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Rx for addiction and medication safety: An evaluation of teen education for opioid misuse prevention

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ABSTRACT

Background: Rhode Island (RI) ninth graders report lifetime nonmedical use of prescription opioids (NMUPO) of 8.9%. NMUPO is associated with transition to heroin use, opioid overdose, and death.

Objectives: Measure changes in 9th grade students' knowledge, confidence, perceptions of opioid use disorder prevention, overdose response with naloxone, treatment, and recovery, following the delivery of an interactive substance use disorder curriculum.

Methods: Eight RI public high schools were recruited to participate. Freshman in each school were administered identical surveys that collected demographic data, substance use and misuse knowledge, students' perceptions of substance misuse harm, reported drug use, and risk and protective behaviors before and after the curriculum.

Results: Among 969 pre-intervention survey respondents, 19% reported use of marijuana, 3% heroin use, and 21% nonmedical use of prescription opioids. Between the pre-intervention to the post-intervention survey, significantly more students identified that addiction is a chronic brain disease (79% to 83%, $p = 0.05$), drug users are not responsible for their addiction (81% to 88%, $p = 0.001$), and that non-medical use of a prescription medication is use without a prescription (81% to 88%, $p = 0.001$). Improved confidence was also reported in identifying opioid withdrawal symptoms (26% to 45%, $p < 0.0001$), identifying signs of an opioid overdose from 29% to 46% ($p < 0.0001$), and knowing when to administer naloxone (17% to 45%, $p < 0.0001$). Confidence to refer someone to treatment improved from 31% to 45% ($p < 0.0001$). Logistic regression showed associations between mental health, peer use, parental affection, and academic performance factors as related to NMUPO.

Conclusions: Students reported significant NMUPO prevalence. Ninth grade students' knowledge and confidence of opioid misuse, overdose response, and recovery resources increased following the delivery of a multi-modal interactive substance use disorder curriculum. Community, school, and student-level multifaceted interventions are needed to prevent reduce NMUPO among adolescents.

Keywords: opioids, misuse, prevention, pharmacy, adolescent

Abbreviations: nonmedical use of prescription opioids (NMUPO), opioid use disorder (OUD), Rx for Addiction and Medication Safety (RAMS)

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BACKGROUND

In 2016, 881,000 or 4% of 12-17 year olds in the United States misused opioid pain relievers in the past year, defined as taking them not as directed, using someone else's prescription, or using them for reasons other than intended.[1] The most common opioid reported misused was hydrocodone, and the most common reason reported for misuse was to relieve physical pain. An average of 5% of Rhode Islanders aged 12 and older reported past year nonmedical use of prescription opioids (NMUPO) between 2012-2014, the highest in New England.[2,3] While past year NMUPO is prevalent in 12-17 year olds (5%), it almost doubles in young adults aged 18-25 to 7.6%.[4] In 2017, the percentage of students in 9th grade that reported ever using prescription pain medicine non-medically was 8.9%, 10.6% of males and 6.3% females.[5] Importantly, these measures are self-reported and subject to social desirability bias, and thus NMUPO may be underreported by as much as 35% in this population.[6]

People who misuse opioids frequently obtained opioids from a friend or relative, or were prescribed them from one doctor.[1] As opioid prescribing dramatically increased among adults and adolescent family members nationally, prescribing among children and adolescents was infrequent and unchanging.[7] Still, Miech, et al. reported a 33% increase in the risk of NMUPO among young adults who were appropriately prescribed an opioid before 12th grade.[8] NMUPO is associated with increasing rates of emergency room visits, inpatient admissions, transition to subsequent heroin use, increased risk of HIV and HCV infection, opioid-involved overdose, and death among adolescents.[9–13] The risk of transition to heroin use is greatest in those that begin NMUPO earlier in adolescence. [14,15]

Encouragingly, the 2017 "Monitoring the Future," study report, a longitudinal study of secondary school students' reported use and impressions of drug risk and availability, shows improving trends regarding

opioid misuse.[16] 12th graders report the lowest levels of non-heroin opioid use, and 8th, 10th, and 12th graders report decreasing opioid availability, and increasing or sustained perceived risk and disapproval of non-medical use of prescription opioids.[16] Even as nonmedical use declines in this population, opioid use disorder diagnoses have increased,[17] along with opioid overdose deaths, primarily attributed to heroin and fentanyl.[18] The overall prescription opioid overdose age-adjusted death rate among 15-24 year olds increased from 2% in 2015 to 2.6% in 2016, a 30% annual rate change, while the overall opioid overdose death rate (including heroin and fentanyl) increased from 7% to 9.3% over the same period, a 32.9% change in rate. [19] The overall societal costs of NMUPO among all ages were estimated to be more than $55 billion per year.[20]

Risk and Protective Factors

Predictors of opioid misuse and use disorder have been identified among adolescents.[21–25] These risk and protective factors become influential at various times during an adolescents development, and often relate to physiological changes or psychosocial concerns[23,24,26,27] Categorization of individual, family, school and community factors are defined by the Office of the United States Surgeon General.[21] Examples include early initiation of opioid use, mental health problems, peer use, and misperception of normative use and risk of use for individual factors. Lack of family support and academic success, as well as, increased availability of opioids are also associated predictors of misuse. Social media use may also affect substance misuse as heavy use has been associated with higher levels of depression and anxiety and increased exposure to pro-substance use content that reinforces misuse. (Woods HC et al. Journal of Adolescence 2016; 51:41-49. Tucker JS et al. J Adoles Health 2013; 53:400-4. Steers et al. Curr Addict Rep 2016; 3:343-348. AAP Council on Communications and Media. Media Use in School-Aged Children and Adolescents. Pediatrics 2016; 138: e20162592)

For every $1 invested in youth prevention, researchers observed a $4 savings in health care costs and $7 savings in law enforcement and other criminal justice costs.[27] Once a child's NMUPO is diagnosable as with an opioid use disorder (OUD), less than 25% of adolescents and young adults are offered and receive evidence-based, medication-first treatment, in part due to healthcare worker stigma.[28,29] While treatment programs require sustainable funding to ensure adolescents manage their OUD and recover into adulthood, universal prevention programs have proven patient-, school-, community-level and economic benefits.[30–32] An example of a universal approach, PROSPER (PROmoting School-community-university Partnership to Enhance Resilience) model uses school- and family-based prevention programs. The PROSPER model has observed a decreased in prescription opioid and prescription drug misuse in adolescents both in the short- and long-term outcomes.[30, 32]

This study evaluates a student pharmacist-delivered, opioid misuse prevention program developed for high school students and builds upon previous work for school-based prevention strategies for adolescents.[33-36] The primary objective of this study was to assess high school students' recall of knowledge of opioid misuse and awareness of medication safety considerations, including appropriate use, overdose identification and naloxone administration. Secondarily, the study examined the effects of student substance misuse and its relationship to risk and protective factors. Recognizing predictors of opioid misuse and use disorder, such as early exposure to opioids, experiencing a safe initial experience with a psychotropic medication, sibling and/or parent misuse of opioids, parental attention, peer NMUPO, depression, perceived stress, and academic problems in school, can help direct educational goals for prevention among this at-risk population.[21,23–25,37]

METHODS

The Rx for Addiction and Medication Safety (RAMS) program was a universal, opioid misuse prevention program developed by University of Rhode Island (URI) College of Pharmacy clinical practice-based faculty and reviewed and approved by an educational consultant with a Master in Education degree. The 3-hour curriculum provided 3-4 interactive educational sessions, including a focus on medication safety (i.e. safe use and storage, proper disposal of opioids), signs and symptoms and risk factors for opioid misuse and withdrawal, opioid overdose identification and response, and local treatment and recovery resources for adolescents and their families and friends. The program used role-play, case scenarios, and the Frayer Model[38] to help guide student learning and knowledge application to real-world examples. The program was also augmented by social media to reinforce information for high-school students and faculty, as well as family members who joined the campaign.

The RAMS program was piloted with a nonrandomized pre-post study design (Thiese et al. Observational and interventional study design types; an overview. Biochem Med (Zagreb) 2014; 24:199-210) in 8 Rhode Island public schools among 9th grade students. Transition into high school increases the risk of misuse as freshmen face additional social and psychological challenges, and an environment with more drug exposure potential.[27] The educational consultant of the program recruited schools over a 6-month period. Monetary incentives were provided for school participation and additional stipends were offered for up to 2 high school students to attend a national drug prevention and leadership summer conference. Prior to program delivery, school committee approval of the curriculum and corresponding study for all 8 schools was required. Additionally, Rhode Island Department of Education approval was also needed. Delivery of the program was unique because URI pharmacy students provided the majority of the curriculum to the schools. Student pharmacists have successfully delivered a presentation on substance misuse focused on the neuroscience of addiction as a service learning activity to high school students.[39] The authors noted several advantages of using student pharmacists to

deliver the presentation, notably to increase the number of presentations delivered, and to have them delivered by relatable, typically younger individuals than the researchers. In this study, the presentations were positively received by both the presenters, the schools, and the students.[39] Student delivery was decided upon for bolstering educational resources, but also to foster peer relationships with teens.[40] Before receiving authorization to deliver the curriculum, students volunteered to complete a faculty-run, train-the-trainer program. The program included adolescent communication and life-skill development, as well as opioid safety and use disorder, overdose recognition and naloxone administration, and family/community outreach to prepare for on-school site presentation of the curriculum.

Associated with program participation, 9th grade students were invited to complete a confidential, matched pre- and post-curriculum survey. Parents received opt-out permission forms at least two weeks prior to survey administration and high-school students were required to assent directly before completing survey. URI Institutional Review Board approval was also obtained prior to study initiation. College faculty developed survey to include items on risk and protective factors for substance misuse. Additional survey items included past nonmedical use of prescription opioids, alcohol and other illicit drugs, students' perception of risk and/or harm from prescription opioids, and awareness of local and national treatment and recovery resources. The survey also evaluated for changes in students' knowledge of proper storage and disposal of prescription drugs, misuse knowledge and addiction awareness, overdose identification and naloxone administration. Questions used were based on the 2015 Youth Risk Behaviors Survey from the Centers for Disease Control and Prevention[41] and the 2015 Ontario Study Survey from the Canadian Centre for Addiction and Mental Health.[42] A behavioral science research professor reviewed final survey for methodology and implemented it for administration via SurveyMonkey®. High school students were provided the survey link and matched by collecting

confidential identifiers (i.e. first 3 letters of mother's maiden name, first 2 letters of student's middle name and day of their birth). Pre-survey administration occurred on the first day of curriculum prior to delivery and post-survey data was collected at least one month after curriculum conclusion.

Statistical Analysis

Bivariate analysis was completed separately among pre-intervention survey respondents and the matched pre-intervention and post intervention survey respondents. Differences between the two groups of survey respondents (i.e., pre-survey and matched sample) were compared for each variable using a chi-square test or Fisher's exact test, as appropriate. Bivariate analysis was also completed for two dichotomous substance use outcome groups during the pre-survey: (1) non-medical use of prescription pain relief medications in the past 30 days; (2) prescription pain relief, attention-deficient/hyperactivity disorder and sedative medications, over-the-counter cough medications and/or loperamide, marijuana and heroin in the previous 30 days. The association of each possible risk factor with each substance use outcome was evaluated using a chi-square test or Fisher's exact test, as appropriate. For each of the substance use outcomes, univariate logistic regression was conducted for each independent variable to determine statistically significant associations with the outcome of interest. All independent variables with P value <0.20 were included in the adjusted logistic regression model for each substance use outcome. Diagnostic tests for collinearity were performed between independent variables and diagnostics of model fit were examined, as guided by Akaike information criterion and the Hosmer Lemeshow test (David W. Hosmer & Stanley Lemesbow (2007) Goodness of fit tests for the multiple logistic regression model, Communications in Statistics - Theory and Methods, 9:10, 1043-1069, DOI: 10.1080/03610928008827941) . Based on the adjusted models, the measure of

association between outcome and each independent variable was determined by an estimated odds ratio with a corresponding 95% confidence interval.

For the matched set of pre/post intervention respondent surveys, change in knowledge from the pre-intervention survey to the post intervention survey was evaluated using McNemar's test for paired data. For the continuous pre/post scores, each person serves as their own control, allowing for comparisons across the two groups because all time-invariant confounding is subtracted out by the individual level differencing and secular trends are less of a concern for this short of a follow-up period. All statistical tests were two-sided and performed at the 0.05 significance level. All statistical analysis was performed using SAS 9.4 (Cary, NC.)

RESULTS

The RAMS program was piloted during the 2016-2017 academic year. There were 969 adolescents who completed the pre-intervention survey (Table 1). The majority were 14 years old (45%), 52% were male, and 62% were white. Most (80%) lived in one home only and spoke English at home (82%) and 54% lived with two parents and siblings. Twenty-four percent reported 5 or more hours of social media use per day and 22% received mostly C's or lower in school. Forty-seven percent had a mother who graduated from college and 36% had a father who graduated from college. In their free time, 64% reported that at least one of their parents always knew where they were. Among those who completed the pre-intervention survey, 9% reported use of marijuana, 1% reported heroin use, and 7% reported NMUPO.

There were 527 adolescents in the matched sample and they were comparable to the pre-survey sample for the demographic factors in Table 1. The majority were 14 (49%) old, 48% were male, and 70% were white. Most (80%) lived in one home only and spoke English at home (85%) and 58% lived with two parents and siblings. Twenty-four percent reported 5 or more hours of social media use per day and 17% received mostly C's or lower in school. Fifty-two percent had a mother who graduated from college and 39% had a father who graduated from college. In their free time, 68% reported that at least one of their parents always knew where they were. Among those in the matched sample, 7% reported use of marijuana, 0% reported heroin use, and 6% reported NMUPO. The matched sample was comparable to the respondents at the pre-intervention survey, except more were white, and less received mostly C's or lower.

Pre-Post Changes in Substance Misuse Knowledge

Among the matched sample of adolescents, there were significant increases in the number of correct responses reported for opioid misuse knowledge questions (Table 2). From the pre-intervention survey to the post-intervention survey, significantly more students correctly identified that addiction is a chronic brain disease (79% to 83%, $p = 0.05$), drug users are not responsible for their addiction (81% to 88%, $p = 0.003$), and drug users do not have weak characters (49% to 57%, $p = 0.004$). The number of students who correctly identified drug misuse as accepting prescription medications from a friend and exceeding the recommended dose, increased (70% to 81%, $p < 0.0001$ and 85% to 88%, $p = 0.14$, respectively). Finally, there was a significant increase in the number of students who correctly identified that non-medical use of a prescription medication is defined as use without a prescription (81% to 88%, $p = 0.001$).

Students were assigned a score for the number of correctly identified opioid withdrawal symptoms (observed score range, 0 to 12) and steps for managing an opioid overdose (observed score range, -4 to 7; negative values represent only choosing incorrect responses). Students' scores for opioid withdrawal symptoms increased from 5.9 correct responses (standard deviation (SD) = 3.6) to 6.3 (SD = 3.9; $p = 0.04$) and scores for identifying the steps to manage an opioid overdose improved from 3.2 correct responses (SD = 1.7) to 3.9 (SD = 2.3; $p < 0.0001$).

As knowledge increased, improved confidence was also reported in identifying opioid withdrawal symptoms (26% to 45%, $p < 0.0001$), identifying signs of an opioid overdose (29% to 46%, $p < 0.0001$), knowing when to administer naloxone (17% to 45%, $p < 0.0001$) and educating friends and family to recognize an opioid overdose and safely give naloxone when indicated (27% to 41%, $p < 0.0001$). Confidence in referral to treatment of friends and family with opioid misuse or use disorder also improved among 9th grade students (31% to 45%, $p < 0.0001$).

Predictors of Substance Use at Pre-Survey

The prevalence of non-medical use of prescription pain relief drugs, and non-medical use of any drugs captured in the pre-intervention survey are reported for each level of the demographic factors. These findings are displayed in Supplementary Table 1.

At the pre-intervention survey, reports of feeling depressed, under stress, peer use, and perception of low parental affection increased the odds of NMUPO (Table 3). Adolescents who reported feeling depressed a little or all the time had over 2 times the odds of reported NMUPO compared to those who were depressed none of the time, while adolescents who felt stressed or strained had over 5 times the

odds of reported NMUPO compared to those that did not feel stressed at all. Reported peer NMUPO in the past year increased the odds of 9th grade students by 1.9 compared to those who had friends who did not engage NMUPO. Adolescents who reported their parents showed affection 2 times per year or less had twice the odds of reported NMUPO, compared to adolescents who reported their parents showed affection 1-2 times per month.

At the pre-intervention survey, older age, being under stress, reported illegal drug sale attempts, peer use of marijuana, and low parental affection were associated with increased odds of non-medical use of drugs (Table 4). Academic success was reported with decreased odds of non-medical use compared to earning lower grades (i.e., mostly C's or lower). Adolescents who were 17 years old had five times the increased odds of non-medical use of drugs compared to 14-year-old peers. Adolescents who felt stressed or strained had over two times the odds of reported non-medical use of drugs when compared to those who were not stressed in the last month. Adolescents who reported illegal drug sale attempts had over three times the odds of reported non-medical use of drugs compared to those who did not report illegal drug sale attempts. Those surveyed who that reported some to all of their closest friends used marijuana had twice the odds of reported non-medical use of drugs compared to those that reported none of their friends were using marijuana. Adolescents who reported their parents showed affection 2 times per year or less had over twice the odds of reported non-medical use of prescription pain relief drugs, compared to adolescents who reported their parents showed affection 1-2 times per month. Grades of C's or lower had 1.5 times the odds of reported non-medical use, where earning A's decreased the odds by 50% compared to those who received mostly B's.

DISCUSSION

The RAMS program provided a universal opioid misuse education program to adolescents uniquely through its curriculum design and delivery. Freshmen students who participated improved their overall knowledge of opioid misuse and use disorder (i.e., addiction). Improved knowledge and confidence were also observed for overdose identification and naloxone administration, as well as increased self-confidence of knowing when treatment is indicated for a friend or family member and what resources are available for treatment and recovery.

Educational prevention programs for teen substance misuse are abundant[21,27,43] though most do not specifically target opioid misuse. [21,27,43] Programs are usually aimed for students using drug resistance and general social skills as prevention strategies[27,33] Many others only target risk factors for general substance misuse or educate specifically on prescription medication safety.[32,43] The RAMS curriculum provided drug resistance skills through awareness of opioid misuse dangers and situational social skills by way of role play, but its distinction is its inclusion of content on opioid safety, proper medication storage and disposal, treatment and recovery support for peers, and overdose recognition and reversal, including naloxone use. Several states in addition to Rhode Island[43] have proposed or passed substance use and misuse prevention high school curricula,[45,46] but none have included naloxone education, despite policies that mandate or recommend naloxone be available in schools[47]. Adolescents can be successfully trained to administer the one-step intranasal formulation; [48] thus, naloxone education should be part of prevention curricula. Harm reduction has been effective for alcohol and tobacco prevention, but related evidence for prescription or illicit drug use has not been studied.[49] A multifaceted approach, such as RAMS, follows the prevention plan from the Substance Abuse and Mental Health Services Administration by addressing prescription drug misuse awareness, but additionally addresses medication safety considerations, harm reduction strategies, and treatment resources[50] in 9th grade students.

Seven and six percent of adolescents who completed the pre-intervention and matched survey, respectively, reported NMUPO. Use among the study population corresponds with the 2017 self-reported data from Rhode Island of 8.9% NMUPO among 9th grade students.[5] Of those adolescents that state NMUPO, their associated risks were depression, stress, peer use, and perception of low parental affection. Additional studies have observed similar mental health risk factors for NMUPO.[23–25] Though self-medication for physical pain is the most common reason for misuse[1], motives to self-treat depression and anxiety (i.e., emotional pain) have been observed in adolescents.[23,24,51]. Peer use and perception of low parental support both have been reported as known risks for NMUPO.[21,37] Risks associated with overall substance misuse, including prescription opioids in the pre-intervention group were older age, lack of academic success, being approached to purchase drugs, as well as stress, peer use and lack of parental affection. School-risk factors, such as academic failure as early as late elementary school, and community-risk factors of ease of drug access have both been observed in other studies and are risks defined by the Surgeon General.[21,37] Age, it seems, may be a reflection of the early initiation of substance use, given the increasing odds with each year of age.[21] RAMS curriculum currently focuses on peer use and drug access through normative education, misuse awareness, and proper storage and disposal. A potential expansion is to further the discussion of self-medication risks and stress reduction strategies as outcomes indicate stress management and mental health resources may be warranted for schools. The perceived lack of support among adolescents in the study highlights the need for family-centered prevention strategies in addition to a school-based approach.[32,35] Parental involvement is essential for prevention strategies though parents and caregivers are difficult to recruit and retain in such programs.[21,52] Use of social media may be a novel approach to reach and connect parents and teens; however, evidence is needed on its effectiveness.

RAMS is delivered in several short, active-learning sessions with student pharmacists within the classroom, modified to fit the pilot school's schedule. This approach allows for pharmacy students to enhance the discussion and knowledge recall among adolescents as they are serving as peer instructors. Student pharmacists also provided advanced knowledge of prescription opioids, overdose education, including naloxone, which is in contrast to National Institute on Drug Abuse teen program that simply use online materials to serve as teacher facilitator guides.[50,53] This is the first work to demonstrate comprehensive opioid misuse prevention education in a school-setting using pharmacy students. However, student pharmacists have provided opioid safety and overdose prevention to emergency department patients, and this program was found to be both feasible and improve patients knowledge of opioids. [54] Prevention education by student pharmacists in a school-setting through the RAMS program is achievable, improves knowledge of opioid misuse and its risks, and enhances students' confidence to engagement in harm reduction strategies and support family and friends in treatment and recovery of opioid use disorder.

Limitations

Development of the opioid misuse curriculum was based on clinical faculty expertise and evidence-based literature supporting the need for education on opioid misuse and increasing awareness of its risks and consequences, as well as safe use of opioids, proper medication storage and disposal, harm reduction strategies and treatment support.[50,55] Therefore, our curriculum was not matched to a standard and may possess features not tailored to adolescent education. Though in its design, the curriculum does provide drug resistance skills and normative education to students while additionally providing harm reduction strategies to help enhance competence skills training.

Delivery of the curriculum proved to be difficult at times. Pharmacy student recruitment for the train-the-trainer program was robust; however, continued interest and motivation of pharmacy students to participate in more than 1 or 2 classroom sessions was limited. Steps to enhance pharmacy student participation has been implementation for subsequent curriculum delivery in the form of student professional development funds. Conversely, pharmacy students were unprepared for occasional behavioral issues within the classroom among high-school students. Incentives provided to high schools were to be set aside to offset costs of having teachers present for classroom management and discipline. However, some pharmacy students found classroom management of adolescents challenging and an obstacle to facilitating discussion of the program key elements. Additional limitations include miscommunication of high school administration and staff which led to conflicts in delivery and timing of the curriculum, necessitating shortened duration of sessions and rescheduled sessions. Certain schools also had different classroom needs, such as auditorium-style delivery, advisory times and rotating schedules adding to the challenge of presenting curriculum as an interactive program. Challenges of existing school culture when implementing a novel curriculum is expected. As the RAMS program continues within schools, scheduling and communication issues hopefully will subside as curriculum expectations will be known be all parties.

Data collection also presented implementation challenges. Surveys were tested for length prior to administration and found to be 10- to 15-minute duration. Thus, pre-surveys were originally scheduled to be administered directly prior to the opening curriculum session. However, some high school students took upwards of 45-60 minutes to complete the survey and arrangements had to be made to reschedule subsequent sessions. In addition, youth had trouble with the confidential identifiers, particularly mother's maiden name. Therefore, the number of matched results were significantly reduced based on student understanding of the identifiers, as students and faculty were unprepared to

explain what we assumed was common knowledge. A new process for matched data collection will be implemented going forward with the removal of mother's maiden name and replaced by street name where they reside. Post surveys were to be administered 1-2 months after curriculum intervention. Nevertheless, some schools scheduled post surveys several months after curriculum, thus recall bias may be relevant due to different timing of the administration for post results.

The responses to the survey were self-report and subject to reporting bias. In addition, based on the self-reported data, adolescents' substance use and knowledge could be misclassified.[6] The matched adolescents may not be representative of the study sample; thus, our results are subject to selection bias. In addition, secular trends may be present that our current approach did not consider, and our analyses could be subject to unmeasured confounding. The results from baseline are cross-sectional, so temporal sequence and causality are not possible to establish. Future longitudinal studies evaluating risk factors and subsequent opioid use initiation are warranted. In these studies, the intervention could be randomized to eliminate unmeasured confounding. Our pilot project evaluated this training among high school students in Rhode Island and these results may not be generalizable to a broader population without additional considerations.

Future goals are to create a video booster curriculum to sustain knowledge gained and evaluate the disseminated or spillover effects of the RAMS training among high school students. We plan to evaluate this program in additional Rhode Island schools to address gaps in opioid misuse prevention education in the state. Further goals are to evaluate the longitudinal effect of prescription opioid misuse, measure the prevalence of heroin and other substance use among adolescents, with the objective to observe a decrease in use as a result of increased knowledge of opioid misuse, its risks, and treatment of opioid use disorder. Additionally, we are creating a corresponding RAMS website for high school teachers and

students, as well as parents and caregivers to expand upon the social media campaign. The website will have video curriculum and additional teacher and parent resources to enhance recruitment and participation in prevention strategies.

CONCLUSIONS

Among adolescents surveyed the lifetime prevalence of NMUPO was 6%-7%. NMUPO was associated with mental health problems, peer use and perceived lack of parental affection. Students receiving multi-modal prevention education for prescription opioid misuse increased their knowledge and confidence in understanding of opioid misuse, overdose identification and its response, and recovery resources. Inclusion of harm reduction strategies delivered by student pharmacists is a novel approach to prevention education. Further evidence is needed to ensure the curricula decreases NMUPO and whether interventions for stress management and mental health, as well as family-centered strategies should be incorporated into the universal-school based program.

CONFLICT OF INTEREST: The authors declare they have no conflicts of interest to disclose.

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