Perianesthesia Nurses' Knowledge and Promotion of Safe Use, Storage, and Disposal of Opioids

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Purpose: *The purpose of this study was to determine perianesthesia nurses' knowledge and promotion of safe use, storage, and disposal of opioids to patients in the ambulatory surgery setting.*
Design: *A mixed methods descriptive survey.*
Methods: *Perianesthesia nurses who have responsibility for discharge education of patients after ambulatory surgery were eligible to participate. An evidence-based survey was e-mailed to all American Society of PeriAnesthesia Nurses members. A total of 1,977 nurses agreed to participate; 1,632 nurses met inclusion criteria and completed the survey. Responses to open-ended questions were coded and analyzed.*
Findings: *Perianesthesia nurses were generally knowledgeable about opioids and a large majority (82%) discuss side effects of opioids with every patient. A smaller percentage of perianesthesia nurses reported promoting safe use (27%), storage (23%), and disposal of opioids (18%) with every patient.*
Conclusions: *Perianesthesia nurses have an opportunity to develop standard guidelines for patient education to uniformly promote postoperative opioid safety.*

Keywords: *opioids, perianesthesia, ambulatory surgery, patient education.*

THE CENTERS FOR DISEASE CONTROL AND PREVENTION has declared the increasing abuse of opioids and opioid-related deaths an epidemic, with 131 Americans dying every day from a prescription or illicit opioid overdose.[1] Opioids are prescribed on a routine basis for patients in ambulatory surgery settings, with 42% to 66% of those opioid prescriptions left unused.[2-4] The overall rate of opioid prescriptions in the United States peaked in 2012 and has since been declining, but the amount of opioids prescribed per person is still three times higher than it was in 1999. More

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than 191 million opioid prescriptions were dispensed to American patients in 2017.[1]

At the same time, a lack of knowledge exists among health care providers and patients regarding safe storage and disposal of opioids.[5,6] Excess opioid pills are often stored in unsecured locations, increasing the chance of diversion and associated risk of death from overdose. Seventy-one percent of those who abuse prescription opioids obtain their pills from family or friends who have legitimate prescriptions.[7,8]

Nurses are well-positioned to teach patients about the risks of diversion, nonmedical use, and proper disposal of opioids.[9] Patient and family education regarding medication safety begins with the ordering physician and is reinforced by other health care providers (eg, pharmacists, registered nurses, advanced nurse practitioners). The goal of opioid education is to ensure that the use, storage, and disposal of opioid medications is part of the health care process.

Research to develop safe postdischarge prescription practices after surgery is needed.[10] The overarching purpose of this study was to determine perianesthesia nurses' knowledge and promotion of safe use, storage, and disposal of opioids to patients in the ambulatory surgery setting. In addition, we described the relationship of these concepts to each other and to demographic factors, as well as summarized themes of the qualitative analysis.

Theory/Conceptual Framework

This study is guided by the Knowledge to Action model, a framework to facilitate the process of knowledge translation.[11,12] (Figure 1) The Knowledge to Action model integrates two major concepts: knowledge creation (represented by a funnel) and an action cycle (a circle surrounding the funnel).[11,12] Knowledge creation identifies knowledge relevant to the practice problem under study and typically ends with clear practice recommendations. Knowledge creation occurs with inquiry, synthesis, and resulting tools for use. An action cycle then facilitates a directed approach to practice change. According to this framework, the initial phases of the action cycle determine the gap between evidence and current practice and assess barriers to inhibit use of moving evidence in practice. Interventions are then determined to assist in implementation of knowledge into practice. We are using information that has been promulgated by the FDA,[13] the AMA,[7] and the AAOS[14] to assess whether information about safe use, storage, and disposal of opioid medications have been translated to action by perianesthesia nurses.

The first step to knowledge creation is to clearly identify and clarify the practice issue or problem.[11,12,15] This study will identify the extent of the gap between the information that is currently available and how often that information is used in practice. Once the practice issue has been clarified, an intervention will be developed to translate new knowledge into practice in the perianesthesia setting with a view toward widespread adoption.

Methods

Design

This descriptive mixed methods study was conducted using data from a cross-sectional survey of perianesthesia nurse professionals. The study was approved by the University of Kentucky Institutional Review Board as an exempt study.

Setting and Participants

The study participants were recruited with an e-mail sent from the American Society of PeriAnesthesia Nurses' (ASPAN) national office to all members of the organization. ASPAN represents nurses who specialize in pre- and postanesthesia care, ambulatory surgery, and pain management. With over 14,000 members, ASPAN is the only professional organization dedicated exclusively to the practice of perianesthesia nursing (www.aspan.org). Eligible participants were perianesthesia nurses who have responsibility for discharge teaching of patients after ambulatory surgery. The study was described in the e-mail with a link provided for nurses who were interested in participating. Once the link was clicked, a message appeared, stating that participation in the survey was completely

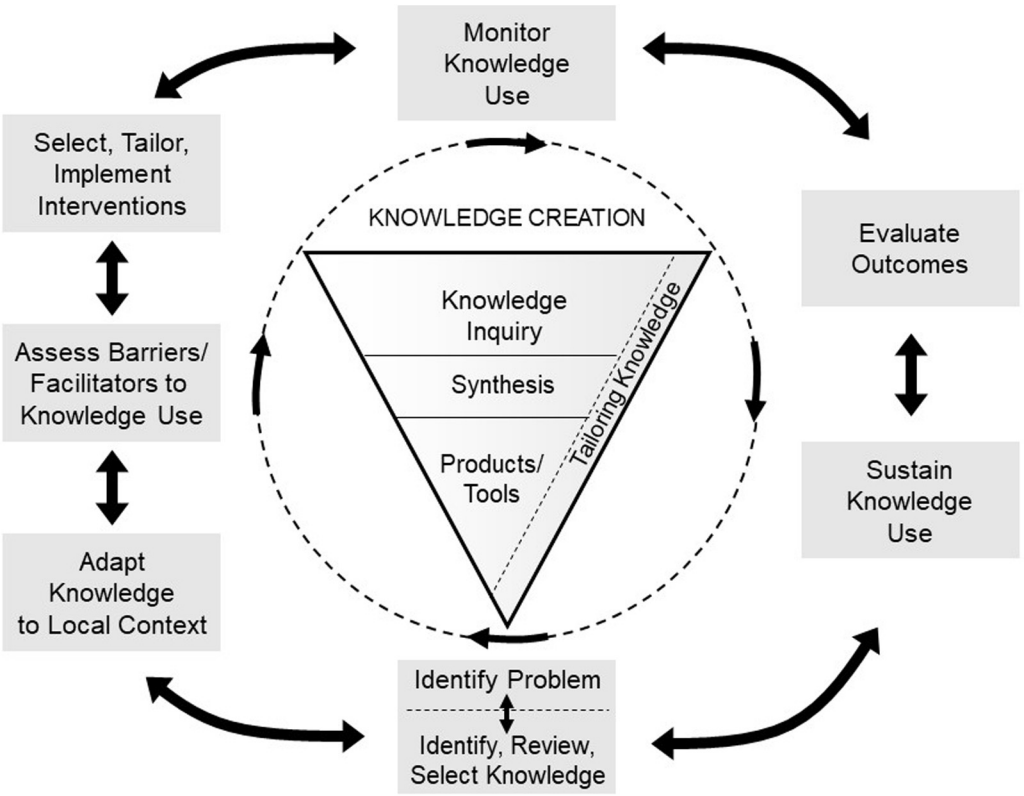

Figure 1. Knowledge to action process.[11]

voluntary and there would be no negative consequences to the nurse who choose not to participate in the study.

Responses were maintained in a password-protected file on a secured server and no individual responses were tracked or reported; anonymity was maintained for all participants. After reading the study description, the potential participant was given the choice of "Yes, I would like to participate" or "No, I do not care to participate." If the choice was "No," then the participant was taken to the last page of the survey, which contained a thank you message. If the choice was "Yes," then the participant moved forward. The second question asked was "Do you ever have job responsibilities for discharge teaching (patient education) of postanesthesia patients?" If the answer was "No," then the participant was taken to the last page of the survey. If the answer was "Yes," then the survey continued. The participant could exit the survey at any time without penalty.

Instrument

There is no established instrument for evaluating nurses' knowledge or practice of safe use, storage, and disposal of opioids. Therefore, an evidence-based instrument was developed by an expert perianesthesia nurse, an expert pain consultant, and a statistician.[16] After development, the survey was sent to several perianesthesia and pain experts (RN and MD) who assessed content validity. Refinements were made based on their feedback. The survey used in this study included this validated instrument and a section that captured the demographic characteristics of participants. The knowledge and practice instrument consisted of 2 parts: perianesthesia nurses' ***knowledge*** of safe use, storage, and disposal of opioids (8 items); and perianesthesia nurses' practice regarding discharge ***teaching*** of safe use, storage, and disposal of opioids to ambulatory surgery patients (10 items). If the participants answered yes to 7 of the items (2 ***knowledge*** and 5 ***teaching***), they were directed to an open-ended question, for

example, "Please describe the information regarding side effects of opioids that is included in the printed discharge instructions in the box below." The demographics section included 7 items. Six of the 7 demographic items allowed the participant to add information if the answer was "other."[16]

Data Collection

Approximately, 12,664 perianesthesia nurses were initially sent an e-mail link to the survey. Responses to the survey were collected and archived using the Qualtrics (Provo, UT; Seattle, WA) system. Qualtrics is a secure web-based application for building surveys and retaining survey responses. It offers a streamlined process for building a response database, interface for data collection and validation, and automated export procedures for downloading collected data to statistical packages. Qualtrics uses Transport Layer Security encryption (also known as HTTPS) for all transmitted data. All Qualtrics data are stored on a secure web server located behind a firewall on the University network. Reminder e-mails for survey completion were sent during week 2 (N = 13,078) and week 4 (N = 13,059). Participants had the opportunity to click a link to voluntarily include their name and address in a separate database to be used in a prize drawing at the end of the survey. Adding their name to the drawing was not necessary to complete the survey. The names of 20 participants were selected with a randomly generated list of ID numbers and each received a $50 check. The name and address were not linked to the participant's survey, maintaining anonymity of responses.

In a study that assessed population surveys and response rates, online response rates were almost doubled (17.1% to 33.7%) with the use of monetary rewards in combination with a relatively short (10 minutes) questionnaire.[17] Additional reasons for choosing the electronic survey format included mailing costs and the fact that physical addresses may be incomplete, out-of-date, or lack key information.[18]

Statistical Analysis

Based on prior studies described above, we anticipated having a response rate of at least 20% and estimated that the size of the ASPAN membership with valid e-mails to be approximately 15,000, yielding an expected sample size of approximately 3,000. Actual survey respondents included 1,977 members, of which 1,764 were eligible for the study because of their responsibilities for patient education pertaining to opioid use. Therefore, the overall response rate was 15.6% of the 12,664 members who were sent the initial survey. The response rate among those who were eligible for the study was not calculable as it is unknown how many ASPAN members have discharge teaching among their job responsibilities. In addition, as the survey was sent to membership from the ASPAN national office, it is unknown how many members may have failed to receive the invitation because of outdated e-mail information, thus the estimated response rate likely underestimated the true rate of return.

The initial analysis included a descriptive summary of all survey variables, including means and SDs or frequency distributions, as appropriate. This analysis included summaries of individual survey items as well as section totals for knowledge and teaching. The 8 ***knowledge*** items were summarized by totaling the number of correct or optimal responses to the yes/no or ordinal items, respectively. Items that were incorrect or skipped were given zero points in this total. The 10 ***teaching*** items formed two 5-item subscales, one for *consistency* of patient education and the other for *documentation* of patient education. The consistency items had 4-option ordinal responses indicating consistency of aspects of patient education, with options ranging from "never" to "every patient discharged with an opioid." These were scored from 1 to 4, with high scores indicating greater consistency in teaching (ie, with "every patient" being the goal). For the documentation items, the scoring was done so that one point was tallied for each correct response. Consistent with knowledge scoring, items that were incorrect or skipped were given zero points toward the total subscale score for teaching documentation.

Although it is possible that the scoring convention for both knowledge and teaching documentation may have underestimated these skills as we assumed skipped items were incorrect, this is a conservative way of estimating these concepts

given that everyone included in the study sample answered at least one item in each of these instruments. Similarly, we used the convention of estimating the frequency distributions and means/SDs of the demographic and personal characteristics based on the subset of the sample who completed each of these items. This convention is reasonable given that each of the survey demographic answers were missing for less than 10% of the sample.

We evaluated how the summary scores related to each other and to demographic factors using bivariate analysis, including Spearman rank correlation and the Mann-Whitney *U* (MWU) test, as appropriate. All quantitative data were analyzed using SAS, version 9.4 (Cary, NC), with an alpha level of 0.01 for inferential testing. This alpha level, chosen before data collection, is an acknowledgment of the robust estimated power given the sample size anticipated for this study. In addition, this more conservative alpha level is appropriate as an adjustment for the multiple comparisons under consideration.

Qualitative Data Analysis

Responses to open-ended questions were reviewed by two authors (JOF and JB). Descriptive content analysis was completed using standard qualitative analysis procedures.[19] Researchers reviewed and isolated the data into preliminary categories. Open-ended responses were grouped into categories related to content of the respondent's answer. The authors re-read the descriptive content and developed and validated patterns found within the data. One author (JB) analyzed the transcripts through axial coding wherein a label or a code is affixed to portions of text. Preliminary codes were based on the question content with additional codes added as data emerged. Analysis was then verified with the second author. In instances of disagreement, the investigators re-read the transcript and agreed to common codes. After discussion, the initial set of six categories was reduced into three categories that reflected important information given to patients related to the disposal of leftover opioids, side effects of opioids included in teaching, risks of diversion, avoiding nonmedical use of opioids, and proper storage of opioids at home.

Findings

Quantitative Results

A total of 1,977 perianesthesia nurses agreed to participate in the research study. When asked about job responsibility for discharge instructions of perianesthesia patients, 226 said "no," 880 responded "sometimes," and 884 responded "every day." Overall, 1,632 perianesthesia nurses were both *eligible for the study* (as evidenced by their response of "sometimes" or "every day" to the question about job responsibility of discharge instructions) and *completed at least one question in each of three parts of the survey*. This subset of participants forms the sample for the study.

Participants had an average of 16.7 years of experience. Sixty percent of participants had a Bachelor of Science in Nursing (BSN) degree and nearly one quarter had a diploma or associate's degree (Table 1). Sixty percent of participants were either certified perianesthesia nurses or certified ambulatory perianesthesia nurses, and most were clinical staff nurses (79%). Most participants worked in a hospital-based postanesthesia care unit or ambulatory surgery center (88%), with a smaller percentage (12%) who indicated their facility type was a free-standing ambulatory surgery center or physician office.

KNOWLEDGE OF PERIANESTHESIA NURSES. Eighty-two percent of nurses were aware that the diversion of prescription opioids is common (Table 2). Most participants also knew that it is not acceptable for postoperative patients to save unused opioids for future pain management needs (87%); that opioids are responsible for more overdose deaths in the United States than any other drug (98%), that studies found that leftover opioid tablets are commonly stored in unsecured locations (96%) and that prescription opioids for postoperative analgesia should be limited to a 5-day supply (93%). Fewer participants (42%) were aware that the percentage of opioid abusers obtained the drug from family members or acquaintances about 75% of the time. Most participants were aware of recommended techniques for disposing of leftover opioids (79%), but only two-thirds were aware of locations for disposal in their community. The

Table 1. Respondent's Demographic Characteristics (*N* = 1,632)

Characteristic	Mean (SD)	*n* (%)
Number of Years in Perianesthesia Nursing	16.7 (10.5)	
Degree		
Nursing Diploma		119 (7.9)
ADN		226 (15.1)
BSN		893 (59.6)
MSN		196 (13.1)
PhD/DNP		12 (0.8)
Other (eg, MBA)		53 (3.5)
Certifications Held*		
CPAN		626 (35.6)
CAPA		433 (24.6)
CCRN		88 (5.0)
CNOR		19 (1.1)
Certified pain management		13 (0.7)
Other (eg, CEN, CPN)		196 (11.1)
Job Title		
Clinical (Staff) Nurse		1,178 (79.4)
Nurse Manager		168 (11.3)
CNS or APN		11 (0.7)
Administration		16 (1.1)
Education		74 (5.0)
Research		0 (0)
Other (eg, Director of Perioperative Services)		37 (2.5)
Type Facility*		
Hospital-based PACU		991 (56.4)
Hospital-based ASU		557 (31.7)
Freestanding ASU		205 (11.7)
Physician's Office		5 (0.3)
Other (eg, GI Lab, Pain Management)		32 (1.8)
Average # Surgeries/Day at Facility		
10 or less		95 (6.4)
11-50		1,020 (68.5)
51-100		324 (21.8)
>100		49 (3.3)

ADN, Associate Degree Nursing; BSN, Bachelor of Science Nursing; MSN, Master of Science Nursing; PhD, Doctor of Philosophy; DNP, Doctor of Nursing Practice; MBA, Masters in Business Administration; CPAN, Certified PeriAnesthesia Nurse; CAPA, Certified Ambulatory PeriAnesthesia; CCRN, Certified Critical Care Nurse; CNOR, Certified Nurse Operating Room; CEN, Certified Emergency Nurse; CPN, Certified Pediatric Nurse; PACU, Postanesthesia Care Unit; ASU, Ambulatory Surgery Unit; GI, gastroenterology; CNS, clinical nurse specialist; APN, Advanced Practice Nurse.

Although the total sample size is 1,632, the number of responses to each variable may be less than this because of missing data.

*Total may exceed 1,632 because of the option to choose multiple types.

total knowledge score, equal to the number of correct/optimal responses on the eight-item scale, had a mean of 6.5 (SD = 1.1) and a range from 4 to 8.

PATIENT EDUCATION—CONSISTENCY. Ninety-three percent of perianesthesia nurses provided education on discharge about the side effects of opioids either with every patient or more than 50% of the time (Table 3). However, only 39% of nurses provided education about the risks of opioid diversion always or more than 50% of the time. Slightly more than half of nurses (56%) provided education regarding nonmedical use of opioids (eg, taken only as prescribed or by person who has

Table 2. Knowledge of Perianesthesia Nurses (N = 1,632)

Item	*n* (%)
Diversion of prescription opioids is common.	
True	1,333 (82.1)
False	291 (17.9)
Is it acceptable for postoperative patients to save unused opioids for future needs?	
Yes	207 (12.7)
No	1,423 (87.3)
Opioids responsible for more overdoses than any other drug.	
True	1,604 (98.3)
False	27 (1.7)
How often are leftover opioids stored in unsecured location?	
Never	17 (1.0)
Rarely	49 (3.0)
Often	1,562 (96.0)
Percentage of opioid abusers who obtain drug from family or acquaintance.	
25%	113 (6.9)
50%	457 (28.0)
75%	690 (42.3)
90%	370 (22.7)
For outpatient surgery, prescription opioids should be limited to 5-day supply for postoperative analgesia.	
True	1,521 (93.2)
False	111 (6.8)
Are you aware of any recommended techniques for disposing leftover opioids?	
Yes	1,291 (79.1)
No	341 (20.9)
Are you aware of locations at which opioids can be disposed in your community?	
Yes	1,091 (66.9)
No	540 (33.1)

Although the total sample size is 1,632, the number of responses to each variable may be less than this because of missing data.

prescription) always or at least half the time. Less frequent education topics were proper storage and disposal methods. Only one-third of perianesthesia nurses report that they advised patients to properly store opioids either always or over half of the time, and even fewer (27%) advise all or more than half of their patients on how to properly dispose leftover opioids. The total score on this subscale ranged from 5 to 20, with higher scores indicating greater teaching consistency. The average score was 12.9 (SD = 4.2).

PATIENT EDUCATION—DOCUMENTATION. The next section of the survey focused on information in the patient's printed discharge instructions. Seventy-five percent of participants reported that the side effects of opioids are included in the patient's printed discharge information (Table 3). However, a lower percentage of participants reported that risks of diversion, avoiding nonmedical use of opioids, information regarding proper storage of opioids at home, and proper disposal of opioids were included in the printed discharge instructions. The total score for teaching documentation had a range from 0 to 5, and the mean was 1.5 (SD = 4.2).

OTHER SURVEY INFORMATION. Other information obtained included the use of combination analgesic therapy. Combination analgesic therapy has been shown to result in less side effects and better postoperative pain control versus a single opioid analgesic plan of care.[20] Thirty percent of participants reported that 75% or more of their patients were discharged home on a combination pain medication therapy plan (Table 3). Participants were also asked if information on safe use, storage,

Table 3. Discharge Teaching to Perianesthesia Patients (N = 1,632)

Item	*n* (%)
Consistency	
Provide education to patients/families about side effects of opioids (eg constipation, sedation)	
Never	18 (1.1)
Less than 50% of the time	104 (6.4)
More than 50% of the time	167 (10.2)
Every patient discharged with opioid	1,343 (82.3)
Provide education to patients about risks of opioid diversion.	
Never	534 (32.7)
Less than 50% of the time	467 (28.5)
More than 50% of the time	194 (11.9)
Every patient discharged with opioid	437 (26.8)
Provide education to patients about risks of nonmedical use (taken as prescribed, not shared).	
Never	316 (19.4)
Less than 50% of the time	407 (24.9)
More than 50% of the time	257 (15.7)
Every patient discharged with opioid	652 (40.0)
Advise how to properly store opioids.	
Never	709 (43.4)
Less than 50% of the time	380 (23.3)
More than 50% of the time	175 (10.7)
Every patient discharged with opioid	368 (22.6)
Advise patients on how to properly dispose of leftover opioids.	
Never	829 (50.8)
Less than 50% of the time	369 (22.6)
More than 50% of the time	139 (8.5)
Every patient discharged with opioid	295 (18.1)
Documentation	
Information regarding side effects in printed discharge information?	
Yes	1,226 (75.4)
No	401 (24.6)
Information regarding risks of diversion in printed discharge information?	
Yes	282 (18.0)
No	1,289 (82.0)
Information regarding how to avoid nonmedical use (taken as prescribed, not shared) in printed discharge information?	
Yes	495 (31.7)
No	1,068 (68.3)
Information regarding proper storage at home in printed discharge information?	
Yes	287 (18.7)
No	1,252 (81.3)
Information regarding proper disposal in printed discharge information?	
Yes	192 (12.6)
No	1,335 (87.4)
Other	
Percentage of patients in facility discharged on combination pain medication therapy plan.	
25% or less	351 (23.5)
26% to 49%	295 (19.8)
50% to 74%	392 (26.3)
75% or greater	453 (30.4)
Information on safe use, storage, and disposal of opioids required for patient teaching in facility?	
Yes, it is required.	154 (10.3)
No, it is not required.	868 (58.1)
I do not know if it is required.	473 (31.6)

Although the total sample size is 1,632, the number of responses to each variable may be less than this because of missing data.

and disposal of opioids was required for patient teaching at their facilities. Only 10% of participants reported that it was required by the facility; the largest percentage (58%) stated that it was not required and 32% did not know if it was required.

BIVARIATE ANALYSIS. The Spearman rank correlations among knowledge, teaching consistency, and teaching documentation were positive and significant with a *P* value less than .001 in each case. Although the correlation coefficients for the relationships of knowledge with each of teaching consistency and teaching documentation were limited (rho estimates were 0.19 and 0.09, respectively), the correlation between teaching consistency and teaching documentation was stronger (rho = 0.38).

The MWU tests that compared scores on knowledge, teaching consistency, and teaching documentation between participants who indicated their position was "staff nurse" and the combined group of those who had any other position description were not significant for knowledge or teaching consistency (*P* values for these two MWU χ^2 tests were .68 and .72, respectively). Although the comparison of teaching documentation scores between staff nurses and the group composed of all other positions was not significant using our stated alpha level (ie, $P = .049$), the comparison of medians indicated that staff nurses tended to have lower documentation scores compared to those in other positions.

The associations of knowledge, teaching consistency, and teaching documentation scores with each of years of work as a perianesthesia nurse and the average number of surgeries performed daily at the facility where they worked were evaluated using Spearman rank correlation (Table 4). The only score that exhibited a significant correlation with years of experience was teaching consistency ($P < .001$). This relationship was positive, albeit weak. The correlations of summary scores with average number of surgeries per day in workplace were significant for teaching consistency and teaching documentation, but not for knowledge. For both significant correlations, the direction of the association was positive, but the strength of the relationships, as evidenced by the size of the correlations, were very modest.

Qualitative Results

The information provided by perianesthesia nurses in response to open-ended survey questions offered further insight into the incorporation of opioid knowledge in their current clinical practice. Three main themes emerged from the data:

VARIABILITY IN EDUCATIONAL CONTENT. There is variability in the teaching methods and instructive content delivered by perianesthesia nurses when educating patients about opioid side effects and opioid safety before patient discharge after ambulatory surgery. When asked to describe the education content provided about opioid side effects, participants focused heavily on constipation, nausea, drowsiness, dizziness, vomiting, and itching. *"We have an individual printout for each narcotic that is given to pts at discharge."* Respiratory depression, addiction, dependency, and impaired judgment were reported at a much lower frequency. Although many nurses reported the inclusion of drowsiness as a common side effect, few discussed the risk of concomitant medication effect or the potential for advancing sedation level with the patient. "(There is a) *Risk of over sedation when used in combination with alcohol or benzodiazepines."*

RELIANCE ON OUT-SOURCED INFORMATION. There is a reliance on other sources (computer generated instructions, web-based patient information) to impart knowledge on the day of discharge that may not include important opioid safety and storage information. *"Usually instructions include, 'take only as prescribed' but it is often limited to just that."* Patient education regarding nonmedical use of prescribed opioids and the potential for addiction was rarely reported. "*I believe (but am not sure) that it is provided in one of the longer handouts… it is not routinely emphasized.*"

LACK OF STANDARDIZED INFORMATION REGARDING DIVERSION AND DISPOSAL. The issue of diversion as a component of opioid medication discharge education (safe storage, not sharing medication with others, appropriate disposal methods, and disposal locations) requires consistent integration into practice. When asked to describe recommended techniques for disposal of leftover opioids, most perianesthesia nurses

Table 4. Spearman Rank Correlations (n = 1,488)

Summary Score	Years of Experience in Specialty, rho (P Value)	Average Number of Surgeries Performed Daily, rho (P Value)
Knowledge	0.026 (.33)	0.014 (.60)
Teaching—Consistency	0.10 (< .001)	0.067 (.010)
Teaching—Documentation	0.013 (.63)	0.090 (< .001)

recommended that patients take all unused medication to a pharmacy or police department drop box. A smaller number instructed the patient on proper disposal by mixing the unused tablets in a container with used coffee grounds or kitty litter and then placing the sealed container into a trash can. Few participants specifically mentioned engagement in community-based drug take-back days. The variability of responses on whether opioid tablets can be dissolved in liquid and flushed down a toilet or sink suggests that some confusion exists among practitioners. *"I'm not sure about flushing of meds down toilet—I know they use to say this but not sure about environmental effects."* When asked to describe disposal locations in the community, participants most often instructed patients to take unused opioid tablets to a law enforcement organization (police, fire, local government) or local pharmacy (retail, hospital). A small number of responses included medication take-back day programs and locations. *"People can call police and they have places and dates. I do not know off hand the exact locations and times." "Sheriff's office in my county is the only one I know of, and that's because I've read about it in a campaign to fight opioid abuse. I don't use opiates, so I am unaware of the locations."*

Discussion

Most perianesthesia nurses in this descriptive survey were knowledgeable about opioid use for postoperative pain relief after ambulatory surgery. However, few discussed storage, misuse, diversion, or disposal techniques for opioids on patient discharge, and even fewer had opioid-specific information printed on the discharge instructions. To our knowledge, this is the first study that has targeted perianesthesia nurses regarding opioid discharge education in the ambulatory surgery population.

Unlike Costello and Thompson[21] who found that only 25% of 133 nurses in their study answered 50% of the survey questions correctly, the nurses in this study were knowledgeable about opioids overall when answering survey questions. It is challenging to compare knowledge of perianesthesia nurses because research in this area is generally limited, and this survey differed from the one used by Costello and Thompson.[21] The studies that do explore disposal, storage, and misuse of opioids focus on self-reported information received from the patient rather than information from perianesthesia nurses.

Patient Education

Kim et al[22] found that only 5.3% of patients (N = 1,415) who filled their prescriptions after upper-extremity surgery were given disposal information from the physician, pharmacist, or perianesthesia nurse. This was supported by our study which found that only 18% of perianesthesia nurses advised all patients on how to properly dispose opioids after discharge. In addition, we found that only 25% of nurses discussed the risks of opioid diversion, 40% discussed risks of nonmedical use of opioids, and just 23% discussed proper storage of opioids with all patients. Bicket et al[23] conducted a systematic review on practices regarding opioid storage and disposal. Although the study did not discuss the education received by the patient, one can surmise it may be lacking as 73% to 77% of patients did not store opioids in a locked container, and only 4% to 30% stated they were going to dispose or had disposed of unused pills.[23] Similarly, Thiels et al[24] found only 7.5% of 1,907 patients had disposed of unused opioids. Of 359 patients who participated in a telephone survey after surgery, only 18% of patients remembered receiving instructions on disposal of opioids, whereas 84% did report hearing instructions on nonopioid pain management.[25] In a study of urological surgery patients, 92% received no education regarding disposal.[3] Excess opioids are often stored in unsecured locations and represent a supply of opioids available for

diversion.[2,5,10] No other studies were found that described preprinted documentation of discharge instructions for patients going home with an opioid prescription.

Strengths and Limitations

The primary strength of this study was the relatively large sample size. An additional strength was the inclusion of detailed open-ended questions about not only knowledge of and patient discharge education concerning opioids, but also detailed qualitative questions to ascertain whether any written documentation was routinely provided to patients regarding safe practices. We were not able to find any other papers in the literature that described whether standard written instructions were included in discharge teaching. A limitation of this study was the use of self-reported information collected via an online survey. The survey link was e-mailed to all members of ASPAN, the national specialty organization representing perianesthesia nurses. There may have been differences between those who answered and those who did not. Also, there may be practice differences between nurses who belong to the specialty nursing organization and those who do not. In particular, it is possible that the nurses who are members of ASPAN and certified are more knowledgeable than those who are not members or certified.[26] The survey was investigator-developed because there were no instruments with established reliability and validity available; however, it was developed in concert with multiple experts in the field.

Perianesthesia Implications

Perianesthesia clinical practice has been impacted by several well-intentioned industry trends that aimed at improving pain outcomes and patient satisfaction; however, the focus on poorly managed pain also produced unintended personal and societal consequences resulting from opioid misuse.[27] Over the past two decades many factors have contributed to the current US opioid crisis, including pervasive opioid oversupply for patients undergoing ambulatory surgery procedures, poor storage practices, and lack of disposal.[23,28] Many patients receive their first prescription for opioids in the perioperative setting.[29] Because opioid prescriptions are frequently unused, stored in an unsecure location, and not properly disposed of in the postoperative period,[23] the adoption of comprehensive evidence-based perioperative patient education strategies is imperative.[30]

Only two research abstracts, both from one facility, and no research articles were found in a search of the literature that focused on patient teaching about safe use, safe storage, and safe disposal of medication in the perianesthesia setting. The two abstracts focused on the importance of educating perianesthesia patients about safe prescription medication disposal.[31,32] The authors believe that perianesthesia nurses need to take a leadership role in addressing the issue of medication disposal.[31] Perianesthesia nurses are central to any effort to combat the opioid crisis because of the opportunity to teach[29] when interfacing with perianesthesia patients who receive prescription medications. Some guidelines have included appropriate prescribing practices as a way to combat the opioid epidemic (eg, generally decreasing the number of opioids prescribed), but are only applicable to advanced practice nurses or physicians.[3,33] Other guidelines focus on the need to combat the addiction after it occurs, such as use of naloxone and medical assistance programs.[34]

There is a compelling need for improved knowledge in health care providers to decrease diversion, abuse, and overdose of opioids.[29,30] The next step is to fashion an intervention that will focus on increasing the knowledge of perianesthesia nurses who can then teach patients both pre- and postsurgery regarding safe use, safe storage, and safe disposal of opioids. Once it has been developed and shown to be effective, this intervention can be implemented at the national level as a guideline for practice. Perianesthesia nurses are well positioned to provide patient education regarding the risks of diversion, nonmedical use, and proper disposal of opioids. In addition, the provision of patient education is within the perianesthesia nurse's scope of practice. Further research to develop safe postdischarge prescription practices and encourage safe opioid practices after surgery is needed.[10,35]

Conclusions

Prescribers and other health care workers rarely educate patients on medication disposal.[13,25,36] Several agencies including the FDA, DEA, Centers

for Medicare and Medicaid Services, and some medical organizations such as AMA and AAOS have written guidelines that discuss safe use, safe storage, and proper disposal of opioids.[1,7,13,14,37] No nursing guidelines were found. The American Nurses Association has a position paper regarding the opioid crisis, but does not discuss the patient teaching aspect of care.[34] The first step to knowledge creation is to clearly identify and clarify the practice issue or problem.[11,12,15] We have identified that opioid prescribing guidelines and education for patients discharged to home are in the beginning phases in some governmental and medical organizations. One study was found that focused on knowledge of opioids in registered nurses,[21] but there are currently no studies that identify the knowledge and practice specifically of perianesthesia nurses. More research is needed to identify effective strategies to increase patient knowledge regarding opioid misuse, storage, and disposal.[4,35,38] With studies noting that various health care workers rarely educate patients on safe use, safe storage, and safe disposal of medication, perianesthesia nurses have an opportunity to develop an intervention that can be implemented at the national level to promote postoperative opioid safety and reduce misuse.

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