



Research Paper

Perceptions and attitudes of medical students toward opioid education: A qualitative study



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HIGHLIGHTS

- Opioid education in medical school is limited and varied across institutions
- Quantity and quality of opioid education available affect perceptions of opioids
- Students are eager for more instruction on safe opioid prescribing practices
- Opportunities exist for medical school education on opioids for pain management

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ABSTRACT

Objective: Explore the perceptions and attitudes of medical students regarding their education in opioid prescribing for pain management.

Design: Three focus group discussions elicited open-ended, information-rich responses from medical students attending multiple institutions. Thematic analysis identified common themes from focus group transcript data.

Setting: Rollins School of Public Health at Emory University, Atlanta, Georgia, USA.

Participants: Medical students ($n = 12$) from four medical schools in the United States.

Results: Focus group participants indicated they experienced changes in their perceptions and attitudes about opioids during their time in medical school, gradually recognizing the importance of treating pain while avoiding overprescribing and opioid-related harms. Discussions revealed that the curriculum on opioid medications and their prescription in medical school is limited and varied, with most opportunities for learning arising during preclinical years. The quantity and quality of the opioid-related education experienced by participants during medical school impacted their perceived knowledge about opioids and, consequently, their confidence in treating pain. Participants noted that important gaps in their knowledge about opioid prescribing persist, which may influence their future prescribing habits. While participants understood they had insufficient knowledge about opioid prescribing, they anticipated there would be additional learning during their residency programs.

Conclusions: There is room for improvement for medical school instruction on the safe and effective use of opioids for pain management in the United States. Medical students themselves have expressed a desire for enhanced opioid education. Strengthening opioid education has implications across various healthcare environments, particularly in settings with prevalent opioid prescribing.

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Introduction

Opioid medications are an effective and essential tool for pain management; however, they entail serious risks for patients due to addictive potential and side effects [1]. Opioid prescribing, which began accelerating rapidly in the late 1990s and peaked in 2012, is widely credited with having contributed to the onset of the opioid epidemic in the United States (US) [1]. This ongoing public health crisis has claimed more than 800,000 lives through fatal overdoses from 1999 to 2023 [2,3], with more than 80,000 of these deaths occurring in 2023 alone [4]. Current clinical practice guidelines recommend prescribing opioids for acute pain from severe traumatic injuries, invasive surgeries associated with postoperative pain, and severe acute pain when nonsteroidal anti-inflammatory drugs (NSAIDs) and other therapies are contraindicated [1].

The conversations surrounding the desire for clinicians to better treat pain symptoms throughout the 1980s was followed by the 1996 introduction of OxyContin by Purdue Pharma [5]. The marketing of OxyContin, with assurances to clinicians that the risk of opioid addiction was “less than one percent” [6], contributed to substantial overprescribing of opioids and, consequently, resulted in hundreds of thousands of opioid-related deaths [5]. Though prescribing rates have declined in recent years, it is crucial to identify and target factors that influence inappropriate opioid prescribing behaviors. Clinician perceptions, attitudes, behaviors, and training are primary drivers of opioid prescribing decision making [7,8], fueling the existence of variation in prescribing patterns among clinicians. Heterogenous opioid and pain management education in medical schools may provide one possible explanation for some variation in opioid prescribing behaviors. The Association of American Medical Colleges (AAMC) reports preclinical medical students receive some education on pain assessment, pain management, substance use disorder (SUD), and treatment of opioid overdoses [9]. Likewise, the American Medical Association (AMA) reports that 87 % of curricula in US medical schools incorporate pain and opioid education, though the approaches these institutions use to implement this education varies [10]. Ongoing research examining medical students' perspectives and attitudes toward content and training of their opioid education are warranted, as they may guide the expansion or improvement of this material in medical schools.

Medical school curricula across the US have responded to the opioid epidemic by increasing opioid-related education for students. For instance, opioid use disorder (OUD) education in medical schools—covering opioid pharmacology, risk factors, signs and symptoms, stigma, and treatment—has become more prevalent, but gaps in material exist surrounding pain management for patients with OUD [11]. Overall, there remains significant variation in quality of opioid prescribing education provided throughout US medical schools [12]. Therefore, it is crucial to evaluate students' perceptions and attitudes toward opioid education they receive during medical school and subsequent clinical training. While the literature does present some exploration on this topic, most research focuses on residents and other clinicians, [8] rather than medical students, when describing perceptions of opioid education and prescribing. Medical education is a vital period during clinicians' training to deliver evidence-based education of safe opioid prescribing. As such, the purpose of this qualitative study was to explore the perceptions and attitudes of medical students regarding the opioid education received in medical school.

Material and methods

Population and sample

Individuals were eligible to participate in this study if they were enrolled in medical school or had graduated from medical school within the last two years but were not in residency, were 18 years or older, were able to communicate in English, provided verbal consent, and had

internet connectivity. A snowball sampling approach was used to recruit participants. Several medical students at the investigators' institution were identified as key informants; these individuals provided student peers with information about the focus groups, including how to register to participate. This nonprobability sampling approach allowed for participants to refer additional, interested medical students from academic and social networks, including those at other medical schools [13,14]. The local institutional review board reviewed and approved this study.

Procedures

Focus groups convened on the online meeting platform Zoom so participants from different geographic areas could attend. Upon completing introductions and informed consent, during which participants verbally consented to participate, the moderator began audio recording the meetings and led the discussion following the open-ended, semi-structured focus group moderator guide. The moderator guide was designed to collect information-rich data and provide flexibility to explore the participants' thoughts and experiences (Appendix A) [15]. Topics in the moderator guide were determined based on recent literature, and its development was an iterative process that involved the research team. After each focus group, the moderator guide was updated with additional questions or probes based on insights gleaned from the discussions. Upon completion of all focus groups, a \$10 Amazon gift card code was sent to each participant.

The audio recordings were transcribed and de-identified using Otter.ai, and a quality check for accuracy was performed on the transcripts. In addition to the audio recordings, the moderator took handwritten notes to assist with discussion facilitation, data collection, and subsequent analysis. Ultimately, three focus groups occurred with a total of 12 participants from four medium- and large-sized medical schools along the US east coast from September 2022 through November 2022.

Data analysis

Transcripts were uploaded to MAXQDA (MAXQDA Standard 2022) for data analysis. Thematic analysis was used to identify and investigate patterns of data related to the research question [16]. A codebook with codes, definitions, and example quotes, was developed and reviewed by team members. The codebook was used to open-code transcript words and phrases expressed by the focus group participants. Both deductive and inductive coding occurred, as the former laid the foundation for anticipated themes based on existing literature, while the later identified themes that unexpectedly emerged through data collection [13]. Codes were then grouped together to form categories based on themes that arose.

Results

Table 1 displays the demographic makeup of the sample. The average participant age was 25.6 (±1.2) years, and most participants (*n* = 10) identified as women. Most participants were located in the southeast and identified as white (*n* = 9), followed by Black/African American (*n* = 3). Themes that emerged included evolving perceptions and attitudes about opioid medications and opioid prescribing,

Table 1
Demographic information of focus group participants.

Demographics	
Age, mean (SD)	25.6 (1.2)
Gender, % (n)	
Female	83.3 (10)
Male	16.7 (2)
Race/Ethnicity, % (n)	
White	75 (9)
Black/African American	25 (3)

perceived quality of the opioid education received throughout medical school, support systems outside formal curricula that provided additional learning about opioids, and predictions about participants' future opioid prescribing during post-graduation medical practice.

Perceptions and attitudes toward opioids

I. Changes in Perceptions and Attitudes of Opioids Before and During Medical School

Medical students living in the US during the opioid epidemic have a unique lens when learning about opioids in medical school. Participants expressed that, before beginning medical school, they lacked a medical lens when thinking about opioids, previously regarding them as “just pain medication” and “surgery pills.” Through their academic and clinical experiences, the participants expressed they now approach opioids through fact-based knowledge acquired throughout medical school. Participants understood the usefulness of opioids, and that these are substances people “should have access to” when appropriate.

II. The Opioid Prescribing and Pain Management Balancing Act

Participants discussed that, though opioids should be accessible when appropriate for treating pain, recognizing the “importance but also inherent danger they can do” is crucial. The “responsibility [of clinicians] to not just prescribe pain medications blindly” was stressed by participants throughout the focus groups, who understood that, upon graduating medical school, they will hold this responsibility as well. As one participant stated, it is “a very challenging balancing act, but an important one to take on.”

Opioid education during medical school

I. Opioid Education in Preclinical Semesters

Participants described how they learned about opioids during preclinical semesters of medical school, and variations in education were revealed. For instance, one participant expressed learning about opioids during their first year of medical school, while another recalled not receiving this education until their second year as clinical rotations approached. Most instruction was reportedly provided by an educator affiliated with their respective institution, but one participant shared that they attended guest lectures from state health department representatives. While some participants recalled that the material they learned “wasn't comprehensive” and that trainings felt “very outdated,” others remarked how their education included “several lectures on how to prescribe, when to prescribe.”

Several participants reported learning about opioids during pharmacology lectures, which were “mostly geared towards mechanism of action and memorizing a list of side effects,” though the material available at different institutions varied slightly. For instance, only one participant reported having a pharmacology instructor who “talked about Narcan [the opioid overdose rescue drug] and showed how to use it.” In contrast, another participant expressed that the only reason they learned how to use Narcan was through a student-run initiative.

II. Opioid Education in Clinical Semesters

Regarding the transition from preclinical lectures to clinical rotations, some second-year medical student participants expressed feeling unprepared to encounter opioids in clinical rotations due to their lack of preclinical opioid education. One participant expressed that they did not feel “prepared to encounter that in a clinical setting with real patients” and felt as though they needed “relearning [of opioids] again.” During certain clinical rotations in which participants expected to interact with opioids, experiences varied. For example, one participant stated that,

during an internal medicine rotation, they learned about opioids from “interns and residents actually applying these drugs to different patients.” In contrast, one participant felt that opioids were not “really something that was emphasized” in their surgical rotation's curriculum.

Two participants in different focus groups pointed to the importance of their medical school's palliative care rotation for their education about opioids, stating that this setting was where “most clinical education around opioids is focused.” Participants emphasized their awareness that they would become practicing clinicians during the continuing opioid epidemic. Many reported that their experiences with opioid prescribing and pain management during clinical rotations played an important part in evolving their perceptions about the role of opioids.

III. Types and Quality of Educational Support Systems

Instances of educational support provided to participants by instructors and peers when learning about opioids were shared. In the classroom, participants described how their learning about opioids was better supported when instructors “were really passionate” about the material. Participants described instances when they felt an absence of educational support surrounding opioids. For instance, during a clinical rotation, one participant recalled not feeling supported in learning about appropriate opioid prescribing, such as not prescribing Narcan® (i.e., naloxone) concurrently with an opioid, from clinical educators because they “didn't model the behavior.” Participants expressed a strong appreciation for the support they received from peers, specifically through one school's addictive medicine interest group. They highlighted how students leading this group have been “supportive points of contact for learning more” about opioids. Participants who reported encountering support through the student-led interest group stated that they “remember [information about opioids] better” from these interactions than from coursework.

Future opioid prescribing

I. Current Perceived Preparedness for Future Prescribing

Across all focus groups, the most common specialties of interest reported by participants were pediatrics ($n = 4$) and orthopaedics ($n = 2$), while six other specialties were mentioned once. These interests may have influenced how the participants feel toward future opioid prescribing behaviors and practices, as described in the following results. When asked to reflect on their preparedness to encounter opioids in the future after graduating medical school, participants expressed similar themes across all focus groups. Seven of the twelve participants stated that, while they currently feel underprepared, they expect to garner knowledge and confidence when they prescribe opioids during residency. For example, three participants described how, with the “support of a team,” they will feel more equipped in making opioid-related decisions, as they anticipate a “learning curve.”

Though it was well-recognized by participants that they would learn more about opioids during residency, participants conveyed differing levels of preparedness to encounter opioids before graduating medical school. Three participants across two focus groups discussed how they felt comfortable approaching the subject of opioids with their future patients because of practiced patient conversations. Participants regarded these conversations as a critical aspect of patient care. Conversely, other participants raised concerns about information they believed they did not, and likely will not, receive during medical school. For instance, one participant shared that they knew “nothing about dosages,” and did not expect to learn about it before graduating.

II. Anticipated Hesitations, Barriers, and Knowledge Gaps for Future Prescribing

Participants described several ways in which they anticipated feeling

hesitant and encountering obstacles when prescribing opioids in their future practice. Such hesitations and barriers were expressed both in terms of an individual's predicted thoughts and behaviors toward their patients as well as environmental or systemic factors. One participant shared an anticipated hesitation in prescribing opioids was their lack of experience conversing with patients, having not practiced medicine long enough to recognize the “little details” that reveal “who needs this much versus who needs that much.” Another participant described the “infrastructure around prescribing opiates,” such as using a prescription drug monitoring programs (PDMP), as a significant barrier.

The participants anticipated lacking certain knowledge about opioids by the time they graduate from medical school. One participant expressed that they expect to not understand the specific “differences between types of opioids.” Similarly, another participant described an expected lack of understanding “which one, what dose, how many days is safe” when prescribing opioids. The idea of the balancing act reemerged in one focus group, as one participant anticipated not knowing “how opioids can be used successfully without the outcome of addiction” before entering residency. Though it was common for participants to reported knowledge gaps after graduating, they expected to receive ongoing opioid education throughout residency.

III. Perceived Factors that Influence Opioid Prescribing

Participants described numerous factors they believed influence opioid prescribing behaviors among clinicians, spanning across the socioecological model. Most participants described clinician-specific, or individual-level, opioid prescribing factors. A “provider's implicit bias,” toward a patient's race for example, was one factor discussed regarding how clinicians evaluate “pain symptoms presenting” in patients. Additionally, the complexity of opioid prescribing decision making was an influencing factor shared by one participant, who commented that they felt “a second-hand sense of the burden that prescribing opioids puts on” clinicians. The topic of clinician burnout and workload arose frequently. As a result of “being tired” from long shifts and feeling “pulled in every direction” by colleagues, participants shared that clinicians may be more willing to prescribe an opioid that they have “prescribed to other people, numerous times.”

The participants described interpersonal-level factors between clinicians and patients that influence how clinicians choose, or do not choose, to prescribe opioids. Depending on “what patients ask for” in terms of prescriptions or treatments, clinicians may perceive them to be opioid seeking. Societal-level influences on opioid prescribing were described as well, especially the impact of systemic racism in medicine. The participants highlighted that “structural racism definitely exists” in patient care and influences how clinicians “consciously and unconsciously” prescribe, resulting in failures toward “equitable prescription of opioids.” Factors discussed in focus groups reflect the literature surrounding the opioid epidemic. Participants contemplated these prescribing influences on opioid prescribing and pain management as they foresaw their own transition from medical students to clinicians.

Discussion

This qualitative study was designed to explore the perceptions and attitudes of medical students concerning opioid-related education received during medical school. The findings demonstrate that the medical student participants altered their perceptions and attitudes of opioids over time, that content on opioids in medical school is limited and varied, and that numerous barriers and knowledge gaps about prescribing persist, which may influence future opioid prescribing habits. To date, the preponderance of research on opioid education has focused on residents, specifically surgical residents [17,18]. Research highlighting opioid prescribing and pain management curricula in medical schools has primarily focused on education framework and intervention results, though not all research focuses on medical schools

located in the US [19,20]. To our knowledge, this is the first focus group study that has been conducted, solely with medical students as participants, to explore this research question. Medical education is a vital time to introduce key content and address potential biases capable of shaping future clinicians' practices. This includes the opportunity to incorporate opioid and pain education early and recurring in medical schools.

The focus group participants emphasized the impact that medical school had on their perceptions and attitudes toward opioids. The participants described the importance of taking a scientific yet humanistic approach toward opioids as pain management medications. Several participants recognized the delicate balance involved in prescribing opioids, acknowledging that opioids can effectively manage pain but may have harmful side effects and risks of misuse. Most of the opioid education participants received in medical school, during both preclinical and clinical segments, focused on the pharmacology, side effects, and biochemical mechanisms. While the AMA reports 87 % of curricula incorporates pain and opioid education [10], themes from this qualitative study show that students may find that the quality and quantity of material provided insufficient. Across focus group discussions, a lack of standardization of opioid education became apparent. There is no denying the importance of pharmacology lectures in medical education, though an argument could be made for adding instruction on treating pain in patients with SUD and harm reduction measures.

Similarly, participant responses varied from the AAMC report [9] previously mentioned regarding certain opioid and pain management education topics taught in US medical schools, a theme present in the literature as well. Most participants noted that most preclinical opioid education occurred during a single block, with little repeat exposure throughout the clinical years. While preclinical semesters involve coursework aimed at increasing knowledge of pharmacological properties of opioids, clinical decision making around opioid prescribing involves a more nuanced and complex set of considerations than a single “correct” answer [11], and many participants expressed uneasiness with their abilities to navigate these decisions. Although participants raised concerns about future opioid prescribing, they expected to receive further education during residency. Pain education should not be siloed given that pain is experienced by patients seen across care setting, therefore clinicians of all specialties may need better preparation to mitigate concerns with pain management, including the use of opioid medications [21]. While previous research has conducted assessments from the perspective of faculty and used written medical students' reflections [22], this research prospectively explored perspectives of medical student and contributes to the growing literature to enhance opioid education [23–26].

The literature presents ongoing concerns surrounding the lack of standardized opioid education in US medical schools [23]. It is known that the approaches used by medical schools to expose medical students to areas of opioid education can differ. One study found 19 distinct teaching methods and 8 different evaluation methods across 102 medical schools [20]. Efforts to standardize opioid education, however, are worth noting, as it supports the possibility to augment and strengthen these initiatives. Suggestions for improving the quality of opioid education in medical school have included increasing educational opportunities for clinical exposure, simulations, interdisciplinary learning, and individualized prescriber feedback [23].

Optimizing patients' pain management while mitigating opioid-related risks remains a challenge for prescribers. The ability to balance pain amelioration and risk reduction is a cornerstone of the Centers for Disease Control and Prevention's clinical practice guideline for opioid prescribing [1], with the terminology “balancing act” used to describe this phenomenon in the literature [27,28]. As reported by participants, opioid prescribing should be conducted in a manner that successfully addresses pain and minimizes risk of adverse events. Innovations for incorporating opioid education and harm reduction throughout various aspects of medical school and clinical training have demonstrated numerous benefits in learning. Such trainings and lectures can improve

knowledge of opioid overdoses and decrease stigma toward patients with SUD [29–31]. Widespread implementation of such innovations can advance knowledge of trainees and improve confidence in managing pain while mitigating opioid-related risks, as well as contribute to reconstructing the oversimplified societal narrative that opioids are inherently harmful.

Furthermore, education during medical school concerning opioid prescribing for pain management should target clinician-level factors that influence treatment outcomes. Participants discussed how medical prescriber biases and burnout may influence opioid prescribing. Research indicates that racial minorities are less likely to be prescribed an opioid [32,33] and experience increased burden of disease compared to their white counterparts [34]. As described by one participant, these implicit biases may be garnered by personal experiences or assumptions to govern clinical decisions regarding how to prescribe opioids, if at all. Education on recognizing these biases is warranted early in medical education to prevent such disparities in opioid prescribing. Furthermore, checking PDMPs prior to prescribing opioids, while necessary, are perceived by some as an administrative barrier and contribute to burnout. The literature highlights that PDMPs have been viewed by clinicians as time-consuming, poor in usability, and difficult if having to integrate with existing electronic health records [35,36], thus hindering routine access to PDMPs and, as a result, limit their effectiveness when prescribing opioids.

Strengths and limitations

The focus group nature of data collection allowed medical students to provide in-depth narratives when answering questions posed by the moderator, contributing to the quantity and quality of the data. Though the sample size was relatively small, yet appropriate for qualitative research and reflective of other studies [37–39], the focus group size permitted individualized rapport building with participants. This may have augmented participants' comfort and willingness to answer questions. Nevertheless, response bias may have influenced the quality of discussions. Participants may have felt inclined to respond to questions in a manner that would be desirable to the moderator.

Due to time constraints for recruitment of focus group participants, the research team was unable to achieve a more diverse participant sample. As a result, the homogeneity of the participant sample limits the generalizability of these findings. Likewise, the small number of medical schools represented in the sample was another limitation of this study, as results could vary based on institutions attended by participants. However, previous literature has shown much of the research on pain and opioid education has been limited to single sites [21]. Furthermore, these findings might be transferable to student experiences at other institutions [40,41]. The broad-natured focus group moderator guide questions assisted in exploring various themes surrounding the participants' personal, educational, and professional perceptions and attitudes regarding opioids and opioid education. Though these questions were successful for the purposes of this study, a more in-depth exploration of themes related to opioid education in clinical settings where opioid prescribing and pain treatment is common, such as in surgery and orthopaedics, would be crucial to uncover. While a considerable amount of qualitative data was collected from the focus groups to produce repetition of some important themes, future researchers may continue to explore these themes to achieve saturation. Despite the limitations, themes identified from focus groups indicate that education focused on mitigating opioid-related risk and safe prescribing is desired by medical students.

Final thoughts

The results from the study indicate that medical students continue to have a minimal amount of time in their training dedicated to opioid education and that is may not always be substantive. Students are eager

for enhanced opioid education from medical schools. While a multitude of factors interplay to impact the opioid epidemic, increased quality and standardization of medical school opioid education could improve opioid prescribing behaviors and, as a result, mitigate the risk of opioid misuse, overdoses, and deaths. Future research focused on enhancing opioid education and discerning longitudinal outcomes of learners is warranted.

ORCID iD authorship contribution statement

Angelina Luciano: Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Conceptualization. **Mara Schenker:** Writing – review & editing, Supervision, Project administration. **Dawn L. Comeau:** Writing – review & editing, Supervision, Methodology. **Courtney R. Yarbrough:** Writing – review & editing, Supervision. **Nicholas A. Giordano:** Writing – review & editing, Supervision, Project administration, Funding acquisition.

Ethics approval

The Emory University institutional review board reviewed and approved this study. Informed consent was obtained from all focus group participants prior to data collection.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Nicholas A. Giordano, PhD, RN, FAAN reports financial support was provided by National Center for Injury Prevention and Control. Other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.sopen.2025.01.007>.

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