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An exploratory study of a hands-on naloxone training for rural clinicians and staff

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Abstract

Introduction: Since the COVID-19 pandemic, an increase in fentanyl-combined drugs has led to a surge in opioid overdose deaths in the United States. Higher opioid overdose mortality rates are problematic in rural communities, and there are few prevention, treatment, and recovery resources for individuals experiencing opioid use disorder.

Method: This exploratory project aimed to investigate a hands-on naloxone training for rural clinicians and staff. Rural clinicians and staff at two behavioral health centers were recruited to participate in a 30-min lecture and 30-min hands-on intranasal naloxone training using a low-fidelity mannequin. A pre-post opioid knowledge questionnaire, rubric based on the Substance Abuse and Mental Health Services Administration toolkit, and investigator-generated survey were used to evaluate opioid knowledge and response, demonstration of intranasal naloxone administration, and participants' perceptions of the training. Enrollment characteristics were summarized using descriptive statistics and paired t-tests were used to assess mean differences.

Results: Of the nine participants in the project, seven (87.5%) were female and six (75.0%) were Black. Four participants assumed a therapist role, attained a MS or MA degree, and had 5 or more years of experience working in healthcare. The total mean rubric score for all participants was 96.0 ($SD=8.8$). No significant pre-post mean differences among opioid knowledge, overdose risk, and overdose response categories were found, all $p > 0.05$. However, post-intervention mean scores were slightly higher in all categories except overdose risk. Most participants (77.8%) responded that they felt comfortable handling an opioid situation and teaching the training to community members. Open-ended responses indicated that participants liked the demonstrations, examples used, hands-on nature of the training, and the presentation materials.

Conclusion: A hands-on naloxone training is beneficial for training rural clinicians and staff to respond to opioid overdose. This training may be a promising solution to reduce response time between recognition of opioid symptoms and administration of the life-saving medication, naloxone. Future studies should examine the efficacy of this training in larger samples with the

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CONFLICT OF INTEREST

There are no conflicts of interest.

inclusion of rural interdisciplinary teams, trusted community leaders, and family and friends of those impacted by opioid use disorder.

Clinical relevance: This innovative hands-on naloxone training is designed for rural clinicians and residents who are most likely to witness individuals experiencing opioid toxicity. The primary goal is to reduce response time between recognition of signs and symptoms and administration of the life-saving medication, Naloxone.

Keywords

clinicians; harms reduction; naloxone training; opioid use disorder; rural

INTRODUCTION

According to the Center for Disease Control and Prevention (2021), more than 100,000 drug overdose deaths have occurred in the United States, with accelerating death rates in the second year of the coronavirus pandemic. While the previous surge in the nation's overdose epidemic was driven by increasing opioid prescriptions and heroin, synthetic opioids such as fentanyl are now responsible for most overdose deaths. In fact, overdose deaths due to fentanyl increased from 57,834 in 2020 to 71,238 cases last year (CDC, 2021; National Institute on Drug Abuse, 2018). Illicitly manufactured fentanyl can be mixed with other street drugs including cocaine, methamphetamine, and other prescription opioids (CDC, 2021; NIDA, 2018). Unfortunately, many people are not aware that they are taking a street combination drug with fentanyl, which can be fatal.

The COVID-19 pandemic has created many challenges for individuals with opioid use disorder (OUD), including those seeking medication treatment for OUD. Physical distancing has led to increased isolation of individuals who use opioids, thus increasing the risk of overdose deaths (Bolinski et al., 2022). Daily challenges (e.g., financial hardships, social distancing, loss of housing, grief and loss of loved ones) experienced during the pandemic can exacerbate mental health conditions that can lead to drug relapse for individuals with OUD. The negative impact of the COVID-19 pandemic on opioid-related deaths in the United States has been more prevalent in rural areas (Bolinski et al., 2022; Walters et al., 2022), which are poorly resourced with prevention, treatment, and recovery services for individuals with OUD and mental health.

Rural communities have been disproportionately affected by the opioid epidemic due to high rates of poverty, social isolation, and limited resources (Bolinski et al., 2022). Bolinski et al. (2022) conducted a mixed-methods survey of rural residents and found reports of decreased drug availability had led to greater use of street drugs contaminated with fentanyl. This led to increased experienced or witnessed drug overdose, and psychological distress. Several residents reported a need for consistent access to harm reduction services such as naloxone and fentanyl test strips (Bolinski et al., 2022). Naloxone is a pure competitive opioid antagonist used for the reversal of opioid effects in emergent situations. Naloxone binds to the opioid receptor, temporarily blocking the opioids' ability to bind and exert its effects. It can be administered via a variety of routes (i.e., intranasal, intravenous, intramuscular, subcutaneous) to reverse the life-threatening respiratory depression of opioid

overdose. Allergic reactions to naloxone are possible however serious side effects are rare. Naloxone may be safely administered during pregnancy. However, naloxone administration will remove the opioid effects and result in withdrawal symptoms (i.e., restlessness, aches, dizziness, fever, chills, stomach pains) (Substance Abuse and Mental Health Services Administration, 2022).

Historically, naloxone has been administered by first responders (e.g., law enforcement officers, fire firefighters, and emergency medical service providers) in community settings when an opioid overdose is suspected. However, in rural communities, it may take longer travel times for a first responder to arrive on the scene. This delay can increase the risk of fatality for an individual who is experiencing an opioid overdose. In addition to first responders, efforts are needed to expand naloxone training to rural interdisciplinary teams. These efforts include mental health therapists, social workers, adult and youth substance use therapists, clerical staff of rural small business organizations, individuals who take opioids, and family and friends of people who take opioids. Studies have shown underutilization of naloxone and higher rates of opioid drug overdose rate in rural areas compared to urban communities (Kilwein et al., 2019; Lipira et al., 2021). These findings suggest that increased access to naloxone and faster response times may be lifesaving and reduce opioid overdose mortality rates in rural communities.

To date, there is extensive literature related to naloxone training among rural first responders (Crocker et al., 2019; Wood et al., 2021; Zhang et al., 2018). However, we developed an exploratory study to examine the impact of a hands-on naloxone training for rural clinicians and staff during the COVID-19 pandemic. This study addressed the need to expand naloxone training and access to rural community professionals who could respond quicker in the event of a suspected opioid overdose. There are three research aims: (1) To examine knowledge of opioids, opioid toxicity, and opioid overdose response among rural clinicians and staff; (2) To examine clinicians and staff performance during a hands-one naloxone training; and (3) To examine the perceptions of a hands-on naloxone training among rural clinicians and staff.

METHODS

Participants and setting

This study was approved by The University of Alabama's Institution Review Board. Clinicians and staff at behavioral health centers were recruited from two rural counties to participate in a 1-h hands on face-to-face Naloxone training. Participants consented to participate in this training held at their clinic on November 19, 2021 and December 17, 2021, and only data from those providing written consent were used in this research.

Instrumentation

We used a validated survey, The Brief Opioid Overdose Knowledge (BOOK), to assess the participants' knowledge of opioids pre-post training (Dunn et al., 2016; Hines et al., 2021; Huhn et al., 2018). We used a rubric based on the Substance Abuse and Mental Health Services Administration (SAMHSA) Opioid Overdose Toolkit (2018) to assess the participants' ability to recognize signs of opioid toxicity and administer intranasal naloxone.

We used an investigator-developed survey to assess the participants' perceptions of the hands-on naloxone training. This study followed our previous naloxone training protocol that was conducted with baccalaureate nursing students (Hines et al., 2021).

The BOOK is a 12-item questionnaire that scores participants across three dimensions of knowledge: general opioid knowledge, opioid overdose knowledge, and opioid overdose response knowledge and generates good internal consistency (Cronbach $\alpha = 0.88$) across all items (Hines et al., 2021). The BOOK scores, which are based on the number of items correct, range from 1 to 12 with higher scores indicating greater general knowledge of opioids (Bergeria et al., 2019; Dunn et al., 2016; Huhn et al., 2018). Scores on the three subsections are based on the number of items correct ranging from 1 to 4, with higher scores indicating greater knowledge.

The SAMHSA-based rubric consists of five steps to evaluate the participants' ability to recognize signs of opioid toxicity and administer intranasal naloxone. Each step has key learning points and is worth 20 points. Participants must perform each step on a low-fidelity mannequin for a summed score ranging from 0 to 100, with higher scores indicating better performance.

We used an investigator-developed survey to assess the participants' perceptions of the hands-on naloxone training. The survey was developed and tested by the researcher prior to the initiation of the research process. The content validity index (CVI) is widely used within nursing research to quantify the content validity for multi-item scale surveys. The CVI is based on expert ratings of relevance and the measure of agreement between experts (Polit et al., 2007). The experts for this research were five doctoral prepared nurse educators. All experts were on faculty in a baccalaureate nursing program within a large public university in the southeast United States and the average experience, in nurse education, for the experts was 16 years. The final eight-item tool was calculated to have a CVI of 0.90. Participants were asked to respond to six statements using a Likert-style scale with responses ranging from *1 = Strong Agree* to *5 = Strongly Disagree*. For example, participants were asked to respond to the statement, *"I would feel comfortable handling an opioid toxicity situation having received the training"*. An additional two items on the survey were open-ended questions used to gather information-related to what participants liked the best and recommendations for improving the training. Demographical data collected with this survey include age, gender, ethnicity, job position, highest education level completed, and number of years worked in healthcare.

Procedures

Rural clinicians and staff were invited to participate in a 30-min lecture on opioids followed by a 30-min hands-on intranasal naloxone training. First, participants completed the BOOK as a baseline knowledge assessment and then listened to a 30-min opioid lecture led by faculty. Second, each participant performed the SAMHSA 5-steps outlined in the rubric and administered the intranasal naloxone on a low fidelity mannequin while being checked off by a trained faculty member. Third, the participants completed the BOOK as a posttest assessment of opioid knowledge. Finally, participants were asked to complete the survey to assess their perceptions of the hands-on naloxone training.

Statistical analysis

Descriptive statistics were used to summarize enrollment characteristics using mean (standard deviation) for continuous variables and frequency (percentage) for categorical variables. Missing data were not imputed. We compared pre and post-intervention means for opioid knowledge, overdose risk, overdose response, and the total score using paired t-tests. JMP Pro Version 15 used for all analyses (SAS Institute Inc., Cary, NC, 1989–2021). P-values ≤ 0.05 considered meaningful.

RESULTS

Cohort summary

On average, participants ($N = 8$) were 43.9 years of age, mostly female (87.5%), Black (75.0%), and from County 2 (62.5%). Four participants assumed a therapist role, held a MS/MA degree, and had 5 or more years of experience working in healthcare. See Table 1 for the complete description of the cohort.

Survey results

For Aim 1 (BOOK scores to assess opioid knowledge), no significant mean differences were found among any characteristics, all $p > 0.05$, Table 2. However, post-intervention mean scores were slightly higher for all characteristics except overdose risk. For Aim 2 (SAMHSA rubric scores to assess hands-on performance), the total mean rubric score for all participants was 96.0 ($SD = 8.8$). See Figure 1 for individual performance scores on the SAMHSA rubric.

For Aim 3, participants were asked to complete an 8-item survey about their perceptions of the naloxone training. The survey consisted of six Likert-based items and two open-ended items. Almost all participants ($N = 7$) strongly agreed to the two survey items addressing comfort level regarding handling an opioid toxicity situation and teaching the training to community members. In response to the open-ended item, “What did you like best about the training?”, participants commented that they enjoyed various aspects of the training. Included in the comments were positive statements regarding enjoyment of demonstrations, the hands-on nature of the training, examples presented, and the presentation materials.

DISCUSSION

Findings from this exploratory study support the need for expanding naloxone training to rural clinicians and staff who can respond quickly in the event of a suspected opioid overdose. Overall, there was an increase in means scores on the BOOK survey post-intervention, specifically in categories of opioid knowledge and overdose response. Almost all of the participants were able to correctly demonstrate the SAMHSA 5-steps outlined in the rubric. There were staff members who participated in the training, which suggests that this training may be applicable to community lay persons with little or no medical experience. The participants' perceptions of the naloxone training were favorable, and most participants felt that the training improved their understanding of opioids and management of opioid toxicity. Most importantly, the majority of the participants felt

comfortable teaching the training to community members. Our findings were similar to the experiences of 18 individuals with past or current opioid and heroin drug use who had administered naloxone to a peer during an overdose emergency (Hanson et al., 2020). Qualitative interviews indicated an effective naloxone training among peers of high-risk individuals living in a rural state, and a majority of the participants felt prepared to administer naloxone during an opioid overdose (Hanson et al., 2020). These results suggest that a hands-on naloxone training for lay persons may be sustainable in rural communities using the Training the Trainers Model. Using this model, rural clinicians and staff can train community members and peers who are likely to witness individuals experiencing opioid overdose how to respond and administer naloxone.

There are a few study limitations. Given this study was conducted during the COVID-19 pandemic when clinics and business were closed and there were staffing shortages, we expected a small sample size. The results should be interpreted with caution given our small sample size and limited generalizability. However, our findings are encouraging for future study of a hands-on naloxone training within a larger sample of rural clinicians and staff. A larger sample size would likely yield significant results in pre-post opioid knowledge scores as seen in Huhn et al. (2018) who compared computer-based education interventions with 197 participants and measured significant knowledge gains using the BOOK questionnaire. Likewise, Bergeria et al. (2019) found a significant increase in opioid overdose knowledge, evidenced by increased BOOK scores, among three unique risk groups ($n = 185$) after completing two web-based opioid interventions. Lastly, Hines et al. (2021) research showed significant knowledge gains, evidenced by increased BOOK scores, among 284 baccalaureate nursing students after completing a hands-on naloxone training. We did not measure knowledge retention within our sample which would provide information about booster naloxone training sessions.

Our hands-on naloxone training is the first to be implemented in the rural South. Future research implications include examining the benefits of this training for interdisciplinary teams, faith-based leaders, trusted community members, and friends and family of individuals impacted by OUD. Perhaps, training expansion may lead to greater access and availability of naloxone within rural communities. There is an online training offered through the Jefferson County Department of Health which provides a free naloxone kit to those who complete the training. Many rural residents lack internet service to complete this training and computer literacy may also be problematic for this type of training. Therefore, our hands-on naloxone training may be an excellent alternative to educate rural community members on ways to intervene when witnessing an opioid overdose. Unfortunately, opioid-related stigma is a barrier to individuals with OUD seeking treatment in rural communities. Many families and loved ones of individuals with OUD fear getting police involved and need to be trained on how to respond when they witness an opioid overdose.

CONCLUSION

Psychological consequences of the COVID-19 pandemic have led to dramatic increases in opioid-related deaths in the U.S. Rural communities continue to be disproportionately impacted by OUD, and there are few resources for individuals seeking treatment. First

responders typically receive naloxone training, but it may take hours for an emergency team to arrive on the scene of a suspected opioid overdose in a rural community. Harm reduction efforts such as naloxone training can be beneficial for rural clinicians and staff who may be likely to respond quickly to an individual experiencing an opioid overdose. A hands-on naloxone training can be promising for engaging rural clinicians and staff and increasing their comfortability in teaching naloxone administration to family and caregivers of those impacted by OUD. Additional studies exploring the efficacy of this training in larger samples are warranted.

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CLINICAL RESOURCES

SAMHSA Opioid Overdose Prevention Toolkit <https://store.samhsa.gov/sites/default/files/d7/priv/sma18-4742.pdf>.

Jefferson County Department of HealthOnline Naloxone Training <https://www.jcdh.org/SitePages/Programs-Services/CommunityHealth/SubstanceUseAndAddiction/NaloxoneTraining.aspx>

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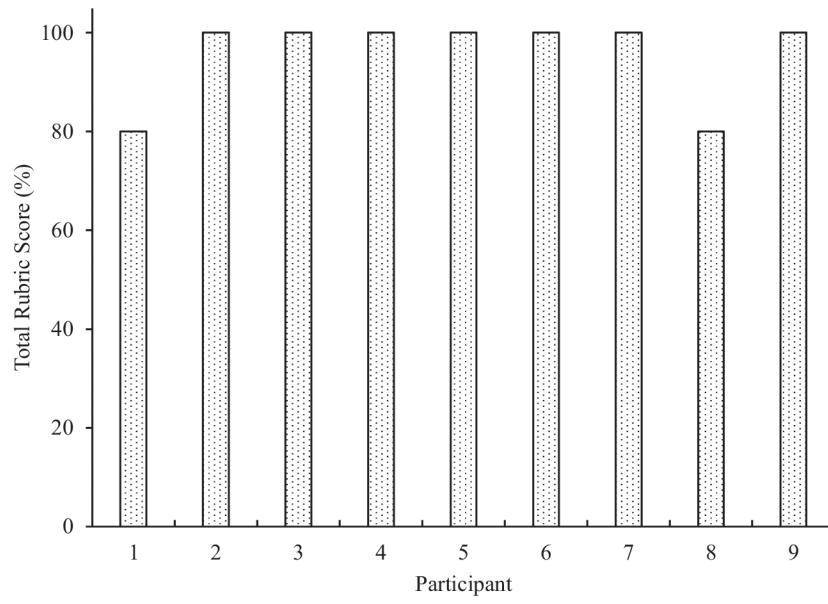


FIGURE 1.
Individual performance scores on the SAMHSA rubric.

TABLE 1

Summary statistics of the study cohort

Characteristic	<i>N</i> = 8 ^a
Age	43.9 (11.1)
Gender	
Female	7 (87.5)
Male	1 (12.5)
Ethnicity	
Black	6 (75.0)
Native American	1 (12.5)
White	1 (12.5)
County	
1	3 (37.5)
2	5 (62.5)
Current position	
Therapist	4 (50.0)
Staff	4 (50.0)
Highest level of education	
High school	1 (12.5)
A.D.	1 (12.5)
BA/BA	2 (25.0)
MS/MA	4 (50.0)
Number of years working in healthcare	
Less than 1	1 (14.3)
1–2	1 (14.3)
3–5	1 (14.3)
5+	4 (57.1)

Note: One participant missing data.

Abbreviation: AD, Associates Degree.

^aMean (SD); *n* (%).

TABLE 2

Pre-post BOOK scores for opioid knowledge, risk, response, and total score

Characteristic	Intervention		<i>t</i> -statistic ^{<i>b</i>}	df
	Pre (<i>N</i> = 9) ^{<i>a</i>}	Post (<i>N</i> = 9) ^{<i>a</i>}		
Knowledge	2.6 (0.7)	3.3 (0.7)	2.13 [*]	8
Overdose risk	2.7 (1.2)	2.6 (0.9)	-0.24 [*]	8
Overdose response	3.0 (1.1)	3.6 (0.5)	1.64 [*]	8
Total score	8.2 (2.2)	9.4 (1.2)	1.74 [*]	8

Abbreviation: df, degrees of freedom.

^{*a*}Mean (*SD*).^{*b*}Paired *t*-test.^{*}*p* > 0.05.