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Emotion Dysregulation as a Risk Factor for Posttraumatic Stress Disorder Stemming from Opioid Overdose Responding Among Community Laypeople

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Abstract

Objective—Efforts to prevent opioid overdose mortality have rapidly expanded, including community-based distribution of naloxone to laypeople. In turn, responding to the opioid overdose crisis has increasingly fallen on the shoulders of community laypeople. Yet, little attention has been given to studying the mental health consequences of responding to an opioid overdose for community laypeople. This study examined emotion dysregulation as a risk factor for posttraumatic stress disorder (PTSD) stemming from opioid overdose responding among community laypeople.

Methods—Participants were 80 community laypeople who had responded to an opioid overdose (M_{age} = 39.10, 59.5% women, 86.3% white).

Results—Elevated emotion dysregulation was found in community laypeople with versus without PTSD stemming from opioid overdose responding. Limited access to effective emotion regulation strategies was uniquely associated with PTSD stemming from opioid overdose responding.

Conclusions—Opioid overdose trainings may benefit from the addition of trauma first aid to bolster emotion regulation skills.

Keywords

Opioid Overdose; Community Responder; Laypeople; Trauma; Posttraumatic Stress Disorder; Emotion Dysregulation

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Declarations

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

Conflict of interest All authors declare that they have no conflict of interest.

The opioid overdose epidemic in the United States is among the worst public health crises in American history. In the 12-month period ending in April 2021, 75,673 drug overdose deaths—or 75% of all overdoses—involved opioids; this was up from 56,064 opioid overdose deaths the year before (Ahmad et al., 2021). The introduction of highly potent synthetic opioids into the drug supply—such as fentanyl and fentanyl-analogs—has exacerbated this epidemic, with four in five opioid-involved overdose deaths in 2020 involving synthetic opioids, and synthetic opioid-involved deaths increasing 1,040% from 2013 to 2019 (Mattson et al., 2021). As opioid overdose deaths have reached crisis levels, efforts to prevent opioid overdose mortality have been rapidly expanded. In response to the extreme potency of synthetic opioids, community-based distribution of naloxone—an opioid overdose antidote—began in 1996 and increased steadily nationwide. From 2012 to 2018, pharmacy-based naloxone dispensations nationwide also increased from 1,282 to 556,847 prescriptions (Guy et al., 2019). Naloxone distribution has been aided by introduction of laws providing liability protections for people who prescribed and administered naloxone in the event of an overdose (Prescription Drug Abuse Policy System, 2022). As legal barriers to the possession of naloxone were removed nationally, increasing amounts of naloxone have been distributed to community laypeople who are often firsthand witnesses to opioid overdose, be they people who use drugs, family members or friends of individuals experiencing opioid overdose, or community members (Bagley et al., 2018). Although community distribution of naloxone for prompt overdose reversal has been a key strategy to address the overdose crisis, almost no attention has been given to studying the potential mental health needs of community laypeople who respond to an opioid overdose.

Posttraumatic stress disorder (PTSD) is a chronic and debilitating mental health condition that is etiologically linked to the experience of trauma, including witnessing actual or threatened death or serious injury (American Psychiatric Association [APA], 2013), such as in the case of responding to an opioid overdose. PTSD has a lifetime prevalence rate of 8.3% (Kilpatrick et al., 2013) and is characterized by intrusions (e.g., nightmares), avoidance of trauma-related internal (e.g., memories) and/or external (e.g., people) cues, negative alterations in cognitions and mood (e.g., self-blame), and alterations in arousal and reactivity (e.g., hypervigilance; APA, 2013). PTSD symptoms are associated with considerable disability and functional impairment (Bovin et al., 2016; Kilpatrick et al., 2013), even among individuals who do not meet full criteria for a PTSD diagnosis (Hellmuth et al., 2014).

Despite the increasing role of community laypeople in the national overdose response, PTSD in this population is not well understood. An important avenue for research in this area is to identify factors that might increase risk for PTSD in community laypeople after responding to an opioid overdose. Emotion dysregulation has emerged as a transdiagnostic mechanism underlying the etiology and maintenance (for reviews, see Gratz & Tull 2010; Hu et al., 2014; Weiss et al., 2022)—and relevant to the treatment (Gratz et al., 2015)—of a wide range of mental health conditions. Emotion dysregulation is a multi-faceted construct involving maladaptive ways of responding to emotions, including: (a) a lack of awareness, understanding, and acceptance of emotions; (b) the inability to control behaviors when experiencing emotional distress; (c) a lack of access to situationally appropriate strategies for modulating the duration and/or intensity of emotional responses in order to

meet individual goals and situational demands; and (d) an unwillingness to experience emotional distress as part of pursuing meaningful activities in life (Gratz & Roemer, 2004). A robust body of evidence supports the role of emotion dysregulation in PTSD among other trauma-exposed populations, including college students (Tull et al., 2007; Weiss et al., 2012), individuals in residential substance use disorder treatment (McDermott et al., 2009; Weiss et al., 2013), and community women experiencing domestic violence (Weiss et al., 2018, 2019), to name a few.

This study aims to extend existing research on emotion dysregulation and PTSD by examining this relation among community laypeople who had responded to an opioid overdose, including: (1) levels of emotion dysregulation (overall and across the specific dimensions) as a function of PTSD stemming from opioid overdose responding; and (2) unique relations between the specific dimensions of emotion dysregulation and PTSD stemming from opioid overdose responding. We expect higher levels of emotion dysregulation (overall and across the specific dimensions) among individuals with versus without PTSD from opioid overdose responding.

Methods

Participants and Procedures

Data were collected as part of a larger study examining prevalence of PTSD among community laypeople who had responded to an opioid overdose. Participants were recruited through outreach, online advertising, and community organization referrals. Potentially eligible individuals were screened using an online survey. They were eligible if they were ≥ 18 years, English-speaking, ever responded to an opioid overdose (with one or more occurring more than two months prior), and did not identify as a professional first responder (medically trained personal, police, fire, emergency medical response). Interviewer-administered assessments were conducted remotely using secure audio/video telehealth service (i.e., Zoom). Participants were reimbursed $25 with a digital or physical gift card. All procedures were reviewed and approved by the Brown University Institutional Review Board.

Measures

***Difficulties in Emotion Regulation Scale − 16* (DERS-16; Bjureberg et al., 2016).—**The DERS-16 is used to assess emotion dysregulation across five dimensions: nonacceptance of negative emotions (Accept), difficulty engaging in goal-directed behavior when distressed (Goals), difficulty controlling impulsive behaviors when distressed (Impulse), limited access to effective emotion regulation strategies for negative emotions (Strategy), and lack of emotional clarity (Clarity). Participants rated each item using a 5-point Likert-type scale (1 = *almost never*, 5 = *almost always*). Subscale scores were obtained by summing items on each respective dimension, and across each dimension for a total score. Higher scores reflect greater emotion dysregulation. The DERS has excellent psychometric properties (Gratz & Roemer, 2004). Internal consistency in the current sample was good ($\alpha = 0.95$).

***Clinician-Administered PTSD Scale for DSM-5* (CAPS − 5; Weathers et al., 2013; Weathers et al., 2018).—**The CAPS-5 is a structured diagnostic assessment used to assess past-month DSM-5 PTSD symptoms and diagnosis. Each symptom is given a severity score based on symptom frequency and intensity ratings (except for items 8 and 12; these items are rated based on amount and intensity). The frequency and intensity responses are combined to give a total severity score on a 5-point scale ranging from 0 (*absent*) to 4 (*extreme/incapacitating*). A symptom is considered present when the severity rating ≥ 2 and trauma-relatedness is probable or definite. Additional questions assess symptom onset, duration, impairment, subjective distress, and the presence of a dissociative subtype (depersonalization and derealization). A total PTSD symptom severity score is computed by summing severity score ratings for items 1–20. PTSD diagnosis is computed by determining the presence/absence of each symptom (i.e., severity rating ≥ 2; trauma-relatedness = probable/definite) and following the DSM-5 diagnostic rule (presence of one Criterion B, one Criterion C, two Criterion D, and two Criterion E). The symptoms must have lasted greater than one month (Criterion F) and cause significant distress or impairment (Criterion G). For the current study, participants referenced the most distressing event involving responding to an opioid overdose. Interviews were administered by Clinical Psychology PhD students trained to reliability with author NHW, a licensed clinical psychologist. All interviews were reviewed by author NHW, with diagnoses confirmed in consensus meetings.

Data Analysis

Assumptions of normality violation (skewness < 3, kurtosis < 8; Kline, 2011), homogeneity of error variances for each dependent variable, linearity between each pair of dependent variables, and multicollinearity (< 0.90; Tabachnick & Fidell, 2013) were evaluated.

Pearson's product-moment (r), point-biserial (r_{pb}), and phi (r_{φ}) correlation coefficients were used to examine associations between PTSD (diagnosis and symptom severity scores), DERS-16 (total and subscale scores), and demographic variables (i.e., age, ethnicity, gender, race, employment, income). Demographic variables found to be significantly related to PTSD diagnosis or symptom severity were included as covariates in the multivariable models.

Six separate bivariable analyses of covariance were conducted to determine whether there were statistically significant differences between the means for the DERS-16 total and subscale scores across those with vs. without a diagnosis of PTSD, controlling for identified covariates. To account for multiple comparisons and limit Type 1 error, the Benjamini-Hochberg adjustment was used (Benjamini & Hochberg, 1995). Effect sizes of partial eta square estimates were utilized (small effect = 0.01, medium effect = 0.06, and large effect = 0.14; Richardson, 2011).

Lastly, a multiple regression analysis was conducted to examine the predictive relations of the DERS-16 subscales on PTSD symptom severity. In the regression analysis, the DERS-16 subscales were entered simultaneously as independent variables to assess their predictive relations with PTSD symptom severity while controlling for relevant covariates.

Results

The final sample included 80 community laypeople who had ever responded to an opioid overdose. Demographic characteristics are summarized in Table 1. Skewness ranged from 0.25 to 1.02 and kurtosis from 0.08 to 0.81 for the DERS-16 subscales. Correlations between the DERS-16 subscales ranged from 0.57 to 0.84 (Table 2), indicating the absence of multicollinearity. The relation between each variable pair was linear, based on an analysis of scatterplots. Twenty-two participants (27.5%) met criteria for a PTSD diagnosis. Results of the correlational analysis indicated that PTSD (diagnosis and severity scores) and DERS-16 (total and subscale scores) were significantly and positively correlated (Table 2). Covariate analyses indicated significant associations between ethnicity and PTSD diagnosis ($r_{\varphi} = 0.26$, $p = .02$) and symptom severity ($r_{pb} = 0.29$, $p = .01$); and race and PTSD symptom severity ($r_{pb} = 0.30$, $p = .01$). All other findings were nonsignificant (correlations ranged from 0.02 to 0.22; *ps* ranged from 0.05 to 0.86). Thus, only ethnicity and race were included as covariates in the final models.

After applying the Benjamini-Hochberg adjustment and controlling for ethnicity, the groups (PTSD diagnosis vs. no-PTSD diagnosis) significantly differed on DERS-16 Total, $F(1, 75) = 10.53$, $p = .002$, $\eta_p^2 = 0.12$; Clarity, $F(1, 75) = 6.17$, $p = .015$, $\eta_p^2 = 0.076$; Goals, $F(1, 75) = 7.84$, $p = .006$, $\eta_p^2 = 0.095$; Impulse, $F(1, 75) = 5.12$, $p = .027$, $\eta_p^2 = 0.064$; Strategy, $F(1, 75) = 10.68$, $p = .002$, $\eta_p^2 = 0.125$; and Accept, $F(1, 75) = 6.89$, $p = .010$, $\eta_p^2 = 0.084$. Compared to the no-PTSD group, the PTSD group reported higher scores across all DERS-16 scales (Table 3).

As shown in Table 4, multiple regression model including each DERS-16 subscale and controlling for ethnicity and race significantly predicted PTSD symptom severity, $F(7, 68) = 4.60$, $p < .001$, with the full model accounting for 32% of the variance. Only DERS Strategy significantly predicted PTSD symptom severity in the model ($\beta = 0.65$, $p = .010$); all other relations were non-significant (*p*s ranged from 0.34 − 0.79).

Discussion

To our knowledge, this is the first study to examine emotion dysregulation as a risk factor for PTSD stemming from opioid overdose responding among community laypeople. Findings showed elevated emotion dysregulation—overall and across the dimensions—in community laypeople with versus without PTSD. Further, results underscored a significant and potentially important role of access to effective emotion regulation strategies in PTSD stemming from opioid overdose responding among community laypeople. These results have important implications for research and intervention with this population, which are discussed below.

Evidence here for heightened emotion dysregulation among community laypeople with versus without PTSD extends previous research (Tull et al., 2007; Weiss et al., 2012, 2013) by focusing on an understudied yet clinically relevant index trauma—responding to an opioid overdose—and trauma population—community laypeople opioid overdose responders. Further building on this work, we found support for a unique role of the

emotion dysregulation dimension of limited access to effective emotion regulation strategies in PTSD stemming from opioid overdose responding among community laypeople. Having less access to effective emotion regulation strategies diminishes available resources for modulating emotional arousal as well as increases appraisals of threat and emotional responding to trauma (Bovin & Marx, 2011); these peri-traumatic emotional vulnerabilities may increase risk for PTSD. Additionally, limited access to effective emotion regulation strategies following opioid overdose responding may interfere with natural recovery from trauma and contribute to the maintenance of PTSD. For instance, individuals who have limited access to effective emotion regulation strategies may perceive their emotions as uncontrollable and subsequently avoid internal and external trauma cues that elicit aversive emotional reactions, thereby preventing exposure to corrective information and interfering with emotional processing (Foa & Kozak, 1986). Future longitudinal research is needed to explicate the timing and context of emotion dysregulation in relation to PTSD stemming from opioid overdose responding among community laypeople. For instance, investigations utilizing ecological momentary assessment in the immediate aftermath of responding to an opioid overdose among community laypeople may clarify the potential reciprocal nature of the relation between emotion dysregulation and PTSD (Weiss et al., 2017).

Our findings have potentially important implications for preventing PTSD among community laypeople who respond to an opioid overdose. Opioid overdose training for community laypeople currently includes calling for medical assistance, administering naloxone, and performing rescue breathing or cardiopulmonary resuscitation (CPR; American Red Cross, 2021). Our data suggest that these training programs would benefit from the addition of trauma first aid curriculum, specifically bolstering emotion regulation strategies (Gratz et al., 2015). Such an approach would be consistent with recent work to develop trauma first aid curriculum for laypeople CPR responders (Snobelen et al., 2018). Adaptation of existing trauma first aid curricula to address the emotional complexity encountered by community laypeople opioid overdose responders (e.g., close relationships with those who were overdosing) is warranted.

These results should be considered within the context of the study's limitations. First, the cross-sectional and correlational nature of the study data precludes causal determination of the associations examined. Future research is needed to investigate the nature and direction of these relations through prospective, longitudinal investigations. Second, this study relied on self-report measures, which may be influenced by an individual's willingness and/or ability to report accurately. Future studies should include objective measures of emotion dysregulation (Vasilev et al., 2009; Weiss et al., 2021). Third, this study did not assess co-morbid diagnoses, such as borderline personality disorder, that are common amongst individuals with opioid use disorder (Tragasser et al., 2013) and associated with emotion dysregulation (Gratz et al., 2006). Future research is needed to examine the influence of emotion dysregulation on borderline personality disorder and other co-morbid conditions in this population. Finally, while recruitment of a community sample of laypeople responders to opioid overdose is a strength of the current study, findings cannot be assumed to generalize to other populations (e.g., professional first responders) or across community laypeople responding to opioid overdose with distinct experiences (e.g., person overdosing required versus did not require medical intervention), and replication in larger and diverse

samples is necessary. Despite these limitations, findings advance our understanding of emotion dysregulation in PTSD stemming from opioid overdose responding in a sample of community laypeople. Future investigations in this area will inform the development of interventions for reducing PTSD among community laypeople responding to opioid overdose.

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Table 1

Descriptive Information on the Sample

Variable	*M*	*SD*	*n*	%
Age (years)	39.10	12.51		
CAPS-5 Severity	14.81	14.29		
DERS-16 Total	38.12	15.84		
DERS-16 Clarity	4.42	2.53		
DERS-16 Goals	8.81	3.49		
DERS-16 Impulse	5.82	3.29		
DERS-16 Strategy	11.82	5.17		
DERS-16 Accept	7.24	3.62		
Gender				
Woman			47	59.5
Man			28	35.4
Transgender			4	5.1
Race				
White			69	86.3
African American/Black			12	15.0
Asian			1	1.3
American Indian/Alaska Native			5	6.3
Ethnicity				
Hispanic/Latinx			8	10.0
Not Hispanic/Latinx			72	90.0%
Employment status				
Full time			32	40.0
Part time			18	22.5
Not in labor force (student, homemaker)			13	16.3
Unemployed			15	18.8
Other			2	2.5
Annual family income (USD)				
≤ $10,000			15	21.4
$10,000 – $19,999			6	8.6
$20,000 – $29,999			3	4.3
$30,000 – $39,999			10	14.3
$40,000 – $49,999			6	8.6
$50,000 – $59,999			6	8.6
$60,000 – $69,999			5	7.1
$70,000 – $79,999			5	7.1
≥ $80,000			14	
Educational attainment				

Variable	***M***	***SD***	***n***	**%**
Education below grade 12			7	8.8
Grade 12 education and above			73	91.3
PTSD Diagnosis				
PTSD			22	27.5
No PTSD			58	72.5

Note. PTSD = posttraumatic stress disorder; DERS-16 = Brief Difficulties in Emotion Regulation Scale; DERS-16 CLARITY = lack of emotional clarity subscale; DERS-16 Goals = inability to engage in goal-directed behavior when distressed subscale; DERS-16 Impulse = impulse control difficulties subscale; DERS-16 Strategy = lack of effective emotion regulation strategies subscale; DERS-16 Accept = lack of emotion acceptance subscale.

Table 2

Correlations and Partial Correlations Between Emotion Dysregulation and PTSD Diagnosis and Symptom Severity

	1	2	3	4	5	6	7	8
1. CAPS-5 Diagnosis	--	0.74***	0.34**	0.28*	0.30**	0.24*	0.34**	0.29**
2. CAPS-5 Severity	0.75***	--	0.38***	0.23	0.29*	0.26*	0.44***	0.34**
3. DERS-16 Total	0.42***	0.44***	--	0.80***	0.86***	0.79***	0.95***	0.86***
4. DERS-16 Clarity	0.32**	0.26*	0.80***	--	0.64***	0.57***	0.71***	0.61***
5. DERS-16 Goals	0.36**	0.34**	0.86***	0.65***	--	0.62***	0.76***	0.64***
6. DERS-16 Impulse	0.33**	0.37***	0.81***	0.57***	0.64***	--	0.69***	0.56***
7. DERS-16 Strategy	0.43***	0.50***	0.96***	0.72***	0.77***	0.72***	--	0.83***
8. DERS-16 Accept	0.37***	0.38***	0.88***	0.64***	0.67***	0.59***	0.84***	--

Note. CAPS-5 = Clinician-Administered PTSD Scale for DSM-5; DERS-16 = Brief Difficulties in Emotion Regulation Scale; DERS-16 CLARITY = lack of emotional clarity subscale; DERS-16 Goals = inability to engage in goal-directed behavior when distressed subscale; DERS-16 Impulse = impulse control difficulties subscale; DERS-16 Strategy = lack of effective emotion regulation strategies subscale; DERS-16 Accept = lack of emotion acceptance subscale. Zero-order correlations appear below the diagonal and partial correlations (controlling for ethnicity and race) appear above the diagonal. Pearson's product-moment correlation coefficients were used for correlations between continuous variables; point-biserial correlation coefficients were used for correlations between continuous and dichotomous variables; and phi coefficients were used for correlations between dichotomous variables.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Results of Univariate Analysis of Variance

	No PTSD (*n* = 57)		**PTSD (*n* = 21)**		***F***	η_p^2
Variable	***Marginal M***	***SE***	***Marginal M***	***SE***		
DERS-16 Total	34.82	1.89	47.07	3.18	$F(1,75) = 10.53$, $p = .002$	0.123
DERS-16 Clarity	3.99	0.32	5.60	0.55	$F(1,75) = 6.17$, $p = .015$	0.076
DERS-16 Goals	8.14	0.44	10.61	0.74	$F(1,75) = 7.84$, $p = .006$	0.095
DERS-16 Impulse	5.33	0.41	7.16	0.69	$F(1,75) = 5.12$, $p = .027$	0.064
DERS-16 Strategy	10.74	0.62	14.76	0.62	$F(1,75) = 10.68$, $p = .002$	0.125
DERS-16 Accept	6.62	0.44	8.94	0.75	$F(1,75) = 6.89$, $p = .010$	0.084

Note. Estimated marginal means are reported to account for the covariate in the model. DERS = Difficulties in Emotion Regulation Scale; DERS CLARITY = lack of emotional clarity subscale; DERS Goals = inability to engage in goal-directed behavior when distressed subscale; DERS Impulse = impulse control difficulties subscale; DERS Strategy = lack of effective emotion regulation strategies subscale; DERS Accept = lack of emotion acceptance subscale. All findings are significant after applying the Benjamini-Hochberg adjustment.

Table 4

Regression Models Predicting PTSD Symptom Severity from DERS-16 Subscales

	B	SE	β	t	P
PTSD Symptom Severity					
Step 1					
Ethnicity	4.29	5.62	0.09	0.76	0.45
Race	7.54	4.02	0.21	1.88	0.06
Step 2					
DERS Clarity	−0.82	0.85	−0.15	−0.96	0.34
DERS Goals	−0.22	0.68	−0.050	−0.32	0.75
DERS Impulse	−0.19	0.67	−0.04	−0.28	0.78
DERS Strategy	**1.82**	**0.68**	**0.65**	**2.66**	**0.01**
DERS Accept	−0.20	0.76	−0.50	−0.27	0.79

Note. DERS-16 = Brief Difficulties in Emotion Regulation Scale; DERS-16 Clarity = Lack of emotional clarity subscale; DERS-16 Goals = Inability to engage in goal-directed behavior when distressed subscale; DERS-16 Impulse = Impulse control difficulties subscale; DERS-16 Strategy = Lack of effective emotion regulation strategies subscale; DERS-16 Accept = Lack of emotion acceptance subscale. Bold-faced text significant at $p \leq .01$.