Implementing and Evaluating a Multihospital Standardized Opioid Curriculum for Surgical Providers

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OBJECTIVE: (1) To identify gaps in providers knowledge on opioid medication and dosing, patient-specific characteristics that require alterations in dosing, and patient monitoring and treatment adjustments. (2) To evaluate an educational intervention aimed at minimizing these deficits.

DESIGN: Observational prospective study. Providers took an anonymous paired pre-and posteducation knowledge assessment before and after participating in a 75-minute educational session. Results before and after the educational session were compared.

SETTING: Surgical providers included nurse practitioners, physician assistants, preinterns, and general surgery residents across 4 quaternary care hospitals in Boston. *Participants* There were 194 participants and 174 completed both pre- and posteducation knowledge assessments.

RESULTS: Average scores on the educational assessment increased from 59% before the course to 68% after the session. Posteducation, providers reported increased comfort in prescribing and 95% stated that the curriculum would impact their practice.

CONCLUSIONS: Surgical providers at multiple hospitals have significant gaps in knowledge for optimal prescribing and management of opioid prescriptions. A 75-minute opioid education session increased prescriber knowledge as well as comfort in prescribing. This multicenter study demonstrates how an educational initiative can be implemented broadly and result in decreased knowledge gaps. (J Surg Ed 77:621–626. © 2020 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: opioid education, knowledge assessment, surgical prescribing

COMPETENCIES: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Numerous regulatory bodies and professional organizations presently highlight that opioids should only be prescribed at the lowest effective dose and for the minimum duration necessary.[1-4] More than one third (36.5%) of all prescriptions written by surgeons are for opioid-containing medications.[5] Despite the well-known adverse effects of opioids, licensure requirements to prescribe and the frequency of prescribing in surgery, there is little formalized education for surgical prescribers on pain management and opioid prescribing. A recent report highlighted the importance and relevance of physician opioid education in addressing the opioid epidemic, clearly linking education to future prescribing practices.[6]

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Notwithstanding the importance of integrated pain management courses, fewer than 4% of U.S. medical schools report requiring such defined training.[7] Additionally, while surgical pain management is clearly a goal of surgeons, only 6% of surgical residents complete opioid education though 20% of program directors report mandatory opioid education.[8,9] This statistic is particularly relevant in academic medical centers, where most pain management and opioid prescribing is carried out by residents.

This study evaluated gaps in opioid knowledge for surgical prescribers as well as an intervention to improve opioid prescribing knowledge.

MATERIALS AND METHODS

A multidisciplinary team of surgeons and anesthesiologists created an opioid educational curriculum tailored to surgical prescribers. The curriculum was designed as a 75-minute didactic session that could be readily integrated within the educational curricula of most residencies. The curriculum included several key components: a review of pain medications, dosing, indications and contraindications; identification of patients at high risk for uncontrolled pain and patients at risk for opioid misuse or abuse; patient monitoring and care plans; and state and federal legislation.

To evaluate changes in knowledge, an 11-question opioid knowledge assessment was utilized both before and after the curriculum. This knowledge assessment was designed by the Pennsylvania Patient Safety Authority and has previously been administered to prescribers, pharmacists, and nurses.[10,11] We added 5 questions to identify prescriber practice level, comfort in prescribing, and feedback on the curriculum. Anonymous pre- and postassessments were paired, which allowed evaluation of individual score changes.

From February to September 2018, preinterns (defined as fourth year medical students who had matched into a surgical residency, but had not yet had any clinical experience as an intern), residents of postgraduate years 1 through 5, nurse practitioners, and physician assistants from 4 academic medical centers in Boston (Beth Israel Deaconess Medical Center, Boston Medical Center, Brigham and Women's Hospital, and Massachusetts General Hospital) were involved in opioid education sessions. These sessions ranged in size from 7 to 26 participants and lasted from 60 to 90 minutes with an average of 75 minutes. Preinterns were defined as individuals who had matched into surgery and attended an educational session prior to beginning clinical rotations as an intern. This study was approved by the Beth Israel Deaconess Medical Center IRB as an exempt protocol.

For data analysis, the questions in the opioid knowledge assessment were organized into 3 categories: (1) general opioid medication and dosing knowledge, (2) patient-specific characteristics that require alterations in dosing, and (3) patient monitoring and treatment adjustments.

Statistical analysis was completed in STATA Version 15.1 (StataCorp, College Station, Texas). Descriptive statistics were generated including mean, median, and interquartile ranges for pre- and postintervention scores. Paired t tests were used to compare pre and postintervention quiz scores at the 5% significance level.

RESULTS

One hundred ninety-four providers participated across 4 Boston academic medical centers. There were 174 (90%) providers who completed both pre- and postknowledge assessments. The completed assessments represented 58 preinterns, 92 residents, 20 nurse practitioners and physician assistants and 4 who did not disclose their job status.

Scores prior to education were an average of 59% (median 64%) and increased to 68% (median 73%) after education, representing a relative average knowledge increase of 15% ($p < 0.0001$; Fig. 1a). Importantly, all groups studied had clear knowledge deficits that diminished after education (Fig. 1b).

Comfort in prescribing opioids was rated as an average of 4.0 prior to education on a scale of 1 to 10 and increased to 5.5 after education ($p < 0.0001$; Fig. 2). Ninety-five percent of participants reported that the education would impact their practice. Overall, the participants rated the educational sessions as a 7.6 (mean) and 8.0 (median) on a scale of 1 to 10.

Prior to the session, participants had the highest starting average score in category 2: patient-specific characteristics that require alterations in dosing (Fig. 3). After the educational session, there were significant improvements in category 1: general opioid medication and dosing knowledge as well as category 2: patient-specific characteristics that require alterations in dosing. There was a slight improvement noted in category 3: patient monitoring and treatment adjustments. However, this was not statistically significant.

DISCUSSION

We were able to demonstrate that an educational curriculum could be developed and delivered in an approximately 75-minute session resulting in statistically significant improvements in prescriber knowledge in comfort prescribing opioids. Consistent with prior reports, our results demonstrated significant knowledge gaps among

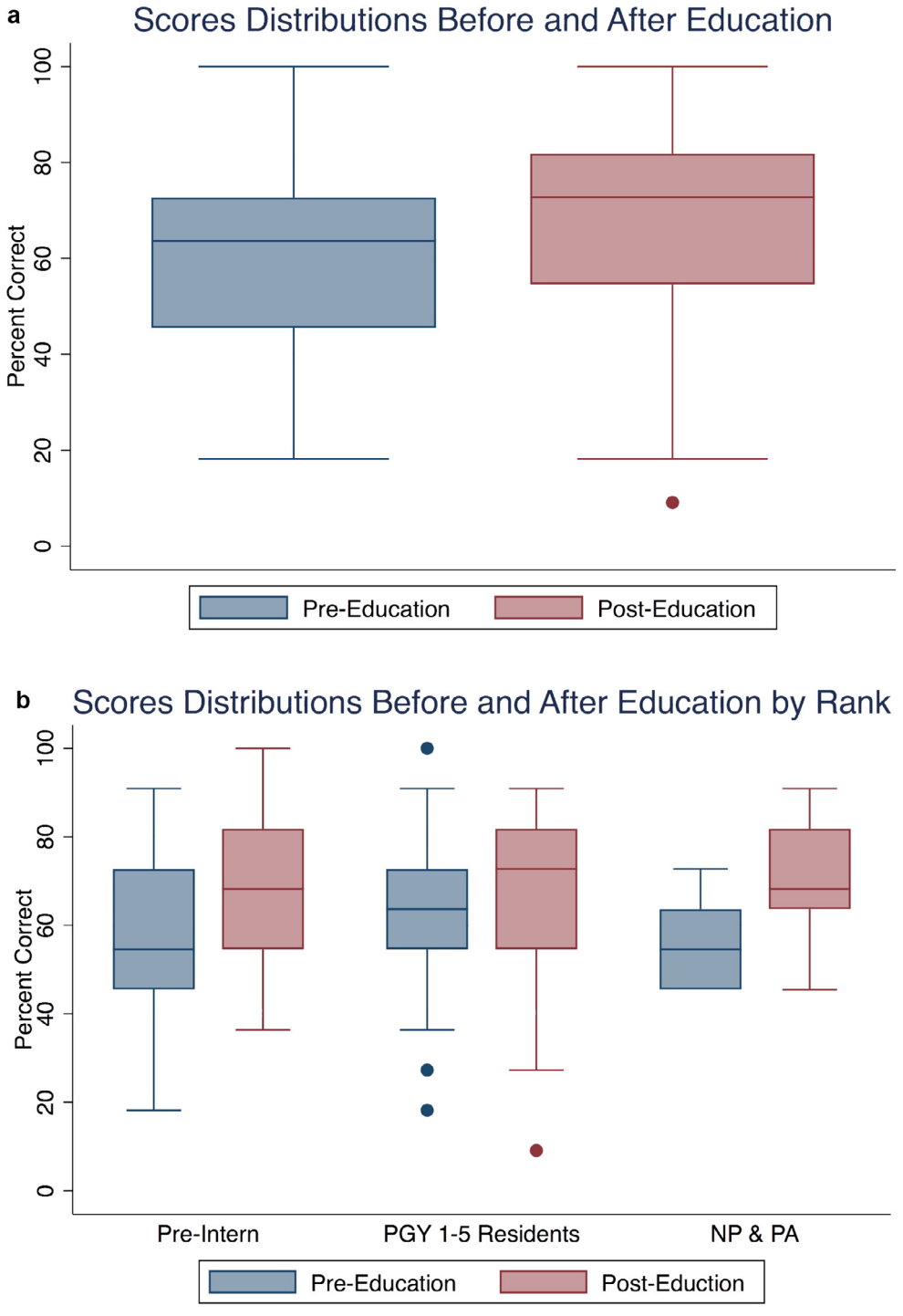

FIGURE 1. a) Boxplots of scores pre- and posteducation for the entire cohort. (b) Boxplots of scores pre- and posteducation separated by provider group.

providers.[10,11] Provider comfort with prescribing was quite low prior to education, highlighting the importance of this intervention. Knowledge deficits were present in all provider groups and all groups showed improvement in their knowledge posteducation.

A previous study demonstrated a decrease in prescribing opioids for hand surgery after an educational session with prescribing recommendations, but did not evaluate prescriber knowledge.[14] In our study, we addressed this gap in current literature by identifying knowledge

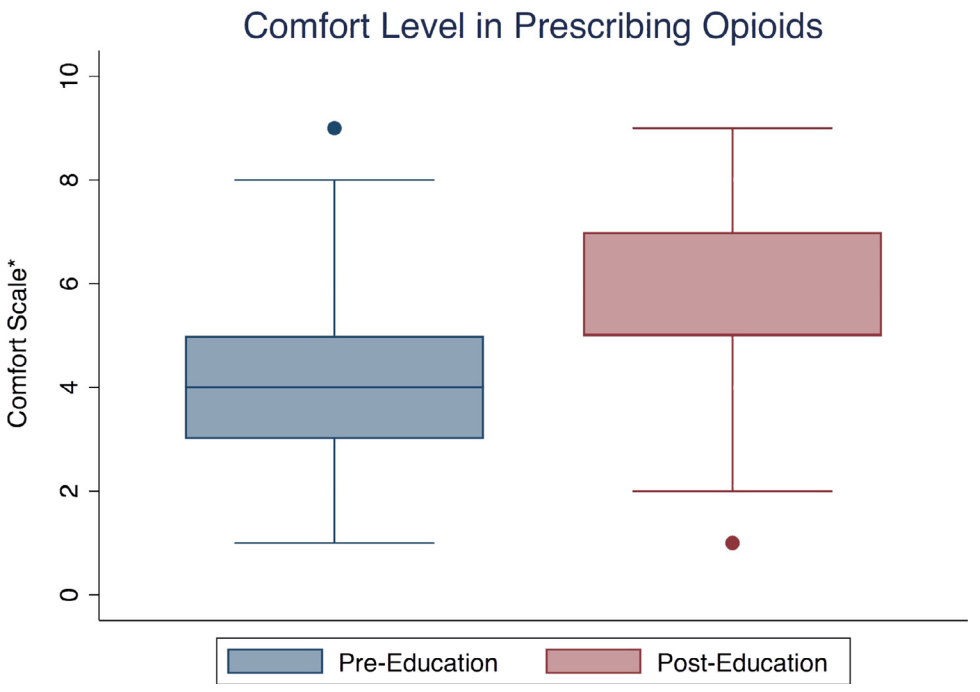

FIGURE 2. Comfort in prescribing pre- and post-education assessments. Comfort scale ranged from 1-10 with 1 being "very uncomfortable" and 10 being "very comfortable."

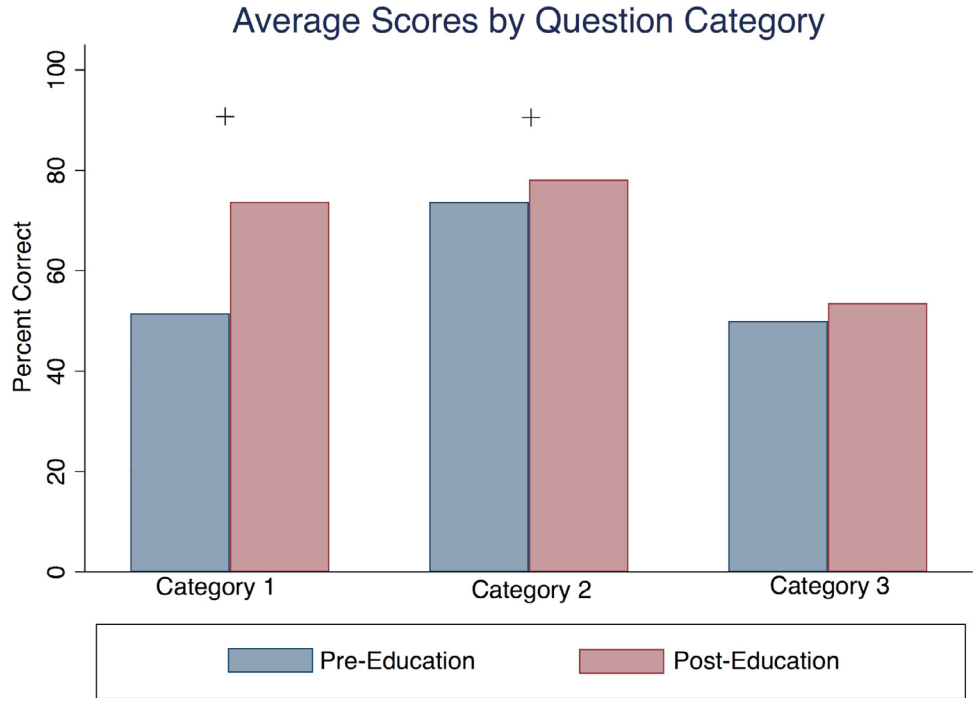

FIGURE 3. Score distributions for pre- and posteducation with questions categorized. +differences are statistically significant $p < 0.05$. Categories: (1) general opioid medication and dosing knowledge, (2) patient-specific characteristics that require alterations in dosing, and (3) patient monitoring and treatment adjustments.

increases for prescribers through education. When evaluating changes in knowledge by category, we identified improvements in all categories; although category 3 results did not meet significance thresholds. Questions relating to category 3 required synthesis and application of acquired knowledge. One reason this may have been observed is that didactic sessions may not be the best educational forum to teach applications of knowledge.

Nearly 80% of program directors surveyed through the Association of Program Directors in Surgery directory reported that they were considering establishing a mandatory opioid prescribing education requirement[8] and prescriber education is often cited as a priority.[6,9,10,12] Other publications have highlighted barriers to implementing education including design, time, and the needs and resources of the institution.[13] This study demonstrates a method to increase knowledge without requiring prohibitive time or financial commitments.

The major strength of this study is its external validity. The educational session was evaluated among multiple provider groups at 4 different institutions. Using the published opioid knowledge assessment tool, we were able to evaluate knowledge deficits and areas where knowledge improved with education.

Despite the importance and potential impact of these findings, this study is not without limitations. For example, the previously published knowledge assessment we used to evaluate participants' knowledge has not, as far as we know, been correlated with provider changes in behavior. We observed significant knowledge increases, but we did not observe knowledge mastery and will continue to modify the intervention. Increased knowledge does not necessarily translate into behavioral change or long-term retention. We are currently evaluating persistence of changes in knowledge over time as well as changes in prescribing practices.

To our knowledge, this is the first multihospital evaluation of opioid knowledge in surgical prescribers both before and after an intervention. The vast majority (95%) of participants reported that this training would impact their practice. These results suggest that targeted education can improve knowledge for surgical providers and may assist in changing practices to combat the opioid epidemic. Further, comfort in prescribing was lower than expected in a group of providers that frequently prescribes opioids. Given these results, we encourage surgery departments to provide training for opioid prescribers; an aliquot of training as limited as 75 minutes was able to significantly improve comprehension and comfort.

Future studies will evaluate knowledge retention as well as comparative effectiveness of case-based curricula and its impact on performance. Follow-up to evaluate long-term changes in knowledge and behavior will be important. Further, there is growing appreciation that education must be complemented with appropriate references for evidence-based prescribing. Our study demonstrates the need for a concise opioid education that can be provided at a variety of sites with similar impact and has the potential to be adapted for local needs, as well as prescribers' appreciation for such education.

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