

Impact of an Educational Intervention on the Opioid Knowledge and Prescribing Behaviors of Resident Physicians

Pankti P. Acharya

Rowan University School of Osteopathic Medicine

Brianna Fram

Rothman Orthopaedic Institute

Jenna R. Adalbert

Sidney Kimmel Medical College

Ashima Oza

Thomas Jefferson University Hospital

Prashanth Palvannan

Thomas Jefferson University Hospital

Evan Nardone

Thomas Jefferson University Hospital

Nicole Caltabiano

Thomas Jefferson University Hospital

Jennifer Liao

Thomas Jefferson University Hospital

Asif M. Ilyas (✉ asif.ilyas@rothmanopioid.org)

Rothman Orthopaedic Institute

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Abstract

Background

The opioid epidemic is a multifactorial issue, which includes pain mismanagement. A recent study has shown that residents have received little training for opioid related patient care. Therefore, resident physician education is essential in addressing this issue. We aimed to analyze the effects of an educational intervention on the knowledge and potential prescribing habits of emergency medicine, general surgery, and internal medicine residents.

Methods

Resident physicians were provided with educational materials and were given pre- and posttests to complete. Descriptive statistics were used to analyze pre- and posttest responses. Chi-squared analysis was used to identify changes between the pre and posttests. A $p < 0.05$ value was considered statistically significant.

Results

Following the educational intervention, we observed improvement in correct prescribing habits for acute migraine management among emergency medicine residents (from 14.8–38.5%). Among general surgery residents, there was significant improvement in adherence to narcotic amounts determined by recent studies for sleeve gastrectomy ($p = 0.01$) and laparoscopic cholecystectomy ($p = 0.002$). Additionally, we observed a decrease in the number of residents who would use opioids as a first line treatment for migraines, arthritic joint pain, and nephrolithiasis.

Conclusions

Resident physicians have an essential role in combating the opioid epidemic. There was significant improvement in various aspects of opioid related pain management among emergency medicine, internal medicine, and general surgery residents following the educational interventions. We recommend that medical school and residency programs consider including opioid related pain management in their curricula.

Introduction

The United States opioid epidemic is a multifactorial crisis, with prescription opioids identified as a key contributor to opioid misuse and overdose deaths.¹ At the medical provider level, harm reduction techniques have focused on preventing an excess of prescription opioids from circulating in the community. Approaches to this have included legislative limits on prescription amounts for certain

patient populations² and state-mandated use of Prescription Drug Monitoring Programs (PDMPs) to regulate opioid dispensing.³ While recent studies have provided specialty- and procedure-specific opioid prescribing recommendations based on patient consumption patterns and pain relief requirements,⁴⁻⁶ no formal prescribing guidelines exist to eradicate the provider uncertainty that stems from the fear of undermanaging patient pain.⁷ Additionally, medical school and residency program curricula dedicated to key opioid and pain management topics are underwhelming in the context of the severity of the opioid epidemic. This has been attributed partly to a limited pool of faculty who feel qualified to teach these concepts, and to a lack of standardized competencies driving curricular design.^{7,8}

Accordingly, residents across all medical disciplines are often underprepared to prescribe opioids for patient pain or respond to various opioid-related patient management scenarios.⁹⁻¹¹ The magnitude of this deficit is well-exemplified in a recent study surveying surgical residents at a large academic institution: 90% reported no formal training in best practices of pain management or opioid prescribing, despite reliance on opioids for postoperative pain management.¹¹ In response to this insufficiency in medical trainee preparation, residency programs have begun to incorporate opioid and pain management material into their curricula. Programs have used various educational models, and some have quantified the effectiveness of these didactics through methods such as survey data collection.¹¹⁻¹³ However, these interventions are typically implemented in a specialty-specific cohort, which limits group knowledge comparisons and the potential to evaluate standardized intervention effectiveness across a variety of medical disciplines.

The purpose of this study was to investigate the impact of an educational presentation on resident knowledge and attitudes related to opioid prescribing and pain management, in internal medicine, general surgery, and emergency medicine residents. By implementing a standardized intervention designed to educate trainees on key concepts such as opioid crisis statistics, opioid prescribing laws, opioid-related complications, and evidence-based opioid prescribing guidelines, we aimed to measure the success of this intervention at content delivery while simultaneously collecting data on the opioid and pain management education of our residents. The goal was to compare the effectiveness of this educational model at improving resident opioid and pain management knowledge, attitudes, and behaviors across several specialties and assess the feasibility of a generalized institutional approach to resident opioid education.

Methods

After obtaining institutional review board approval, 46 internal medicine (IM), 17 general surgery (GS), and 27 emergency medicine (EM) residents from all postgraduate years (PGYs) at Thomas Jefferson University Hospital in Philadelphia, Pennsylvania, were recruited by email to voluntarily participate in this study. The intervention was designed as a 7-minute pre-recorded lecture with accompanying pre- and post-tests. Tests were intended to assess resident opioid and pain management knowledge, attitudes, and behaviors at baseline and upon presentation completion. Lecture presentation content consisted of

opioid crisis statistics, opioid prescribing laws, opioid-related complications, and evidence-based opioid prescribing guidelines with practice recommendations modified for each specialty. Pre- and posttests were designed identically for each group of residents, with differences only in case vignette content and prescribing guidelines between the three cohorts to provide residents with recommendations and scenarios relevant to their specific fields. The complete pre- and posttests for each specialty are available in Appendix A. The data from the pre- and posttests were organized into Additional file 1. We performed descriptive statistics to quantify pre- and posttest responses and used a Chi-squared analysis to identify resident changes between baseline and completion of the educational intervention. Additionally, we generated comparisons of performance measures across the three cohorts to identify specialty-specific trends. A $p < 0.05$ value was considered statistically significant.

Results

A total of 90 residents completed the pre-tests, consisting of 27 residents in emergency medicine, 17 in general surgery, and 46 in internal medicine. There were 46 post-test responses from 13 emergency medicine residents, 13 general surgery residents, and 20 internal medicine residents. The response rates between pre and post-tests for emergency medicine, general surgery, and internal medicine were 48%, 76% and 43% respectively. The demographics for the residents are listed in **Table 1**.

EM residents reported receiving education about opioids from various avenues and stages of training, including personal reading (10 residents [37%]), medical school (16 residents [59.3%]), and residency (22 residents [81.5%]). Regarding training previously received, 4 residents were very satisfied (14.8%), 8 were satisfied (29.6%), 11 were neutral (40.7%), 3 were unsatisfied (11.1%), and 1 was very unsatisfied (3.7%). The EM resident prescribing habits and opioid knowledge are listed in **Table 2**. After receiving the educational intervention, the attitudes of EM residents to the statement “If I suspect someone is abusing opioids, I do not prescribe opioids to them” significantly changed [$p=0.04$].

Comparatively, general surgery residents received opioid training from personal reading (5 residents, 29%) medical school (9 residents, 53%), and residency (17 residents, 100%). Regarding prior opioid training, 1 resident felt unsatisfied, 4 residents felt neutral, 9 residents felt satisfied (52.9%), and 3 felt very satisfied (17.6%). Following this educational intervention, 1 resident felt unsatisfied (7.7%), 7 felt satisfied (53.8%), and 5 felt very satisfied (38.5%) with their opioid prescribing abilities. Furthermore, there was significant improvement in prescribing habits following a sleeve gastrectomy ($p=0.01$) and a laparoscopic cholecystectomy ($p=0.002$). The GS resident prescribing habits are listed in **Table 3**.

The internal medicine residents reported receiving opioid training from personal reading (14, 30.4%), medical school (28, 60.9%), residency (33, 71.7%), or in some cases, never received training (4, 8.7%). Regarding their previous opioid training, 1 resident was very unsatisfied (4.3%), 21 residents (45.7%) were unsatisfied, 19 (41.3%) were neutral, 3 (6.5%) were satisfied, and 2 were very satisfied (4.3%). Following the study training, 9 residents were unsatisfied (45%), 9 residents were neutral (45%), and 2 residents were satisfied (10%). Following the educational intervention, there was improvement in responses to multiple

treatment scenarios, though none of these reached significance. These included treatment of acute episodic migraines according to American Headache Society 2015 Guidelines (45.7% to 70% prescribing naratriptan, $p=0.11$), improvement in prescribing habits for joint pain in a patient with a history of osteoarthritis (23.9% to 45%, $p=0.14$), and an increase in non-opioid management of nephrolithiasis in a patient with no history of GI bleed (62.2% to 70%, $p=0.59$) [Table 4].

All three groups of residents were asked questions about opioid background knowledge and attitudes. In response to “Which three states have the highest percentage of opioid-related deaths per capita?”, there was significant improvement in general surgery ($p=0.001$) and internal medicine ($p=0.003$) responses following the intervention. Furthermore, there was increase in knowledge of the number of drug overdose deaths that occurred from opioids, though it did not reach statistical significance, in both general surgery (41% to 77%, $p=0.07$) and internal medicine (45.7% to 65%, $p=0.15$). Lastly, there was significant improvement in all specialties regarding knowledge of the number of deaths that were a result of heroin overdose (general surgery $p<0.001$, internal medicine $p<0.001$, emergency medicine $p=0.015$) [Figure 1].

Regarding the level of satisfaction with prior opioid training, there was a significant difference between specialties ($p<0.0001$). Almost half of all internal medicine residents felt unsatisfied with their prior opioid training (unsatisfied or very unsatisfied - 47.9%). Comparatively, 5.9% of general surgery residents and 14.8% of emergency medicine residents felt unsatisfied or very unsatisfied with their training. There was also a significant difference across specialties in the initial management of mild pain ($p=0.005$) and moderate pain ($p<0.001$). For moderate pain, general surgery residents (35.5%) were more likely to prescribe opioids than their colleagues in internal medicine (2.2%) and emergency medicine (0%).

Discussion

The opioid epidemic in the United States has progressively worsened. There are several historical factors that contributed to the rise of the opioid epidemic, including the classification of pain management as a human right¹⁴ and a fifth vital sign,¹⁵ pharmaceutical marketing,¹⁶ and postoperative pain mismanagement.¹⁷ To combat the epidemic, there has been growth in non-opioid treatments in pain management, such as nerve blocks, NSAIDs, and ketamine.¹⁸ This study aimed to assess the baseline responses and the effect of a brief educational intervention on the knowledge and attitudes of emergency medicine, general surgery, and internal medicine residents at a single institution.

This study found many significant opportunities for improvement in resident opioid education. Regarding previous opioid knowledge training, 45.7% of internal medicine residents were unsatisfied with the quality of training they had received. This suggests an area of potential collaboration between residents and hospital administration to better equip trainees with the practical information and skills they need to safely and effectively manage pain.

With this brief intervention, there was an improvement of prescribing habits across all specialties. In emergency medicine, we observed a greater percentage of residents indicating knowledge that, per

Pennsylvania state guidelines, 7 days is the maximum duration of opioids that should be prescribed to an adult patient presenting to the Emergency Department with acute pain (22.2–30.8%). Additionally, there was an increase in the correct use of naratriptan for acute migraine management in the emergency department (from 14.8–38.5%). This particular scenario represents a key opportunity to reduce opioid use in exchange for a more efficacious medication. A study conducted by Colman et al. found that more than half of all patients presenting with migraines were treated with opioids as a first line therapy across 4 different hospitals.¹⁹ Focusing on common clinical presentations like this, where treatment algorithms may be ambiguous for many providers, could greatly reduce the unnecessary use of opioids. Additionally, this effort is not meant to create a divide between providers and patients. Patients who have a history of drug misuse should receive the appropriate pharmacotherapy and psychosocial counseling to equip them with the tools to make effective change.²⁰ From the provider perspective, it is imperative to keep the patient's best interest in mind when treating someone struggling with drug dependence, without letting biases affect your judgement.

We observed a change in perspective among emergency medicine residents. Initially, majority of residents would not prescribe opioids to someone who appeared to be misusing drugs (70.3%). After our intervention, the number of residents who agreed with this statement decreased to 30.8% ($p = 0.04$). This change in perspective highlights the multifaceted and individualized approach needed for each patient, considering the dangers of both over and under prescribing.

For general surgery, we observed significant improvement in prescribing habits, better conforming to narcotic amounts determined by recent papers, following common procedures such as sleeve gastrectomy ($p = 0.01$) and laparoscopic cholecystectomy ($p = 0.002$).^{21,22} A similar study conducted by Hill et al. found that an educational intervention effectively decreased the number of opioids prescribed to patients following general surgery procedures.²³

Among internal medicine residents, there was a decrease in participants who wanted to use opioids as a first line treatment for migraines, arthritic joint pain, and nephrolithiasis. While these findings may not reach statistical significance, the increased percentage of correct responses indicates improvement of knowledge. The recommended first line treatment for acute migraine includes non-steroidal drugs and triptans. Opioid use in migraine treatment has not shown to have significant improvement so they are not recommended as initial treatment;²⁴ however, studies such as Bigal et al. have found that opioids were commonly used in clinical practice for migraine treatment (20.8%).²⁵ A possible solution in this gap between recommendations and clinical practice can be educational interventions such as this study to target specific clinical situations that are confusing for providers or commonly treated inappropriately with opioids when good alternatives exist.

Potential limitations in this study can be attributed to study design. Since our study focused on survey responses, the data largely depended on completion of both pre- and post-tests. There was a discrepancy in response rates between pre and posttests, likely due to survey fatigue and the demands of residents' schedules. Additionally, this study took place during the Covid-19 pandemic, which placed considerable

stress on resident physicians.²⁶ In order to boost survey responses, we sent reminders via email, had participating residents from each department make announcements at weekly meetings, and sent other team members to attend departmental conferences. Despite our best efforts however, we were unable to improve these response rates. Additionally, our data is from survey answers and not real-world clinical actions. Given residents are largely constrained in their medication prescribing practices by the desires and preferences of supervising attendings, we did not feel studying their prescribing behaviors would yield meaningful results. Resident physicians are an integral component in battling the opioid epidemic. With these findings, we encourage medical schools and residency programs to integrate training on the effective use of non-opioid pain treatments into their curricula.

Conclusions

The opioid epidemic is a multifaceted issue that can be attributed to many causes. Resident physicians are a key resource in combating the opioid epidemic. We observed significant improvement in opioid knowledge and prescribing habits among all residents following the specialty specific educational interventions. Therefore, we recommend that medical school and residency programs consider integrating opioid related pain management strategies throughout their curricula.

Abbreviations

IM - Internal medicine

GS- General surgery

EM- Emergency medicine

PDMP- Prescription Drug Monitoring Programs

Declarations

Ethics approval and consent to participate: Jefferson IRB exempted this study from IRB approval on 05/09/2019 in accordance with Federal Wide Assurance #00002109 to the US Department of Health and Human Services.

Consent for publication:

I, Pankti Acharya, give my consent to publish this manuscript and supplemental figure 1, tables 1-4, and additional file 1 in the Journal of BMC Medical Education

Availability of data and material: All data generated or analyzed during this study is included in the supplemental information file labeled raw data.

Competing interests: not applicable

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Authors' contributions: PA and BF were involved in conducting the study and writing the manuscript. All authors contributed to data collection and analysis.

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References

1. Overdose Death Maps | Drug Overdose | CDC Injury Center. <https://www.cdc.gov/drugoverdose/data/prescribing/overdose-death-maps.html>. Accessed September 8, 2020.
2. Zhang H, Tallavajhala S, Kapadia SN, et al. State opioid limits and volume of opioid prescriptions received by medicaid patients. *Med Care*. 2020;58(12):1111-1115. doi:10.1097/MLR.0000000000001411
3. Manasco AT, Griggs C, Leeds R, et al. Characteristics of state prescription drug monitoring programs: a state-by-state survey. *Pharmacoepidemiol Drug Saf*. 2016;25(7):847-851. doi:10.1002/pds.4003
4. Wyles CC, Hevesi M, Ubl DS, et al. Implementation of Procedure-Specific Opioid Guidelines: A Readily Employable Strategy to Improve Consistency and Decrease Excessive Prescribing Following Orthopaedic Surgery. *JB JS Open Access*. 2020;5(1):e0050. doi:10.2106/JBJS.OA.19.00050
5. Starr MR, Patel SV, Bartley GB, Bothun ED. Impact of Standardized Prescribing Guidelines on Postoperative Opioid Prescriptions after Ophthalmic Surgery. *Ophthalmology*. 2020;127(11):1454-1459. doi:10.1016/j.ophtha.2020.04.015
6. Glaser GE, Kalogera E, Kumar A, et al. Outcomes and patient perspectives following implementation of tiered opioid prescription guidelines in gynecologic surgery. *Gynecol Oncol*. 2020;157(2):476-481. doi:10.1016/j.ygyno.2020.02.025
7. Singh R, Pushkin GW. How should medical education better prepare physicians for opioid prescribing? *AMA J Ethics*. 2019;21(8):E636-641. doi:10.1001/amajethics.2019.636
8. Boscoe E, Rodriguez KD, Johnson AP. Opioid prescribing education in surgical training. In: Svider PF, Pashkova AA, Johnson AP, eds. *Perioperative Pain Control: Tools for Surgeons: A Practical, Evidence-Based Pocket Guide*. Cham: Springer International Publishing; 2021:29-38. doi:10.1007/978-3-030-56081-2_4
9. Garcia J, Ohanisian L, Sidley A, et al. Resident knowledge and perception of pain management. *Cureus*. 2019;11(11):e6107. doi:10.7759/cureus.6107
10. Huynh V, Colborn K, Christian N, et al. Resident Opioid Prescribing Habits Do Not Reflect Best Practices in Post-Operative Pain Management: An Assessment of the Knowledge and Education Gap. *J Surg Educ*. December 2020. doi:10.1016/j.jsurg.2020.12.014
11. Chiu AS, Ahle SL, Freedman-Weiss MR, Yoo PS, Pei KY. The impact of a curriculum on postoperative opioid prescribing for novice surgical trainees. *Am J Surg*. 2019;217(2):228-232.

doi:10.1016/j.amjsurg.2018.08.007

12. Naimer MS, Munro J, Singh S, Permaul JA. Improving Family Medicine Residents' Opioid Prescribing: A Nurse Practitioner-Led Model. *The Journal for Nurse Practitioners*. 2019;15(9):661-665. doi:10.1016/j.nurpra.2019.07.002
13. Warner LL, Warner PA, Eldrige JS. Orthopedic resident education on postoperative pain control: bridging knowledge gaps to enhance patient safety. *Int J Med Educ*. 2018;9:72-73. doi:10.5116/ijme.5a91.2f7f
14. Weiner SG, Malek SK, Price CN. The opioid crisis and its consequences. *Transplantation*. 2017;101(4):678–81. <https://doi.org/10.1097/TP.0000000000001671>.
15. Society AP. Principles of analgesic use in the treatment of acute pain and cancer pain: American Pain Society; 1999.
16. Van Zee A. The promotion and marketing of oxycontin: commercial triumph, public health tragedy. *Am J Public Health*. 2009;99(2):221–7. <https://doi.org/10.2105/AJPH.2007.131714>.
17. Vadivelu N, Kai AM, Kodumudi V, Sramcik J, Kaye AD. The opioid crisis: a comprehensive overview. *Curr Pain Headache Rep*. 2018;22(3):16. doi:10.1007/s11916-018-0670-z
18. Jones MR, Viswanath O, Peck J, Kaye AD, Gill JS, Simopoulos TT. A brief history of the opioid epidemic and strategies for pain medicine. *Pain Ther*. 2018;7(1):13-21. doi:10.1007/s40122-018-0097-6
19. Colman I, Rothney A, Wright SC, Zilkalns B, Rowe BH. Use of narcotic analgesics in the emergency department treatment of migraine headache. *Neurology*. 2004;62(10):1695-1700.
20. *Guidelines for the Psychosocially Assisted Pharmacological Treatment of Opioid Dependence*. Geneva: World Health Organization; 2009.
21. Hill MV, McMahon ML, Stucke RS, Barth RJ. Wide variation and excessive dosage of opioid prescriptions for common general surgical procedures. *Ann Surg*. 2017;265(4):709-714. doi:10.1097/SLA.0000000000001993
22. Opioid Prescribing Recommendations | Michigan OPEN. <https://michigan-open.org/prescribing-recommendations/>. Accessed June 3, 2021.
23. Hill MV, Stucke RS, McMahon ML, Beeman JL, Barth RJ. An educational intervention decreases opioid prescribing after general surgical operations. *Ann Surg*. 2018;267(3):468-472. doi:10.1097/SLA.0000000000002198
24. Casucci G, Cevoli S. Controversies in migraine treatment: opioids should be avoided. *Neurol Sci*. 2013;34 Suppl 1:S125-8. doi:10.1007/s10072-013-1395-8
25. Bigal ME, Borucho S, Serrano D, Lipton RB. The acute treatment of episodic and chronic migraine in the USA. *Cephalalgia*. 2009;29(8):891-897. doi:10.1111/j.1468-2982.2008.01819.x
26. Opinion | Covid-19 is pushing doctors to the brink. Medicine needs to recognize they're human and need help. - The Washington Post. <https://www.washingtonpost.com/opinions/2020/07/20/covid->

19-is-pushing-doctors-brink-medicine-needs-recognize-theyre-human-need-help/. Accessed June 2, 2021.

Tables

Table 1: Resident Demographics

<i>Emergency Medicine</i>		
	Pre-test	Post-test
Year in Residency		
PGY1	8 (30%)	5 (38%)
PGY 2	8 (30%)	2 (15%)
PGY3	11 (41%)	6 (46%)
DEA License		
Yes	0 (0%)	0 (0%)
No	27 (100%)	27 (100%)
<i>General Surgery</i>		
	Pre-test	Post-test
Year in Residency		
PGY1	2 (12%)	0 (0%)
PGY 2	2 (12%)	3 (23%)
PGY3	3 (18%)	3 (23%)
PGY4	5 (29%)	4 (31%)
PGY5	4 (24%)	3 (23%)
DEA License		
Yes	15 (88%)	13 (100%)
No	2 (12%)	0 (0%)
<i>Internal Medicine</i>		
	Pre-test	Post-test
Year in Residency		
PGY1	18 (39%)	9 (45%)
PGY 2	12 (26%)	8 (40%)
PGY3	16 (35%)	3 (15%)
DEA License		
Yes	4 (9%)	0 (0%)
No	42 (91%)	20 (100%)

Table 2: EM resident knowledge and attitudes

	Pre-test	Post-test	P-value
<i>For an adult patient that presents to the emergency room with acute pain, according to current PA state guidelines, what is the maximum duration (days) for which an opioid prescription should be given?</i>			
7 days*	6 (22.2%)	4 (30.8%)	0.56
<i>For an adult presenting to the ED with acute low back pain, I would typically prescribe:</i>			
0-10 tablets of 5mg Oxycodone + NSAID*	0 (0%)	2 (15.4%)	0.54
<i>A 25-year-old female presents to the office with an acute episodic migraine According to the American Headache Society 2015 Guidelines, what treatment has Level A evidence?</i>			
Naratriptan*	4 (14.8%)	5 (38.5%)	0.09
<i>I feel comfortable in my knowledge of non-opioid pain management.</i>			
Agree	15 (55.5%)	7 (53.8%)	0.06
Strongly agree	5 (18.5%)	3 (23.1%)	
<i>If I suspect someone is abusing opioids, I do not prescribe opioids to them.</i>			
Agree	12 (44.4%)	2 (15.4%)	0.04
Strongly agree	7 (25.9%)	2 (15.4%)	
<i>For patients experiencing moderate pain, I usually initially prescribe:</i>			
Tylenol	5 (18.5%)	5 (38.5%)	
NSAIDS	22 (81.5%)	8 (61.5%)	0.17
Opioid	0 (0%)	0 (0%)	

Table 3: General surgery specific questions

For a patient being discharged home after a sleeve gastrectomy, I would typically prescribe:			
0-10 tablets 5mg oxycodone*	9 (52.9%)	13 (100%)	0.01
For a patient being discharged home after a laparoscopic cholecystectomy, I would typically prescribe:			
0-15 tablets*	1 (5.9%)	7 (53.8%)	0.002
For a patient being discharged home after an open small bowel resection, I would typically prescribe:			
0-15 tablets*	6 (35.3%)	8 (61.5%)	0.16
For a patient being discharged home after a major hernia repair, I would typically prescribe			
0-10 tablets*	4 (23.5%)	9 (69.2%)	0.04

Table 4: Internal Medicine specific questions

If I suspect someone is abusing opioids, I do not prescribe opioids to them.			
Agree	25 (54.3%)	9 (45%)	0.22
Strongly Agree	8 (17.4%)	9 (45%)	
I think that proper pain management is associated with better patient outcomes.			
Agree	25 (54.3%)	14 (70%)	0.11
Strongly Agree	20 (43.5%)	6 (30%)	
A 25-year-old female presents to the office with an acute episodic migraine According to the American Headache Society 2015 Guidelines, what treatment has Level A evidence?			
Naratriptan*	21 (45.7%)	14 (70%)	0.11
A 65-year-old man returns to the clinic for joint pain in his knees. He has a history of osteoarthritis and states that it is difficult for him to complete daily tasks. His pain was not treated by NSAIDs or weight loss. What should be the next line of treatment?			
Tramadol*	11 (23.9%)	9 (45%)	0.14

Figures

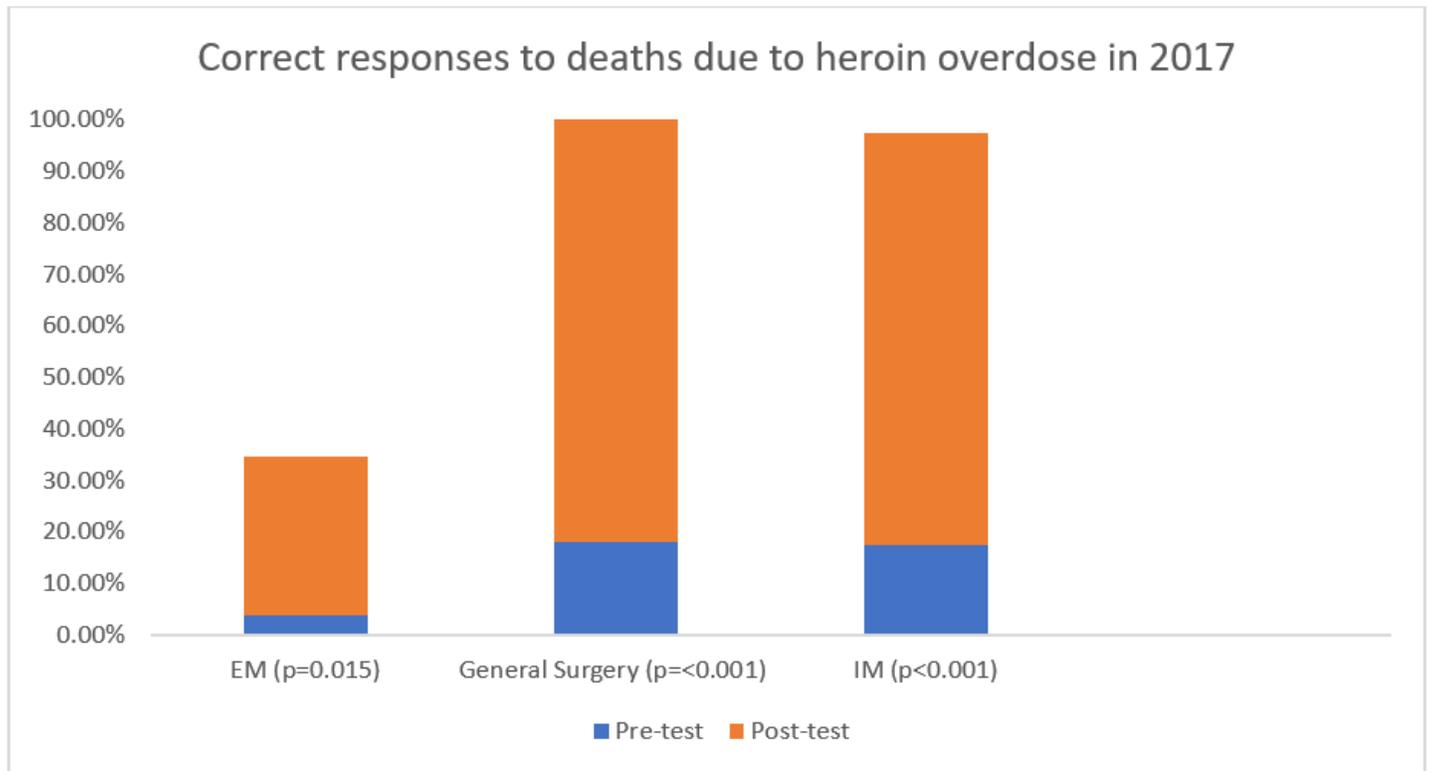


Figure 1

Correct responses to the number of deaths due to heroin overdose in 2017

Supplementary Files

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- [RawData.xlsx](#)
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- [Additionalfile3Generalsurgeryresidentknowledgeandattitudespre.docx](#)
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