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School nurse experiences with prescription opioids in urban and rural schools: A cross-sectional survey

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Abstract

Few studies have examined the use of prescription opioids in schools. The current study aimed to: (1) describe the context within which school nurses encounter student opioid prescriptions; (2) assess school nurses' preferences for training and student education; and (3) explore urban–rural differences in school nurses' experiences and training preferences. A convenience sample of school nurses ($n = 633$) from North Carolina and South Carolina participated in a brief, anonymous, online survey. Qualitative data were analyzed thematically and statistical tests (t -tests and Chi-square tests) were performed to investigate urban–rural differences. Many school nurses (40.3%) had encountered a student with an opioid prescription, but only 3.6% had naloxone available in case of an overdose. Most school nurses (69.9%), especially rural school nurses, believed students would benefit from opioid education (74.9 versus 66.6%, $p = 0.03$). The majority of school nurses (83.9%) were interested in opioid-related training. Many school nurses encounter students with prescription opioids and would like additional opioid-related training. The potential benefits of providing naloxone access to prevent opioid-related deaths at schools should be explored.

Keywords

Opioids; naloxone; school nurses; school education

Introduction

Opioid deaths and prescription sales in the United States have nearly quadrupled since 1999.¹ This has been associated with a concomitant increase in non-medical opioid use

among youth.² Between 1997 and 2012, opioid-related hospital admissions of adolescents aged 15–19 increased 175%;³ pain relievers were the largest category of misused prescription drugs among teenagers in 2013.⁴

Adolescents primarily misuse opioids for their recreational effects⁵ and are often prescribed excessive quantities; 36.9% of high school students used opioids non-medically or took medication from a previous prescription.⁶ Of adolescent patients hospitalized due to trauma, 12.5% were still taking opioids 1 year after admission.⁷

School years represent a significant period of opioid exposure for young people and, thus, present an important opportunity for prevention of opioid use and misuse. Among college students who used opioids non-medically, the majority reported initiation before attending college.⁸ Additionally, heroin initiation in late adolescence is more likely if initial opioid use occurred between ages 10 and 12.⁹

School nurses are the first point of contact for students who take medication at school.¹⁰ To the best of the authors' knowledge, no studies have reported on the use of prescription opioids within schools and little is known about school nurse training needs surrounding opioid administration. Non-medical prescription pain reliever use is more common among rural adolescents than urban adolescents,^{11,12} therefore, training needs may vary geographically. The current study assessed prescription opioid use in schools, the training and education needs of school nurses and students, and whether they differ based on rurality.

Methods

Participants

The authors recruited a non-random sample of registered school nurses who received an e-mail invitation and volunteered to complete a 5–10-minute online survey and were located in North Carolina (NC) and South Carolina (SC). In 2016, there were 1,318 registered school nurses in NC and 1,006 registered school nurses and 162 licensed practical school nurses in SC.

Procedure

School nurses received an e-mail from their regional school nurse supervisor or superintendent containing a hyperlink to the online survey. The survey was anonymous and investigated the experiences, current practices, and training requirements of school nurses; thus, the Institutional Review Board of the University of NC Chapel Hill concluded that the study (#16–3189) did not constitute human subjects research. Participation was voluntary and no incentive was provided. Due to anonymity, it was not possible to track how many school nurses received the survey.

Materials and measures

The survey was comprised of 22 questions in 5 different categories.

Experience with opioids

Participants indicated how often they had encountered a student with an opioid prescription in the past year (daily, weekly, monthly, at least twice, one time, never). Participants who gave any response except “never” provided a brief example (without identifying information) of their experience. Those participants also provided the indication for the opioid: (1) headache; (2) dental procedures; (3) musculoskeletal pain (e.g., back ache); (4) broken bones/fractures; (5) chronic conditions (e.g., sickle cell crisis); (6) other; and (7) unsure, and indicated who prescribed the opioid: (1) dentist; (2) primary care provider or pediatrician; (3) provider from emergency department (ED) or urgent care; (4) doctor of osteopathic medicine (DO); (5) other; and (6) unsure.

Training and resources

Participants reported whether they had the ability to safely lock and store controlled drugs (yes/no) and had naloxone available in case of an opioid overdose (yes/no/unsure). Two (yes/no) questions assessed training on the administration and/or counseling of naloxone and opioids. Participants indicated how comfortable they felt: (1) talking to students about opioids; and (2) training and/or delegating opioid administration to non-licensed staff members. Responses ranged from 1 = extremely comfortable to 5 = extremely uncomfortable.

Training preferences

Participants designated whether they would be interested in receiving training on: (1) opioid risks; (2) identifying students with substance abuse issues; (3) how to counsel children about opioids; (4) how to counsel parents about opioids; (5) protocol for administering opioids in schools; (6) communicating with providers about opioids; (7) how to administer naloxone (Narcan®); (8) other; and (9) not interested in training on these topics. They also indicated their training method preference: (1) online; (2) conference; (3) local workshop; (4) written materials; and (5) other.

Student education preferences

The survey asked if participants thought students at their school would benefit from opioid education (yes/no) and, if yes, whether educational materials should be targeted toward: (1) all elementary school students; (2) all middle school students; (3) all high school students; (4) individual students as they bring in prescription opioids; and (5) other. Participants also indicated the most appropriate format: (1) a short video using actors similar in age to students; (2) in-person presentation by an older student; (3) face-to-face talk with a health care professional; (4) written materials; and (5) other.

Demographics

Participants answered demographic questions about: their school setting (elementary [K–5], middle [6–8], or high [9–12]); how long they had worked as a school nurse; highest nursing credential; gender; and age. Two questions using color-coded maps asked nurses to select the county in which they worked. Each county’s rurality was determined using the U.S.

Department of Agriculture's Urban Influence Codes 2013; metropolitan was designated as urban and non-metropolitan as rural.¹³

Data analysis

Quantitative data were analyzed using IBM SPSS (version 23). Surveys with fewer than 50% of questions answered (excluding demographic questions) were omitted from the analyses. Descriptive statistics were calculated and Chi-squared tests used to examine urban–rural differences ($p < 0.05$). Qualitative data from open-ended responses were thematically categorized and defined using example quotes. One coder (EPS) read all responses and created a codebook. A second coder (DMC) reviewed the codebook to determine if all major themes had been captured. Once consensus was achieved, the original coder re-analyzed and organized all quotations into themes.

Results

Demographics

A total of 665 school nurses accessed the survey. Based on the total number of school nurses in NC and SC ($n = 2,486$), approximately 27% responded to the survey. Thirty-two were excluded due to missing data; resulting in 633 completed surveys. Eleven nurses did not indicate rurality, so urban-rural comparisons are limited to 622 respondents. Table 1 displays the sample's demographic characteristics; there were no significant differences between urban and rural nurses.

Prescription opioids in schools

Most school nurses (59.7%) had not encountered a student with an opioid prescription during the past year. Of those who did, 16.1% had encountered opioids once, 18.0% two or more times, 4.6% monthly, and 1.5% weekly or daily; urban and rural responses were not significantly different ($\chi^2 = 5.57$, $p = 0.35$). Students were most commonly prescribed opioids for broken bones/fractures ($n = 148$, 58.5%), dental procedures ($n = 105$, 41.5%), and post-surgical pain ($n = 52$, 20.6%). There were no significant urban-rural differences ($\chi^2 = 12.03$, $p = 0.10$). Table 2 lists the most common prescribers of opioids for students. Rural nurses were more likely than urban nurses to report opioid prescriptions from ED/urgent care providers (30.6 versus 43.6%, $p = 0.01$) and DOs (7.6 versus 16.4%, $p = 0.02$).

School nurse experiences with prescription opioids

Six themes related to school nurse experiences with prescription opioids at school were identified (Table 3).

Preferences for student opioid education

The majority of school nurses indicated their students would benefit from opioid education ($n = 435$, 69.9%), but rural nurses were more likely to report this (74.9 versus 66.6%, $p = 0.03$). Among nurses who thought students would benefit from opioid education, 61.3% indicated high school students and 55.1% indicated middle school students would benefit most. A short video using actors similar in age to students ($n = 198$, 31.3%) was the most

highly endorsed education format, followed by an in-person presentation by an older student ($n = 128$, 20.2%). There were no differences in age or format preferences for urban and rural nurses.

Access to resources

Ninety-seven percent of school nurses had access to secure opioid storage facilities at their schools; however, only 3.6% reported having naloxone available in case of an overdose. Approximately one-third of school nurses (34.6%) were moderately comfortable counseling students about opioid medications. Of the nurses ($n = 494$) who were required to delegate or train other staff members on the administration of opioids, approximately half ($n = 234$, 47.4%) were moderately or extremely uncomfortable doing so. There were no significant urban–rural differences.

School nurse training preferences

Although the majority of school nurses (67.1%) had undertaken opioid-related training, only 26.1% had received specific training on the administration or counseling of naloxone. There were no significant differences in training between urban and rural school nurses. Table 4 displays the topics for which nurses were most interested in receiving training; there were no significant urban–rural differences.

Discussion

The current article examined school nurses' experiences of students with prescription opioids. The key findings are school nurses: (1) commonly encountered prescription opioids; (2) rarely have naloxone available at their schools; and (3) want additional training about opioids for themselves and their students.

Forty percent of school nurses encountered a student with an opioid during the past year. This is not surprising considering that between 1994 and 2007, the number of opioids prescribed for adolescents nearly doubled.¹⁴ Previous studies have found that opioids are often prescribed when simple analgesics may be sufficient (e.g., headache or surgical tooth extraction).^{15,16} School nurses are in a position to contact prescribers, students, and families to discuss alternative pain relief, such as non-steroidal anti-inflammatory drugs (NSAIDs), which could curb the number of young people who become addicted to opioid medications. Training school nurses to effectively communicate with different providers may be key, as rural school nurses more frequently encountered prescriptions from ED and urgent care providers than urban nurses.

Currently, there is no nationwide initiative to implement structured school-based opioid education programs. Approximately 70% of school nurses reported opioid education would be useful for their students. Interventions could target two important windows: reducing non-medical opioid use in middle school children and preventing escalation to heroin use in high school adolescents.¹⁷ This is supported by a recent study, which found an increased risk of non-medical opioid use during the transition from middle to high school.¹⁸

As of 2015, 87% of teens had access to a desktop or laptop and 73% to a smartphone,¹⁹ supporting school nurses' opinions that students would be most receptive to video-based education. Programs incorporating online and video resources may also overcome access barriers, increasing access to opioid education. Several programs including videos have been successful in increasing student knowledge of the dangers of prescription opioids and heroin, including, This is (Not) About Drugs,²⁰ the Narcotics Overdose Prevention & Education Task Force,²¹ the Robert Crown Center Heroin Prevention Program,²² and Operation Prevention.²³

Only one-quarter of school nurses had additional training on the administration and counseling of naloxone, and far fewer had access to naloxone on school property. This is particularly concerning considering the agreement between Adapt Pharma and State Departments for Education, to provide intranasal naloxone (Narcan®) to high schools free of charge.²⁴ The National Association of School Nurses has endorsed school nurse access to naloxone for the emergency treatment of opioid overdose.²⁵ Although complicated by variations in state law, this highlights the need for local implementation plans to increase uptake of Narcan® within schools.

School nurses were only moderately comfortable counseling students and lacked confidence when delegating administration to other staff members, reflected in the high demand for training on the use of opioids and naloxone. The strong preference for online training modules may be due to the ability to overcome barriers including cost, time constraints, work and family commitments,²⁶ and could minimize urban–rural training disparities.²⁶ Additionally, local workshops may provide an effective method of training.

Limitations

The exact number of school nurses who received the survey is unknown so a true response rate cannot be calculated. Thus, the authors do not know how generalizable the present survey results are for the Carolinas or other states. Results should also be interpreted with caution as data on non-responders were not collected and it was not examined whether responders differed meaningfully from non-responders, which is a potential source of bias. The study may suffer from selection bias; school nurses who responded are more likely to be engaged with this topic and endorse the need for additional training. Additionally, only one coder reviewed all qualitative responses, which may have introduced coding bias.

The potential benefits of distributing naloxone (Narcan®) to middle and high schools in communities with high opioid overdose rates should be explored. Online training and education programs should be disseminated to schools across the country. Future studies should examine whether urban–rural disparities in school nurse opioid training and student education programs exist on a national level. Additionally, it would be valuable to investigate the potential for school nurses to act as mediators between students, families, and prescribers to determine effective treatments of acute conditions using non-opioid medications.

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Table 1. School nurse demographics ($n = 622$).

	Urban ($n = 371$) n (%) or mean $\pm$ SD	Rural ($n = 251$) n (%) or mean $\pm$ SD
Work setting ^a		
Elementary	247 (66.6)	163 (64.9)
Middle	136 (36.7)	113 (45.0)
High	137 (36.9)	102 (40.6)
Highest credential		
A.D.N	71 (19.3)	43 (17.3)
B.S.N	243 (66.0)	172 (69.4)
M.S.N	26 (7.1)	9 (3.6)
D.N.P	0 (0)	1 (0.4)
Other	28 (7.6)	23 (9.3)
Years worked Range (0.04–40)	8.9 $\pm$ 6.7	8.5 $\pm$ 6.7
Gender		
Male	3 (0.8)	0 (0)
Female	367 (99.2)	251 (100)
Age in years		
18–24	0 (0)	0 (0)
25–34	32 (8.7)	36 (14.4)
35–54	215 (58.4)	140 (56.0)
55 and older	121 (32.9)	74 (29.6)

Note:

^aNurses could select multiple responses so percentage totals do not equal 100.

Table 2.

Providers who prescribed opioids to students (N = 622).

	Urban		Rural		<i>p</i> -value for χ^2 test
	<i>n</i>	(%)	<i>n</i>	(%)	
Primary care provider or pediatrician	66	(45.8)	41	(37.3)	0.64
Dentist	56	(38.9)	41	(37.3)	0.68
Other	55	(38.2)	34	(30.9)	0.66
Emergency department or urgent care provider	44	(30.6)	48	(43.6)	0.01 *
Doctor of osteopathic medicine	11	(7.6)	18	(16.4)	0.02 *
Unsure	10	(6.9)	4	(3.6)	0.36

Note:

* Significant Chi-square test comparing urban and rural school nurses.

Table 3.

Examples of school nurses' experiences with students taking opioids ($n = 247$).

Theme and definition	Example quotations
Opioid medications given at school	
Opioids taken to school by parent or student with valid doctor's order and parental permission; school nurse gave medication as prescribed.	"I have had 2-3 students within the last year that have been prescribed opioids for various medical reasons. The medication was brought in and locked up in the health room with physicians (sic) orders to administer to student."
Opioid medications not given at school	
a. Medications taken to school without correct documentation (e.g., doctor's order)	"The student had surgery and mother sent a pills (sic) to school for student to take with no Dr.'s order. Mother was called to come pick up medication, because I had no order to give it. She picked it up and student did fine at school without it."
b. School nurse contacted providers to change opioid to Tylenol/NSAID for school hours	"I was given a bottle of Tylenol #3 with codeine for a student who had a cholecystectomy 2 weeks prior. We were able to contact the MD and get regular OTC analgesics for the student to take prn at school instead of the codeine."
c. Students sent home to take opioids due to negative impacts of opioids or pain on learning.	"I had a student with sickle cell prescribed Motrin and oxycontin (sic) for school and I told mom we would keep the Motrin at school but not the oxycontin (sic). If she is in pain enough to need the stronger medicine then she needs to be at home."
Prescription opioids taken at home	
No medications taken to school but students reported taking prescribed opioids at home to school nurse.	"Both times were for children that had broken there (sic) arm. They weren't taking this medications (sic) at school they were taking narcotics at home"
Illicit activities	
a. Opioid medications stolen from friends, relatives or other students.	"Our resource officer has brought students to my office for evaluation after finding they had consumed opioid (sic) medication that they had stolen from a relatives (sic) medicine cabinet."
b. Opioid medications sold to other students.	"I had a student that was discovered selling opioids (sic) she had gotten out of parents (sic) med cabinet."
c. Medications shared among students.	"Student gave her classmate hydrocodone to help relieve menstrual cramping. The classmate became very ill in class."
d. Non-medical use of opioids, including addiction.	"Another student was found to be impaired, had empty bottles of cough syrup in his book bag, reported taking Xanax that morning and taking OxyContin the day before and previously in an attempt to 'get high.'"
e. Possession of opioids without a prescription.	"Medication discovered during random bookbag searches per school resource officers and/or administration."
Accidental ingestion of opioids or incorrect doses	
Students/parents intending to use another medication but mistakenly use an opioid or higher opioid dose than prescribed.	"Student came in feeling 'weird' mom had given student his grandmother's cough medicine for his cough. She thought it was adequate that she had checked dosing on WebMD."

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Theme and definition	Example quotations
Opioid side effects experienced Students experiencing side effects of opioid medications and being unable to concentrate at school.	"Numerous kids were prescribed Oxycontin (sic) for dental procedures and were at school after taking it and couldn't stay awake and came to me because the teachers wouldn't let them put their head down on their desks."

Table 4. School nurse opioid training preferences ($n = 625$).

	<i>n</i>	(%)
Topic ^a		
Identifying students with substance abuse issues	388	(61.3)
Protocol for administering opioids in school	382	(60.3)
How to counsel children about opioids	363	(57.3)
How to administer naloxone (Narcan®)	354	(55.9)
How to counsel parents about opioids	322	(50.9)
Opioid risks	293	(46.3)
Communicating with providers about opioids	253	(40.0)
Not interested in training	94	(14.8)
Other	19	(3.0)
Method ^b		
Online	201	(31.8)
At a local workshop	187	(29.5)
At a conference	86	(13.6)
Written materials	37	(5.8)
Other	19	(3.0)

Notes:

^aNurses could select multiple topics so totals add to more than 100.^bNurses who stated they were not interested in receiving training were not asked this question.