

The Role of Gender in Suicidal Ideation among Long-term Opioid Users

Le rôle du sexe dans l'idéation suicidaire chez les utilisateurs d'opioïdes à long terme

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Abstract

Objective: This study aims to examine factors associated with suicidal ideation among people with opioid dependence and to explore whether these factors are gender-specific.

Methods: Cross-sectional data were collected among long-term opioid-dependent individuals ($n = 176$; 46.0% women). Lifetime histories of suicidal ideation were measured using the Composite International Diagnostic Interview, and additional data were collected regarding sociodemographic characteristics, drug use, health, and adverse life events. Multivariable logistic regression was used to determine the relationships between these variables and suicidal ideation for the full study sample and separately for women and men to explore the potential role of gender.

Results: A total of 43.8% ($n = 77$) of participants reported a lifetime history of suicidal ideation. Among those with suicidal ideation, 49.3% were women and the overall average age of first ideation was 19.82 years (SD, 11.66 years). Results from multivariable analyses showed that a history of depression, anxiety, and childhood emotional neglect and the number of lifetime traumatic events were significantly associated with higher odds of suicidal ideation. The gender-based analysis suggested that histories of depression and anxiety remained independently associated with lifetime suicidal ideation among women, whereas for men, childhood emotional neglect and the number of lifetime potentially traumatic events were independently associated with lifetime suicidal ideation.

Conclusions: This study offers a critical first step to understanding factors associated with suicidal ideation among long-term opioid-dependent men and women and the potential importance of gender-sensitive approaches for suicidal behavior interventions. These data inform further research and clinical opportunities aiming to better respond to the psychological health needs of this population.

Abrégé

Objectif : Cette étude vise à examiner les facteurs associés à l'idéation suicidaire chez les personnes dépendantes des opioïdes et à explorer si ces facteurs sont sexospécifiques.

Méthodes : Des données transversales ont été recueillies chez des personnes dépendantes des opioïdes à long terme ($n = 176$; 46,0% de femmes). Les antécédents d'idéation suicidaire de durée de vie ont été mesurés à l'aide de l'Entrevue composite diagnostique internationale, et des données additionnelles sociodémographiques ont été recueillies ainsi que sur l'utilisation de drogues, la santé, et les expériences de vie indésirables. La régression logistique multivariée a déterminé la

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relation entre ces variables et l'idéation suicidaire pour l'échantillon de l'étude au complet, puis séparément pour les femmes et les hommes afin d'explorer le rôle potentiel du sexe.

Résultats : Un total de 43,8% ($n = 77$) des participants a déclaré des antécédents de durée de vie d'idéation suicidaire. Parmi ceux ayant une idéation suicidaire, 49,3% étaient des femmes et l'âge moyen global de la première idéation était 19,82 ($ET = 11,66$). Les résultats des analyses multivariées ont déterminé que les antécédents de dépression, d'anxiété, de négligence émotionnelle dans l'enfance et le nombre d'expériences traumatisantes de durée de vie étaient significativement associés à des probabilités plus élevées d'idéation suicidaire. L'analyse sexospécifique suggérait que les antécédents de dépression et d'anxiété demeuraient indépendamment associés à l'idéation suicidaire de durée de vie chez les femmes; alors que chez les hommes, la négligence émotionnelle dans l'enfance et le nombre d'expériences potentiellement traumatisantes de durée de vie étaient indépendamment associés à l'idéation suicidaire de durée de vie.

Conclusions : Cette étude offre une première étape critique pour comprendre les facteurs associés à l'idéation suicidaire chez les femmes et les hommes dépendants des opioïdes à long terme, et souligne l'importance potentielle des approches sexospécifiques pour les interventions de comportement suicidaire. Ces données pourront servir à d'autre recherche et aux démarches cliniques visant à mieux répondre aux besoins de santé psychologiques de cette population.

Keywords

opioid dependence, suicidal ideation, psychological health, childhood adversity, historical trauma, gender

Opioid dependence is a chronic condition that exacts a considerable number of harms to the self and to communities.^{1,2} Despite efforts to prevent and treat opioid dependence, there are an estimated 17 million opioid users globally.² People with opioid dependence face significant personal and structural vulnerabilities related to histories of childhood maltreatment,^{3,4} ongoing trauma,^{5,6} and criminal justice system involvement and incarceration.⁷⁻⁹ The intersection of these experiences is further associated with mental (e.g., depression, posttraumatic stress disorder)¹⁰ and physical health comorbidities (e.g., infections),^{11,12} which contribute to increased risks of morbidity and mortality.

In the past decade, efforts to improve understanding of the causes of mortality among people with opioid dependence have focused on suicidal behaviours, especially fatal and nonfatal suicidal attempts.^{13,14} An early review of suicide attempts among heroin users reported the lifetime prevalence to be 17% to 47%.¹³ Particularly salient risk factors for suicide attempts among people using street heroin include childhood maltreatment,^{13,14} depression,¹³ and posttraumatic stress disorder.¹⁴ Additionally, one of the strongest risk factors for suicide attempts is history of suicidal ideation,¹⁴⁻¹⁶ and this risk factor has been shown to persist over time among heroin users, even when suicide attempts decrease.¹⁵

Despite the known association between suicidal ideation and future suicide attempts,¹⁷ few studies have examined suicidal ideation among long-term opioid users.¹³ One study in the United Kingdom reported a lifetime suicidal ideation prevalence of 60% among people dependent on heroin and receiving community-based addiction treatment.¹⁸ A more recent national survey-based study in the United States determined that suicidal ideation in the prior year was 11% for persistent nonmedical prescription opioid users (i.e., people using nonprescribed opioids for pain relief or because of the feeling it caused) compared with

3% for never users.¹⁹ However, neither of these studies reported factors associated with suicidal ideation among long-term opioid users. This important gap in the literature has implications for suicide prevention efforts in long-term street opioid users due to a broader and emerging recognition that risk factors for suicidal ideation are distinct from those of suicide attempts. Thus, efforts to distinguish risks factors for suicidal ideation versus suicide attempts are theoretically and clinically relevant to better understand these processes.¹⁷

Another important factor to consider in understanding suicidal ideation among opioid-dependent populations is the role of gender. It is well known that there exists a “gender paradox” in suicidal behaviours.²⁰ For example, women tend to have higher rates of nonfatal suicide attempts while men have higher rates of fatal attempts.²⁰ This paradox has also been observed among opioid-dependent populations, with higher rates of fatal suicide observed among men and higher rates of suicide attempts observed among women.^{13,14} Such gender differences are not surprising given the ample evidence showing that the risks (e.g., role of childhood maltreatment) and outcomes of opioid dependence (e.g., mental and physical health, treatment access)⁶ are gender specific. Thus, further considering the role of gender in factors associated with suicidal ideation may yield evidence to inform gender-sensitive suicide intervention efforts for this population.

In light of the current gaps in the evidence surrounding suicidal ideation among long-term opioid users, the present study has two aims. The first aim is to examine factors associated with suicidal ideation among a sample of long-term opioid-dependent women and men, and the second is to explore whether these factors are gender-specific. Given that suicide is a preventable cause of mortality, such evidence is critical to earlier intervention efforts that could be incorporated in addiction treatment settings.

Methods

Design, Setting, and Participants

Gender Matters in the Health of Long-term Opioid Users (GeMa) was a cross-sectional study conducted between December 2011 and June 2013 in Vancouver, Canada. The study tested gender-specific patterns of drug use, health, and access to care. Data on adverse life experiences, including childhood maltreatment (physical, emotional, or sexual abuse; physical or emotional neglect), potentially traumatic life events occurring over the lifetime, and suicidal behaviours, were also collected.

The target population included long-term opioid-dependent women and men. To reach this sample, partnerships were formed with community-based organizations (e.g., Drug Users Resource Centre) and healthcare provider organizations (e.g., Providence Health Care) serving the target population. Participants were also recruited through snowball sampling. Eligible participants were adults (19 years of age or older) with at least 5 years of illicit opioid use, regular use of illicit opioids during the prior 6 months, and 1 or more episodes of opioid agonist treatment (e.g., methadone maintenance treatment, buprenorphine/naloxone [Suboxone]) in the lifetime.

GeMa received ethical approval from the Providence Health Care/University of British Columbia Research Ethics Board. The informed consent form was reviewed, and informed consent was obtained before any research took place. A member of the trained research team who had experience working with the target population carried out all study procedures in a confidential research office.

Measures

Dependent Variable. The Composite International Diagnostic Interview–Major Depression Module, developed by the World Health Organization, was used to measure suicidal behaviours over the lifetime.²¹ To measure suicidal ideation, participants were asked, “Have you ever seriously thought about committing suicide?” This prompted additional questions regarding suicidal thoughts, plans, and attempts only among those reporting suicidal ideation. This questionnaire has been extensively used in the surveillance and monitoring of suicidal behaviours²² and also in studies with opioid-dependent populations.¹⁵

Independent Variables. Questionnaires used in the GeMa study were carefully selected according to those commonly used with the study population. For the present analysis, independent variables collected for a lifetime reference period were used. Domains of interest included (1) sociodemographic characteristics (e.g., age, gender, ethnicity, housing); (2) history of depression and anxiety; (3) opioid use history; (4) addiction treatment history; (5) childhood maltreatment experiences; and (6) exposure to potentially traumatic life events. Histories of depression, opioid use, and addiction

treatment were measured with the European version of the Addiction Severity Index.²³ Childhood maltreatment (including emotional, physical, and sexual abuse; emotional and physical neglect) was measured using the Childhood Trauma Questionnaire,²⁴ a standardized instrument with scores ranging from 5 to 25 for each maltreatment subscale (higher scores indicate more severe maltreatment). As used in similar samples,^{25,26} potentially traumatic life events were assessed with a checklist of 34 events (e.g., death of loved one, life-threatening accidents or illnesses, loss of a child) described in the *Diagnostic and Statistical Manual of Mental Disorders* for posttraumatic stress disorder.²⁷ This checklist covers a lifetime reference period, does not measure suicidality (thoughts, plans, or attempts), and was scored as the number of events endorsed (i.e., 0–34, where a higher score indicates more severe exposure). To strengthen the sex- and gender-based analysis, complementary topics previously identified in the literature⁶ as potentially influencing the experiences of opioid-dependent women and men were included. Specifically, pregnancy, parenting, and survival sex work histories were also explored.

Statistical Analysis

A binary outcome variable defined participants with and without a lifetime history of suicidal ideation. Continuous variables were described using mean and standard deviation (SD) or median and interquartile range, and their relationship with suicidal ideation was tested with independent-samples *t*-tests or 2-sample Wilcoxon rank sum tests. Categorical variables were described using frequencies and percentages and compared using chi-square tests.

Multivariable logistic regression was used to test factors independently associated with the adjusted odds of lifetime suicidal ideation. Variables were selected from bivariate analyses to enter the model based on a significance level of <0.20 ; this more liberal statistical criterion reduced the likelihood that potentially important independent variables would be removed for this new line of inquiry. Backward elimination was then used, where one-by-one, variables with the least significance were dropped from the model. In addition to this process, at each step, the reduced model's Akaike information criterion (AIC) and Bayesian information criterion (BIC) were compared with the prior model. The final model was selected based on the AIC and BIC (i.e., given the collection of models, lower values indicate better relative quality of statistical model). To explore whether the relationship between independent variables and lifetime suicidal ideation was gender-specific, stratified multivariable logistic regression models were built separately for women and men. The full sample model was adjusted by age, gender, and ethnicity, and gender-specific models were adjusted by age and ethnicity. Firth's penalized likelihood was used to fit all models, a method that is commonly used to avoid bias typically found in models built with a small number of observations in 1 or more groups.²⁸ Data analyses were conducted using Stata 13.1.²⁹

Table 1. Select sociodemographic, health, drug use, and addiction treatment characteristics.

Characteristics	Total (<i>n</i> = 176; 100%)	No history of suicidal ideation (<i>n</i> = 99; 56.2%)	History of suicidal ideation (<i>n</i> = 77; 43.8%)
Sociodemographic and health characteristics			
Age	45.0 [9.5]	45.29 [9.62]	44.56 [9.44]
Gender, female	81 (46.0)	43 (43.4)	38 (49.3)
Any Indigenous ancestry ^a	49 (27.8)	23 (23.2)	26 (33.8)
Less than high school education	78 (44.3)	46 (46.5)	32 (41.6)
Prior nonstable housing ^b	109 (62.6)	65 (67.0)	44 (57.1)
Has a biological child	107 (61.1)	55 (56.1)	52 (67.5)
Ever engaged in sex work [*]	89 (50.6)	43 (43.4)	46 (59.7)
Lifetime months incarcerated, median [IQR] ^c	6.0 [0.0-24.0]	9.5 [1.0-48.0]	3.5 [0.0-18.0]
Lifetime history of depression ^{***}	111 (63.8)	44 (45.4)	67 (87.0)
Lifetime history of anxiety ^{***}	120 (69.4)	51 (53.1)	69 (89.6)
Substance use and addiction treatment history			
Age at first opioid injection	23.95 [9.05]	24.02 [8.69]	23.86 [9.55]
Heroin was the first street opioid used	116 (65.9)	68 (68.7)	48 (62.3)
Years of regular heroin use	16.19 [10.13]	16.41 [9.44]	15.90 [11.02]
Ever accidental overdose	121 (68.7)	65 (65.7)	56 (72.7)
Lifetime use of illicit stimulants ^d	151 (85.8)	81 (81.8)	70 (90.9)
Lifetime number accidental overdoses [*]	3.31 [6.90]	2.38 [3.28]	4.51 [9.66]
Ever intentional overdose ^{***}	18 (10.3)	3 (3.0)	15 (20.0)
Lifetime number intentional overdoses ^e	2.0 [1.61]	1.67 [0.58]	2.07 [1.75]
Lifetime number of detox episodes ^f	9.3 [5.77]	9.38 [5.47]	9.21 [6.17]
Lifetime number of residential treatment episodes ^f	2.07 [3.51]	1.81 [3.07]	2.41 [4.00]
Ever accessed counseling	112 (64.7)	58 (59.8)	54 (71.0)
Number of OAT episodes in life	4.03 [2.95]	3.96 [2.94]	4.12 [2.99]
Age at first OAT episode	33.87 [9.51]	34.02 [9.33]	33.68 [9.8]

IQR = interquartile range; OAT = opioid addiction treatment (i.e., methadone, Suboxone). Data shown as mean [standard deviation] and *n* (%), unless otherwise noted. Statistical analysis by independent 2-samples *t*-test or 2-sample Wilcoxon rank sum test and chi-square test.

^aSelf-reported First Nations, Inuit, or Métis ancestry.

^bIncludes housing within last 3 years in single-resident occupancy hotel rooms with restrictions or couch surfing.

^cNumber of months incarcerated in lifetime. *N* missing = 8 (7 among those without suicidal ideation; 1 among those with suicidal ideation).

^dIncludes use of cocaine powder (110/151), crack cocaine (16/151), amphetamines (20/151), and/or speedball (a combination of opioid and stimulant; 5/151).

^eLifetime number of intentional overdoses among those who ever reported an overdose. For the total sample, the lifetime number of intentional overdoses was 0.21 [SD, 0.79], for those without suicidal ideation 0.05 [SD, 0.30], and for those with suicidal ideation 0.41 [SD, 1.13].

^fThe number of times in life participants have accessed detox (i.e., withdrawal management) and residential treatments. *N* missing for each variable = 2 (among those without suicidal ideation history).

P* < 0.05; *P* < 0.01; ****P* < 0.001.

Results

Table 1 summarizes sociodemographic characteristics, substance use, and addiction treatment history for the total sample (*n* = 176) and for participants with (*n* = 77; 43.8%) and without (*n* = 99; 56.2%) lifetime histories of suicidal ideation. Participants' average age was 45.0 years (SD, 9.5 years), 46.0% (*n* = 81) self-identified as women (including 2 participants who self-identified as transgender women), and 27.8% (*n* = 49) self-identified as having Indigenous ancestry. Participants' average age of first opioid injection was 23.95 years (SD, 9.05 years) and heroin was the first street opioid used for 65.9% (*n* = 116) of participants. Participants reported using heroin for an average of 16.19 years (SD, 10.13 years) in their lifetime and had an average of 9.3 (SD, 5.77) detox episodes, 2.07 (SD, 3.51) residential treatment episodes, and 4.03 (SD, 2.95) opioid agonist treatment

episodes. There were significant differences between participants with and without histories of suicidal ideation with respect to lifetime histories of sex work (59.7% vs. 43.4%; $\chi^2 = 4.61$; *p* = 0.032, *df* = 1), lifetime histories of depression (87.0% vs. 45.4%; $\chi^2 = 32.24$; *p* < 0.000, *df* = 1) and anxiety (89.6% vs. 53.1%; $\chi^2 = 26.77$; *p* < 0.000, *df* = 1), and the average number of accidental overdoses (mean = 4.51 [SD, 9.66] vs. mean = 2.38 [SD, 3.28]; *t* statistic = 2.13; *p* = 0.043).

Table 2 displays further the suicidal behaviors and select lifetime maltreatment histories. Among participants reporting a history of suicidal ideation, their average age of first suicidal ideation was 19.82 years (SD, 11.66 years), and 36.4% (*n* = 28) experienced suicidal ideation in the 12 months prior to data collection (Table 2). Of those with lifetime suicidal ideation (*n* = 77), plans for suicide were

Table 2. Suicidal behaviours and select lifetime maltreatment histories.

Characteristics	Total (<i>n</i> = 176; 100%)	No history of suicidal ideation (<i>n</i> = 99; 56.2%)	History of suicidal ideation (<i>n</i> = 77; 43.8%)
Suicidal behaviours^a			
Age of first suicidal thoughts	—	—	19.82 [11.66]
Suicidal thoughts in past 12 months	—	—	28 (36.4)
Suicidal plans	—	—	48 (62.3)
Age of first suicidal plans	—	—	23.21 [12.47]
Suicidal plans in past 12 months	—	—	14 (29.2)
Suicidal attempts	—	—	58 (75.3)
Age of first suicidal attempts	—	—	19.69 [10.49]
Number of lifetime attempts, median [IQR]	—	—	2 [1-4]
Suicidal attempts in past 12 months	—	—	6 (10.3)
Lifetime potentially traumatic life events score ^{b***}	14.33 [5.13]	12.44 [4.47]	16.74 [4.93]
Childhood maltreatment^c			
Emotional abuse score ^{***}	13.36 [6.23]	11.72 [5.88]	15.45 [6.08]
Physical abuse score ^{***}	10.83 [5.71]	9.21 [4.77]	12.91 [6.16]
Age of first experience [*]	6.03 [3.34]	6.91 [4.03]	5.31 [2.46]
Parent as perpetrator ^d	60 (74.1)	24 (66.7)	36 (80.0)
Sexual abuse score ^{***}	9.99 [6.20]	8.59 [5.69]	11.77 [6.41]
Age of first experience ^{**}	7.52 [3.76]	8.74 [3.52]	6.31 [3.63]
Parent as perpetrator ^d	16 (25.4)	7 (25.9)	9 (25.0)
Emotional neglect score ^{**}	13.84 [5.42]	12.80 [5.79]	15.16 [5.42]
Physical neglect score ^{**}	9.75 [4.64]	8.93 [4.23]	10.8 [4.94]

IQR = interquartile range. Data shown are mean [standard deviation] and *n* (%), unless otherwise noted. Statistical analysis by independent 2-samples *t*-test/Wilcoxon rank sum test and chi-square/Fisher exact test.

^aComposite International Diagnostic Interview–Suicidality Scale: further questions about suicidal ideation, plans, and attempts are asked only among those who have ever reported suicidal ideation (*n* = 77).

^bPotentially traumatic life events score ranges from 0 to 34 (higher score indicates more severe exposure). *N* missing = 1 (among those with history of suicidal ideation).

^cChildhood Trauma Questionnaire evaluates emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. Scores for each subscale range from 5 to 25 (higher scores indicate more severe maltreatment). Data available for *n* = 171 (5 participants did not complete this questionnaire: 3 among those with no history of suicidal ideation; 2 among those with history of suicidal ideation).

^dPerpetrator type includes parent, other family, acquaintance, stranger, other (e.g., police).

P* < 0.05; *P* < 0.01; ****P* < 0.001.

reported by 62.3% (*n* = 48), and 75.3% (*n* = 58) reported suicide attempts. In the prior year, approximately 30% (*n* = 14) reported plans and 10% (*n* = 6) reported attempts. Lifetime potentially traumatic events and each of the childhood maltreatment subscale scores were significantly higher among participants with histories of lifetime suicidal ideation.

Results from the final adjusted multivariable logistic regression model for the full sample and the gender-specific models are presented in Table 3. The adjusted odds ratios (AORs) of suicidal ideation were significantly higher for participants with histories of depression (AOR = 2.96; 95% confidence interval [CI], 1.14 to 7.72) and anxiety (AOR = 3.98; 95% CI, 1.40 to 11.27) compared with participants without these conditions. Additionally, for each unit increase in childhood emotional neglect score and number of potentially traumatic life events, the adjusted odds of lifetime suicidal ideation increased by 9% (AOR = 1.09, 95% CI, 1.02 to 1.16) and 13% (AOR = 1.13, 95% CI, 1.04 to 1.23), respectively. The gender-based analysis suggested that histories of depression and anxiety remained independently associated with lifetime suicidal ideation among

women. For men, the number of lifetime potentially traumatic events was independently associated with lifetime suicidal ideation (Table 3).

Discussion

Following recent recommendations in suicide research,¹⁷ and in contrast to the existing research on suicide attempts,¹³⁻¹⁶ the present study focused specifically on histories of suicidal ideation for people with long-term opioid dependence. This is both theoretically and clinically meaningful since emerging evidence suggests that distinct processes may explain suicidal ideation and suicide attempts.¹⁷ In the present study, 43.8% of participants reported histories of suicidal ideation, and 75% of this sample also reported suicide attempts. These striking statistics confirm that suicidal behaviours among people with long-term opioid dependence remain a significant public health concern. Histories of depression, anxiety, and adverse life events (including childhood emotional neglect) were independently associated with an increased probability of

Table 3. Multivariable logistic regression model of factors associated with suicidal ideation for the full sample and by gender.

	Women and men Adjusted OR ^a <i>n</i> = 169 (95% CI)	Women only Adjusted OR ^b <i>n</i> = 74 (95% CI)	Men only Adjusted OR ^b <i>n</i> = 95 (95% CI)
Lifetime history of depression			
Yes	<i>n</i> = 107 2.96 (1.14-7.72)*	<i>n</i> = 53 5.33 (1.07-26.67)*	<i>n</i> = 54 2.68 (0.72-9.98)
No	<i>n</i> = 62 Ref.	<i>n</i> = 21 Ref.	<i>n</i> = 41 Ref.
Lifetime history of anxiety			
Yes	<i>n</i> = 116 3.98 (1.40-11.27)**	<i>n</i> = 55 6.68 (1.06-42.10)*	<i>n</i> = 61 3.31 (0.80-13.64)
No	<i>n</i> = 53 Ref.	<i>n</i> = 19 Ref.	<i>n</i> = 34 Ref.
Lifetime number of accidental overdoses	1.04 (0.98-1.11)	0.96 (0.80-1.15)	1.09 (0.97-1.22)
Childhood emotional neglect score	1.09 (1.02-1.16)*	1.08 (0.97-1.19)	1.10 (0.99-1.21)*
Lifetime potentially traumatic life events score	1.13 (1.04-1.23)**	1.10 (0.97-1.24)	1.19 (1.04-1.37)*

OR = odds ratio; 95% CI = 95% confidence interval. Of the 176 participants in the study, 7 were excluded from the full model due to missing data on the childhood trauma questionnaire, potentially traumatic life events, and lifetime depression and anxiety variables. The final number of observations used for the analysis was 169 (74 women, 95 men), 74 of whom were individuals with lifetime suicidal thoughts. Cell values for *n* have been added to show the number of participants with and without depression.

^aAge, gender (man, woman), ethnicity (Indigenous, non-Indigenous) forced in.

^bAge and ethnicity (Indigenous, non-Indigenous) forced in.

P* < 0.05; *P* < 0.01; ****P* < 0.001.

lifetime suicidal ideation. Additionally, the gender-based analysis in the present study suggests that the relationship between these factors and suicidal ideation may be unique for women and men. Together, these findings may inform the development of additional domains of suicide risk assessment for people with opioid dependence.

In examining factors associated with suicidal ideation, a gender-sensitive approach was applied to the analysis in an effort to explore the role of gender in suicidal ideation. The gender-based exploration of factors associated with suicidal ideation emphasizes the importance of analyses beyond standard approaches in which sex and/or gender is included as a variable in analyses.³⁰ Even when gender differences may not be initially observed, there is much to be learned from exploring associations separately for women and men. This is particularly beneficial in studies such as the current study, in which a great amount of complexity is involved in disentangling structural and personal risk factors for suicidal ideation. Indeed, when we tested factors independently associated with suicidal ideation separately for women and men, childhood emotional neglect and the number of potentially traumatic life events were significantly associated with suicidal ideation among men only, whereas for women, depression and anxiety histories were significantly associated with suicidal ideation.

To support the interpretation of the observed independent association between adverse life events and suicidal ideation among men, we might consider framing these findings within a broader understanding of cultural expectations of men's masculinity (e.g., characteristics of aggression, dominance, protector). For example, prior studies have shown

that among men with traumatic event histories, expectations of masculinity lead to internalizing blame,³¹ experiences of shame and stigma,³² and an underreporting of trauma and emotional vulnerabilities.³³ Thus, one possible explanation for the present gender-specific associations is that masculine expectations may be interconnected with the psychological impact that trauma histories pose for men,³⁴ while also masking the role of gender in suicidal ideation. Considering the present findings within these broader theories emphasizes the need to incorporate gender-sensitive research and clinical approaches to promote men's resilience following these experiences.³⁵

Comorbid depression and anxiety have previously been documented among people with opioid dependence.^{4,36} Additionally, prior studies in both substance-using¹⁴ and non-substance-using samples^{22,37,38} have shown depression and anxiety to be associated with suicidal attempts. However, finding these risk factors to persist for suicidal ideation among women specifically reveals the need for continued efforts to reduce the prevalence of these conditions in this population. One possible explanation for the persistent association between psychological health and suicidal ideation may be reflected in the social exclusion faced by this population. For example, in efforts to further understand suicidal behaviours among opioid users, a recent study showed that loneliness, perceived burdensomeness, and the extent to which people felt connected to others were independently associated with suicidal attempts.³⁹ Interestingly, social connectedness and loneliness have also been associated with depression⁴⁰ and anxiety⁴¹ and may explain the observed association among women in the present study. These

findings suggest that efforts to support the psychological health, interpersonal relationships, and social connections of women with long-term opioid dependence may reduce their burden of suicidal ideation.

Although not statistically significant in the present study, a higher number of lifetime accidental overdoses were associated with increasing odds of suicidal ideation. Among opioid users, the question of whether overdoses are intentional and might potentially explain suicidal behaviours has been previously examined. For example, Vingoe et al¹⁸ found an association between suicide attempts and heroin overdoses but found distinct predictors of these experiences. Additionally, Maloney et al¹⁴ reported that impulsivity, injection of opioids, and concurrent sedative dependence were associated with opioid overdoses, while mental disorders were associated with suicide attempts. Likewise, Connor et al (2007)⁴² found that a low sense of belonging was associated with suicide attempts but not with overdose history. Considered together, the evidence suggests that the reasons people with opioid dependence experience overdose and suicidal behaviors may be unique, despite their potential association.

The primary limitations to be considered while interpreting our findings are that data are prevalence based and were collected from a relatively small sample for the analysis conducted. While efforts were made to include only independent variables measured over the lifetime (i.e., preceding onset of suicidal ideation), we cannot be certain that some variables (e.g., depression, potentially traumatic lifetime events) occurred only before the onset of suicidal ideation. In addition, our measure of suicidal ideation was for a lifetime reference period and among participants with at least 1 prior episode of opioid agonist treatment. As such, the associations observed in this analysis cannot be generalized to individuals experiencing new-onset suicidal ideation and for opioid-dependent populations without such treatment histories. Finally, in building the multivariable regression model, we chose a liberal statistical criterion ($p < 0.20$) in an effort to include all potentially important predictors of suicidal ideation. Nevertheless, it is possible that some predictors were missed through this approach.

Despite these limitations, the present study offers significant promise for addiction treatment and clinical practice teams seeking to assess, prevent, and offer support for suicidal behaviours among people with long-term opioid dependence. Importantly, results from the bivariate analysis showed that prior histories of addiction treatment, including detox, residential treatment, and the number of opioid agonist treatment episodes, were similar for participants with and without histories of suicidal ideation. With similar exposure to addiction treatment, individuals with suicidal ideation who enter the healthcare system through addiction treatment will have opportunities for assessment and intervention. Moreover, with improved understanding of factors associated with suicidal ideation among women and men, healthcare providers encountering people with

opioid dependence will be better equipped to perform risk assessments.

Conclusions

This study offers a critical first step to better understand factors associated with suicidal ideation for women and men dependent on opioids. These gender-sensitive findings provide healthcare providers with further indicators to be complemented with suicide ideation risk assessments in routine clinical encounters. For researchers in this field, continued efforts are needed to further explore the underlying mechanisms explaining the role and process of the identified risk factors.

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