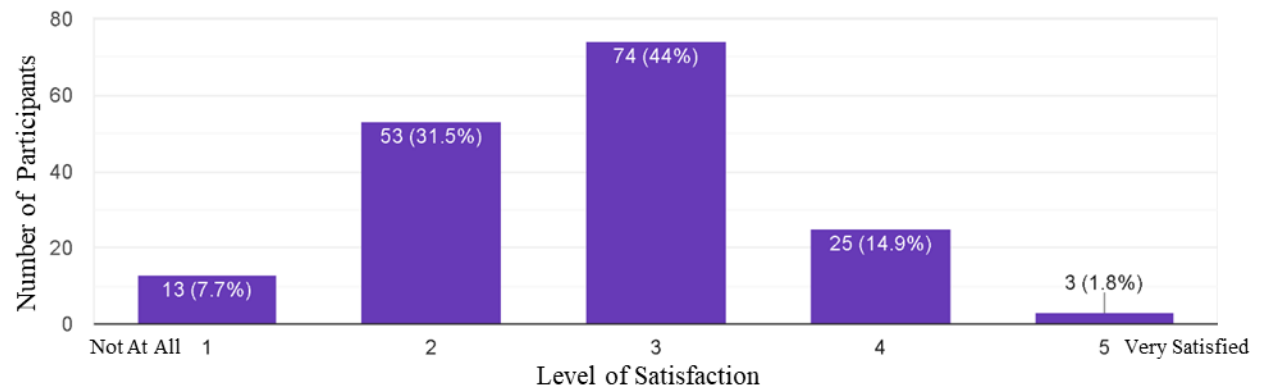
58 responses



**Figure 3:** Clerks' survey results on preparedness from Professional Competency content to better manage chronic pain patients

How satisfied are you with the pre-clerkship chronic pain curriculum?

168 responses



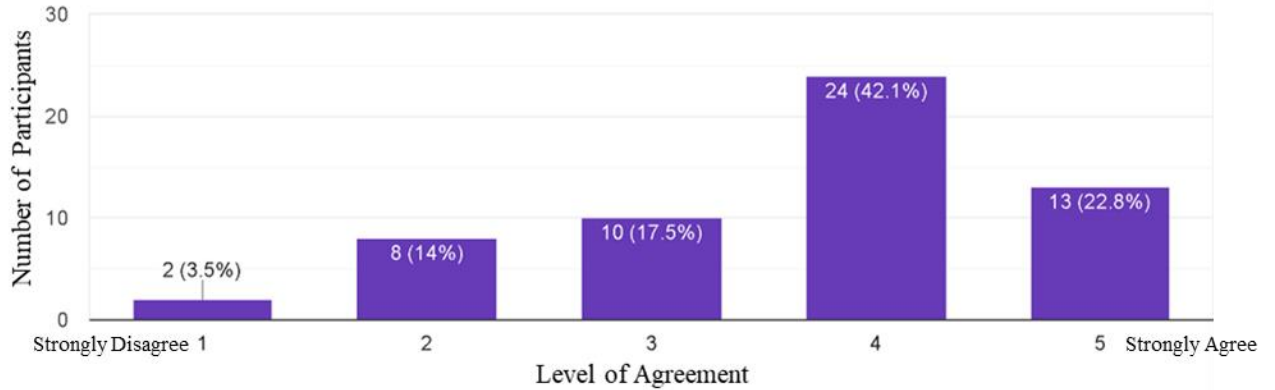
**Figure 4:** Survey results on satisfaction with pre-clerkship chronic pain curriculum

When asked the specialties in which respondents were interested from a pre-selected list, 59% endorsed family medicine, 51% endorsed internal medicine, 27% endorsed emergency medicine, 21% endorsed pediatrics, 21% endorsed psychiatry, and 15% endorsed anesthesiology. Additionally, 28% endorsed having an interest in completing a fellowship or further training in CP. Furthermore, 96% of participants foresaw their medical practice involving patients who experience CP.

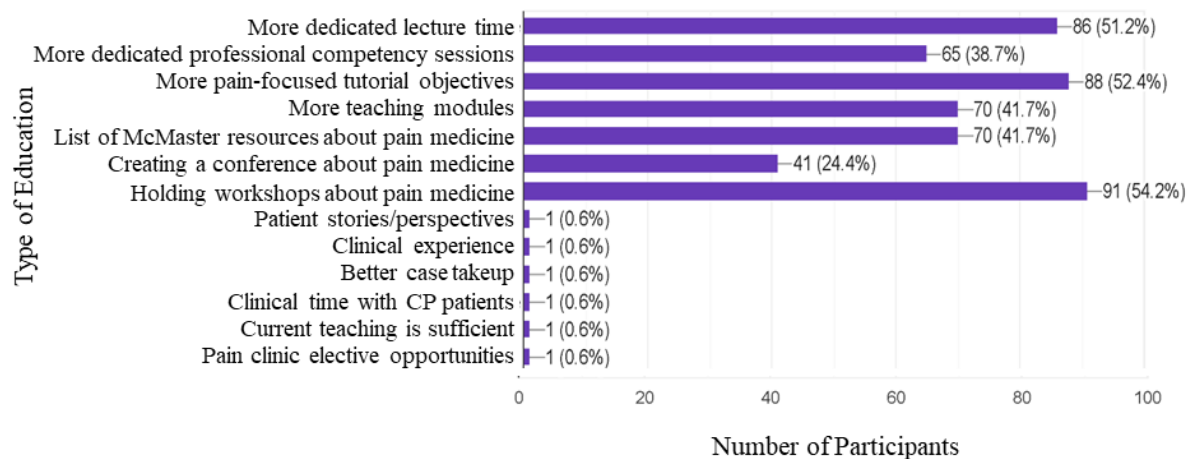
Based on the survey results, clerks identified a need for more learning opportunities to mitigate their CP skill gaps (Figure 5). Using seven pre-selected options and one “Other” free form text field, the majority of survey participants confirmed that CP education could be improved (Figure 6) through CP workshops (n=91), having more pain focused tutorial objectives (n=88), and having more CP-dedicated lecture time (n=86). Furthermore, most third-year medical students participating (34 out of 53), agreed that more pain focused tutorial subjects would help improve CP education.

If you are a clerk, rate your agreement with this statement: I wish I had more learning opportunities in the field of chronic pain and pain management in pre-clerkship in order to better prepare me to manage pain during my rotations.

57 responses



**Figure 5:** Clerks' responses on desire for additional pre-clerkship chronic pain learning experiences



**Figure 6:** Participant responses for how chronic pain education can be improved

## Discussion

Our survey results found that two-thirds of participants had encountered CP patients, including all final-year students who completed the survey. Generally low satisfaction ratings with the current pre-clerkship CP curriculum, especially for final year students, demonstrate that greater CP-related learning opportunities and education are warranted. Participants also indicated that there is a gap



in CP knowledge and a low level of confidence in pain diagnosis, including those in their final year of medical school.

Our findings demonstrate the importance of greater exposure to CP knowledge in pre-clerkship and the need to improve the CP curriculum to prepare students to proficiently manage such patients. The Canadian Pain Task Force declares that, to prevent pain from becoming chronic, primary health care workers need to receive specialized training and education that the system is currently lacking (7). CP patients will likely be prevalent in the professional future of medical students, and it is essential for these students to receive ample opportunities to develop their CP-related skills.

When pain is not taken as a legitimate health issue, it can often lead to misdiagnosis or complete dismissal, leading to stigmatization (1). Up to 40-80% of CP patients are misdiagnosed or over-diagnosed, and, without proper patient analysis, disease entities such as Complex Regional Pain Syndrome may be over-diagnosed up to 71-91% of the time (10). The absence of an in-depth medical history of the patient and the incorrect use of medical tests and imaging are the leading causes of CP misdiagnoses (10).

This study is limited by its inclusion of participants only from the McMaster UGME program, which is a unique three-year condensed curriculum in Ontario and may lack applicability to other medical school populations in the rest of Canada. Furthermore, given that not all students responded, and the risk of response bias, our findings may not be representative of the entire McMaster UGME student body. Namely, it could be that only participants that felt compelled to express their views about the pain curriculum and those who monitor the McMaster UGME Facebook groups completed the survey. Additionally, this survey was cross-sectional in nature; given that it was conducted approximately three months into any given student's respective year of training, it may not capture perspectives at the precise start and end dates of the program. Therefore, the risk of recall bias may have affected the accuracy of self-reported survey input.

## **Conclusion**

Overall, our survey results demonstrate that, on average, students had low ratings in their confidence in CP-related skills. They generally supported improving the McMaster UGME curriculum by incorporating additional CP-related lecture time, online teaching modules, and virtual workshops. These findings suggest a potential gap in the medical curriculum that could be explored at other Canadian medical schools. Distributing a survey to other Canadian medical school students could reinforce our findings and contribute to improvement of the UGME CP curriculum on a national level, as well as improve medical students' ability to confidently assess, diagnose, and manage CP patients to provide better clinical outcomes.

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## Appendix 1

### McMaster Chronic Pain MedEd Survey

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\* Required

1. What is your class year? \*  
*Mark only one oval.*

c2020

c2021

c2022

c2023

2. What is your campus? \*  
*Mark only one oval.*

Hamilton

NRC

WRC

#### Personal Chronic Pain History

3. Have YOU ever been diagnosed with a form of chronic pain? \*  
*Mark only one oval.*

Yes

No

4. Have you lived with anyone who has chronic pain? \*  
*Mark only one oval.*

Yes

No

5. Did you ever have a family member or a friend that has/had chronic pain? \*  
*Mark only one oval.*

Yes

No

#### Medical Education & Knowledge Comfort

6. What was your level of knowledge about chronic pain and pain management \*  
PRIOR to medical school?  
*Mark only one oval.*

1      2      3      4      5

Very little      Extremely high

7. What is your level of knowledge about chronic pain and pain management TODAY? \*  
*Mark only one oval.*

1      2      3      4      5

Very little      Extremely high

8. How satisfied are you with the pre-clerkship chronic pain curriculum? \*

*Mark only one oval.*

	1	2	3	4	5	
Not At All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Satisfied

9. How best can your chronic pain education be improved? (Select all that apply) \*

*Check all that apply.*

- More dedicated lecture time
- More dedicated professional competency sessions
- More pain-focused tutorial objectives
- More teaching modules
- List of resources about pain medicine provided by McMaster
- Creating a conference about pain medicine
- Holding workshops about pain medicine
- Other: \_\_\_\_\_

10. If an online pain education program were offered, to teach you an approach to chronic pain management and allow you to practice your communication skills with chronic pain patients, would you use it? \*

*Mark only one oval.*

- Yes
- No

11. Have you ever encountered a patient with any form of chronic pain? \*  
*Mark only one oval.*
- Yes
- No
- Unsure
12. Rate your agreement with this statement: There are sufficient opportunities for chronic pain education in case-based tutorials. \*  
*Mark only one oval.*
- 1 2 3 4 5
- 
- Strongly Disagree      Strongly Agree
- 
13. Rate your agreement with this statement: There are sufficient opportunities for chronic pain education in Professional Competency. \*  
*Mark only one oval.*
- 1 2 3 4 5
- 
- Strongly Disagree      Strongly Agree
- 
14. Rate your agreement with this statement: There are sufficient opportunities for chronic pain education in Clinical Skills. \*  
*Mark only one oval.*
- 1 2 3 4 5
- 
- Strongly Disagree      Strongly Agree
- 
15. Rate your agreement with this statement: Exposure to chronic pain management in Preclerkship is important for my medical education. \*  
*Mark only one oval.*
- 1 2 3 4 5
- 
- Strongly Disagree      Strongly Agree
-

16. What is your level of confidence in the following skills? \*

*Mark only one oval per row.*

	Poor	Fair	Somewhat Fair	Average	Somewhat Good	Good	Excellent
Pain Mechanisms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain Diagnoses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pain Assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Approach to pharmacological pain management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Approach to physical and psychological pain management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Addressing psychosocial aspects of chronic pain such as depression, anxiety, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a difficult conversation with a patient with chronic pain regardless of their disease course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working respectfully and appropriately in an interprofessional and multidisciplinary setting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying barriers to treating chronic pain patients (i.e. gaps in access to care, underfunded research, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



17. How would you rate your knowledge about the following pathologies of chronic pain? \*

*Mark only one oval per row.*

	Poor	Fair	Somewhat Fair	Average	Somewhat Good	Good	Excellent
Back Pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cancer Pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carpal Tunnel Syndrome	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complex Regional Pain Syndrome (CRPS/RSD)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diabetic Neuropathy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fibromyalgia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lupus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Migraines and Headaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Osteoarthritis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Osteoporosis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rheumatoid Arthritis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sickle Cell Disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Traumatic Brain Injuries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Clerkship Section: ONLY do this session if you are a clerk (c2021)

Skip this session if you are NOT currently in clerkship

18. If you are a clerk, how well has the pre-clerk chronic pain curriculum prepared you to manage patients with chronic pain during your rotations?

*Mark only one oval.*

	1	2	3	4	5	
Not At All	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Well

19. If you are a clerk, rate your agreement with this statement: Content in case-based tutorials prepared me to better manage chronic pain in patients during my rotations.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

20. If you are a clerk, rate your agreement with this statement: Content in Professional Competency prepared me to better manage chronic pain in patients during my rotations.

*Mark only one oval.*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

21. If you are a clerk, rate your agreement with this statement: Content in Clinical Skills prepared me to better manage chronic pain in patients during my rotations.

*Mark only one oval.*

1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

22. If you are a clerk, rate your agreement with this statement: I wish I had more learning opportunities in the field of chronic pain and pain management in pre-clerkship in order to better prepare me to manage pain during my rotations.

*Mark only one oval.*

1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

### Career Goals

23. Please select all the following specialties you are interested in: \*

*Check all that apply.*

- Anesthesiology
- Emergency medicine
- Family medicine
- Internal Medicine
- Neurology
- Pediatrics
- Physical Medicine & Rehabilitation
- Psychiatry
- Radiology
- Rheumatology
- Other

24. Do you foresee your medical practice involving patients suffering from any form of chronic pain? \*

*Mark only one oval.*

- Yes
- No
- 

25. Rate your level of interest in working with patients that have chronic pain. \*

*Mark only one oval.*

	1	2	3	4	5	
No Interest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very interested

26. Would you be interested in completing a fellowship or other further training in chronic pain? \*

*Mark only one oval.*

- Yes
- No