

## RESEARCH ARTICLE

# Associations among child abuse history, deployment-related traumatic events, mental disorders, and suicidal behaviors in Canadian Regular Force personnel

Tamara L. Taillieu<sup>1</sup>  | Jitender Sareen<sup>2</sup> | Tracie O. Afifi<sup>3</sup>

<sup>1</sup>Department of Community Health Sciences, University of Manitoba, Winnipeg, Manitoba, Canada

<sup>2</sup>Department of Psychiatry, University of Manitoba, Winnipeg, Manitoba, Canada

<sup>3</sup>Departments of Community Health Sciences and Psychiatry, University of Manitoba, Winnipeg, Manitoba, Canada

## Correspondence

Tracie O. Afifi, S113-750 Bannatyne Avenue, Winnipeg, Manitoba, R3E 0W5, CANADA.

Email: [tracie.affi@umanitoba.ca](mailto:tracie.affi@umanitoba.ca)

Article preparation was supported by a Canadian Institutes of Health Research (CIHR) New Investigator award (Tracie O. Afifi), CIHR Foundations Scheme grant (Tracie O. Afifi), and CIHR Foundation Scheme grant (JitenderSareen). Funding for this article was also supported by a research contract from the Government of Canada.

The authors would like to acknowledge Sarah Turner for her valuable comments and suggestions regarding the development and design of this research project, as well as for providing assistance with coding and data analysis. We have no conflicts of interest to declare.

## Abstract

Increasing attention has been focused on suicidal behavior among military personnel. Exposure to deployment-related traumatic events (DRTEs) and child abuse (CA) both have been associated with mental disorders and suicidal behaviors among military personnel. Thus, the primary objectives of this study were to examine (a) sex differences in CA history and DRTEs, past-year mental disorders, and past-year suicide-related outcomes and (b) independent, cumulative, and interactive effects of CA history and DRTEs on past-year mental disorders and suicide outcomes among Canadian military personnel. Data were from the representative Canadian Forces Mental Health Survey collected in 2013 ( $N = 8,161$ ; response rate = 79.8%). The results indicated a high prevalence of trauma exposure, with sex differences noted for specific trauma types. Both CA history and DRTEs were strongly associated with mental disorders, CA history:  $aORs = 1.60-2.44$ ; DRTEs;  $aORs = 1.67-3.88$ . Cumulative, but not interactive, effects were noted for the effects of CA history and DRTEs on most mental disorders. Associations between CA history and DRTEs on suicide outcomes were largely indirect via their impact on mental disorders. Information regarding the role of specific types of predeployment trauma on mental disorders and suicidal behavior can be used to develop more targeted prevention and intervention strategies aimed at improving the mental health of military personnel.

Increasing attention has been focused on suicidal behavior among military personnel (Nock et al., 2015; Sareen et al., 2016), who are often exposed to traumatic events while deployed. This exposure has been associated with both mental disorders and suicidal behavior (Bonanno et al., 2012; Clancy et al., 2006; Hotopf et al., 2006;

LeardMann et al., 2009); for example, combat exposure has been linked to higher scores on measures of alcohol use (Hotopf et al., 2006), major depressive disorder (Dedert et al., 2009), and posttraumatic stress disorder (PTSD; Bonanno et al., 2012; Clancy et al., 2006; Dedert et al., 2009; Hotopf et al., 2006). Deployment-related traumatic

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2022 The Authors. *Journal of Traumatic Stress* published by Wiley Periodicals LLC on behalf of International Society for Traumatic Stress Studies.

events (DRTEs), higher numbers of DRTEs, and multiple deployments have also been linked to PTSD and suicidal behaviors among military personnel (Belik et al., 2009; LeardMann et al., 2009; Maguen et al., 2012; Sareen et al., 2017).

However, research suggests that exposure to DRTEs cannot be the only factor contributing to increased rates of suicidal behavior among military personnel. High rates of suicidal behavior have also been noted in new recruits (Ursano et al., 2015) and in never-deployed personnel (Bush et al., 2013; Kessler et al., 2015; Nock et al., 2014; Schoenbaum et al., 2014), and mental health status indicators appear to be similar across deployed and nondeployed personnel (Hotopf et al., 2006). Further, nonsignificant differences in the risk for suicide death have been reported between military personnel in the United States who were deployed in support of military operations in Iraq and Afghanistan relative to military service members who never deployed (Reger et al., 2015). In fact, reported associations between deployment-related covariates and mental disorders or suicidal behavior often disappear when predeployment traumatic events or indicators of concurrent or predeployment mental health status are included in analyses (Bossarte et al., 2012; LeardMann et al., 2009; Maguen et al., 2011; Sareen et al., 2017).

Much of the focus in the literature has been on the association between deployment-related covariates and PTSD (Bonanno et al., 2012; LeardMann et al., 2009; Zinzow et al., 2007). Although this is no doubt an important line of inquiry, other factors need to be considered to more fully understand suicidal behavior among military personnel. Less is known about the association of different specific types of lifetime trauma (e.g., child abuse) on a broader range of mental disorders (e.g., depression, generalized anxiety disorder, panic disorder, alcohol abuse or dependence) and how these factors influence suicidal behavior among military personnel (Zinzow et al., 2007). This is surprising given evidence that military personnel often report substantial lifetime non-military trauma histories (Afifi et al., 2016; Bolton et al., 2001; Bryan et al., 2013; Clancy et al., 2006; Dedert et al., 2009; Krinsley et al., 2003; LeardMann et al., 2010; Nelson et al., 2011; Youssef et al., 2013; Zinzow et al., 2007) and that mental disorders and suicidal behaviors among military personnel are also strongly related to other types of traumatic events that occur over the lifetime (Afifi et al., 2016; Bryan et al., 2013; Dedert et al., 2009; LeardMann et al., 2010; Nelson et al., 2011; Youssef et al., 2013). In particular, previous research has identified an association between adverse childhood experiences and mental disorders and suicidal behaviors among military personnel (Afifi et al., 2016; Carroll et al., 2017; Dedert et al., 2009; Stein et al., 2018; Youssef et al., 2013). For example, Dedert et al. (2009)

found that childhood physical abuse remained independently associated with current PTSD and major depressive disorder after adjusting for combat exposure and sociodemographic covariates. Childhood trauma has also been found to be significantly associated with depressive symptoms and suicidal ideation after adjustment for combat exposure and PTSD (Youssef et al., 2013). Further, in a sample of U.S. veterans of conflicts in Iraq and Afghanistan seeking treatment for PTSD, Carroll et al. (2017) found that the total number of adverse childhood experiences an individual experienced was associated with an increased risk of suicidal ideation and attempts after adjusting for deployment-related stressors. In a study of new recruits in the U.S. Army, all child maltreatment profiles were found to be associated with lifetime suicidal ideation, plans, and attempts, even after adjusting for mental disorders (Stein et al., 2018). Importantly, child abuse history has been found to be more strongly related to past-year suicide-related behaviors among currently serving Canadian Armed Forces (CAF) personnel than exposure to DRTEs (Afifi et al., 2016).

Additionally, although sex differences in the prevalence of specific trauma types (Belik et al., 2009; Bolton et al., 2001; Bryan et al., 2013; Cox et al., 2011; Kelly et al., 2013; Maguen et al., 2012; Tolin & Foa, 2006), mental disorders (Kelly et al., 2013; LeardMann et al., 2009; Maguen et al., 2012; Tolin & Foa, 2006) and suicidal behaviors (Belik et al., 2009; Bush et al., 2013; Lemaire & Graham, 2011; Nock et al., 2014) have been noted, less is known about whether specific types of traumatic experiences differentially impact the association between mental disorders and suicidal behavior in male and female military personnel (Zinzow et al., 2007). This is an important area of investigation given the increased involvement and changing roles of women in the military (Street et al., 2009).

The current study was designed to address several limitations of the existing literature by examining sex differences in the prevalence of trauma and its association with mental disorder and suicidal behaviors; broadening the scope of mental disorders assessed in relation to trauma exposures; examining the impact of the association between child abuse history and DRTEs on mental disorders and suicide-related behaviors; and using a large, representative sample of CAF Regular Force personnel. Thus, the primary objectives of this study were to (a) examine sex differences in exposure to traumatic events (i.e., child abuse history and DRTEs), past-year mental disorders, and past year suicide-related outcomes among Canadian Regular Force personnel; (b) determine whether child abuse and DRTEs had a cumulative or interactive effect on the association between these trauma types and past-year mental disorders; and (c) examine whether child abuse and DRTEs were independently associated with past-year

suicide-related outcomes after adjustment for concurrent past-year mental disorders among Canadian Regular Force personnel. Information regarding the role of exposure to specific predeployment trauma types on the relation between mental disorders and suicidal behavior among military personnel can be used to develop more targeted prevention and intervention strategies aimed at improving the mental health of Canadian military personnel.

## METHOD

### Participants and procedure

Data were from the Canadian Forces Mental Health Survey (CFMHS), collected in 2013. This survey included a representative sample of Regular Force personnel ( $n = 6,692$ ) as well as a subsample of Reserve Force personnel who deployed in support of the mission in Afghanistan ( $n = 1,469$ ). The overall response rate was 79.8%. For the present study, we restricted analyses to Regular Force personnel between 18 and 60 years of age ( $n = 6,692$ ), as the Reserve Force subsample was not representative of all Reserve Force personnel serving in the CAF (i.e., only Reserve Forces who had been deployed in support of the mission to Afghanistan were included in the sampling frame). Further details on the CFMHS have been published elsewhere (Zamorski et al., 2016). Ethical approval for the survey was provided by the relevant policy committees at Statistics Canada.

### Measures

#### Child abuse history

Respondents were asked to report on child abuse experiences that occurred in the home before the age of 16 years. The survey assessed physical abuse, sexual abuse, and exposure to intimate partner violence (IPV) based on items derived from the Childhood Experiences of Violence Questionnaire (Walsh et al., 2008). Physical abuse was defined as present if one or more of three variables met the following threshold criteria: (a) being slapped on the face, head or ears, or hit or spanked with something hard three times or more; (b) being pushed, grabbed, shoved, or having something thrown at the respondent to hurt them three times or more; and (c) being kicked, bit, punched, choked, burned, or physically attacked at least once. Exposure to IPV was defined as present if the respondent indicated having seen or heard parents, stepparents or guardians hitting each other or another adult in the home three times or more. Sexual abuse was defined as present if either of the following occurred at least once: (a) attempted or being

forced into unwanted sexual activity by being threatened, held down, or hurt in some way and/or (b) being sexually touched, defined as unwanted touching or grabbing, kissing, or fondling against the respondent's will. An "any child abuse" variable (i.e., yes or no) was also computed based on whether the respondent reported experiencing one or more of the three types of child abuse assessed in the survey.

#### DRTEs

In the survey, respondents were asked to report on eight different traumatic events that may have occurred during CAF deployment. These events included (a) knowing someone who was seriously injured or killed, (b) finding oneself in a threatening situation where they were unable to respond because of the rules of engagement, (c) ever being injured, (d) ever seeing ill or injured women or children who the respondent was unable to help, (e) ever receiving incoming artillery, rocket, or mortar fire, (f) ever feeling responsible for the death of Canadian or ally personnel, (g) ever having a close call (e.g., being shot or hit but saved by protective gear), and (h) and ever having difficulty distinguishing between combatants and noncombatants. For the present study, a dichotomous "any DRTE" variable was computed based on whether a respondent reported experiencing one or more of these eight traumatic events.

#### Past-year mental disorders

Several mental disorders were assessed using the World Health Organization's version of the Composite International Diagnostic Interview (CIDI; World Health Organization, 1997), which is based on criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (fourth ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000). Past-year mental disorders included major depressive episode, generalized anxiety disorder (GAD), panic disorder, panic attacks, PTSD, and alcohol abuse or dependence.

#### Past-year suicide-related outcomes

Past-year suicidal ideation was assessed using a question that asked whether the respondent had seriously thought about committing suicide or taking their own life in the past 12 months (i.e., "yes" or "no" response). Past-year suicide plan was assessed using a question asking whether the respondent had made a plan to commit suicide in the past

12 months (i.e., “yes” or “no”). The low prevalence of past-year suicide attempts precluded the examination of this type of suicide-related outcome in this study.

### Sociodemographic and military variables

Sociodemographic and military covariates included sex, in non-sex-stratified models; age (continuous), marital status (married/common-law, separated/divorced/widowed, single), educational attainment (high school or less; some postsecondary; trade, college, or university certificate or diploma; university degree or higher), income (less than CAD \$100,000 vs. \$100,000 or more), and military rank (junior noncommissioned member, senior noncommissioned member, officer).

### Data analysis

Statistical weights and bootstrapping techniques were applied to the data. First, descriptive statistics were computed to examine the distribution of child abuse, DRTEs, mental disorders, and suicidal behaviors among CAF men and women. Multivariable logistic regression was used to examine sex differences in child abuse, DRTEs, mental disorders, and suicidal behaviors between CAF men and women. Second, a series of multivariable logistic regression models were computed to examine whether the associations between child abuse history (i.e., three types assessed separately) and DRTEs (i.e., all eight items assessed separately) and each past-year mental disorder varied by sex by entering Child Abuse x Sex and DRTE x Sex interaction terms into each multivariable model. Third, multivariable logistic models were computed to examine whether child abuse history and DRTEs evidenced an additive effect on past-year mental health outcomes. The cumulative-effects models examined the association of trauma exposures and mental disorders in mutually exclusive categories (i.e., no child abuse history or DRTE, DRTEs only, child abuse history only, both child abuse history and DRTEs). Differences between each category were examined by changing the reference group in multivariable logistic regression models. Fourth, a series of nested multivariable logistic regression models were run to examine the independent and interactive effects of child abuse and DRTEs on past-year mental disorders. In the interactive models, non-mutually exclusive coding was used, and the independent variables were entered in a series of steps. All multivariable models for sociodemographic and military variables including age; sex, in non-sex-stratified models; marital

status; educational attainment; income; and military rank

## RESULTS

Sociodemographic and mental health characteristics of the sample are provided in Table 1. Sex differences in exposures to child abuse, DRTEs, and past-year mental disorders and suicidal behaviors are provided in Table 2. Approximately half of all military personnel reported having experienced exposure to at least one type of child abuse before 16 years of age. Men compared to women were significantly more likely to report a history of physical abuse, adjusted odds ratio (aOR) = 1.19, 95% CI [1.02, 1.40], and significantly less likely to report a history of sexual abuse, aOR = 0.20, 95% CI [0.16, 0.25], or exposure to IPV, aOR = 0.66, 95% CI [0.53, 0.84]. Almost half the sample (48.0%) reported exposure to at least one DRTE during CAF deployment. The most common DRTEs for both men and women were having known someone who was seriously injured or killed (39.1% and 23.2%, respectively); received incoming artillery, rocket, or mortar fire (35.7% and 23.2%, respectively); and seeing ill or injured women or children who they were unable to help (24.5% and 16.4%, respectively). With the exception of having felt responsible for the death of Canadian or allied personnel, men were significantly more likely to report exposures to each individual DRTE and to have experienced any DRTE compared with women, aORs = 1.66–3.60. Among men, the prevalence of past-year mental disorders ranged from 3.2% for panic disorder to 12.1% for panic attacks; among women, the prevalence ranged from 2.3% for alcohol abuse or dependence to 19.6% for panic attacks. Men were significantly less likely than women to meet the diagnostic criteria for past-year major depressive episode, GAD, panic disorder, panic attacks, and PTSD, aORs = 0.48–0.65, than women. Men were more likely to meet the diagnostic criteria for alcohol abuse or dependence, aOR = 1.99, 95% CI [1.08, 3.68], than women. Finally, the prevalence of past-year suicidal ideation and past-year suicide plan was similar for both men (4.3% and 1.8%, respectively) and women (4.3% and 1.6%, respectively).

All Child Abuse History x Sex and DRTE x Sex interaction terms in the multivariable logistic regression models examining the association between child abuse history and DRTEs on mental disorders were not significant (results not shown). Therefore, even though significant sex differences exist in the prevalence of different trauma types, the effects of such exposures on mental disorders are similar for both men and women. Thus, cumulative and interactive logistic regression models were run in the total sample, versus using sex-stratified models, with sex included as

**TABLE 1** Sociodemographic and mental health characteristics of the sample

Sociodemographic covariates	% <sup>a</sup>	95% CI
Sex		
Male	86.1	[85.3, 87.0]
Female	13.9	[13.0, 14.7]
Age (years)		
18–29	33.0	[31.7, 34.1]
30–39	32.4	[31.1, 33.6]
40–49	25.5	[24.6, 26.6]
50–60	9.2	[8.6, 9.9]
Marital status		
Married or common-law	65.6	[64.5, 66.8]
Separated, divorced, or widowed	7.5	[6.9, 8.2]
Single (never married)	26.9	[25.8, 28.0]
Educational attainment		
High school or less	29.8	[28.7, 31.0]
Some postsecondary	8.8	[8.2, 9.6]
Trade, college, or university certificate	40.3	[39.0, 41.5]
University degree or higher	21.1	[20.5, 21.7]
Total household income (CDN)		
< \$30,000	1.7	[1.4, 2.0]
\$30,000–\$49,999	48.8	[4.3, 5.6]
\$50,000–\$79,999	29.1	[28.0, 30.3]
≥ \$80,000	64.4	[63.2, 65.5]
Military rank		
Junior noncommissioned member	55.1	[54.9, 55.3]
Senior noncommissioned member	24.1	[23.8, 24.3]
Officer	20.9	[20.8, 21.0]
Deployment history		
Never deployed	38.5	[37.6, 39.4]
Ever deployed	61.5	[60.6, 62.5]
Any deployment-related traumatic event		
Yes	48.0	[47.1, 48.8]
Any child abuse history		
Yes	47.7	[46.4, 49.1]
Major depressive disorder		
Yes	8.0	[7.3, 8.7]
Generalized anxiety disorder		
Yes	4.8	[4.2, 5.3]
Panic disorder		
Yes	3.4	[2.9, 3.9]
Panic attacks		
Yes	13.1	[12.3, 14.1]
Posttraumatic stress disorder		
Yes	5.3	[4.7, 5.9]
Alcohol abuse or dependence		
Yes	4.5	[4.0, 5.1]
Suicidal ideation		
Yes	4.3	[3.7, 4.9]
Suicide plan		
Yes	1.8	[1.5, 2.1]

Notes:  $N = 6,692$ .

<sup>a</sup>Based on weighted  $N$ s, which were rounded to base 20 for confidentiality purposes according to Statistics Canada data release policies.

an additional sociodemographic covariate in multivariable models.

The results from cumulative effects models are provided in Table 3. The findings indicated that DRTE exposure in the absence of a child abuse history was associated with significantly increased odds of major depressive disorder, GAD, panic disorder, panic attacks, and PTSD,  $aOR = 1.52$ – $6.85$ . Child abuse history without DRTE exposure was associated with significantly increased odds of major depressive disorder, panic attacks, PTSD, and alcohol abuse or dependence,  $aORs = 1.96$ – $4.48$ . Experiencing both DRTEs and a child abuse history was associated with significantly increased odds of all past-year mental disorders assessed in this study,  $aORs = 3.31$ – $13.29$ . Except for past-year alcohol abuse or dependence, the odds of meeting the diagnostic criteria for each past-year mental disorder was significantly higher for respondents who experienced both DRTEs and child abuse than respondents who experienced either trauma type alone. Additionally, as indicated by the subscripts in Table 3, the odds of meeting the diagnostic criteria for panic disorder or PTSD were significantly higher among respondents who reported DRTE exposure only compared with respondents who reported a history of child abuse alone. In contrast, the odds of meeting the diagnostic criteria for alcohol abuse or dependence were significantly higher among respondents with a history of child abuse only compared with those who solely reported a history of DRTEs.

The results from the interactive effects models are provided in Table 4. Except for alcohol abuse or dependence, DRTEs were associated with increased odds of each past-year mental disorder, after adjusting for sociodemographic covariates and military rank,  $aORs = 1.67$ – $3.88$ , in Model 1 (i.e., models that were not adjusted for child abuse history). In Model 2 (i.e., models that were not adjusted for DRTEs), child abuse history was associated with significantly increased odds of each past-year mental disorder after adjustment for sociodemographic covariates and military rank,  $aORs = 1.60$ – $2.44$ . A similar pattern of findings was noted when DRTEs and child abuse history were entered into multivariable logistic models simultaneously (i.e., Model 3). With the exception of the association between DRTEs and alcohol abuse or dependence, both DRTEs,  $aORs = 1.63$ – $3.80$ , and child abuse history,  $aORs = 1.57$ – $2.38$ , remained independently associated with each past-year mental disorder assessed. The only significant DRTE x Child Abuse History interaction effect (i.e., Model 4) was for PTSD. An examination of the interaction effect indicated that child abuse history exerted a slightly more pronounced effect on the prevalence of PTSD among military personnel who reported DRTEs compared to those without DRTE exposure.

**TABLE 2** Sex differences in child abuse history, deployment-related traumatic events, past-year mental disorders, and past-year suicidal behaviour among Canadian Regular Force personnel

Study variable	Male (n = 5,769)		Female (n = 923)		aOR <sup>b,c</sup>	95% CI
	% <sup>a</sup>	95% CI	% <sup>a</sup>	95% CI		
<b>Child abuse</b>						
Physical abuse	44.3	[42.8, 45.7]	40.4	[36.8, 44.1]	1.19*	[1.02, 1.40]
Sexual abuse	5.3	[4.7, 5.9]	21.8	[18.9, 24.9]	0.20***	[0.16, 0.25]
Exposure to IPV	9.8	[9.0, 10.7]	13.5	[11.4, 16.2]	0.66***	[0.53, 0.84]
Any child abuse	47.4	[46.0, 48.9]	50.0	[46.1, 53.4]	0.93	[0.79, 1.08]
<b>Deployment-related traumatic events</b>						
Known someone who was seriously injured or killed	39.1	[38.0, 40.1]	23.2	[20.7, 25.9]	2.14***	[1.81, 2.53]
Found yourself in a threatening situation but were unable to respond due to rules of engagement	18.6	[17.7, 19.5]	7.2	[5.7, 9.0]	2.79***	[2.13, 3.63]
Ever been injured	15.3	[14.4, 16.1]	8.8	[7.1, 10.7]	1.86***	[1.45, 2.39]
Seen ill or injured women or children who you were unable to help	24.5	[23.5, 25.6]	16.4	[14.0, 18.8]	1.66***	[1.37, 2.12]
Received incoming artillery, rocket or mortar fire	35.7	[34.8, 36.7]	23.2	[20.6, 26.2]	1.83***	[1.53, 2.18]
Felt responsible for the death of Canadian or ally personnel	3.6	[3.2, 4.1]	2.7	[1.8, 3.8]	1.39	[0.92, 2.13]
Had a close call, for example shot or hit but protective gear saved you	14.2	[13.4, 15.1]	4.3	[3.2, 5.9]	3.60***	[2.56, 5.06]
Had difficulty distinguishing between combatants and noncombatants	20.8	[19.9, 21.8]	7.2	[5.9, 9.0]	3.34***	[2.62, 4.26]
Any deployment-related traumatic event	50.0	[49.0, 51.0]	35.4	[32.5, 38.7]	1.92***	[1.63, 2.26]
<b>Mental disorders</b>						
Major depressive episode	7.5	[6.8, 8.2]	10.8	[8.8, 13.3]	0.65**	[0.50, 0.85]
Generalized anxiety disorder	4.3	[3.8, 4.8]	7.4	[5.7, 9.5]	0.54***	[0.39, 0.73]
Panic disorder	3.2	[2.7, 3.7]	4.6	[3.3, 6.4]	0.65*	[0.43, 0.98]
Panic attacks	12.1	[11.2, 13.0]	19.6	[16.9, 22.7]	0.55***	[0.45, 0.68]
Posttraumatic stress disorder	4.7	[4.1, 5.3]	8.7	[6.8, 11.2]	0.48***	[0.35, 0.66]
Alcohol abuse or dependence	4.9	[4.3, 5.5]	2.3	[1.3, 3.9]	1.99*	[1.08, 3.68]
<b>Suicide behavior</b>						
Suicidal ideation	4.3	[3.7, 4.9]	4.3	[2.9, 6.0]	0.99	[0.65, 1.51]
Suicide plan	1.8	[1.5, 2.2]	1.6	[0.8, 2.8]	1.13	[0.55, 2.31]

Note: aOR = adjusted odds ratio; IPV = intimate partner violence.

<sup>a</sup>Based on weighted Ns, which were rounded to base 20 for confidentiality purposes according to Statistics Canada data release policies (child abuse items were rounded to base 50). <sup>b</sup>Male sex is the reference category (OR = 1.00). <sup>c</sup>Adjusted for age, marital status, educational attainment, income, and military rank.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**TABLE 3** Cumulative effects of child abuse history and deployment-related traumatic events on past-year mental disorders among Canadian Regular Force personnel

Mental disorder	No DRTEs and no child abuse history	DRTEs without a child abuse history		Child abuse without DRTEs		Both DRTEs and child abuse history	
	Reference	aOR <sup>a</sup>	95% CI	aOR <sup>a</sup>	95% CI	aOR <sup>a</sup>	95% CI
Major depressive disorder	1.00	<b>1.52<sub>a</sub></b>	[1.09, 2.14]	<b>1.96<sub>a</sub></b>	[1.39, 2.75]	<b>3.31<sub>b</sub></b>	[2.44, 4.49]
Generalized anxiety disorder	1.00	<b>2.02<sub>a</sub></b>	[1.30, 3.14]	1.53 <sub>a</sub>	[0.92, 2.53]	<b>3.24<sub>b</sub></b>	[2.17, 4.84]
Panic disorder	1.00	<b>2.92<sub>a</sub></b>	[1.61, 5.31]	1.45 <sub>b</sub>	[0.73, 2.91]	<b>5.47<sub>c</sub></b>	[3.13, 9.56]
Panic attacks	1.00	<b>2.00<sub>a</sub></b>	[1.54, 2.60]	<b>2.01<sub>a</sub></b>	[1.53, 2.65]	<b>3.60<sub>b</sub></b>	[2.84, 4.58]
Posttraumatic stress disorder	1.00	<b>6.85<sub>a</sub></b>	[3.69, 12.70]	<b>4.48<sub>b</sub></b>	[2.30, 8.72]	<b>13.29<sub>c</sub></b>	[7.25, 24.35]
Alcohol abuse or dependence	1.00	1.23 <sub>a</sub>	[0.80, 1.89]	<b>2.39<sub>b</sub></b>	[1.58, 3.61]	<b>2.43<sub>b</sub></b>	[1.60, 3.69]

Note: Adjusted odds ratios (aORs) with different subscripts, and bolded estimates, differ significantly from one another at  $p < .05$ . DRTE = deployment-related traumatic event.

<sup>a</sup>Adjusted for age, sex, marital status, education, income, and military rank.

The results regarding the associations among DRTEs, child abuse history, and past-year suicidal ideation and plans are provided in Table 5. In Model 1 (i.e., DTREs and child abuse history entered simultaneously), a history of child abuse was associated with increased odds of past-year suicidal ideation, aOR = 2.15, 95% CI [1.61, 2.88], and both DRTEs and child abuse were associated with past-year suicide plan, aOR = 1.55, 95% CI [1.02, 2.37] and aOR = 2.63, 95% CI [1.65, 4.22], respectively, after adjustment for sociodemographic covariates and military rank. Model 2 further adjusted for all past-year mental disorders. Exposure to DRTEs was not significantly associated with past-year suicidal ideation or plans in these fully adjusted models. Similarly, child abuse history was not significantly associated with past-year suicide plan in fully adjusted models. However, child abuse history remained significantly associated with past-year suicidal ideation, aOR = 1.42, 95% CI [1.02, 1.98], in the fully adjusted models. In addition, specific mental disorders seemed to be related to specific suicide-related outcomes. Major depressive episodes were strongly related to both past-year suicidal ideation, aOR = 6.69, 95% CI [4.36, 10.26], and past-year suicide plan, aOR = 15.15, 95% CI [7.49, 30.62]. GAD and panic attacks were significantly associated with past-year suicidal ideation, aORs = 2.16 and 2.72, respectively, but not past-year suicide plan. PTSD was associated with past-year suicidal ideation and suicide plans, aORs = 3.79 and 3.80, respectively. Alcohol abuse or dependence were significantly associated with past-year suicide plan, aOR = 2.30, 95% CI [1.10, 4.81], but not past-year suicidal ideation.

## DISCUSSION

The present study produced several novel findings. First, although there were significant sex differences in the prevalence of exposure to different trauma types, the effects of such exposures on mental disorders were similar for both male and female Regular Force CAF personnel. Second, both child abuse history and DRTEs were associated with a broad range of mental disorders. Cumulative-effects models indicated that experiencing both child abuse and DRTEs may have been especially detrimental to mental health among CAF Regular Force personnel. Additionally, child abuse history in the absence of DRTE exposure appeared to be more strongly related to the development of alcohol use disorders, whereas DRTE exposure without a history of child abuse seemed to be more strongly related to the development of panic disorder and PTSD, as indicated by the subscript differences in Table 3. Third, the significant interaction between child abuse history and DRTEs on PTSD warrants further attention. Finally, the association between child abuse history and DTREs on suicidal behaviors appeared to be largely indirect via their impact on mental disorders. However, child abuse history continued to exert an independent effect on past-year suicidal ideation even after adjusting for sociodemographic covariates, military rank, and the presence of several concurrent mental disorders.

Sex differences in exposures to both deployment-related and other types of traumatic events have been noted elsewhere (Belik et al., 2009; Bolton et al., 2001; Bryan et al., 2013; Cox et al., 2011; Kelly et al., 2013; Maguen et al., 2012;

TABLE 4 Independent and interactive effects of child abuse history and deployment-related traumatic events on past-year mental disorders among Canadian Regular Force personnel

Model	MDD		GAD		Panic disorder		Panic attacks		PTSD		Alcohol abuse/dependence	
	aOR <sup>a</sup>	[95% CI]	aOR <sup>a</sup>	[95% CI]	aOR <sup>a</sup>	[95% CI]	aOR <sup>a</sup>	[95% CI]	aOR <sup>a</sup>	[95% CI]	aOR <sup>a</sup>	[95% CI]
Model 1 <sup>a</sup>												
DRTes	1.67 <sup>***</sup>	[1.35, 2.05]	2.12 <sup>***</sup>	[1.61, 2.79]	3.50 <sup>***</sup>	[2.43, 5.05]	1.92 <sup>***</sup>	[1.61, 2.27]	3.88 <sup>***</sup>	[2.92, 5.15]	1.12	[0.85, 1.47]
Model 2 <sup>b</sup>												
CA	2.09 <sup>***</sup>	[1.71, 2.56]	1.60 <sup>***</sup>	[1.24, 2.07]	1.81 <sup>***</sup>	[1.34, 2.45]	1.92 <sup>***</sup>	[1.63, 2.26]	2.44 <sup>***</sup>	[1.88, 3.18]	2.22 <sup>***</sup>	[1.65, 2.98]
Model 3 <sup>c</sup>												
DRTes	1.63 <sup>***</sup>	[1.32, 2.01]	2.08 <sup>***</sup>	[1.58, 2.73]	3.39 <sup>***</sup>	[2.34, 4.90]	1.87 <sup>***</sup>	[1.58, 2.23]	3.80 <sup>***</sup>	[2.86, 5.05]	1.09	[0.83, 1.44]
CA	2.07 <sup>***</sup>	[1.70, 2.53]	1.57 <sup>***</sup>	[1.22, 2.04]	1.74 <sup>***</sup>	[1.29, 2.36]	1.89 <sup>***</sup>	[1.60, 2.23]	2.38 <sup>***</sup>	[1.82, 3.11]	2.22 <sup>***</sup>	[1.65, 2.98]
Model 4 <sup>d</sup>												
DRTes x CA	1.11	[0.73, 1.69]	1.05	[0.58, 1.91]	1.29	[0.59, 2.80]	0.89	[0.63, 1.26]	0.43 <sup>*</sup>	[0.21, 0.88]	0.83	[0.47, 1.46]

Notes: DRTe = deployment-related traumatic event; CA = childhood abuse; aOR = adjusted odds ratio; MDD = major depressive disorder; GAD = generalized anxiety disorder; PTSD = posttraumatic stress disorder. <sup>a</sup>Adjusted for age, sex, marital status, educational attainment, income, and military rank. <sup>b</sup>Adjusted for age, sex, marital status, educational attainment, income, and military rank. <sup>c</sup>Adjusted for the same variables as Models 1 and 2, plus both DRTes and CA victimization in the same model. <sup>d</sup>Adjusted for the same variables as Model 1 and 2, with the main effects of DRTe and CA victimization and the interaction term for DRTe x CA.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Tolin & Foa, 2006). Also consistent with previous research was the finding that sex differences existed in the prevalence of different types of mental disorders (Kelly et al., 2013; LeardMann et al., 2009; Maguen et al., 2012; Tolin & Foa, 2006). The present study adds to the existing body of literature by showing that the strength of the association between trauma exposure on the development of different mental disorders is similar for both men and women in the CAF even though men and women tend to be exposed to different types of traumatic events, and the exposures tend to manifest as different mental disorders. Thus, it seems likely that both child abuse history and DRTes play a role in the development of a range of mental health problems in military personnel. Future research examining a broader range of lifetime traumatic experiences (e.g., natural disasters, adult victimization experiences), different types of exposures (e.g., witness, victim), and different health outcomes (e.g., physical health, externalizing behaviors) is warranted to better understand the potential sex differences in outcomes associated with different types of trauma exposure.

In the current sample, both DRTes and child abuse history were associated with a broad range of past-year mental disorders both independently, after adjustment for sociodemographic and military covariates, and additively, with the experience of both trauma types especially detrimental for mental health. We also found that different types of lifetime trauma exposure might manifest as different types of mental disorders. For example, child abuse history seemed to be more strongly related to alcohol use disorders, whereas DRTes seemed to be more strongly related to panic disorder and PTSD. This finding is significant given evidence that specific types of mental disorders may be critical predictors of suicide attempts among military personnel (Nock et al., 2014). Longitudinal research is needed to further understand these associations.

The present findings also indicate that exposure to DRTes was not significantly associated with past-year suicidal ideation or suicide plan after adjusting for sociodemographic covariates, military rank, and concurrent past-year mental disorders. This suggests that the effects of DRTes on suicide-related behaviors are largely indirect through the development of specific mental disorders. This is consistent with data from the Millennium Cohort Study showing that specific mental disorders (i.e., depression, manic-depressive disorder, and alcohol-related problems), but not combat-related variables or other types of mental disorders, were significantly associated with death by suicide (LeardMann et al., 2013). Similarly, Belik et al. (2009) found that DRTes did not substantively add to the risk of suicide attempts beyond the presence of mental disorders in a sample of CAF personnel. In contrast, child abuse history remained significantly associated with past-year



**TABLE 5** Associations between trauma type and past-year mental disorders, by past-year suicide outcomes

Model	Suicidal ideation		Suicide plan	
	aOR	95% CI	aOR	95% CI
<b>Model 1<sup>a</sup></b>				
Any DRTE	1.26	[0.94, 1.70]	1.55*	[1.02, 2.37]
Any child abuse	2.15***	[1.61, 2.88]	2.63***	[1.65, 4.22]
<b>Model 2<sup>b</sup></b>				
Any DRTE	0.72	[0.50, 1.04]	0.80	[0.46, 1.38]
Any child abuse	1.42*	[1.02, 1.98]	1.54	[0.89, 2.66]
Major depressive episode	6.69***	[4.36, 10.26]	15.15***	[7.49, 30.62]
Generalized anxiety disorder	2.16**	[1.29, 3.63]	1.57	[0.77, 3.20]
Panic disorder	0.76	[0.41, 1.42]	1.57	[0.77, 3.20]
Panic attacks	2.72**	[1.83, 4.03]	1.18	[0.60, 2.32]
Posttraumatic stress disorder	3.79***	[2.36, 6.08]	3.80***	[2.05, 7.04]
Alcohol abuse or dependence	1.58	[0.92, 2.72]	2.30*	[1.10, 4.81]

Notes: DRTE = deployment-related traumatic event; aOR = adjusted odds ratio.

<sup>a</sup>Adjusted for age, sex, marital status, educational attainment, income, and military rank with the addition of both DRTEs and child abuse history in the same model. <sup>b</sup>Adjusted for the same variables as Model 1, with the inclusion of all the past year mental disorders.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

suicidal ideation, but not past-year suicide plan, even after the effects of concurrent past-year mental disorders were taken into account. This is similar to previous research reporting that childhood trauma remained significantly associated with depressive symptoms and suicidal ideation after adjusting for combat exposure and PTSD (Youssef et al., 2013). Likewise, Stein et al. (2018) found that child maltreatment profiles remained significantly associated with lifetime suicide behaviors even after adjustment for mental disorders in a sample of new U.S. Army recruits. Thus, child abuse history may impact suicidal behaviors among military personnel in both direct and indirect ways.

The present study had several strengths, including the use of a large, representative sample of CAF Regular Force men and women. However, the results also need to be interpreted in the context of several limitations. The cross-sectional nature of the survey design precludes making inferences about causality. In addition, the data were retrospective and self-reported, which introduces recall and same-source bias. This study also represents secondary analyses of data collected by Statistics Canada; thus, the analyses were also limited to the variables available in the dataset. It is likely that other types of adverse childhood experiences, DRTEs, and other types of lifetime traumatic events not captured in the current study have an impact on mental health and suicide-related behaviors. Further, several important externalizing disorders were not assessed, and research has suggested that certain externalizing disorders (e.g., intermittent explosive disorder, conduct disorder, oppositional disorder, attention deficit hyperactivity disorder, adjustment disorder) may be implicated in suicidal behaviors among military personnel

(Nock et al., 2014, 2015; Pruitt et al., 2019). The findings are also not generalizable to CAF Reserve Force personnel or the Canadian veteran population. Finally, we were not able to assess suicide attempts or suicide deaths using the current data.


Researchers have speculated that the association between DRTEs and PTSD may actually be overestimated, as some military personnel may be at a risk for developing PTSD, and perhaps, by extension, suicide-related behaviors, due to events that occur before deployment (Bolton et al., 2001). In addition, the risk of developing mental health problems, including suicide-related behaviors, may be exacerbated among military personnel with predeployment trauma history (Brailey et al., 2007; Youssef et al., 2013). From a clinical perspective, these findings suggest that the assessment of trauma among military personnel needs to be broadened to include lifetime trauma exposure rather than an exclusive focus on DTREs (Bolton et al., 2001). In particular, an assessment of childhood trauma exposure should be undertaken given the present findings and those reported elsewhere (Afifi et al., 2016; Carroll et al., 2017; Dedert et al., 2009; Youssef et al., 2013) showing a strong association between childhood trauma and mental disorders and/or suicidality among military personnel. Additionally, previous research has shown that military personnel report a substantially higher prevalence of child abuse exposures relative to the general population (Afifi et al., 2016). Evidence also suggests that a substantial proportion of suicidal behaviors in military personnel have a preenlistment onset and can be attributed to preenlistment mental disorders (Nock et al., 2014, 2015) or suicide behaviors (Bryan et al.,

2014). Hence, preenlistment mental health might also be an important target for early screening and intervention (Nock et al., 2014). The strong association between mental health disorders and suicide-related behaviors suggests that military personnel who present with mental health issues should undergo a thorough risk assessment for self-harming behaviors while adhering to the principles of trauma-informed care.

## OPEN PRACTICES STATEMENT

Neither of the studies reported in this article was preregistered. We analyzed data that are not under our direct control; requests to access the data should be directed to Statistics Canada Research Data Centres (RDC). Statistics Canada.

## ORCID

Tamara L. Taillieu  <https://orcid.org/0000-0001-5856-8131>

## REFERENCES

- Afifi, T. O., Taillieu, T., Zamorski, M. A., Turner, S., Cheung, K., & Sareen, J. (2016). Association of child abuse exposure with suicidal ideation, suicide plan, and suicide attempts in military personnel and the general population in Canada. *JAMA Psychiatry, 73*(3), 229–238. <https://doi.org/10.1001/jamapsychiatry.2015.2732>
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Author.
- Belik, S. -L., Stein, M. B., Asmundson, G. J. G., & Sareen, J. (2009). Relation between traumatic events and suicide attempts in Canadian military personnel. *Canadian Journal of Psychiatry, 54*(2), 93–104. <https://doi.org/10.1177/070674370905400207>
- Bolton, E. E., Litz, B. T., Britt, T. W., Adler, A., & Roemer, L. (2001). Reports of prior exposure to potentially traumatic events and PTSD in troops poised for deployment. *Journal of Traumatic Stress, 14*(1), 249–256. <https://doi.org/10.1032/A:1007864305207>
- Bonanno, G. A., Mancini, A. D., Horton, J. L., Powell, T. M., LeardMann, C. A., Boyko, E. J., Wells, T. S., Hooper, T. I., Gackstetter, G. D., & Smith, T. C., for the Millennium Cohort Study Team. (2012). Trajectories of trauma symptoms and resilience in deployed U.S. military service members: Prospective cohort study. *The British Journal of Psychiatry, 200*(4), 317–323. <https://doi.org/10.1192/bjp.bp.111.096552>
- Bossarte, R. M., Know, K. L., Piegari, R., Altieri, J., Kemp, J., & Katz, I. R. (2012). Prevalence and correlates of suicidal ideation and attempts among active military and veteran participants in a national health survey. *American Journal of Public Health, 102*, S38–S40. <https://doi.org/10.2105/AJPH.2011.300487>
- Brailey, K., Vasterling, J. J., Proctor, S. P., Constans, J. I., & Friedman, M. J. (2007). PTSD symptoms, life events, and unit cohesion in U.S. soldiers: Baseline findings from the neurocognition deployment health study. *Journal of Traumatic Stress, 20*(4), 495–503. <https://doi.org/10.1002/jts.20234>
- Bryan, C. J., Bryan, A. O., Ray-Sannerud, B. N., Etienne, N., & Morrow, C. E. (2014). Suicide attempts before joining the military increase risk for suicide attempts and severity of suicidal ideation among military personnel and veterans. *Comprehensive Psychiatry, 55*(3), 534–541. <https://doi.org/10.1016/j.comppsy.2013.10.006>
- Bryan, C. J., McNaughton-Cassill, M., Osman, A., & Hernandez, A. M. (2013). The associations of physical and sexual assault with suicide risk in nonclinical military and undergraduate samples. *Suicide and Life-Threatening Behavior, 43*(2), 223–234. <https://doi.org/10.1111/sltb.12011>
- Bush, N. E., Reger, M. A., Luxton, D. D., Skopp, N. A., Kinn, J., Smolenski, D., & Gahm, G. A. (2013). Suicides and suicide attempts in the U.S. military, 2008–2010. *Suicide and Life-Threatening Behavior, 43*(3), 262–273. <https://doi.org/10.1111/sltb.12012>
- Carroll, T. D., Currier, J. M., McCormick, W. H., & Drescher, K. D. (2017). Adverse childhood experiences and risk for suicidal behavior in male Iraq and Afghanistan veterans seeking PTSD treatment. *Psychological Trauma: Theory, Research, Practice, and Policy, 9*(5), 583–586. <https://doi.org/10.1037/tra0000250>
- Clancy, C. P., Graybeal, A., Tompson, W. P., Badgett, K. S., Feldman, M. E., Calhoun, P. S., Erkalni, A., Hertzberg, M. A., & Beckham, J. C. (2006). Lifetime trauma exposures in veterans with military-related posttraumatic stress disorder: Association with current symptomatology. *Journal of Clinical Psychiatry, 67*(9), 1346–1353. <https://doi.org/10.4088/jcp.v67n0904>
- Cox, D. W., Ghahramanlou-Holloway, M., Szeto, E. H., Greene, F. N., Engel, C., Wynn, G. H., Bradley, J., & Grammer, G. (2011). Gender differences on documented trauma histories: Inpatients admitted to a military psychiatric unit for suicide-related thoughts or behaviors. *Journal of Nervous and Mental Disease, 199*(3), 183–190. <https://doi.org/10.1097/NMD.0b013e31820c71c9>
- Dedert, E. A., Green, K. T., Calhoun, P. S., Yoash-Gantz, R., Taber, K. H., Mumford, M. M., Tupler, L. A., Morey, R. A., Marx, C. E., Weiner, R. D., & Beckham, J. C. (2009). Association of trauma exposure with psychiatric morbidity in military veterans who have served since September 11, 2001. *Journal of Psychiatric Research, 43*(9), 830–836. <https://doi.org/10.1016/j.jpsychires.2009.01.004>
- Hotopf, M., Hull, L., Fear, N. T., Browne, T., Horn, O., Iversen, A., Jones, M., Murphy, D., Bland, D., Earnshaw, M., Greenberg, N., Hacker Hughes, J., Tate, A. R., Dandeker, C., Rona, R., & Wessely, S. (2006). The health of U.K. military personnel who deployed to the 2003 Iraq war: A cohort study. *Lancet, 367*(9524), 1731–1741. [https://doi.org/10.1016/S0140-6736\(06\)68662-5](https://doi.org/10.1016/S0140-6736(06)68662-5)
- Kelly, M. L., Runnals, J., Pearson, M. R., Miller, M., Fairbank, J. A., & VA Mid-Atlantic MIRECC Women Veterans Workgroup, VA Mid-Atlantic MIRECC Registry Workgroup, & Brancu M. (2013). Alcohol use and trauma exposure among male and female veterans before, during, and after military service. *Drug and Alcohol Dependence, 133*(2), 615–624. <https://doi.org/10.1016/j.drugalcdep.2013.08.002>
- Kessler, R. C., Stein, M. B., Bliese, P. D., Bromet, E. J., Chiu, W. T., Cox, K. L., Colpe, L. J., Fullerton, C. S., Gilman, S. E., Gruber, M. J., Heeringa, S. G., Lewandowski-Romps, L., Millikan-Bell, A., Naifeh, J. A., Nock, M. K., Petukhova, M. V., Rosellini, A. J., Sampson, N. A., Shoenbaum, M., ... Ursano, R. J. (2015). Occupational differences in U.S. Army suicide rates. *Psychological Medicine, 45*(15), 3293–3304. <https://doi.org/10.1017/S0033291715001294>

- Krinsley, K. E., Gallagher, J. G., Weathers, F. W., Kutter, C. J., & Kaloupek, D. G. (2003). Consistency of retrospective reporting about exposure to traumatic events. *Journal of Traumatic Stress, 16*(4), 399–409. <https://doi.org/10.1023/A:1024474204233>
- LeardMann, C. A., Powell, T. M., Smith, T. C., Bell, M. R., Smith, B., Boyko, E. J., Hooper, T. I., Gackstetter, G. D., Ghamsary, M., & Hoge, C. W. (2013). Risk factors associated with suicide in current and former U.S. military personnel. *JAMA, 310*(5), 496–506. <https://doi.org/10.1001/jama.2013.65164>
- LeardMann, C. A., Smith, B., & Ryan, M. A. K. (2010). Do adverse childhood experiences increase the risk of postdeployment post-traumatic stress disorder in U.S. marines? *BMC Public Health, 10*, 437. <https://doi.org/10.1186/1471-2458-10-437>
- LeardMann, C. A., Smith, T. C., Smith, B., Wells, T. S., & Ryan, M. A. K. (2009). Baseline self reported functional health and vulnerability to posttraumatic stress disorder after combat deployment: Prospective U.S. military cohort study. *British Medical Journal, 338*, b1273. <https://doi.org/10.1136/bmj.b1273>
- Lemaire, C. M., & Graham, D. P. (2011). Factors associated with suicidal ideation in OEF/OIF veterans. *Journal of Affective Disorders, 130*, 231–238. <https://doi.org/10.1016/j.jad.2010.10.021>
- Maguen, S., Cohen, B., Ren, L., Bosch, J., Kimerling, R., & Seal, K. (2012). Gender differences in military sexual trauma and mental health diagnoses among Iraq and Afghanistan veterans with post-traumatic stress disorder. *Women's Health Issues, 22*(1), e61–e66. <https://doi.org/10.1016/j.whi.2011.07.010>
- Maguen, S., Luxton, D. D., Skopp, N. A., Gahm, G. A., Reger, M. A., Metzler, T. J., & Marmar, C. R. (2011). Killing in combat, mental health symptoms, and suicidal ideations in Iraq veterans. *Journal of Anxiety Disorders, 25*(4), 563–567. <https://doi.org/10.1016/j.janxdis.2011.01.003>
- Nelson, C., St. Cyr, K., Corbett, B., Hurley, E., Gifford, S., Elhai, J. D., & Richardson, J. D. (2011). Predictors of posttraumatic stress disorder, depression, and suicidal ideation among Canadian Forces personnel in a national Canadian military health survey. *Journal of Psychiatric Research, 45*(11), 1483–1488. <https://doi.org/10.1016/j.jpsychires.2011.06.014>
- Nock, M. K., Stein, M. B., Heeringa, S. G., Ursano, R. J., Colpe, L. J., Fullerton, C. S., Hwang, I., Naifeh, J. A., Sampson, N. A., Schoenbaum, M., Zaslavsky, A. M., & Kessler, R. C. (2014). Prevalence and correlates of suicidal behavior among soldiers: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *JAMA Psychiatry, 71*(5), 514–522. <https://doi.org/10.1001/jamapsychiatry.2014.30>
- Nock, M. K., Ursano, R. J., Heeringa, S. G., Stein, M. B., Jain, S., Raman, R., Sun, X., Chiu, W. T., Colpe, L. J., Fullerton, C. S., Gilman, S. E., Hwang, I., Naifeh, J. A., Rosellini, A. J., Sampson, N. A., Schoenbaum, M., Zaslavsky, A. M., & Kessler, R. C. (2015). Mental disorders, comorbidity, and pre-enlistment suicidal behavior among new soldiers in the U.S. Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Suicide and Life-Threatening Behavior, 45*(5), 588–599. <https://doi.org/10.1111/sltb.12153>
- Pruitt, L. D., Smolenski, D. J., Bush, N. E., Tucker, J., Issa, F., Hoyt, T. V., & Reger, M. A. (2019). Suicide in the military: Understanding rates and risk factors across the United States' Armed Forces. *Military Medicine, 184*(3/4), 432–437. <https://doi.org/10.1093/milmed/usy296>
- Reger, M. A., Smolenski, D. J., Skopp, N. A., Metzger-Abamukang, M. J., Kang, H. K., Bullman Perdue, S., & T, A., Gahm, G. A. (2015). Risk of suicide among U.S. military service members following Operation Enduring Freedom or Operation Iraqi Freedom deployment and separation from the U.S. military. *JAMA Psychiatry, 72*(6), 561–569. <https://doi.org/10.1001/jamapsychiatry.2014.3195>
- Sareen, J., Afifi, T. O., Taillieu, T., Cheung, K., Turner, S., Stein, M. B., & Zamorski, M. A. (2017). Deployment-related traumatic events and suicidal behaviours in a nationally representative sample of Canadian Armed Forces personnel. *Canadian Journal of Psychiatry, 62*(11), 795–804. <https://doi.org/10.1177/0706743717699174>
- Sareen, J., Afifi, T. O., Taillieu, T., Cheung, K., Turner, S., Bolton, S. -L., Erickson, J., Stein, M. B., Fikretoglu, D., & Zamorski, M. A. (2016). Trends in suicidal behaviour and use of mental health services in Canadian military and civilian populations. *Canadian Medical Association Journal, 188*(11), E261–E267. <https://doi.org/10.1503/cmaj.151047>
- Schoenbaum, M., Kessler, R. C., Gilman, S. E., Colpe, L. J., Heeringa, S. G., Stein, M. B., Ursano, R. J., & Cox, K. L. (2014). Predictors of suicide and accident death in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS): Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *JAMA Psychiatry, 71*(5), 493–503. <https://doi.org/10.1001/jamapsychiatry.2013.4417>
- Stein, M. B., Campbell-Sills, L., Ursano, R. J., Rosellini, A. J., Colpe, L. J., He, F., Heeringa, S. G., Nock, M. K., Sampson, N. A., Schoenbaum, M., Sun, X., Jain, S., & Kessler, R. C. (2018). Childhood maltreatment and lifetime suicidal behaviors among new soldiers in the U.S. Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Journal of Clinical Psychiatry, 79*(2), 16m10900. <https://doi.org/10.4088/JCP.16m10900>
- Street, A. E., Vogt, D., & Dutra, L. (2009). A new generation of women veterans: Stressors faced by women deployed to Iraq and Afghanistan. *Clinical Psychology Review, 29*(8), 685–694. <https://doi.org/10.1016/j.cpr.2009.08.007>
- Tolin, D. F., & Foa, E. B. (2006). Sex differences in trauma and post-traumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin, 132*(6), 959–992. <https://doi.org/10.1037/0033-2909.132.6.959>
- Ursano, R. J., Heeringa, S. G., Stein, M. B., Jain, S., Raman, R., Sun, X., Chiu, W. T., Colpe, L. J., Fullerton, C. S., Gilman, S. E., Hwang, I., Naifeh, J. A., Nock, M. K., Rosellini, A. J., Sampson, N. A., Schoenbaum, M., Zaslavsky, A. M., & Kessler, R. C. (2015). Prevalence and correlates of suicidal behavior among new soldiers in the U.S. Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Depression and Anxiety, 32*(1), 3–12. <https://doi.org/10.1002/da.22317>
- Walsh, C. A., MacMillan, H. L., Trocmé, N., Jamieson, E., & Boyle, M. H. (2008). Measurement of victimization in adolescence: Development and validation of the Childhood Experiences of Violence Questionnaire. *Child Abuse & Neglect, 32*(11), 1037–1057. <https://doi.org/10.1016/j.chiabu.2008.05.003>
- World Health Organization. (1997). Composite International Diagnostic Interview (Version 2.1). Author.
- Youssef, N. A., Green, K. T., Dedert, E. A., Hertzberg, J. S., Calhoun, P. S., & Dennis, M. F. (2013). Exploration of the influence of childhood trauma, combat exposure, and the resilience construct on depression and suicidal ideation among U.S. Iraq/Afghanistan

era military personnel and veterans. *Archives of Suicide Research*, 17(2), 106–122. <https://doi.org/10.1080/13811118.2013.776445>

Zamorski, M. A., Bennett, R., Boulos, D., Garber, B. G., Jetly, R., & Sareen, J. (2016). The 2013 Canadian Mental Forces Mental Health Survey: Background and methods. *Canadian Journal of Psychiatry*, 61(Suppl 1), 10S–25S. <https://doi.org/10.1177/0706743716632731>

Zinzow, H. M., Grubaugh, A. L., Monnier, J., Suffoletta-Maierle, S., & Frueh, B. C. (2007). Trauma among female veterans: A critical review. *Trauma, Violence, & Abuse*, 8(4), 384–400. <https://doi.org/10.1177/1524838007307295>

**How to cite this article:** Taillieu, T. L., Sareen, J., & Afifi, T. O. (2022). Associations among child abuse history, deployment-related traumatic events, mental disorders, and suicidal behaviors in Canadian Regular Force personnel. *Journal of Traumatic Stress*, 35, 1060–1071. <https://doi.org/10.1002/jts.22814>