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Course and Predictors of Major Depressive Disorder in the Canadian Armed Forces Members and Veterans Mental Health Follow-up Survey

Cours et Prédicteurs du Trouble de Dépression Majeure Dans l'Enquête de Suivi Sur la Santé Mentale Auprès Des Membres des Forces Armées Canadiennes et des ex-Militaires

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Abstract

Objectives: The present report is the first study of Canadian military personnel to use longitudinal survey data to identify factors that determine major depressive episodes (MDEs) over a period of 16 years.

Methods: The study used data from the Canadian Armed Forces Members and Veterans Mental Health Follow-up Survey (CAFVMHS) collected in 2018 ($n = 2,941$, response rate 68.7%) and linked baseline data from the same participants that were collected in 2002 when they were Canadian Regular Force members. The study used structured interviews to identify 5 common *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* mental disorders and collected demographic data, as well as information about traumatic experiences, childhood adversities, work stress, and potential resilience factors. Respondents were divided into 4 possible MDE courses: No Disorder, Remitting, New Onset, and Persistent/Recurrent. Relative risk ratios (RRRs) from multinomial regression models were used to evaluate determinants of these outcomes.

Results: A history of anxiety disorders and post-traumatic stress disorder (RRRs: 1.50 to 20.55), mental health service utilization (RRRs: 1.70 to 12.34), veteran status (RRRs: 1.64 to 2.15), deployment-associated traumatic events (RRRs: 1.71 to 2.27), sexual traumas (RRRs: 1.91 to 2.93), other traumas (RRRs: 1.67 to 2.64), childhood adversities (RRRs: 1.39 to 1.97), avoidance coping (RRRs 1.09 to 1.49), higher frequency of religious attendance (RRRs: 1.54 to 1.61), and work stress (RRRs: 1.05 to 1.10) were associated with MDE courses in most analyses. Problem-focused coping (RRRs: 0.73 to 0.91) and social support (RRRs: 0.95 to 0.98) were associated with protection against MDEs.

Conclusions: The time periods following deployment and trauma exposure and during the transition from active duty to veteran status are particularly relevant for vulnerability to depression in military members. Interventions that enhance problem-focused coping and social support may be protective against MDEs in military members.

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Abrégé

Objectifs : Le présent rapport est la première étude du personnel militaire canadien à utiliser les données de l'enquête longitudinale pour identifier les facteurs qui déterminent les épisodes dépressifs majeurs sur une période de 16 ans.

Méthodes : L'étude a utilisé les données de l'Enquête de suivi sur la santé mentale auprès des membres des Forces armées canadiennes et des ex-militaires (ESSMFACM) recueillis en 2018 (n = 2 941, taux de réponse 68,7%), et lié les données de base des mêmes participants qui ont été recueillies en 2002 quand ils étaient membres des Forces canadiennes régulières. L'étude a utilisé des entrevues structurées pour identifier 5 troubles mentaux communs du DSM-IV, et recueilli des données démographiques, ainsi que de l'information sur les expériences traumatisantes, les adversités de l'enfance, le stress du travail et les facteurs de résilience potentiels. Les répondants étaient divisés entre quatre cours du TDM possibles: pas de trouble, rémission, nouvel épisode, et persistant/récurrent. Les rapports de risque relatif (RRR) des modèles de régression multinomiale ont servi à évaluer les déterminants de ces résultats.

Résultats : Des antécédents de troubles anxieux et de trouble de stress post-traumatique [RRR 1,50 – 20,55], l'utilisation des services de santé mentale [RRR 1,70 – 12,34], le statut d'ancien combattant [RRR 1,64 – 2,15], les événements traumatisants associés au déploiement [RRR 1,71 – 2,27], les traumas sexuels [RRR 1,91 – 2,93], d'autres traumas [RRR 1,67-2,64], les adversités de l'enfance [RRR 1,39 – 1,97], l'adaptation par l'évitement [RRR 1,09 – 1,49], une fréquence accrue de fréquentation religieuse [RRR 1,54 – 1,61] et le stress au travail [RRR 1,05 – 1,10] étaient associés au cours d'un épisode dépressif majeur dans la plupart des analyses. L'adaptation axée sur la résolution des problèmes [RRR 0,73 – 0,91] et le soutien social [RRR 0.95 – 0,98] étaient associés à la protection contre les épisodes dépressifs majeurs.

Conclusions : Les périodes de temps suivant le déploiement et l'expositions aux traumas et durant la transition entre le service actif et le statut d'ancien combattant sont particulièrement pertinentes pour la vulnérabilité à la dépression chez les militaires. L'identification de styles d'adaptation axés sur les problèmes et le soutien social comme étant protecteurs suggère des possibilités d'interventions thérapeutiques préventives.

Keywords

major depressive disorder, military, longitudinal study, armed forces, DSM-5, comorbidity, prevalence, veteran

Introduction

Major depressive disorder (MDD) has an estimated past-year prevalence of 4.7% in Canada.[1] The burden of MDD includes distress, functional impairment, and economic costs.[2] The prevalence of major depression in Canadian Forces (CF) personnel is higher than that in the general population. In the 2002 Canadian Community Health Survey Canadian Forces Supplement (CCHS-CFS) and the 2013 Canadian Forces Mental Health Survey, the past-year prevalence of major depression was 8.0%.[3] This figure is more striking when contrasted with full-time employed Canadian civilians, in which the past-year prevalence of major depression was 2.8%.[4] The past-year prevalence of major depression in CF personnel is higher that the prevalence of post-traumatic stress disorder (PTSD; 8.0% major depression vs. 5.3% PTSD),[5] and CF members with major depression or PTSD report similar levels of disability.[6] In a cross-sectional study of Canadian military personnel, those with major depression prior to deployment to Afghanistan had a postdeployment past-year prevalence of major depression of 48.9% (vs. 5.4% in those with no prior major depression) and a postdeployment past-year prevalence of PTSD of 12.8% (vs. 6.3% in those with no prior major depression).[7]

Although much is known about the prevalence and importance of major depression in the Canadian military, there remain significant limitations, including the lack of information on the course of major depression in this population and the lack of studies based on repeated assessment. The transition from active duty to veteran has been identified as a time of substantial risk for mental health concerns,[8] but longitudinal study before and after this transition has not been reported for the Canadian military. More than 40,000 CF members served in Afghanistan between 2001 and 2014, and this mission was particularly arduous, so the mental health impacts of this deployment merit particular attention.[9,10] The present study utilized the Canadian Armed Forces Members and Veterans Mental Health Follow-up Survey (CAFVMHS) to identify baseline (2002) and interim factors (2002 to 2018) that are associated with major depressive episode (MDE) courses in Canadian military personnel.

Methods

Sample

The CAFVMHS was a follow-up survey of CF personnel who were active duty members of the Regular Force in 2002 and had previously participated in the 2002 CCHS-CFS. There were 5,155 Regular Force active duty CF members surveyed in the 2002 CCHS-CFS. In 2018, Statistics Canada was able to contact and reinterview 2,941 individuals whose information was linked with their 2002 survey results, yielding a response rate of 68.7%. Attrition between the 2002 and 2018 surveys was extensively evaluated and it was determined that the 2018 sample closely resembled the original 2002 sample.[11] Additional details of the study methods are available elsewhere.[12]

Diagnostic Assessment

Trained Statistics Canada interviewers used the World Health Organization Composite International Diagnostic Interview at wave 1 (2002) and wave 2 (2018) to assess for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) MDEs, as well as PTSD, generalized anxiety disorder, panic disorder, and social phobia.[13] The latter 4 diagnoses were dichotomized into a single variable, "any anxiety disorder." The CIDI Short Form was used in 2002 to assess past-year alcohol dependence.[14] The *DSM-IV* diagnoses were used in the 2018 survey to be consistent with the 2002 CCHS-CFS. Lifetime *DSM-IV* MDEs assessed in 2002 and MDEs occurring in the interval between 2002 and 2018, assessed in 2018, were used to determine depression courses. The 4 possible courses were: "No disorder" indicating no lifetime MDEs when assessed in 2002 or 2018; "Remitting" indicating lifetime MDEs when assessed in 2002, but no MDEs between 2002 and 2018; "New onset" indicating no lifetime MDEs when assessed in 2002, but having had MDEs between 2002 and 2018; "Persistent/recurrent" indicating lifetime MDEs when assessed in 2002 and MDEs between 2002 and 2018. Participants who had incomplete diagnostic information for MDEs in either 2002 or 2018 were excluded.

Other Assessed Variables

Trauma exposure. In 2002, lifetime exposure to trauma was assessed using a list of 28 traumatic events. Exposure to the same 28 events between 2002 and 2018 was assessed in 2018.[15] Because neither the CCHS 1.2 nor the CAVMHS inquired whether these events occurred exclusively while the member was on deployment, a "deployment associated traumas" category was defined empirically based on which traumatic experiences were statistically associated with deployment history. Regression analyses were conducted between each traumatic event and lifetime deployment status at 2002, and those events that were significantly ($P < 0.01$) associated with deployment history were called "deployment-associated traumatic events." A dichotomous variable denoting exposure to one or more deployment-associated traumas, versus no exposure, was created. The remaining events were categorized as sexual trauma (sexual assault or unwanted sexual touching/grabbing) and other traumas (12 items such as being in a serious motor vehicle accident or being beaten by a spouse or romantic partner).

Childhood adversity. Participants answered questions about exposure to adversities before age 18 years as follows: (1) "Did you spend two weeks or more in the hospital?" (2) "Did your parents get a divorce or separate?" (3) "Did your father or mother not have a job for a long time when they wanted to work?" (4) "Did either of your parents drink or use drugs so often that it caused problems for the family?" (5) "Were you apprehended by a child protection service?" (6) "As a child, were you ever badly beaten by your parents or the people who raised you?" (7) "When you were a child, did you ever witness serious physical fights at home, like your father beating up your mother?" (8) Childhood sexual abuse was assessed using 2 questions: "We define sexual assault as anyone forcing you or attempting to force you into any unwanted sexual activity, by threatening you, holding you down, or hurting you in some way. Has this ever happened to you?" and "Has anyone ever touched you against your will in any sexual way? By this I mean unwanted touching or grabbing, to kissing or fondling?" The childhood adversity questions were used to generate a dichotomous variable denoting the reporting of one or more of the 8 childhood adversities (vs. none), as well as a variable reflecting the total number of adversities. Previous cross-sectional analyses with these items found an association with mood and anxiety disorders in active military personnel.[16]

Social support and social network size. Participants completed the Medical Outcomes Study Social Support Survey in both the 2002 and 2018 surveys.[17] This survey yields a continuous measure of social support. Social network size was assessed in 2002 using a single survey question: "About how many close friends and close relatives do you have, that is, people you feel at ease with and can talk to about what is on your mind?"

Coping mechanisms. At both survey time points, participants were asked about their use of strategies for coping with life difficulties. The item content was compiled by Statistics Canada from previously developed coping measures including the COPE Scale, the Ways of Coping Questionnaire, and the Coping Strategy Indicator.[18] Factor analysis of the coping items yielded a 3 factor solution including problem-focused coping (4 items, e.g., trying to solve the problem), avoidance coping (5 items, e.g., relaxing by doing something enjoyable), and self-medication (2 items, e.g., feeling better by drinking alcohol).[19] Previous research with this scale in a military sample found associations in the anticipated direction with mental disorders and distress symptoms.[19] Internal reliabilities were as follows: problem-focused coping $\alpha = 0.95$, avoidance $\alpha = 0.91$, self-medication $\alpha = 0.92$.

Work stress. A 12-item version of the Job Content Questionnaire was used to measure perceived work stress.[20] Each question was answered on a 5-point scale, and the scores were summed to create a continuous measure of work stress. Work stress was assessed in participants who were currently employed at the time of each assessment. Previous work with this scale has demonstrated an association between work stress and mood and anxiety disorders.[21]

Demographic data. Sociodemographic data (i.e., age, sex, ethnicity, marital status, household income, education) and CF service data, including military rank, length of service, and environment (land, sea, air), were gathered in the 2002

CCHS-CFS survey. In 2018, participants reported whether they were still serving with the CF or were veterans.

Mental health service use. Participants reported their use of mental health service providers such as primary care providers, psychiatrists, psychologists, and counselors. The answers to these questions were dichotomized reflecting any lifetime or 2002 to 2018 interval use of mental health services.

Religious attendance. Participants reported their frequency of religious attendance. "Not counting events, such as weddings or funerals, during the last 12 months, how often did you participate in religious activities or attend religious services or meetings?" The answers were dichotomized as less than once per month versus monthly or more often.

Analyses

Statistical analyses were conducted in STATA MP. Sampling weights were used to make the survey data representative of active CF Regular Force personnel in 2002. Variance estimates were calculated using bootstrap weights. Because the sampling weights included adjustments for nonresponse and "out of scope" (e.g., mortality) values and due to the lack of substantial differences between responders and nonresponders, imputation was not used for missing data. Weighted cross-tabulations were used to examine the prevalence of each baseline and interim variable among the 4 MDE courses. Statistical analyses based on the 4 MDE courses utilized multinomial regressions to calculate relative risk ratios (RRRs) for the 4 outcomes, using the "No disorder" group as the reference category (RRR = 1.00). A second set of multinomial regression models examined the factors associated with a "Persistent/recurrent" course of MDE compared with a "Remitting" course (reference group: "Remitting").

An initial set of regression analyses examined the RRRs for sociodemographic variables to assess their association with depression outcomes. All subsequent analyses were adjusted for these sociodemographic factors. Analyses are presented based on the year of data collection (2002 or 2018). Anticipating that there may be an association between traumatic events and MDE and that this association could be explained on the basis of traumatic events causing PTSD, a final set of analyses examined the association between traumatic events and depression while adjusting for a lifetime diagnosis of PTSD.

Results

The relationship between demographic variables and depression outcomes is shown in Table 1. A remitting course of major depression was observed in 7.1%, new onset was observed in 23.5%, persistent/recurrent depression was seen in 9.4%, and 60.1% never had MDEs. Female sex, younger age, being widowed, separated or divorced, lower education and lower income, being a junior noncommissioned member, and serving with the army or navy (vs. air force) showed significant associations with remitting, new onset, and persistent/recurrent depression in comparison with the no disorder group. Female sex and younger age were significantly associated with persistent depression in comparison with remitting depression.

Table 2 displays the relationship between 2002 survey variables and major depression courses, adjusting for demographic variables. Lifetime history of any anxiety disorder showed a large, consistent association with remitting, new onset, and persistent/recurrent depression in comparison with no lifetime depression. Other variables that were positively associated with remitting, new onset, or persistent depression in comparison with no lifetime depression included traumatic experiences, childhood adverse experiences, mental health service utilization, religious attendance, avoidance coping, self-medication, and work stress. Problem focused coping, social support, and social network size were associated with reduced risk. A similar pattern of associations was observed for persistent/recurrent depression in comparison with remitting depression, although the number of significant associations was smaller. A lifetime history of deployment prior to 2002 did not show a significant association with depression course.

Table 3 displays the relationship between 2018 survey variables and depression courses, adjusted for demographic variables. Deployment between 2002 and 2018 was associated with new onset depression in comparison to no lifetime depression. Deployment was inversely associated with persistent/recurrent depression and remitting depression. Any anxiety disorder and any mental health treatment seeking between 2002 and 2018 were robustly associated with remitting, new onset, and persistent/recurrent depression outcomes in comparison to no lifetime depression. Alcohol dependence between 2002 and 2018 was strongly associated with new onset and persistent/recurrent depression in comparison to no lifetime depression. Other significant associations with depression outcomes versus no lifetime depression included several traumatic experience and number of traumatic experiences between 2002 and 2018, avoidance coping, and work stress. Problem-focused coping and social support were inversely associated with new onset and persistent/recurrent depression in comparison to no lifetime depression. Problem-focused coping and social support were inversely associated with persistent/recurrent depression in comparison with remitting depression.

Tables 4 and 5 show the relationship between trauma and depression course adjusting for demographic variables and lifetime PTSD. The pattern of results is similar to the results that were unadjusted for PTSD. However, most RRRs became smaller and some no longer reached statistical significance.

Table 1. Sociodemographic and Military Demographic Variables and the Course of Major Depressive Episodes in Canadian Force Members between 2002 and 2018.

	No lifetime depression in 2002 or SLI (No disorder)	Lifetime depression in 2002—no depression SLI (Remitting)		No lifetime depression in 2002—depression SLI (New onset)		Lifetime depression in 2002—depression SLI (Persistent/Recurrent)		Persistent depression (Ref: Remitting)
	%	%	RRR (95% CI)	%	RRR (95% CI)	%	RRR (95% CI)	RRR (95% CI)
Sex								
Male	90.2	86.5	1.00	86.3	1.00	76.8	1.00	1.00
Female	9.8	13.5	**1.44* (1.00 to 2.06)**	13.8	**1.46*** (1.20 to 1.78)**	23.2	**2.78*** (2.12 to 3.64)**	**1.94*** (1.30 to 2.88)**
Race/ethnicity								
White	95.8	97.8	1.00	93.7	1.00	93.5	1.00	1.00
Non-White	4.2	2.2	0.51 (0.17 to 1.56)	6.3	1.52 (0.93 to 2.49)	6.5	1.58 (0.82 to 3.07)	3.09 (0.90 to 10.57)
Marital status in 2002								
Married/common-law	75.3	65.0	1.00	69.9	1.00	58.2	1.00	1.00
Widowed, separated, or divorced	5.7	17.2	**3.48*** (2.24 to 5.41)**	7.6	1.43 (0.96 to 2.14)	17.5	**3.95*** (2.54 to 6.15)**	1.13 (0.64 to 2.01)
Single, never married	19.0	17.8	1.08 (0.71 to 1.66)	22.5	1.27 (0.97 to 1.66)	24.3	**1.65** (1.14 to 2.39)**	1.52 (0.91 to 2.55)
Household income								
CAN$49,999 or less	18.0	15.2	0.82 (0.50 to 1.33)	23.8	**1.42* (1.07 to 1.88)**	23.5	1.40 (0.96 to 2.03)	1.71 (0.97 to 3.02)
CAN$50,000 or more	82.0	84.8	1.00	76.3	1.00	76.5	1.00	1.00
Education in 2002								
Secondary school grad or less	39.1	41.1	1.09 (0.78 to 1.51)	47.1	**1.39** (1.12 to 1.73)**	42.4	1.15 (0.86 to 1.54)	1.06 (0.69 to 1.62)
Some postsecondary or higher	60.9	58.9	1.00	52.9	1.00	57.6	1.00	1.00
Rank in 2002								
Junior noncommissioned member	49.5	53.6	**1.51* (1.03 to 2.22)**	70.1	**2.71*** (2.09 to 3.50)**	65.9	**2.05*** (1.45 to 2.89)**	1.36 (0.82 to 2.24)
Senior noncommissioned member	24.5	27.8	**1.59* (1.09 to 2.32)**	16.3	1.27 (0.96 to 1.70)	17.2	1.08 (0.74 to 1.59)	0.68 (0.40 to 1.17)
Officer grouping	26.1	18.7	1.00	13.6	1.00	16.9	1.00	1.00
Environment in 2002								
Land	45.0	53.0	**1.47* (1.02 to 2.11)**	56.9	**1.84*** (1.45 to 2.32)**	55.2	**1.57** (1.11 to 2.21)**	1.07 (0.67 to 1.70)
Air	35.8	28.7	1.00	24.6	1.00	27.9	1.00	1.00
Sea	19.2	18.3	1.19 (0.75 to 1.88)	18.6	**1.41* (1.05 to 1.89)**	16.9	1.13 (0.74 to 1.72)	0.95 (0.54 to 1.67)
	Mean (*SE*)	Mean (*SE*)	RRR (95% CI)	Mean (*SE*)	RRR (95% CI)	Mean (*SE*)	RRR (95% CI)	RRR (95% CI)
Age at baseline	36.3 (0.20)	37.7 (0.57)	**1.03* (1.00 to 1.05)**	33.6 (0.31)	**0.96*** (0.94 to 0.97)**	35.5 (0.50)	0.99 (0.97 to 1.01)	**0.96** (0.94 to 0.99)**

Note. All variables were based on information collected in 2002. The first 3 columns of RRRs are referenced to the group that never had an MDE; the last column of RRRs is referenced to the group that had a lifetime MDE in 2002 but remitted (no MDE SLI). CI = confidence interval; MDE = major depressive episode; RRR = relative risk ratio; *SE* = standard error; SLI = since last interview (interval between 2002 and 2018). Bold font indicates statistical significance. *$P < 0.05$. **$P < 0.01$. ***$P < 0.001$.

Table 2. Time 1 Variables and the Course of Major Depressive Episodes between 2002 and 2018, Adjusted for Sociodemographic and Military Demographic Factors.

	Lifetime depression in 2002—no depression SLI (Remitting)	No lifetime depression in 2002—depression SLI (New onset)	Lifetime depression in 2002—depression SLI (Persistent/Recurrent)	Persistent depression (Ref: Remitting)
	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Lifetime history of any anxiety disorder in 2002				
No	1.00	1.00	1.00	1.00
Yes	**6.03*** (4.09 to 8.90)**	**2.40*** (1.79 to 3.22)**	**12.74*** (9.19 to 17.66)**	**2.11*** (1.37 to 3.26)**
Past-year alcohol dependence (SF-probable)				
No	1.00	1.00	1.00	1.00
Yes	1.45 (0.51 to 4.15)	1.52 (0.82 to 2.84)	2.06 (0.96 to 4.42)	1.42 (0.43 to 4.68)
Ever deployed in 2002				
No	1.00	1.00	1.00	1.00
Yes	0.94 (0.63 to 1.39)	1.16 (0.92 to 1.47)	0.93 (0.67 to 1.29)	0.99 (0.61 to 1.62)
Any deployment-associated traumatic experience	1.31 (0.86 to 1.98)	**1.88*** (1.41 to 2.50)**	**2.24*** (1.52 to 3.31)**	**1.71* (1.01 to 2.92)**
Combat	1.05 (0.70 to 1.58)	**1.47** (1.14 to 1.91)**	**1.48* (1.02 to 2.14)**	1.41 (0.86 to 2.29)
Peacekeeping	0.97 (0.67 to 1.41)	**1.38** (1.09 to 1.74)**	1.10 (0.77 to 1.57)	1.12 (0.71 to 1.78)
Unarmed civilian in war zone	1.15 (0.51 to 2.58)	1.32 (0.82 to 2.10)	1.15 (0.60 to 2.19)	1.00 (0.39 to 2.59)
Chemical exposure	1.24 (0.81 to 1.88)	**1.65*** (1.28 to 2.15)**	**1.59** (1.13 to 2.25)**	1.28 (0.79 to 2.10)
Life-threatening accident	1.15 (0.74 to 1.78)	**1.50** (1.14 to 1.97)**	**1.75** (1.16 to 2.66)**	1.52 (0.88 to 2.64)
Natural disaster	0.76 (0.49 to 1.20)	1.05 (0.80 to 1.37)	0.86 (0.59 to 1.25)	1.13 (0.65 to 1.94)
Man-made disaster	1.07 (0.62 to 1.84)	**1.74*** (1.27 to 2.41)**	**1.51* (1.02 to 2.25)**	1.42 (0.76 to 2.65)
Mugged	1.07 (0.69 to 1.66)	**1.29 (0.99 to 1.70)**	**1.84*** (1.29 to 2.62)**	**1.72* (1.03 to 2.88)**
Witnessed death	1.15 (0.82 to 1.62)	**1.57*** (1.27 to 1.96)**	**2.21*** (1.60 to 3.05)**	**1.91** (1.22 to 2.99)**
Accidently caused injury	—	—	**—**	—
Witnessed atrocities	1.52 (0.96 to 2.41)	**1.83*** (1.33 to 2.51)**	**2.43*** (1.66 to 3.56)**	1.60 (0.94 to 2.74)
Other deployment associated trauma	0.76 (0.35 to 1.65)	**1.82** (1.22 to 2.73)**	**2.07** (1.29 to 3.34)**	**2.73* (1.18 to 6.31)**
Sexual trauma	**2.93*** (1.79 to 4.81)**	**1.93*** (1.39 to 2.69)**	**2.91*** (1.87 to 4.52)**	0.99 (0.55 to 1.78)
Other traumatic experience	**1.82*** (1.26 to 2.63)**	**1.67*** (1.31 to 2.14)**	**2.63*** (1.81 to 3.82)**	1.44 (0.88 to 2.37)
Any adverse childhood experience	**1.23 (0.86 to 1.74)**	1.39** (1.10 to 1.76)	1.97*** (1.43 to 2.72)	1.61* (1.04 to 2.51)
Frequency of religious attendance in 2002				
Less than once per month	1.00	1.00	1.00	1.00
Once per month or more	1.09 (0.71 to 1.68)	**1.61*** (1.25 to 2.09)**	**1.54* (1.04 to 2.29)**	1.41 (0.81 to 2.45)
Lifetime history of mental health service use				
No	1.00	1.00	1.00	1.00
Yes	**9.92*** (6.88 to 14.29)**	**1.70*** (1.35 to 2.13)**	**9.70*** (6.54 to 14.38)**	0.98 (0.60 to 1.60)
Number of lifetime traumatic experiences before 2002	**1.06* (1.01 to 1.12)**	**1.15*** (1.10 to 1.19)**	**1.20*** (1.14 to 1.25)**	**1.13*** (1.06 to 1.20)**
Number of adverse childhood experiences	1.22** (1.06 to 1.39)	1.19*** (1.09 to 1.30)	1.37*** (1.23 to 1.52)	**1.12 (0.96 to 1.31)**
Coping style in 2002				

(continued)

Table 2. (continued)

	Lifetime depression in 2002—no depression SLI (Remitting)	No lifetime depression in 2002—depression SLI (New onset)	Lifetime depression in 2002—depression SLI (Persistent/Recurrent)	Persistent depression (Ref: Remitting)
	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Problem-focused	**0.91* (0.83 to 0.99)**	0.97 (0.91 to 1.04)	**0.83*** (0.77 to 0.90)**	0.92 (0.83 to 1.01)
Avoidance	**1.30*** (1.22 to 1.40)**	**1.09*** (1.04 to 1.13)**	**1.46*** (1.36 to 1.57)**	**1.12* (1.02 to 1.23)**
Self-medication	**1.22*** (1.09 to 1.37)**	**1.14** (1.05 to 1.24)**	**1.32*** (1.19 to 1.46)**	1.08 (0.94 to 1.24)
Level of social support in 2002	0.99 (0.98 to 1.01)	1.00 (0.99 to 1.00)	**0.97*** (0.96 to 0.98)**	**0.98** (0.96 to 0.99)**
Social network size in 2002	**0.96* (0.94 to 0.99)**	0.99 (0.97 to 1.00)	**0.92*** (0.88 to 0.96)**	0.96 (0.91 to 1.00)
Work stress score in 2002	**1.05** (1.02 to 1.08)**	1.01 (0.99 to 1.03)	**1.10*** (1.06 to 1.15)**	**1.05* (1.00 to 1.10)**

Note. Time 1 variables were all derived from information collected in 2002. The first 3 columns of RRRs are referenced to the group of participants that never had an MDE; the last column of RRRs is referenced to the group of participants that had a lifetime MDE in 2002 but remitted (no MDE SLI). All analyses are adjusted for age, sex, education, marital status, household income, ethnicity, military personnel type, and military environment. CI = confidence interval; MDE = major depressive episode; RRR = relative risk ratio; SLI = since last interview (interval between 2002 and 2018).
Bold font indicates statistical significance. *P < 0.05. **P < 0.01. ***P < 0.001.

Discussion

The present research constitutes a unique examination of the course of MDEs in a military sample over 16 years. Significant RRRs for depression outcomes were found for demographic factors, childhood adversities, deployment, traumatic events, transition to civilian life, religious attendance, lack of social support, and coping styles.

A previous survey found that major depression was more prevalent in CF Regular Force personnel who had deployed to Afghanistan versus those who had not (9.3% vs. 6.8%).[10] Similarly, studies of US military personnel have noted an association between deployment and depressive disorders.[22,23] Being deployed is a stressful experience involving prolonged duties in an uncertain and demanding environment and months of separation from family and nonmilitary friends. In the present analyses, deployment between 2002 and 2018 was significantly associated with new onset of MDE, but lifetime deployment assessed in 2002 was associated with a better course of major depression (see Table 3). This counterintuitive observation likely reflects that those with poorer mental health were less likely to be deployed. In contrast to the dichotomous deployment variable, deployment-associated traumas showed a more consistent association with the course of MDEs. Studies in other military populations have also found an association between deployment-associated traumas and major depression.[24,25] Deployment-associated traumas showed a substantial association with the course of depression but other forms of trauma (sexual trauma and other traumas) appeared to have a similar or greater strength of association (Tables 2 and 3). This draws attention to both unique and shared factors contributing to the course of major depression in a military sample versus a general sample of the population.

The CF members in the army or navy differed in risk for MDEs (in comparison to air force); army members had significant RRRs for MDEs in most analyses while navy members had 1 significant RRR for new onset of depression. The degree of exposure to traumatic events may partially explain this result.

A strong association between trauma and PTSD is an obvious expectation. While life stresses of a variety of types are known to be associated with major depression,[26,27] interpersonal and loss events are the ones most typically noted.[28] Because other anxiety disorders (which, in *DSM-IV* terms, includes PTSD) and traumas at both time points were robustly associated with depression outcomes in the present analyses, it suggests that the association of traumatic experiences and major depression might be mediated by the occurrence of PTSD, especially since it has been observed that PTSD and major depression have a number of overlapping symptoms.[29] When the association between traumatic experiences and depression outcomes was recalculated, adjusting for lifetime PTSD (see Tables 4 and 5), many of the observed RRRs were attenuated, but many remained significant, suggesting that a diagnosis of PTSD explains part of but not the whole association between trauma and depression.

The well-replicated finding of frequent *DSM-IV* mental disorder comorbidity with major depression is also evident in the present study.[30,31] The variable from both the 2002 and 2018 surveys (see Tables 2 and 3) that had the highest odds ratios for poorer depression outcome was a diagnosis of any anxiety disorder.

In most previous studies, religious practices have been found to be associated with protection against depression.[32,33] In the present study, a higher frequency of religious attendance in 2002 (once per month or more) was associated with increased relative risk of new-onset depression and persistent depression over the subsequent 16 years. It is possible that religious attendance is a risk factor for poorer depression outcome.[34] Alternatively, increased religious

Table 3. Time 2 Variables and the Course of Major Depressive Episodes between 2002 and 2018, Adjusted for Sociodemographic and Military Demographic Factors.

	Lifetime depression in 2002—no depression SLI (Remitting)	No lifetime depression in 2002—depression SLI (New onset)	Lifetime depression in 2002—depression SLI (Persistent/Recurrent)	Persistent depression (Ref: Remitting)
	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Deployed since 2002				
No	1.00	1.00	1.00	1.00
Yes	**0.64* (0.44 to 0.94)**	**1.41** (1.12 to 1.78)**	**0.58** (0.42 to 0.82)**	0.91 (0.57 to 1.44)
Current member status				
Active duty	1.00	1.00	1.00	1.00
Veteran	1.18 (0.79 to 1.75)	**1.64*** (1.28 to 2.11)**	**2.15*** (1.46 to 3.17)**	**1.83* (1.10 to 3.04)**
Any anxiety disorder since 2002				
No	1.00	1.00	1.00	1.00
Yes	**1.50* (1.00 to 2.25)**	**15.42*** (11.65 to 20.42)**	**20.55*** (14.05 to 30.06)**	**13.66*** (8.23 to 22.70)**
Alcohol dependence since 2002				
No	1.00	1.00	1.00	1.00
Yes	0.86 (0.27 to 2.76)	**4.41*** (2.67 to 7.30)**	**3.88*** (2.01 to 7.49)**	**4.49* (1.37 to 14.72)**
New deployment-associated traumatic experience				
No	1.00	1.00	1.00	1.00
Yes	0.88 (0.62 to 1.26)	**2.27*** (1.79 to 2.87)**	1.24 (0.90 to 1.71)	1.40 (0.89 to 2.20)
New sexual trauma				
No	1.00	1.00	1.00	1.00
Yes	2.25 (0.91 to 5.51)	**2.17*** (1.38 to 3.42)**	**2.21** (1.32 to 3.73)**	0.99 (0.40 to 2.42)
New other trauma type				
No	1.00	1.00	1.00	1.00
Yes	1.23 (0.88 to 1.71)	**2.15*** (1.72 to 2.69)**	**2.05*** (1.48 to 2.84)**	**1.67* (1.08 to 2.58)**
Recent consultation with professional for mental/emotional health				
No	1.00	1.00	1.00	1.00
Yes	**2.04*** (1.48 to 2.81)**	**10.63*** (7.96 to 14.20)**	**12.34*** (7.83 to 19.45)**	**6.05*** (3.55 to 10.33)**
Length of service	1.00 (0.97 to 1.03)	0.99 (0.97 to 1.01)	**0.94*** (0.92 to 0.97)**	**0.94*** (0.91 to 0.98)**
Number of traumatic events since 2002	0.98 (0.91 to 1.06)	**1.20*** (1.15 to 1.26)**	**1.15*** (1.08 to 1.23)**	**1.17*** (1.07 to 1.28)**
Number of traumatic experiences on deployment 2002 to 2018	0.94 (0.84 to 1.05)	**1.22*** (1.15 to 1.29)**	1.08 (0.98 to 1.18)	**1.15* (1.00 to 1.31)**
Coping style in 2018				
Problem-focused	0.97 (0.89 to 1.07)	**0.76*** (0.71 to 0.81)**	**0.73*** (0.67 to 0.78)**	**0.74*** (0.67 to 0.83)**
Avoidance	**1.10*** (1.04 to 1.17)**	**1.39*** (1.34 to 1.45)**	**1.49*** (1.40 to 1.58)**	**1.35*** (1.25 to 1.46)**
Self-medication	1.02 (0.91 to 1.14)	1.00 (0.93 to 1.09)	1.06 (0.95 to 1.18)	1.04 (0.90 to 1.19)
Social support in 2018	0.99 (0.97 to 1.01)	**0.96*** (0.94 to 0.97)**	**0.95*** (0.93 to 0.96)**	**0.96*** (0.93 to 0.98)**
Work stress score in 2018	1.02 (0.97 to 1.07)	**1.05*** (1.02 to 1.08)**	**1.06*** (1.02 to 1.11)**	1.04 (0.99 to 1.10)

Note. Time 2 variables were all derived from information collected in 2018. The first three columns of RRRs are referenced to the group that never had an MDE; the last column of RRRs is referenced to the group that had a lifetime MDE in 2002 but remitted (no MDE SLI). All analyses are adjusted for age, sex, education, marital status, household income, ethnicity, military personnel type, and military environment. CI = confidence interval; SLI = since last interview (interval between 2002 and 2018); RRR = relative risk ratio.
Bold font indicates statistical significance. *P < 0.05. ** P < 0.01. ***P < 0.001.

Table 4. Traumatic Experiences Reported at Time 1 and the Course of Major Depressive Episodes, Adjusted for Lifetime PTSD Diagnosis, Sociodemographic Factors, and Military Demographic Factors.

	Lifetime depression in 2002—no depression SLI [Remitting] RRR (95% CI)	No lifetime depression in 2002—depression SLI [New onset] RRR (95% CI)	Lifetime depression in 2002—depression SL (Persistent/Recurrent) RRR (95% CI)	Persistent depression (Ref: Remitting) RRR (95% CI)
Any deployment-associated traumatic experience	1.25 (0.82 to 1.91)	**1.54** (1.14 to 2.08)**	**1.67* (1.10 to 2.52)**	1.33 (0.77 to 2.30)
Sexual trauma	**2.75*** (1.67 to 4.54)**	1.33 (0.90 to 1.96)	1.61 (0.95 to 2.71)	0.58 (0.30 to 1.13)
Other traumatic experience	**1.78** (1.22 to 2.59)**	**1.40* (1.07 to 1.83)**	**2.11*** (1.39 to 3.21)**	1.19 (0.69 to 2.05)
Number of lifetime traumatic experiences before 2002	1.05 (1.00 to 1.10)	**1.08*** (1.03 to 1.13)**	**1.11*** (1.05 to 1.18)**	1.06 (0.99 to 1.13)

Note. Time 1 variables were all derived from information collected in 2002. The first three columns of RRRs are referenced to the group that never had an MDE; the last column of RRRs is referenced to the group that had a lifetime MDE in 2002 but remitted (no episodes SLI). All analyses are adjusted for age, sex, education, marital status, household income, ethnicity, military personnel type, and military environment and lifetime PTSD (lifetime PTSD diagnosis in 2002 and/or PTSD diagnosis in the interval between 2002 and 2018). CI = confidence interval; MDE = major depressive episode; PTSD = post-traumatic stress disorder; RRR = relative risk ratio; SLI = since last interview (interval between 2002 and 2018).
Bold font indicates statistical significance. $^{*}P < 0.05$. $^{**}P < 0.01$. $^{***}P < 0.001$.

Table 5. Traumatic Experiences Reported at Time 2 and the Course of Major Depressive Episodes, Adjusted for Lifetime PTSD Diagnosis, Sociodemographic Factors, and Military Demographic Factors.

	Lifetime depression in 2002—no depression SLI (Remitting) RRR (95% CI)	No lifetime depression in 2002—depression SLI (New onset) RRR (95% CI)	Lifetime depression in 2002—depression SLI (Persistent/Recurrent) RRR (95% CI)	Persistent depression (Ref: Remitting) RRR (95% CI)
Any deployment-associated traumatic experience	0.82 (0.57 to 1.19)	**1.77*** (1.35 to 2.31)**	0.92 (0.65 to 1.32)	1.13 (0.70 to 1.82)
Sexual trauma	1.98 (0.85 to 4.59)	1.18 (0.74 to 1.90)	1.20 (0.68 to 2.09)	0.60 (0.24 to 1.52)
Other traumatic experience	1.12 (0.80 to 1.57)	**1.58*** (1.22 to 2.03)**	**1.38 (0.96 to 1.98)**	1.23 (0.77 to 1.97)
Number of lifetime traumatic experiences 2002 to 2018	0.95 (0.88 to 1.03)	**1.11*** (1.06 to 1.17)**	1.05 (0.97 to 1.12)	1.10 (0.99 to 1.21)

Note. Time 2 variables were all derived from information collected in 2018. The first three columns of RRRs are referenced to the group that never had an MDE; the last column of RRRs is referenced to the group that had a lifetime MDE in 2002 but remitted (no episodes SLI). All analyses are adjusted for age, sex, education, marital status, household income, ethnicity, military personnel type, and military environment and lifetime PTSD (lifetime PTSD diagnosis in 2002 and/or PTSD diagnosis in the interval between 2002 and 2018). CI = confidence interval; MDE = major depressive episode; PTSD = post-traumatic stress disorder; RRR = relative risk ratio; SLI = since last interview (interval between 2002 and 2018).
Bold font indicates statistical significance. $^{*}P < 0.05$. $^{**}P < 0.01$. $^{***}P < 0.001$.

attendance may represent a response to traumatizing or morally injurious events that may occur during military service.[35,36] This specific analysis examined religious attendance only, and other variables such as faith or religiosity may have a different relationship with depression outcome.

Avoidance coping assessed at either 2002 or 2018 was associated with remitting, new onset, and persistent/recurrent depression in comparison to no lifetime depression and was associated with persistent/recurrent depression in comparison to remitting depression. Self-medication, at the 2002 assessment only, was also associated with worse depression outcomes. In contrast, problem-focused coping was associated with better depression outcomes. These observations are in keeping with previous cross-sectional research in the Canadian military,[19] and the replicated observation that self-medication predicts not only future substance use disorders but also mood and anxiety disorders.[37] Although the present findings do not prove causality, they suggest that therapeutic strategies to enhance problem-focused coping and minimize avoidance and self-medication might reduce vulnerability to MDEs in the military context.

In comparison to CF members who remained on active duty in 2018, those who had become veterans between 2002 and 2018 had a higher relative risk of new onset or persistent/recurrent depression (see Table 3). The movement from active duty to veteran status has been identified as a stressful period due to such issues as difficulty securing subsequent employment, interpersonal challenges with civilian employers, distance from one's previous support network, and loss of soldier identity.[38] Depressive illness, particularly when long lasting or recurring, may also be a significant contributor toward the decision to medically release from the CF.

The present research identifies risk factors for MDE outcomes including new onset or persistence/recurrence in a military sample over an extended time frame of 16 years. Strengths of the study include a relatively large sample, a

good response rate with a group that was representative of actively serving CF Regular Force personnel in 2002, the use of structured diagnostic interviewing, and the lengthy follow-up. We note the following limitations: First, the findings are limited to CF Regular Force personnel; CF reservists were not interviewed. Second, a structured diagnostic interview conducted by a lay interviewer may not match the validity of diagnosis by an expert clinician. Third, the assessment of the course of MDEs was based on interviews conducted at only 2 time points, so a detailed examination of the course of depression was not possible and the temporal relationships among some variables are not certain. Fourth, childhood adversities were not comprehensively assessed, so the overall impact of childhood adversities may have been underestimated. Fifth, the classification of deployment-associated traumatic events was inferred based on a statistical association with deployment, and some misclassification of deployment-related events would have occurred. Sixth, there is modest evidence of the validity and reliability of the measures of coping styles used in the study. Seventh, the lifetime and interval prevalence of depressive episodes is affected by limitations in the accuracy of retrospective recall and is likely an underestimate of the true prevalence of MDEs. Finally, MDEs occurring among individuals with MDD and bipolar disorder have been counted without differentiation.

The present research was the first to examine the correlates of new onset, remitting, and persistent/recurrent depression courses in a nationally representative sample of actively serving CF members and veterans over a 16-year interval. Several findings, such as the apparently protective effects of problem-focused coping and social supports might be translated into strategies for reducing major depression in military samples. Although such interventions may be relevant at multiple points in time, deployment, trauma exposures, and transition from active duty to veteran status are risk periods that may warrant focused attention. Some of these strategies are present in the Road to Mental Readiness Program developed by the CF.[39] The impact of this program on the trajectory of major depression in members of the CF is a fertile area for future research. Questions regarding outcomes in military reservists, hypotheses regarding causal directions of some of the observed associations, and possible interactions among risk factors require additional study.

Authors' Note

Data can be accessed by application to the Canadian Research Data Centres. Statistics Canada collected and provided the data for academic purposes, but the analyses are the sole responsibility of the authors. The opinions expressed do not represent the views of Statistics Canada.

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References

1. Patten SB, Williams JV, Lavorato DH, Wang JL, McDonald K, Bulloch AG. Descriptive epidemiology of major depressive disorder in Canada in 2012. Can J Psychiatry. 2015;60(1):23-30.
2. Lam RW, McIntosh D, Wang J, et al. Canadian network for mood and anxiety treatments (CANMAT) 2016 clinical guidelines for the management of adults with major depressive disorder: section 1. Disease burden and principles of care. Can J Psychiatry. 2016;61(9):510-523.
3. Zamorski MA, Bennett RE, Rusu C, Weeks M, Boulos D, Garber BG. Prevalence of past-year mental disorders in the Canadian armed forces, 2002-2013. Can J Psychiatry. 2016;61(1 suppl):26S-35S.
4. Rusu C, Zamorski MA, Boulos D, Garber BG. Prevalence comparison of past-year mental disorders and suicidal behaviours in the Canadian armed forces and the Canadian general population. Can J Psychiatry. 2016;61(1 suppl):46S-55S.
5. Richardson JD, Thompson A, King L, et al. Comorbidity patterns of psychiatric conditions in Canadian armed forces personnel. Can J Psychiatry. 2019;64(7):501-510.
6. Weeks M, Garber BG, Zamorski MA. Disability and mental disorders in the Canadian armed forces. Can J Psychiatry. 2016;61(1 suppl):56S-63S.
7. Beliveau PJH, Sampasa-Kanyinga H, Colman I, Zamorski MA. Are personnel with a past history of mental disorders disproportionately vulnerable to the effects of deployment-related trauma? A cross-sectional study of Canadian military personnel. BMC Psychiatry. 2019;19(1):156.
8. Ainspan ND, Penk W, Kearney LK. Psychosocial approaches to improving the military-to-civilian transition process. Psychol Serv. 2018;15(2):129-134.
9. Zamorski MA, Boulos D. The impact of the military mission in Afghanistan on mental health in the Canadian armed forces: a

summary of research findings. Eur J Psychotraumatol. 2014;5(1):23822. doi:10.3402/ejpt.v5.23822

10. Boulos D, Zamorski MA. Contribution of the mission in Afghanistan to the burden of past-year mental disorders in Canadian armed forces personnel, 2013. Can J Psychiatry. 2016;61(1 suppl):64S-76S.
11. Bolton SL, Afifi TO, Mota N, et al. Predictors of attrition in a 16-year longitudinal follow-up in the Canadian military. Can J Psychiatry. Submitted.
12. Sareen J, Afifi TO, Bolton SL, et al. Rationale and methodology of the 2018 Canadian armed forces and veterans mental health 16-year follow up survey. Can J Psychiatry. Submitted.
13. Kessler RC, Abelson J, Demler O, et al. Clinical calibration of DSM-IV diagnoses in the world mental health (WMH) version of the world health organization (WHO) composite international diagnostic interview (WMH-CIDI). Int J Methods Psychiatr Res. 2004;13(2):122-139.
14. Kessler RC, Andrews G, Mroczek D, et al. The world health organization composite international diagnostic interview short-form (CIDI-SF). Int J Methods Psychiatr Res. 1998;7(4):171-185.
15. Belik SL, Stein MB, Asmundson GJG, Sareen J. Relation between traumatic events and suicide attempts in Canadian military personnel. Can J Psychiatry. 2009;54(2):93-104.
16. Sareen J, Henriksen CA, Bolton SL, Afifi TO, Stein MB, Asmundson GJ. Adverse childhood experiences in relation to mood and anxiety disorders in a population-based sample of active military personnel. Psychol Med. 2013;43(1):73-85.
17. Sherbourne CD, Stewart AL. The MOS social support survey. Soc Sci Med. 1991;32(6):705-714.
18. Statistics Canada. Canadian Forces 2002 Canadian Community Health Survey Supplement: Briefing Document. Ottawa (ON): Statistics Canada; 2003.
19. Mota NP, Medved M, Whitney D, Hiebert-Murphy D, Sareen J. Protective factors for mental disorders and psychological distress in female, compared with male, service members in a representative sample. Can J Psychiatry. 2013;58(10):570-578.
20. Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The job content questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. J Occup Health Psychol. 1998;3(4):322-355.
21. Wang JL. Perceived work stress, imbalance between work and family/personal lives, and mental disorders. Soc Psychiatry Psychiatr Epidemiol. 2006;41(7):541-548.
22. Gadermann AM, Engel CC, Naifeh JA, et al. Prevalence of DSM-IV major depression among U.S. military personnel: meta-analysis and simulation. Mil Med. 2012;177(8 suppl):47-59.
23. Levin-Rector A, Hourani LL, Van Dorn RA, et al. Predictors of posttraumatic stress disorder, anxiety disorders, depressive disorders, and any mental health condition among U.S. soldiers and marines, 2001–2011. J Trauma Stress. 2018;31(4):568-578.
24. Curry JF, Banigan MS, Van Voorhees EV, et al. Sex differences in predictors of recurrent major depression among current-era military veterans. Psychol Serv. Epub ahead of print 2019. doi:10.1037/ser0000397
25. Ikin JF, McKenzie DP, Gwini SM, et al. Major depression and depressive symptoms in Australian gulf war veterans 20 years after the gulf war. J Affect Disord. 2016;189:77-84.
26. Costello CG. Social factors associated with depression: a retrospective community study. Psychol Med. 1982;12(2):329-339.
27. Tennant C. Life events, stress and depression: a review of recent findings. Aust N Z J Psychiatry. 2002;36(2):173-182.
28. Brown GW, Harris T. Social Origins of Depression. London (UK): Tavistock Institute; 1978.
29. Hurlocker MC, Vidaurri DN, Cuccurullo LAJ, Maieritsch K, Franklin CL. Examining the latent structure mechanisms for comorbid posttraumatic stress disorder and major depressive disorder. J Affect Disord. 2018;229:477-482.
30. Blazer DG, Kessler RC, McGonagle KA, et al. The prevalence and distribution of major depression in a national community sample: the national comorbidity survey. Am J Psychiatry. 1994;151(7):979-986.
31. Kessler RC, Berglund P, Demler O, et al. The epidemiology of major depressive disorder: results from the national comorbidity survey replication (NCS-R). JAMA. 2003;289(23):3095-3105.
32. Sharma V, Marin DB, Koenig HK, et al. Religion, spirituality, and mental health of U.S. military veterans: results from the national health and resilience in veterans study. J Affect Disord. 2017;217:197-204.
33. Braam AW, Koenig HG. Religion, spirituality and depression in prospective studies: a systematic review. J Affect Disord. 2019;257:428-438.
34. Leurent B, Nazareth I, Bellón-Saameño J, et al. Spiritual and religious beliefs as risk factors for the onset of major depression: an international cohort study. Psychol Med. 2013;43(10):2109-2120.
35. Bryant-Davis T, Wong EC. Faith to move mountains: religious coping, spirituality, and interpersonal trauma recovery. Am Psychol. 2013;68(8):675-684.
36. Wansink B, Wansink CS. Are there atheists in foxholes? Combat intensity and religious behavior. J Relig Health. 2013;52(3):768-779.
37. Turner S, Mota N, Bolton J, Sareen J. Self-medication with alcohol or drugs for mood and anxiety disorders: a narrative review of the epidemiological literature. Depress Anxiety. 2018;35(9):851-860.
38. Mobbs MC, Bonanno GA. Beyond war and PTSD: the crucial role of transition stress in the lives of military veterans. Clin Psychol Rev. 2018;59:137-144.
39. Zamorski MA, Rusu C, Guest K, et al. Exposure to mental health training and education in Canadian armed forces personnel. J Mil Veteran Fam Heal. 2018;4(2):91-100.