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Low overdose responding self-efficacy among adults who report lifetime opioid use

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Abstract

Background: Evaluations of overdose response programs suggest effectiveness in preventing overdose-related death and individual willingness to respond to an overdose. However, knowledge of and confidence in performing response behaviors is necessary for individuals to intervene. This study assessed overdose responding self-efficacy among adults who reported lifetime opioid use.

Methods: Data come from a cross-sectional survey, part of a randomized controlled trial designed for adults living with hepatitis C. Participants were 18 years old or older, and reported lifetime opioid use. Overdose responding self-efficacy was assessed by perceived knowledge and/or need for additional training to have confidence responding to an overdose. Univariate statistics were calculated for overdose responding self-efficacy, and individual characteristics and experiences. Adjusted logistic regression was used to identify variables associated with low overdose responding self-efficacy.

Results: Of the 424 participants, 67.2% reported low overdose responding self-efficacy. Sixty percent witnessed and 30.4% experienced an overdose in the past year. Witnessing an overdose in the past year, experience with naloxone training, and receiving and using naloxone were

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Contributors

This manuscript has been reviewed and approved by all authors. Tobin, Davey-Rothwell, and Latkin contributed to study design and data collection. Tormohlen and Tobin played a role in choice of analyses and interpretation of data. Tormohlen conducted all statistical analyses. Tormohlen drafted the manuscript. Tobin, Davey-Rothwell and Latkin assisted with manuscript revisions.

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Conflicts of Interest

No conflicts declared.

associated with high overdose responding self-efficacy. While, apprehension with particular response behaviors (e.g. rescue breathing) was associated with low overdose responding self-efficacy.

Conclusions: A large proportion of adults who reported lifetime opioid use did not feel confident or knowledgeable responding to an overdose. This could be influenced by overdose exposure, specific response behaviors, and response trainings.

Keywords

Overdose; Opioid Use; Injection Drug Use; Overdose Response; Overdose Response Training; Naloxone; Self-Efficacy

1.0 Introduction

In the United States, more than 70,000 deaths due to drug overdose occurred in 2017 (Ahmad et al., 2018). Maryland is ranked in the top five states with the most opioid-related overdose deaths (National Institute on Drug Abuse, 2018). Baltimore City has the highest number of opioid deaths in the state, with 692 in 2017 (Maryland Department of Health, 2018).

One longstanding strategy employed to prevent drug overdose deaths are overdose response programs. In the United States, overdose education and naloxone distribution (OEND) programs have existed since the 1990s. Programs distributing naloxone have increased substantially since 2010, with 30 states having at least one program (Wheeler et al., 2015). OEND programs typically include instruction on the following: 1) contacting first-responders, 2) administering naloxone, 3) conducting rescue-breathing, and 4) monitoring the victim (Mueller et al., 2015). Results from studies evaluating feasibility and effectiveness, suggest individuals are willing to intervene if they witness an overdose, and that OEND programs are feasible and effective in preventing deaths (Mueller et al., 2015). Overdose prevention and response training has been in place since the early 2000s in Baltimore City, with the Staying Alive Drug Overdose Prevention and Response Plan beginning in 2004. Between 2004 and 2016, over 25,000 individuals were trained. In 2016, there were 9,399 naloxone kits dispensed and 733 overdose reversals reported (Baltimore City Health Department, n.d.). One study evaluating the Staying Alive program found an improvement in knowledge related to naloxone and an increase in naloxone use, as well as other response behaviors after training (Tobin et al., 2009).

Self-efficacy is defined by a person’s belief in the ability to complete a particular task or behavior (Bandura, 1977). Self-efficacy is associated with a broad range of behavior change, including substance use treatment outcomes (e.g. abstaining from use) (Kadden and Litt, 2011). One gap in the overdose literature, is the inclusion of the construct in understanding overdose response behaviors. Because responding to an overdose involves a number of behaviors (e.g. recognizing symptoms and administering naloxone), lack of knowledge and confidence in ability to perform response behaviors may reduce likelihood and/or effectiveness of a response. The current paper assessed overdose responding self-efficacy in

a population of individuals who reported lifetime opioid use. We further assessed factors that could be associated with low overdose responding self-efficacy.

2.0 Methods

2.1. Study Design and Population

Data are from the first 474 individuals who were recruited beginning in December, 2016 and completed the baseline survey of a phase-III randomized controlled trial aimed to reduce risk behaviors and improve health outcomes among people living with hepatitis C. For the current study, eligible participants were 18 years old or older and reported lifetime opioid use (n=424). Participants provided written informed consent and completed the baseline survey, administered by a trained research assistant in a private setting. Participants were paid $20 for completing the survey. This research was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and the trial is registered in Clinical Trials.gov.

2.2. Measures

2.2.1. Overdose Responding Self-Efficacy.—Participants responded to the following questions: “I am going to need more training before I would feel confident to help someone who has overdosed” and “I know very little about how to help someone who has overdosed.” The response options included: (a) strongly agree (b) agree (c) neither agree nor disagree (d) disagree (e) strongly disagree. Based on the concept of self-efficacy, interpretability and data distribution, low efficacy was defined by responding agree nor disagree, agree, or strongly agree to either/both questions, whereas high efficacy was defined by responding disagree or strongly disagree to either/both questions. According to Bandura (1977), efficacy is the belief that one can successfully perform behaviors related to a desired outcome. Therefore, if someone disagreed at all to either having insufficient knowledge or needing more training in order to feel confident, they were considered to have high self-efficacy. Pilot testing with the target population confirmed adequate face validity.

2.2.2. Overdose Experience and Response.—Participants reported the last time they experienced a personal overdose and witnessed an overdose (never, one year or more, or within the past year). Participants reported ever receiving naloxone training and been prescribed and/or used naloxone (yes/no). Participants reported if they preferred to call 911 to performing rescue breathing, to call 911 but perform no other steps, and staying with victim until help arrives (agree/disagree). Participants also reported if they were worried about getting a disease from resuscitation (agree/disagree).

2.2.3. Demographic Characteristics and Drug Use.—Participants reported age, sex (male/female), race (Black/African American, White, or other), education level (grade 11 or less, grade 12 or GED, or some college or more), current unemployment (yes/no), and homelessness in the past six months (yes/no). Individuals reported the last time they used prescription opioids, heroin, and injected drugs (never, more than a year ago, in the last year, or in the last 3 months).

2.3. Data Analyses

Univariate statistics were calculated for overdose responding self-efficacy, demographic characteristics, drug use, and overdose experience and response variables. Adjusted logistic regression models including age, race, sex, education level, employment, and homelessness, were used to identify variables associated with low overdose responding self-efficacy. All analyses were completed using Stata 14.2 (StataCorp, 2014).

3.0 Results

3.1. Sample characteristics

Table 1 displays characteristics of the 424 participants. Sixty-seven percent of individuals reported low overdose responding self-efficacy. Sixty percent of participants witnessed an overdose and 30.4% experienced a personal overdose in the past year. Twenty percent used prescription opioids, 70.8% used heroin, and 53.1% injected drugs in the last three months.

3.2. Adjusted Associations With Overdose Responding Self-Efficacy

After adjusting for sociodemographic variables, unemployment (aOR=2.85, 95% CI 1.11, 7.33), White race (aOR=2.54, 95% CI 1.48, 4.35), and education level of some college or more (aOR=1.90, 95% CI 1.02, 3.52) were associated with increased odds of high overdose responding self-efficacy (Table 2).

Witnessing an overdose in the past year (aOR=2.57, 95% CI 1.09, 6.05), completion of naloxone training (1.97, 95% CI 1.18, 3.28), ever been prescribed and/or received naloxone (aOR=2.05, 95% CI 1.18, 3.56) and experience using naloxone (aOR=2.96, 95% CI 1.79, 4.90) were associated with increased odds of high overdose responding self-efficacy. Preferring to call 911 rather than conducting rescue breathing (aOR=0.29, 95% CI 0.18, 0.48), only calling 911(aOR= 0.48, 95% CI 0.30, 0.79), and being worried about getting a disease from resuscitation (aOR=0.36, 95% CI 0.22, 0.58) were associated with decreased odds of high overdose responding self-efficacy.

4.0 Discussion

Overdose education and naloxone distribution programs have existed in the US for over twenty years. Evaluations suggest that these programs are effective in preventing death and that individuals are willing to respond to an overdose (Mueller et al., 2015). However, less is known about a persons' self-efficacy related to overdose response, and the factors associated with low overdose responding self-efficacy among individuals who report lifetime opioid use. The current study found that 67% of individuals reported low overdose responding self-efficacy, and that low overdose responding self-efficacy was associated a number of factors, particularly those related to experience with overdose response.

Based on the presence of OEND programs, particularly in Baltimore City, the high proportion of low overdose responding self-efficacy was surprising and meaningful. This is particularly true, considering the exposure to overdose among the sample population. In our sample, witnessing an overdose in the past year was associated with increased self-efficacy, but experiencing an overdose in the past year was not. This could suggest that those who

have witnessed an overdose in the past year also have more recent experience performing overdose response behaviors and might be more prepared to respond (e.g. carry naloxone). However, the pathways between experiencing an overdose and increased confidence and knowledge of responding to another person's overdose may not be direct, suggesting that other barriers or mechanisms might exist.

Training, as well as receipt and use of naloxone was associated with reporting high overdose responding self-efficacy. These results are consistent with previous literature that suggests that individuals who complete training are better able to recognize overdose and the need for naloxone (Green et al., 2008; Mueller et al., 2015). However, only 39% of the study sample reported having completed naloxone training, suggesting that programs are not necessarily reaching populations at-risk for overdose. This gap in training might also influence the racial differences in overdose responding self-efficacy that were apparent. While the receipt and use of naloxone might help to improve overdose responding self-efficacy, previous research suggests that many people might not know where they can obtain naloxone and a small percentage of people actually carry naloxone with them (Tobin et al., 2018; Kirane et al., 2016). Therefore, gaps between knowledge of and training to use naloxone, and actually being prepared to respond by carrying naloxone could exist.

Preferring to call 911 to performing rescue breathing, only calling 911, and the worry of disease transmission were also associated with reporting low overdose responding self-efficacy. This is important to address, since rescue breathing is one step involved in overdose response. One potential explanation for this finding are fallacies about health risks associated with rescue breathing. Another is possible misperceptions about the importance of rescue breathing, as recent American Heart Association guidelines de-prioritized rescue breathing for response to cardiac arrest for untrained bystanders (American Heart Association, 2017). However, respiratory depression, not cardiac arrest, is the main cause of opioid overdose death and therefore rescue breathing is still an essential step if the person is having difficulty breathing (NIOSPH, 2018; SAMHSA, 2018). This finding might also suggest that individuals do not feel confident performing rescue breathing. These results are relevant for messaging within overdose response trainings. In a review of community overdose prevention and naloxone programs, Clark and colleagues (2014), found that rescue breathing was not included in all programs. Response programs should consider potential consequences introduced by not discussing each overdose response behavior.

One constraint of this data is the measure of overdose responding self-efficacy asked about overall confidence and knowledge related to overdose response and was not specific to behaviors associated with responding to an overdose, such as recognizing overdose symptoms, carrying and administering naloxone, performing rescue breathing, or placing someone in a recovery position. Therefore, we cannot conclude what specific overdose response behavior(s) (e.g. naloxone administration or rescue breathing) may be driving the low self-efficacy. This has implications for both research and practice. Future research needs to assess self-efficacy for specific responding behaviors. Careful consideration of overdose response behaviors is important for designing and implementing overdose prevention and response programs, as well as work to improve access to OEND programs.

4.1. Limitations

While our study contributes to understanding overdose response particularly in a population of individuals who use opioids, some limitations need to be addressed. The use of self-report measures could introduce possible reporting bias. Due to the cross-sectional design, causal relationships could not be assessed. We also used a select sample for an intervention, therefore results may be particularly relevant for adults with hepatitis C and report injecting drugs. Additionally, based on the demographic characteristics of the sample, as well as the geography, generalizability may be limited. Finally, we did not assess specific reasons for low overdose responding self-efficacy. Future research would benefit by obtaining more qualitative information about why individuals may not feel they have the needed skills to feel confident responding to an overdose.

4.2. Conclusions

Given the persistent and alarming number of deaths due to drug overdose and current widespread distribution and extreme lethality of fentanyl, overdose responding self-efficacy may be a critical mechanism to increasing response behaviors (Scholl et al., 2019). We found that 67% of our sample reported lack of confidence and/or knowledge related to overdose response. Further, a number of modifiable factors were associated low overdose responding self-efficacy. These findings have implications for overdose education and naloxone distribution programs in the US, including careful consideration of all overdose response steps when designing and implementing overdose response trainings, as well as in the development of future research focused on the measurement of overdose responding self-efficacy.

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Highlights

- 67.2% of adults reported low overdose responding self-efficacy
- Perceptions of specific response behaviors negatively impacted self-efficacy
- Overdose response training and naloxone use positively impacted self-efficacy

Table 1.

Demographic characteristics of adults who reported lifetime opioid use (n=424)

	Mean (SD)
Age	46.7 (10.45)
	Frequency (%)
Male sex	271 (63.9)
Race[a]	
Black/African American	252 (59.4)
White	125 (29.5)
Other[b]	12 (2.8)
Unemployed[c]	374 (88.2)
Homeless in past 6 months	197 (46.5)
Education level	
Grade 11 or less	167 (39.4)
Grade 12 or GED	175 (41.3)
Some college or more	82 (19.3)
Last time used prescription opioids	
Never	196 (46.2)
More than a year ago	100 (23.6)
In the last year	42 (9.9)
In the last 3 months	86 (20.3)
Last time used heroin	
Never	4 (0.9)
More than a year ago	81 (19.1)
In the last year	39 (9.2)
In the last 3 months	300 (70.8)
Last time injected drugs	
Never	20 (4.7)
More than a year ago	136 (32.1)
In the last year	43 (10.1)
In the last 3 months	225 (53.1)
Witnessed overdose in past year	255 (60.1)
Personal overdose in past year	129 (30.4)
Low overdose responding self-efficacy	285 (67.2)

[a] 35 missing cases (8.3%)

[b] Other includes American Indian or Alaskan Native, Mixed Race, and Hispanic/Latino ethnicity

[c] 7 missing cases (1.7%)

Table 2.

Associations with overdose responding self-efficacy

	Overdose Responding Self-Efficacy			
	Low	**High**	**aOR (95% CI)**[a,b]	**p-value**
Total	285 (67.2)	139 (32.8)		
Demographic Characteristics				
Age			0.98 (0.95-1.00)	0.056
Sex				
Female	104 (36.5)	49 (35.3)		
Male	181 (63.5)	90 (64.7)	1.12 (0.69-1.82)	0.659
Race				
Black/African American	190 (73.6)	62 (47.3)		
White	58 (22.5)	67 (51.2)	2.54 (1.48-4.35)	0.001
Other	10 (3.9)	2 (1.5)	0.42 (0.09-2.05)	0.283
Unemployed				
No	36 (12.8)	7 (5.2)		
Yes	246 (87.2)	128 (94.8)	2.85 (1.11-7.33)	0.030
Homeless in past 6 months				
No	164 (57.5)	63 (45.3)		
Yes	121 (42.5)	76 (54.7)	1.10 (0.68-1.77)	0.708
Education level				
Grade 11 or less	118 (41.4)	49 (35.3)		
Grade 12 or GED	117 (41.1)	58 (41.7)	1.03 (0.61-1.72)	0.921
Some college or more	50 (17.5)	32 (23.0)	1.90 (1.02-3.52)	0.043
Injection drug use in the past year				
No	116 (40.7)	40 (28.8)		
Yes	169 (59.3)	99 (71.2)	0.99 (0.58-1.68)	0.963
Overdose Experience				
Last time witnessed overdose				
Never	40 (14.0)	8 (5.8)		
One year or more	87 (30.5)	34 (24.5)	1.80 (0.71-4.57)	0.217
Within the past year	158 (55.4)	97 (69.8)	2.57 (1.09-6.05)	0.030
Last personal overdose				
Never	106 (37.2)	42 (30.2)		
One year or more	96 (33.7)	51 (36.7)	1.14 (0.65-1.99)	0.654
Within the past year	83 (29.1)	46 (33.1)	0.84 (0.47-1.50)	0.551
Overdose Response				
Would rather call 911 than rescue breathing				
Disagree	61 (21.5)	72 (51.8)		

	Overdose Responding Self-Efficacy			
	Low	**High**	**aOR (95% CI)**[a,b]	**p-value**
Agree	223 (78.5)	67 (48.2)	0.29 (0.18-0.47)	<0.001
Would call ambulance but nothing else				
Disagree	133 (46.7)	99 (71.2)		
Agree	152 (53.3)	40 (28.8)	0.48 (0.30-0.79)	0.003
Worried about getting a disease from resuscitation				
Disagree	121 (42.6)	98 (70.5)		
Agree	163 (57.4)	41 (29.5)	0.36 (0.22-0.58)	<0.001
Would stay with victim until help arrives				
Disagree	18 (6.3)	7 (5.0)		
Agree	267 (93.7)	132 (95.0)	0.89 (0.33-2.39)	0.810
Ever received training to use naloxone				
No	115 (44.8)	36 (26.3)		
Yes	142 (55.2)	101 (73.7)	1.97 (1.18-3.28)	0.009
Ever prescribed or received naloxone kit				
No	94 (36.6)	27 (19.7)		
Yes	163 (63.4)	110 (80.3)	2.05 (1.18-3.56)	0.010
Ever used naloxone to reverse overdose				
No	198 (77.3)	67 (48.9)		
Yes	58 (22.7)	70 (51.1)	2.96 (1.79-4.90)	<0.001

[a] Adjusted for sociodemographic variables (age, race, sex, education, employment, and homelessness)

[b] Low overdose responding self-efficacy is the reference category