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Adolescents' Perspectives on Prescription Opioid Misuse and Medication Safety

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OBJECTIVES This study explored adolescents' perspectives on prescription opioids, opioid safety and misuse, and sources of opioid information.

METHODS High school students participated in focus groups that elicited information about adolescent perspectives on prescription opioids and opioid safety. Demographic information was collected. Focus groups consisted of 5 to 8 student participants and 2 moderators. Focus groups were audio-recorded and professionally transcribed. Transcript content was thematically analyzed using NVivo.

RESULTS A total of 54 high school students (59% female, 44% white, 44% Latino) participated in 8 focus groups. Participants ranged from ages 14 to 18 years and grades 9 to 12. Five major themes emerged: 1) perceptions of prescription opioids and misuse; 2) prevalence of prescription opioid misuse; 3) reasons for prescription opioid misuse; 4) consequences of prescription opioid misuse; and 5) sources of medication information. Participants identified examples of misuse and reasons for and consequences of teen opioid misuse, including mental and physical health challenges, peer and family influences, and addiction. Sources of opioid-related information included family, peers, online Web sites, and television shows.

CONCLUSIONS Adolescents had some knowledge pertaining to prescription opioids, but they had misconceptions related to safety. Participants were aware of safety risks and negative consequences of misuse. Adolescents obtained medication information from various sources, including health care professionals, family and peers, and online sources. Educational efforts that target adolescents should provide opportunities for addressing misconceptions about safe and responsible use of medications.

ABBREVIATIONS FG, focus group; P, participant

KEYWORDS adolescent health; medication counseling; medication safety; opioid misuse; patient education; prescription opioids

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Introduction

Misuse of prescription opioids continues to be a major public health issue in the United States, and the public health burden of opioid-related deaths is steadily rising. Approximately 130 people in the United States die each day from an opioid overdose.¹ In 2016, about 11.8 million people aged 12 years or older misused opioids, with most misusing prescription pain relievers.²

Young adults (aged 15 to 34 years) have seen the largest increase of public health burden due to opioid overdose deaths.³ In 2016, approximately 891,000 adolescents aged 12 to 17 years had misused opioids in the past year.² Fatal drug overdose rates have increased in adolescents aged 15 to 19 years from 1999 to 2015, with death rates highest for opioid medications.⁴ These adolescents may have access to prescription opioids in their own home, through their own leftover medication or someone else's medications.^{5–7} The accessibility of opioids in adolescents' homes suggests a need for more education on proper disposal, handling, and

storage of prescription medications.

Although opioid use and misuse are prevalent among adolescents, research frequently overlooks their perspectives.⁸ Researchers often examine adult populations, leading to a poor understanding of the unique needs and perceptions of adolescents. Limited research exists regarding what adolescents know about opioids and how they learn about safe use of these medications. This is evident in the shortage of tools for opioid safety education developed specifically for adolescents.⁹ It is important to examine what adolescents know so that any gap in their awareness or knowledge can be addressed with appealing and appropriate educational interventions for this vulnerable population. Educating adolescents about opioid safety and the consequences of misuse may even lower their risk of misusing opioids in the future.^{9,10}

This exploratory pilot study aimed to characterize adolescents' perspectives on prescription opioids, opioid safety and misuse, and sources of opioid

medication information. Specifically, this study explored adolescents' awareness of safe opioid use, including sharing, storage, and disposal of medications, as well as their medication information sources and perspectives of misuse.

Materials and Methods

Focus groups were chosen as a data collection method. Focus group methodology was used to capture group interaction and discussions of adolescents about prescription opioid safety and preferences for learning about medication safety.¹¹ Qualitative data collection allowed participants to expand on their responses and opinions and offered focus group moderators an opportunity to ask probing follow-up questions as needed.¹¹ Focus groups consisted of small groups of peers, which provided a collaborative environment for participants to build on each other's responses.

Sampling and Recruitment. Adolescents were recruited from 3 Wisconsin high schools in May 2019 to participate in focus groups about prescription opioid safety. Schools were chosen intentionally to include diverse participants from rural, suburban, and urban populations. Participants were eligible if they were students in grades 9 to 12 who could speak and understand English. School staff distributed packets containing a letter of introduction to the study, along with consent forms and instructions to return completed forms on a later date. Two schools distributed these envelopes to all students, and one school distributed envelopes only to students enrolled in a required health class. Staff distributed packets to all 4 sections of this health class, for a total of 112 potential participants (of approximately 600 students enrolled in the school). Parental consent and student assent were required for all participants under the age of 18 years; students aged 18 years and older were able to consent and participate without parental consent. Participants were each given \$10 in cash as an incentive to participate in the focus groups. This study was approved by the university's Institutional Review Board.

Data Collection. Focus groups were designed to elicit information about adolescents' perspectives on prescription opioid safety. A focus group discussion guide was created by the study team, using a previously developed statewide adult opioid safety questionnaire. The statewide questionnaire was created by the University of Wisconsin Survey Center and Population Health Institute, based on a similar survey used by the state of Maryland.^{12,13} The resulting discussion guide was adapted for adolescents and edited to include investigator-generated questions in order to address study objectives. The study team discussed and revised the guide before submitting it to the university's Survey Center for expert review. Their feedback enhanced the content validity and clarity of the discussion guide. The Survey Center provided

recommended phrasing to ensure questions were clear and that concepts aligned with study objectives. The discussion guide was pilot-tested in 2 after-school youth programs and revised based on youth feedback to ensure questions and content were appropriate for the desired audience. The discussion guide consisted of broad, open-ended questions divided into societal, intrapersonal, and interpersonal sections. Participant demographic information was also collected, including age, sex, race, and ethnicity.

Prior to data collection, study team members moderated practice sessions to receive feedback from the team and ensure consistency throughout focus groups. Each focus group included 5 to 8 students and was facilitated by 2 members of the study team. Schools provided separate rooms for each focus group to ensure privacy for participants. One moderator led the focus group discussion, whereas the second moderator observed and asked additional probing or clarifying questions as needed. Focus groups lasted approximately 45 to 60 minutes, were audio-recorded, and were professionally transcribed verbatim. Additionally, facilitators used reflective journaling after each focus group and peer debriefing to document and discuss their impressions of the data collection process at each study setting.

Data Analysis. Transcripts were verified for accuracy and quality of transcription by 2 members of the study team before beginning data analysis. Two members of the study team independently reviewed all focus group transcripts to ensure that transcription matched the audio-recordings. Verbatim transcripts were content and thematically analyzed by 4 study team members. NVivo 12 (QSR) Qualitative analysis software (NVivo 12, QSR International, Burlington, Massachusetts) was used to code all transcripts. Codes were developed using an inductive and deductive approach.¹⁴⁻¹⁷ Each team member independently reviewed all 8 transcripts to develop relevant codes, which were combined to create a master codebook. The study team then held weekly meetings to discuss codes, review the master codebook and coding structure, and address discrepancies. Prevalent codes were identified by the research team and categorized into major themes and subthemes, which are described below.

Results

A total of 54 high school students (59% female, 44% white, 44% Latino) participated in 8 focus groups. Each focus group included 5 to 8 student participants from the same high school. Participants ranged from age 14 to 18 years and grades 9 to 12 (Table 1). Five key themes emerged during data analysis: 1) perceptions and misconceptions of prescription opioids and misuse; 2) prevalence of prescription opioid misuse; 3) reasons for prescription opioid misuse; 4) consequences of prescription opioid misuse; and 5) sources of medica-

Table 1. Description of Focus Group Participants (N = 54)

Characteristic	Result
Sex, n (%)	
Female	32 (59)
Male	20 (37)
Other*	2 (4)
Age, n (%)†	
14 yr	1 (2)
15 yr	17 (32)
16 yr	19 (35)
17 yr	13 (24)
18 yr	3 (6)
Race/ethnicity, n (%)	
White	24 (44)
Hispanic or Latino	24 (44)
Black or African American	2 (4)
Asian and Native Hawaiian or Other Pacific Islander	2 (4)
Multiracial‡	2 (4)
School grade level, n (%)	
9th	15 (28)
10th	24 (44)
11th	9 (17)
12th	6 (11)
Number of people <18 yr in household, n (%)	
1	10 (19)
2	24 (44)
3	15 (28)
4	4 (7)
5	1 (2)

* Two individuals selected “In another way” when asked how they identified. One answered “Nonbinary,” and the other answered “A bit male, female, and non-binary.”

† One participant did not provide their age.

‡ Two individuals selected more than 1 option for race/ethnicity. One selected “American Indian or Alaskan native,” “Black or African American,” “Native Hawaiian or Other Pacific Islander,” and “White,” and the other selected “Black or African American” and “White.”

tion information. Table 2 depicts a summary of themes and subthemes. Supplemental Tables S1 and S2 have additional verbatim quotes from study participants. Quotes are identified by participant (P) and focus group (FG) numbers. Themes and subthemes are described in detail below.

Theme 1: Perceptions of Prescription Opioids and Misuse. Definitions of Opioids. Participants defined opioids as strong medications, pain medications, prescription drugs, street drugs, controlled medications, and dangerous, addictive, or harmful medications. Some participants stated that drugs such as non-steroidal anti-inflammatory drugs or medications for

managing attention deficit hyperactivity disorder were opioids because they are powerful medications.

They are a painkiller medication, and they’re like super strong. And like apparently, in like hospitals, you can get like addicted to it. And in health class, I learned that it’s like a gateway drug to heroin, I think. – P2, FG5

I feel like it’s a pill to help you think. – P3, FG7

Examples of Opioids. Participants provided specific examples of the names of opioid medications, some of which were non-opioids. The most recognized

Table 2. Definitions of Themes and Subthemes

Themes	Subthemes	Definitions
Perceptions of prescription opioids and misuse	Definition of opioids	Descriptions or definitions of what participants believe to be opioid medications.
	Examples of opioids	Specific examples of what participants believe are opioid medications.
	Examples of opioid misuse	Actions that participants consider misuse of prescription opioids.
	Disposal and storage of prescription opioids	Participant discussion of proper or improper disposal or storage of prescription opioids.
Prevalence of prescription opioid misuse	Sharing medications with family	Discussion regarding family members sharing opioid medications or giving participants incorrect dosages.
	Limited personal experience	Participants describe having limited personal experience with opioid misuse among their peers.
	Regional experience	Participants describe prescription opioid misuse local or regional opioid misuse patterns or prevalence.
Reasons for prescription opioid misuse	Teen substance misuse	Participants discuss experience with non-opioid substance misuse among peers.
	Mental health challenges	Mental health–related issues as reasons for prescription opioid misuse among teens.
	Stress	Stress as a reason for prescription opioid misuse among teens, including school-related stress.
	Peer or family influence	Peer or family influence as a reason for prescription opioid misuse among teens, including pressures to fit in with peers or family member use of opioids.
	Recreational use	Recreational reasons for teen prescription opioid misuse, such as partying, curiosity, or “getting high.”
	Pain	Minimizing pain or preventing further pain as reasons for teen misuse of prescription opioids.
Consequences of prescription opioid misuse	Addiction	Addiction or dependence as reasons teens misuse prescription opioids.
	Other reasons for opioid misuse	Reasons teens misuse prescription opioids besides mental health challenges, stress, peer or family influence, recreational use, pain, or addiction.
	Physical health consequences	Discussion of health consequences of prescription opioid misuse, not including effects on mental health.
	Overdose, addiction, and death	Discussion of overdose, addiction, dependence, tolerance, or death due to misuse of prescription opioids.
	Mental health consequences	Discussion of any mental health or emotional consequences due to prescription opioid misuse, including changes in self-esteem and motivation.
	Damaged relationships and personality changes	Discussion of effects on a person’s relationships and reputation or changes to personality due to their misuse of prescription opioids.
	Decline in school or work performance	Discussion of poor or changed performance in school or at work due to misuse of prescription drug use.
Sources of medication information	Poor decision-making and legal issues	Discussion of legal issues and poor decision-making as a results of prescription drug misuse.
	Television	Participants state that they received information about opioid medications through television.
	Family	Participants describe learning about medications from family or going to family members for medication information.
	Health care professionals	Participants describe learning about medications from health care professionals or going to health care professionals for medication information.
	Medication leaflets and pamphlets	Participants state that they have learned about medications through leaflets, pamphlets, prescription bottles, or other resources distributed at clinics, pharmacies, and hospitals.
	Online	Participants describe previously learning about medications through online resources or searching for medication information online.
Peers	Participants describe discussing medications with peers or other people with similar prescriptions and health conditions.	

opioids were oxycodone, codeine, morphine, fentanyl, hydrocodone/acetaminophen, opium, heroin, and methadone. The most common non-opioids suggested were non-steroidal anti-inflammatory drugs and other over-the-counter pain medications, benzodiazepines, anesthesia, antibiotics, and gabapentin and pregabalin. Other examples included over-the-counter medications (i.e., allergy, cold and flu medications, cough medications), antidepressants, sleeping pills, amphetamine/dextroamphetamine, and illicit drugs, such as ecstasy or “Molly,” mushrooms, and “Flakka.”

I've heard of them before, but I can't think of them right now. – P3, FG1

Like I said Advil, I said it because like it's powerful, and like it can like show, like a sign that it works, by like helping someone with pain. – P2, FG7

Examples of Opioid Misuse. Participants stated that using opioids not prescribed to the person taking them or using a higher dosage than prescribed are examples of misuse. Other, less common examples of misuse included using medication after the prescription's expiration date, selling medications, overdose, addiction, recreational use, and lying to a doctor to get medications.

... taking somebody else's prescription for your own, and just kind of like, even if you are in pain, that's kind of a misuse of it me thinks, because if so, probably just get your own prescription, you know, because they might be prescribed something different like something stronger or weaker than what you need taken. – P1, FG3

Taking any or too many of, taking any that's not prescribed to you, or too many of a certain one that's prescribed. – P5, FG4

Disposal and Storage of Prescription Opioids. Participants shared examples of personal unsafe medication use practices and a lack of awareness regarding safe storage and disposal. Participants were unsure why medications could not be placed in the trash or flushed into the sewer system. Participants stated that their peers were likely unaware of safe medication disposal practices. Furthermore, participants realized that their family members had been practicing inappropriate opioid storage by leaving medications in an unlocked and unsafe location.

My mom just had surgery, and she just leaves her stuff out, and I didn't see a problem with it until now. – P4, FG3

... I wouldn't know at all like how to dispose of

them. Like I wouldn't know why you couldn't throw them in the trash or why you couldn't flush them down the toilet. Because I'd be like, oh, they're going into the sewer system, like what's going to happen? Like it doesn't matter. And so I feel like nobody that I know is educated on it except for like my parents, and that's because, like [P3] said, health profession. – P1, FG4

Sharing Medications With Family. Several participants shared examples of unsafe prescription opioid use among family members. They described instances where family members had allowed them to use someone else's prescription or had given them the incorrect dosage of a medication.

I got like mouth surgery a while ago, and I couldn't get my prescription medication in time, because I couldn't drive, and both my parents were at work. So my dad had like extra medication from like a mouth surgery like he'd had like three years ago. And he's like here's where it is. You get one, and then you're done. – P1, FG4

Well, I mean, like I know some parents are like, oh, you're not feeling good, or like you're hurt, like take this, even though it's not prescribed to the kid. It's prescribed to the parent. But sometimes parents are like, I was just doing what was best for my child but like in the long run, you might be hurting them. – P1, FG5

Theme 2: Prevalence of Prescription Opioid Misuse. Limited Personal Experience. Participants stated that substance misuse, including prescription opioid misuse, is prevalent among teens.

Yeah, you don't really hear it and know people are doing it. – P7, FG1

Not that I have seen, but I bet there are people that do. – P2, FG5

Regional Experiences. Participants identified nearby locations where they believed prescription opioid misuse was more common.

I was going to say, 20 minutes north you get meth. Twenty minutes south you get the prescription drugs. – P3, FG2

So it's probably not in this area as much, but ... it's not that it doesn't happen. – P2, FG4

Teen Substance Misuse. Participants explained that teen use of other substances, such as marijuana, mushrooms, and alcohol, occurred more commonly than

prescription drug misuse due to their easy accessibility.

Because there's more popular drugs around here. – P2, FG2

Like a lot of people smoke weed. Some people that I know will drink alcohol is technically a drug. Some people that I know do 'shrooms. Like there's, those things are all easier to come by, relatively easier to come by than having to find a person that has a hookup for prescription, and like I don't know. The penalty for like smoking pot is way less than it is for selling and misusing opioids. – P3, FG4

Theme 3: Reasons for Prescription Opioid Misuse.

Mental Health Challenges. Participants frequently cited mental health challenges as reasons for teen prescription opioid misuse. This included anxiety, depression, suicidal ideation, and other mental and emotional health issues.

Maybe they have like bad anxiety or something like that, and they think that it will help. – P3, FG1

I would say more like suicidal tendencies maybe. – P7, FG3

Stress. Stress was another common reason for teen opioid misuse. Some participants believed that people are ill-equipped to deal with stress, therefore causing them to use opioids as a coping mechanism. One participant suggested that the stress of keeping up good grades may cause teens to turn to opioids.

"I feel like people don't know how to handle as much. People don't know how to handle stress, so they turn to things that don't actually help with stress, but that's their way out ... – P3, FG3

Well, I guess like to relieve stress. – P4, FG6

Peer or Family Influence. Peer groups and family members can also influence teens to misuse prescription opioids. Teens may use opioids to fit in with their peers and to "look cool." Teens may feel pressured to misuse prescription opioids simply because members in their peer groups or family are using them.

Peer pressure or like their home life. Like if their parents were into that kind of stuff, then it might promote them to do it more. – P4, FG4

I think it's becoming a trend now that everybody is doing it, like they see that their friends are doing it, so they think, oh, if I do it too, I'll fit in. – P1, FG7

Recreational Use. Participants explained that teens might choose to use opioids for recreational reasons, such as during parties or out of curiosity.

To extend parties. – P4, FG2

They're curious about it, so they just take it. – P3, FG8

Pain. Pain may be another reason for teen prescription opioid misuse. Participants believed that teens may misuse opioids to decrease current pain, or to avoid future pain.

It's nice to be pain free. – P6, FG1

Because they are trying to get rid of pain that they may feel, and they want to get rid of the pain fast, so they may be like thinking taking a whole bunch will get rid of the pain faster than that, so that's probably why. – P3, FG3

Addiction. Addiction was commonly provided as a reason for teen opioid misuse. Participants suggested that continuous use of an opioid could lead to perceptions that the drug was needed for overall daily functioning.

It's like it trains your brain to think you need it. – P7, FG1

Like you said, they're addicted to it They depend on it, like they need it. Like they feel like they need it to like in order to like go through the day. – P1, FG7

Other Reasons for Opioid Misuse. Participants stated that prescription medications are more easily accessible and easier to hide because they are legal and prevalent. A lack of awareness of the negative consequences was also identified as a reason for opioid misuse due to false perceptions of safety, since they are legally prescribed medications. Some participants suggested that teens may sell prescription opioids in order to make money.

I mean, they could be like, if they're at a party or something, they could be like drunk, and they don't know what's happening. – P7, FG1

Money, like if you can sell your prescription drugs, people will pay a pretty high price for that. So you can make money pretty easily. – P1, FG4

Theme 4: Consequences of Prescription Opioid Misuse.

Physical Health Consequences. Participants identified several potential physical health consequences of prescription opioid misuse. Physical effects of misuse

included general bodily harm, changes in a person's looks, and injury. Many participants gave general examples of physical harm, but others shared more specific examples, such as heart attacks and seizures.

Can it like, because I'm pretty sure I heard this. I don't know if it's true. Like some drugs like heroin and stuff like that, they can, they like change the way you look ... – P3, FG1

Lung failure, like respiratory failure. – P3, FG4

Overdose, Addiction, and Death. Overdose, addiction, and death were frequently discussed as potential consequences of prescription opioid misuse. Participants explained that misuse could cause people to develop a higher tolerance and seek additional prescription opioids, which could then lead to increasing use, death, or overdose.

Well, death is the main one I think. It's a pretty big one. – P1, FG3

I would say like get addicted to it, and then you keep wanting to get more of it. And I think it can probably also like harm your body in some ways. I don't know exactly the specificity of it. But and then it obviously like because you get so caught into like, I need to have it ... – P5, FG5

Mental Health Consequences. Participants identified mental health consequences of prescription opioid misuse. Depression and changes in self-esteem, motivation, and emotions were common examples of mental health consequences.

I think our depression would get a lot worse. We're already like super-messed up that way, I guess, more than ever before, really, with the introduction of social media and that kind of stuff. But, yeah, I think that would get even more, like people would just have like way worse attitudes, and like I feel like, I don't know, that. – P3, FG4

Some, I think some can even cause depression ... – P1, FG7

Damaged Relationships and Personality Changes. Changes to relationships and personality were frequent examples of the consequence of prescription opioid misuse. Participants stated that opioid misuse could lead to damaged relationships.

I mean, people, it could probably change the way people look at you. – P7, FG1

You could break relationships with like with your

family and friends. – P4, FG6

Decline in School or Work Performance. According to participants, poor performance at work or in school is a common consequence of prescription opioid misuse. Participants perceived that opioid misuse caused a loss of motivation and challenges with learning.

Oh, I was going to say bad grades. – P4, FG1

And it also kind of takes control of your life. You don't really act the same in your like job and everything. Just kind of like P5 said, the relationships around you. – P2, FG5

Poor Decision-Making and Legal Issues. Participants identified that opioid misuse could also lead to legal issues related to poor decision-making, such as driving under the influence, stealing, getting into fights, hurting others around them, and using illicit substances.

I would say like hurting people around you. Like I feel it's very synonymous with driving while drunk. Like people who would drive while like on prescription pain medications, you're not supposed to drive. And like you can kill people. I think that's like probably the biggest problem, I feel like, because personally, I feel like if you want to put stuff in your body that messes with your own body, like I can't tell you not to. But if you're going to put other people's lives in danger, like that's where I start to be like, okay, you need to stop. Like that's a problem, a serious one. – P1, FG4

You can go to rehab for it. ... Yeah, and it's like in your record. – P4, FG6

Theme 5: Sources of Medication Information. Participants cited several frequent sources for medication information described below.

Television. Many participants learned about opioids through documentaries and TV shows they watched on their own or at school. Participants gave examples of TV programs such as *Family Guy* and *Last Week Tonight* and described opioid information they gleaned, such as medication names or brands, and effects of opioids on the human body.

Like again, with John Oliver, it's, it was like this family like who owns these prescription drug chains, and they were like having doctor, they were paying doctors off to prescribe more and more fentanyl to their patients. – P1, FG3

Well, I just know what I've seen in like, well, it was like TV shows, something like that. People will

sometimes look through their parent's cabinets for opioids. Like once they're like past their due date, or whatever that is. And then they'll use them like inappropriately. – P8, FG5

Family. Participants discussed medication information with family members, particularly mothers. Participants sought medication information from grandmothers, siblings, parents, and cousins. Participants stated that talking to parents was easy and comfortable because they seek their children's best interest.

My mom [...] She's the one that listens to the doctor, so. – P4, FG2

Well, the first thing, I tell my mom. Then I go to Google and then search for information. – P1, FG8

Health Care Professionals. Participants asked health care professionals for medication information, particularly doctors. Students perceived doctors to be trustworthy, more knowledgeable than family members, and stated they could contact doctors about medication-related questions. Participants also received drug information from pharmacists when medications were picked up at pharmacies.

Parents probably don't know as much as a doctor does I would assume, so I tend to talk to the doctor. – P2, FG3

At the store, like at Walgreens when they're giving me the medicine, then they would say, oh, take it twice a day and this many, whatever. – P3, FG4

Medication Leaflets and Pamphlets. Medication packaging or pamphlets that accompanied prescriptions were mentioned as another source of drug information. Participants stated they used instructions found in pamphlets to understand how to take their medications.

If you have questions, I know like for certain medications they like, well, like inside, this might make people uncomfortable, like birth control, they have like instructions on what to do. And like they do that with other medications too. They give you like a packet on what to read about it. – P1, FG5

Like the paper they give you with the medications too. – P6, FG7

Online. Participants used Google and other web sites, such as WebMD and Mayo Clinic, to seek out opioid medication information.

Yeah, on like WebMD or Mayo Clinic. – P2, FG5

Because I don't know, you do everything on

Google – P1, FG8

Peers. Some participants used peers with similar health diagnoses or medications as a resource for medication information.

... maybe if like you had a friend or something that was more knowledgeable on like complications, then you would maybe go to them I'm thinking before like you did anything, but, yeah, doctor or parents if you don't have anybody else. – P1, FG3

Yeah, so but, no, like I've talked to my friends like for birth control, like the different side effects. Like, oh, mine really sucks, or like, oh, this one like works better than others. So like comparing different ones and the side effects, and like knowing what works more effectively for certain people. – P1, FG4

Discussion

Adolescents generally had some basic understanding of opioids and the consequences of misuse. They recognized that teen opioid misuse is likely prevalent and identified factors that lead to misuse. Participants received this medication information from various sources, including family, peers, health care workers, and web sites. However, they lacked critical information about prescription opioids, such as safe storage and disposal, and shared examples of misuse among family and peers. Some adolescents were unable to identify opioid medications, confusing them with illicit substances or even over-the-counter medications.

Participants in this study were familiar with prescription opioids, describing opioids as strong pain medications that could lead to addiction if used inappropriately. Family members, particularly mothers, were identified as a potential source of medication information. Parents with knowledge about the negative effects of prescription opioid misuse may be educating their children about medication safety. Some participants had misconceptions about examples of opioids, citing benzodiazepines, stimulants, and non-opioid analgesics. This points to the fact that even if adolescents know the harms of opioids, they may not know what medications are considered opioids and could easily misuse a medication they did not realize was an opioid.

Participants demonstrated some knowledge of what characterizes misuse. Participants recognized certain behaviors that match *The Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* diagnostic criteria for Opioid Misuse Disorder: "opioids are often taken in larger amounts or over a longer period than was intended" and "craving, or a strong desire or urge to use opioids."¹⁸ On the other hand, misinformation about the safe storage and disposal of opioid medications was present. Current research indicates that many

homes with children present report using unsafe storage of prescriptions.¹⁹ Adolescents participating in this study corroborated this by sharing examples of family members using unsafe storage methods, along with identifying a lack of knowledge about proper disposal. While some participants mentioned keeping medications locked or in an area not accessible to everyone, others saw no issue with storing medications in common spaces in the house. Participants were unsure why medications could not be thrown out or flushed down the toilet. Even though these disposal methods are not recommended, current research indicates that there is still a large proportion of adults who flush prescription opioids down a toilet or throw them away.²⁰

Participants described stories of opioid medication misuse they or their family members had encountered. These experiences mostly shed light on parents unknowingly misusing opioid medications for their children and being unaware of the risks and harms that it may cause. Parents used their pain medications or leftover medications in the house to ease their child's pain out of convenience; however, this still constitutes opioid misuse and could harm their child. In fact, current research suggests that the majority of adults keep their leftover prescription opioids for future use.²⁰ Sharing prescription opioids is also common among adolescents, especially with family members, who are perceived to have superior knowledge about medications.²¹ Children learn by example, and this is a situation where they would be exposed to opioid medication sharing and unsafe disposal as an acceptable practice.^{22,23} Educating parents and caregivers of adolescents about opioid safety and misuse could equip them to set a better example for their child.

Wisconsin has been severely affected by the opioid crisis.²⁴ Adolescents cited that there are certain regions where prescription opioid misuse was more common and that they personally witnessed misuse of substances other than prescription opioids. Participants also mentioned that because of the availability of non-opioids, adolescent use of non-opioids or street drugs is more prevalent than prescription opioid misuse. This suggests that adolescents are familiar with misuse. The rates of prescription opioid misuse vary based on the geographic region, hence the need to examine misuse nationally and locally.^{25,26} However, participants at one school mentioned that they did not socialize with individuals who misused substances. The focus group topic could have discouraged students who misuse opioids from participating. It is therefore unclear whether prescription opioid misuse is less common among these populations, or if participants who have witnessed misuse declined to participate due to subject matter.

Adolescents identified peer and family influences and academic pressure as major contributors to teen opioid misuse. They also cited pain, stress, recreational use, addiction, and mental health challenges as com-

mon reasons for teen opioid misuse. These factors align with other studies that have reported similar factors for misuse in adolescents.²⁷⁻³¹ Misusing prescription opioids can lead to addiction, which leads to misusing and abusing non-opioid medications. Adolescents were aware that opioid overdose could be fatal and recognized that misuse can cause depression and affect mental health. They were aware of the academic and legal consequences of misuse, like decline in academic performance, probation, and other legal issues. Earlier studies looking at the effect of opioids on brain function have correlated that opioid use is associated with a decrease in ability to process and encode verbal information, delayed information recall, and worse performance on tests that rely on the ability to make conclusions, memorize unrelated topics, and match information from a stimulus.^{32,33} In addition, there is an increase in risky behavior due to changes in cognitive impulsivity and a decreased inability to complete complex tasks, such as driving, while using opioids.^{33,34} This reflects insightful thinking and consideration on adolescents' part about misusing opioids and the consequences of misuse.

Family upbringing and peer influence have been reported to strongly contribute to adolescents' opioid misuse behavior.⁸ This can be explained by social cognitive theory and social learning theory, where adolescents imitate actions of people they look up to and consider important.^{22,23} Adolescents in this study mentioned speaking with parents about medication-related problems, which makes parents a major influencer in adolescents' decision-making and education. Adolescents identified doctors, pharmacists, and material provided by health care providers as trustworthy sources of medication information. However, some adolescents also received medication information from sources that are potentially less trustworthy, such as television shows and online web sites. A few participants mentioned using research databases or web sites, such as MayoClinic.org, but it is unclear how most adolescents choose which sites to trust. Adolescents may read incorrect information online, depending on which types of Internet sources they used. This indicates that health professionals should have direct conversations with adolescents, and not just parents or caregivers, when prescribing or dispensing a medication. It is important to answer adolescents' questions and provide them with the necessary information for safe medication use.³³ Health care professionals need to educate both adolescents and parents or caregivers about the risks of opioids and safety precautions.^{35,36}

This study shows that not all adolescents are knowledgeable about opioid medication misuse, risks, and safety measures. Adolescents are at an age where they make decisions about their medications and health, and it is necessary that they be well educated and informed about medications and their risks through an educational platform available to them.³⁵ The legitimate

use of opioid medications in adolescence is associated with an increase in risk of future misuse.¹⁰ Hence, it is critical that youth are provided with information on the safe and appropriate use of opioid medications when prescribed. There is a need for focused efforts on understanding how adolescents prefer to learn about opioids and who they prefer to provide this information to them. The results of this study provide insight about potential gaps in adolescents' knowledge, perspectives, and attitudes about opioids, which points to the need for structured educational efforts. Pharmacists should consider these potential knowledge gaps when counseling adolescent patients on opioid medications. These results can be used to guide the development of educational materials, interventions, and programs for improving adolescents' knowledge about opioid safety.

There are several limitations to this study. The findings are limited to three high schools in Wisconsin with a mainly White and Latino population, which limits the generalizability of study findings. In addition, participants may have felt uncomfortable sharing openly in front of their peers or may have worried about sharing incorrect answers. Accordingly, high school students who misused opioids may have felt uncomfortable disclosing this information or may have chosen not to participate in the study. Future research should include involve a quantitative study to survey a larger and representative sample of adolescents on their perspectives on prescription opioid safety and preferences for education in school and clinic settings.

Conclusion

This study provides insight as to what adolescents know about prescription opioids and how they are learning about them. Some adolescents did not know what an opioid was, or which medications were opioids. Adolescents identified examples of opioid misuse and were aware of opioid misuse among their peers. Study participants acknowledged that teen misuse is likely prevalent, even if they have not personally witnessed it. Adolescents also suggested that mental health challenges, stress, family and peer influence, pain, recreational use, and addiction may all lead to teen opioid misuse and were aware that misuse of prescription opioids may lead to negative physical, mental, and social consequences. Adolescents sought medication information from a variety of sources, including health care professionals, medication pamphlets, and online. However, this study suggests that adolescents do not have adequate knowledge of prescription opioids or safe medication practices. Health care professionals should consider these potential knowledge gaps when counseling adolescent patients on opioid medications. Family and peers may also heavily influence adolescents' behaviors and serve as a medication information source, thereby illustrating the importance of providing both parents and teens with accurate and accessible

education. Educational efforts should seek to address adolescent misconceptions surrounding opioids and to provide them with baseline information about safe and responsible medication storage and disposal.

Article Information

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Ethical Approval and Informed Consent. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national guidelines on human experimentation. The project was approved by the appropriate committees at our institution (University of Wisconsin-Madison and IRB approval No. 2019-0020). All patients and/or parents/caregiver(s) provided written informed consent and/or assent (as applicable) at enrollment.

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Supplemental Material

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