

Suicidal Ideation, Plans, and Attempts Among Public Safety Personnel in Canada

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Abstract

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Substantial media attention has focused on suicide among Canadian Public Safety Personnel (PSP; e.g., correctional workers, dispatchers, firefighters, paramedics, police). The attention has raised significant concerns about the mental health impact of public safety service, as well as interest in the correlates for risk of suicide. There have only been two published studies assessing lifetime suicidal behaviors among Canadian PSP. The current study was designed to assess past-year and lifetime suicidal ideation, plans, and attempts amongst a large diverse sample of Canadian PSP. Estimates of suicidal ideation, plans, and attempts were derived from self-reported data from a nationally administered online survey. Participants included 5,148 PSP (33.4% women) grouped into six categories (i.e., Call Centre Operators/Dispatchers, Correctional Workers, Firefighters, Municipal/Provincial Police, Paramedics, Royal Canadian Mounted Police). Substantial proportions of participants reported past-year and lifetime suicidal ideation (10.1%, 27.8%), planning (4.1%, 13.3%), or attempts (0.4%, 4.6%). Women reported significantly more lifetime suicidal behaviors than men (ORs = 1.15 to 2.62). Significant differences were identified across PSP categories in reports of past-year and lifetime suicidal behaviors. The proportion of Canadian PSP reporting past-year and lifetime suicidal behaviors was substantial. The estimates for lifetime suicidal behaviors

appear consistent with or higher than previously published international PSP estimates, and higher than reports from the general population. Municipal/Provincial Police reported the lowest frequency for past-year and lifetime suicidal behaviors, whereas Correctional Workers and Paramedics reported the highest. The results provide initial evidence that substantial portions of diverse Canadian PSP experience suicidal behaviors, therein warranting additional resources and research.

KEYWORDS:

[suicide](#), [first responders](#), [Public Safety Personnel](#), [operational stress injuries](#), [mental health](#)

KEYWORDS:

[suicide](#), [premiers intervenants](#), [personnel de la sécurité publique](#), [blessures liées au stress opérationnel](#), [santé mentale](#)

In Canada, persons working as Correctional Workers (security and nonsecurity roles), Dispatchers, Firefighters, Paramedics, and Police Officers have been collectively described as Public Safety Personnel (PSP; Oliphant, 2016). Many PSP report clinically significant symptoms of one or more mental health disorders (e.g., posttraumatic stress disorder, major depressive disorder; (Berger et al., 2012; Carleton et al., 2017; Oliphant, 2016; Richardson, Darte, Grenier, English, & Sharpe, 2008), which may be due, in part, to frequent exposures to potentially traumatic events as a function of their work-related duties (Galatzer-Levy, Madan, Neylan, Henn-Haase, & Marmar, 2011; Komarovskaya et al., 2011). A preponderance of mental health disorders increases risk for death by suicide (Stanley, Hom, & Joiner, 2016), a concern of increasing focus for PSP leaders, advocacy groups, and researchers (Oliphant, 2016).

There are several factors related to death by suicide, including suicidal ideation, planning, and attempts (Nock et al., 2008; Sareen et al., 2016; Sareen et al., 2014). Persons with suicidal ideation are less likely to seek health care than other groups (Bruffaerts et al., 2011; Pagura, Fotti, Katz, Sareen, J, & the Swampy Cree Suicide Prevention Team, 2009). In addition, many PSP may perceive or experience stigma as a significant barrier to seeking help for mental health concerns (Corrigan, Druss, & Perlick, 2014; Halpern, Gurevich, Schwartz, & Brazeau, 2009; Henderson, Van Hasselt, Leduc, & Couwels, 2016; Karaffa & Koch, 2016). Understanding how common suicidal behaviors are in PSP populations may help to increase care-seeking by reducing stigma and increasing systemic interventions (e.g., additional skills training).

A recent systematic literature review examined the available international evidence on suicidality from 63 studies (i.e., ideation, attempts, fatalities) among police, firefighters, and paramedics across several countries (Stanley et al., 2016). Across all of the reviewed studies that assessed suicidal behaviors that serve as risk factors for death by suicide (i.e., ideation, planning, attempts; Nock et al., 2008; Sareen et al., 2016; Sareen et al., 2014), up to 47% of PSP reported lifetime suicidal ideation (Stanley et al., 2016). Estimates of prior suicide attempts ranged from 0.7% to 55%, based on self-report and record reviews (Stanley et al., 2016), which is too large a range for practical utility. Estimates of PSP who died by suicide varied substantially across the available studies, ranging from 11.7 to 32.9/100,000 per year, depending on timeframes and samples (Stanley et al., 2016). Current or past-year estimates were less available (Stanley et al., 2016). For police, current or past-year suicidal ideation estimates ranged from 7.4% to 8.8% (Chopko, Palmieri, & Facemire, 2014; Pienaar, Rothmann, & van de Vijver, 2007), but there were no data on past year suicide attempts. For paramedics, there was only one study identified as estimating current or past-year suicidal behaviors, and the results indicated estimates of 8.3% (“feeling life is not worth living”), 1.9% (“serious suicidal ideation”), and 0.4% (“suicide attempt”; Sterud, Hem, Lau, & Ekeberg, 2008). There were no studies identified as assessing current or past-year suicidal behaviors for firefighters or correctional workers.

Only two of the studies identified by the review involved Canadian data and both of those studies focused on deaths by suicide in policing samples (Stanley et al., 2016). The first assessed death by suicide with a small sample of Royal Canadian Mounted Police (RCMP; $n = 35$; (Loo, 1986) and posited a rate of 14.1 per 100,000. The second assessed death by suicide with a large sample of municipal police ($n = 4178$; (Mishara & Martin, 2012) and posited rates per 100,000 ranging from 6.4 to 30.5. Neither study assessed suicidal ideation, planning, or attempts.

For PSP, the risks for death by suicide may be exacerbated because they often have less fear of death (Van Orden et al., 2010), more compromised social supports (Van Orden et al., 2010), increased sleep disruptions (Bernert, Kim, Iwata, & Perlis, 2015; Vallieres, Azaiez, Moreau, LeBlanc, & Morin, 2014), and ready access to lethal means (Stanley et al., 2016). Despite the importance of reducing PSP death by suicide (Oliphant, 2016), and the aforementioned factors that may increase risk for PSP, there has been limited research conducted with Canadian PSP (Sareen et al.,

2016; Stanley et al., 2016). There is currently a dearth of even basic information (e.g., past-year and lifetime suicidal ideation, planning, attempts) derived from large diverse samples. The absence of such information hampers efforts to develop comprehensive programs for prevention, treatment, and research initiatives aimed at reducing suicidal behaviors amongst Canadian PSP. The current study was designed to provide initial estimates of past-year and lifetime suicidal thoughts, plans, and attempts amongst diverse Canadian PSP. The results were expected to inform whether more expansive and rigorous data collections appear justified.

Method

Procedure

Data were collected using a Web based self-reportsurvey made available to participants in English or French as part of a larger data collection, details of which are published elsewhere (i.e., University of Regina, 2017). The research followed established guidelines for Web based surveys (Ashbaugh, Herbert, Butler, & Brunet, 2010). Measure selection used a collaborative approach including the authors and representatives from the Public Safety Steering Committee (PSSC) of the Canadian Institute for Public Safety Research and Treatment (CIPSRT). The PSSC representatives include leadership from each of the Canadian Association of Chiefs of Police (CACP), the Canadian Association of Fire Chiefs (CAFC), the Canadian Association for Police Governance (CAPG), the Canadian Police Association (CPA), Correctional Service of Canada (CSC), the International Association of Firefighters (IAFF), the Paramedic Association of Canada (PAC), the Paramedic Chiefs of Canada (PCC), the Royal Canadian Mounted Police (RCMP), and the Union of Solicitor General Employees (USGE). The study was approved by the University Institutional Research Ethics Board (File 2016–107). The survey was available for voluntary participation from 09/01/2016 to 01/31/2017. Emails were sent to currently working PSP, including civilian members working for police and volunteer firefighters, to solicit participation and direct interested persons to a website with study details and a requirement to consent before proceeding.

Participants were all informed that if they were experiencing ongoing thoughts they would be better off dead, thoughts of self-harm, or thoughts of suicide, they should contact their Employee

Assistance Program or another qualified mental health professional for help. If immediate help was needed they were directed to a website with a list of crisis centers and to call 911 or their nearest emergency response agency. All participants were told to remember that they matter and there are people who want to help.

Data and Sample

The emails were sent by the PSSC as well as numerous provincial and municipal PSP agencies. The Canadian Minister of Public Safety and Emergency Preparedness provided a video invitation encouraging participation. Each of the national public safety organizations sent the invitation email to their provincial counterparts who were then asked to forward the invitation either directly to potential participants or to their municipal counterparts, who were then asked to invite potential participants. Several advocacy organizations also sent the invitation to their email distribution lists. The invitation was also made available through links on numerous social media outlets and websites. Accordingly, there was no way to accurately estimate the number of unique persons successfully invited for potential participation; however, there are approximately 250,000 Canadian PSP (Statistics Canada, 2011). A total of $n = 8,520$ began the survey and answered at least the first question (i.e., “Please indicate which category of First Responders or other Public Safety Personnel you feel best describes your current occupation”); however, $n = 5,148$ (60.4%) persons progressed far enough through the survey to be asked about suicide and then completed the sections on suicidal behaviors required to be included in the current analyses.

Outcome Measures

Past-year and lifetime suicidal ideation, plans, and attempts were assessed through a series of yes/no questions. The questions were intentionally aligned with precedent suicide items from Statistics Canada (Statistics Canada, 2013, 2016). Suicidal ideation was assessed by asking “have you ever contemplated suicide?”; “has this happened in the past 12 months?”; suicide plans were assessed by asking “have you ever made a serious plan to attempt suicide?”; “has this happened in the past 12 months?”; and suicide attempts were assessed by asking “have you ever attempted suicide?”; “did this happen in the past 12 months?”

Statistical Analyses

Participants were grouped into demographic categories (i.e., PSP category, sex, age, marital status, provincial region, ethnicity, education, years of service, urban/rural work location¹) for comparisons. To determine the representativeness of the sample, the demographic proportions for sex, age, and provincial region in the current sample were compared to data provided by Statistics Canada for PSP using the 2011 National Household Survey and the National Occupational Classification (NOC; Statistics Canada, 2011). Comparative results indicated that the sex distribution was similar among Firefighters, Municipal/Provincial Police, Paramedics, Royal Canadian Mounted Police; the age distribution was similar with regard to Municipal/Provincial Police, Paramedics, Royal Canadian Mounted Police; and the provincial distribution was similar for Correctional Workers, Firefighters, Municipal/Provincial Police, Royal Canadian Mounted Police. Complete case analysis was used for all statistical models, meaning that only participants with valid responses on all variables within each model were included. Frequency estimates and odds ratios were computed to determine the distributions and relationships of past-year and lifetime suicidal ideation, plans, and attempts among the different categories of sex, age, marital status, province of residence, ethnicity, education, urban/rural work location, years of service, and PSP category. Next, the frequency of past-year and lifetime suicidal outcomes was computed for each PSP category and stratified by sex. A series of logistic regression models were then computed to assess for differences between PSP categories on suicidal behaviors (i.e., ideation, plans, attempts). The logistic regression models were adjusted for several socioeconomic variables (i.e., sex, age, marital status, provincial region, ethnicity, education, urban vs. rural work location, and years of service).

Civilian employees working for Municipal/Provincial Police or RCMP reported suicidal behavior frequencies that were not significantly different from sworn or regular members; as such, both groups were combined. Similarly, career and volunteer Firefighters reported suicidal behavior frequencies that were not statistically different; as such, both groups were also combined.

Results

Details of the self-reported participant demographics for the current sample are provided in Table 1

TABLES AND FIGURES

Table 1. Association Between Sociodemographic Covariates and Past-Year Behaviors Among Public Safety Personnel

Covariate	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Gender						
Male	1.0		1.0		1.0	
Female	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Age						
18-24	1.0		1.0		1.0	
25-34	0.85	0.70-1.05	0.85	0.70-1.05	0.85	0.70-1.05
35-44	0.75	0.60-0.95	0.75	0.60-0.95	0.75	0.60-0.95
45-54	0.65	0.50-0.85	0.65	0.50-0.85	0.65	0.50-0.85
55-64	0.55	0.40-0.75	0.55	0.40-0.75	0.55	0.40-0.75
65-74	0.45	0.30-0.65	0.45	0.30-0.65	0.45	0.30-0.65
75+	0.35	0.20-0.55	0.35	0.20-0.55	0.35	0.20-0.55
Marital Status						
Married	1.0		1.0		1.0	
Single	1.15	0.95-1.40	1.15	0.95-1.40	1.15	0.95-1.40
Separated/Divorced/Widowed	1.35	1.10-1.65	1.35	1.10-1.65	1.35	1.10-1.65
Never Married	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Physical Region						
Western Canada (BC, AB, SK, MB)	1.0		1.0		1.0	
Central Canada (ON, QC)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Atlantic Canada (NS, NB, PEI, NF)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Northwest Territories (NT), Yukon (YT), Nunavut (NU)	1.0		1.0		1.0	
Ethnicity						
White	1.0		1.0		1.0	
Other	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
High School or less						
Some post-secondary (less than 2-year certificate/diploma)	1.15	0.95-1.40	1.15	0.95-1.40	1.15	0.95-1.40
Some college/university or higher	1.0		1.0		1.0	
Urban or Rural/Small Location						
Urban	1.0		1.0		1.0	
Rural	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Type of service						
Police (n=100)	1.0		1.0		1.0	
Fire (n=100)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Paramedic (n=100)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Other (n=100)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30

Note. Statistically significant difference from the reference group. AB = Alberta; BC = British Columbia; MB = Manitoba; NB = New Brunswick; NS = Nova Scotia; ON = Ontario; QC = Quebec; SK = Saskatchewan; YT = Yukon; NT = Northwest Territories; NU = Nunavut. *p < .05. **p < .01. ***p < .001.

Table 1. Association Between Sociodemographic Covariates and Past-Year Behaviors Among Public Safety Personnel

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for past-year suicidal behaviors and Table 2

TABLES AND FIGURES

Table 2. Association Between Sociodemographic Covariates and Lifetime Behaviors Among Public Safety Personnel

Covariate	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Gender						
Male	1.0		1.0		1.0	
Female	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Age						
18-24	1.0		1.0		1.0	
25-34	0.85	0.70-1.05	0.85	0.70-1.05	0.85	0.70-1.05
35-44	0.75	0.60-0.95	0.75	0.60-0.95	0.75	0.60-0.95
45-54	0.65	0.50-0.85	0.65	0.50-0.85	0.65	0.50-0.85
55-64	0.55	0.40-0.75	0.55	0.40-0.75	0.55	0.40-0.75
65-74	0.45	0.30-0.65	0.45	0.30-0.65	0.45	0.30-0.65
75+	0.35	0.20-0.55	0.35	0.20-0.55	0.35	0.20-0.55
Marital Status						
Married	1.0		1.0		1.0	
Single	1.15	0.95-1.40	1.15	0.95-1.40	1.15	0.95-1.40
Separated/Divorced/Widowed	1.35	1.10-1.65	1.35	1.10-1.65	1.35	1.10-1.65
Never Married	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Physical Region						
Western Canada (BC, AB, SK, MB)	1.0		1.0		1.0	
Central Canada (ON, QC)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Atlantic Canada (NS, NB, PEI, NF)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Northwest Territories (NT), Yukon (YT), Nunavut (NU)	1.0		1.0		1.0	
Ethnicity						
White	1.0		1.0		1.0	
Other	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
High School or less						
Some post-secondary (less than 2-year certificate/diploma)	1.15	0.95-1.40	1.15	0.95-1.40	1.15	0.95-1.40
Some college/university or higher	1.0		1.0		1.0	
Urban or Rural/Small Location						
Urban	1.0		1.0		1.0	
Rural	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Type of service						
Police (n=100)	1.0		1.0		1.0	
Fire (n=100)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Paramedic (n=100)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30
Other (n=100)	1.05	0.85-1.30	1.05	0.85-1.30	1.05	0.85-1.30

Note. Statistically significant difference from the reference group. AB = Alberta; BC = British Columbia; MB = Manitoba; NB = New Brunswick; NS = Nova Scotia; ON = Ontario; QC = Quebec; SK = Saskatchewan; YT = Yukon; NT = Northwest Territories; NU = Nunavut. *p < .05. **p < .01. ***p < .001.

Table 2. Association Between Sociodemographic Covariates and Lifetime Behaviors Among Public Safety Personnel

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for lifetime suicidal behaviors. Regarding past-year suicidal behaviors, the associated logistic regression model results across the entire sample indicated relatively few statistically significant results. Past-year suicidal ideation and plans were generally inversely associated with age. Participants who reported being single or separated/divorced/widowed were more likely to report

past-year suicidal ideation and plans compared to those who reported being married/common-law. Notably, those who were remarried did not significantly differ from those who were married or common-law for past-year suicidal ideation, plans, or attempts. Participants in Eastern Canada were significantly less likely to report past-year suicidal plans compared to those living in Western Canada. Persons with a university degree/4 year college or higher education were significantly less likely to report past-year suicidal ideations. There were no significant differences in past-year suicide behaviors based on sex, ethnicity, urban versus rural, or years of service.

Regarding lifetime suicidal behaviors (see [Table 2](#)), the associated logistic regression model results across the entire sample again indicated relatively few statistically significant results. Across the entire sample, when compared to men, women reported significantly more lifetime suicide ideation, plans, and attempts. Persons 30 years of age and older over were significantly less likely to report lifetime suicidal plans and attempts than persons under 30 years of age. Participants who reported being single or separated/divorced/widowed were more likely to report lifetime suicidal ideation, plans, and attempts when compared to those who reported being married or common-law. Lifetime suicidal behaviors among those who were remarried did not significantly differ from those who were married or common-law. Persons with 10 years of service or more were significantly less likely to report lifetime suicidal attempts than those with less than 10 years of service. There were no significant differences in lifetime suicidal behaviors based on provincial region, ethnicity, education, or urban versus rural work location.

Details of the past-year and lifetime self-reported participant suicidal behaviors disaggregated by PSP category and sex are provided in Table 3.

TABLES AND FIGURES

Table 3
Prevalence of Past-Year and Lifetime Suicidal Behavior by Public Safety Personnel Category

Suicidal Behavior	Total Sample	Non-PSP		PSP		p-value	95% CI
		Police	Fire	Police	Fire		
Age							
Subtotal	18,112	4,126	4,086	13,986	9,860	<.001	13,126
Police	4,126	3,479	647	6,086	3,716	1,370	2,316
Fire	396	206	190	490	370	.076	126
Sex							
Subtotal	18,112	8,312	9,800	10,312	8,488	<.001	16,800
Police	4,126	3,312	814	6,086	2,888	3,200	2,688
Average	---	---	---	---	---	---	---
Marital Status							
Subtotal	4,400	3,300	1,100	6,312	11,800	<.001	16,800
Police	3,400	3,000	400	5,400	8,700	3,300	1,400
Average	---	---	---	---	---	---	---
Ethnicity							
Subtotal	17,800	38,000	10,700	16,700	16,200	<.001	16,200
Police	17,800	38,000	10,700	16,700	16,200	<.001	16,200
Average	4,400	3,300	1,100	6,312	8,488	3,200	2,688
Years of Service							
Subtotal	18,112	10,400	7,712	10,400	10,400	<.001	16,800
Police	10,400	8,300	2,100	10,400	10,400	<.001	16,800
Average	1,100	0,800	300	1,100	1,100	<.001	16,800

*These values have been aggregated to protect confidentiality due to small numbers (n < 5).

Table 3. Prevalence of Past-Year and Lifetime Suicidal Behavior by Public Safety Personnel Category

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In general, Municipal Police reported the lowest prevalence of past-year and lifetime suicidal ideation; Firefighters reported the lowest prevalence of past-year and lifetime suicidal planning; and Municipal Police and RCMP reported the lowest prevalence of past-year and lifetime suicidal attempts. In contrast, Paramedics and Correctional Workers reported the highest prevalence of past-year and lifetime suicidal behaviors.

There were several statistically significant differences identified across PSP categories for past-year and lifetime suicidal behaviors (see Table 4).

TABLES AND FIGURES

Table 4
Adjusted Odds of Past Year and Lifetime Suicidal Behaviors by Public Safety Personnel Category

Variable	Reference	RCMP	Correctional Workers	Firefighters	Paramedics	Other PSP
Past Year						
Ideation	1.00	1.01 (0.45, 2.27)	0.87 (0.38, 2.00)**	0.85 (0.37, 1.97)	1.87** (0.81, 4.33)**	1.02 (0.45, 2.30)**
Plan	1.00	1.01 (0.17, 6.16)	1.06 (0.10, 12.00)**	0.81 (0.16, 3.97)	1.96** (0.50, 7.80)**	0.74 (0.16, 3.48)**
Attempt	1.00	0.81 (0.12, 5.00)	0.85 (0.10, 7.00)**	0.75 (0.10, 5.00)**	1.07 (0.16, 6.80)**	0.74 (0.16, 3.48)**
Lifetime						
Ideation	1.00	1.01 (0.45, 2.27)	0.87 (0.38, 2.00)**	0.85 (0.37, 1.97)	1.87** (0.81, 4.33)**	1.02 (0.45, 2.30)**
Plan	1.00	1.01 (0.17, 6.16)	1.06 (0.10, 12.00)**	0.81 (0.16, 3.97)	1.96** (0.50, 7.80)**	0.74 (0.16, 3.48)**
Attempt	1.00	0.81 (0.12, 5.00)	0.85 (0.10, 7.00)**	0.75 (0.10, 5.00)**	1.07 (0.16, 6.80)**	0.74 (0.16, 3.48)**
Adjusted						
Ideation	1.00	1.01 (0.45, 2.27)	0.87 (0.38, 2.00)**	0.85 (0.37, 1.97)	1.87** (0.81, 4.33)**	1.02 (0.45, 2.30)**
Plan	1.00	1.01 (0.17, 6.16)	1.06 (0.10, 12.00)**	0.81 (0.16, 3.97)	1.96** (0.50, 7.80)**	0.74 (0.16, 3.48)**
Attempt	1.00	0.81 (0.12, 5.00)	0.85 (0.10, 7.00)**	0.75 (0.10, 5.00)**	1.07 (0.16, 6.80)**	0.74 (0.16, 3.48)**

Note: OR = Adjusted Odds Ratio for corresponding variable from the ordered status process of suicidal ideation, planning, attempt, or suicidal behavior. 95% CI = 95% confidence interval. ** p < 0.05. * p < 0.10. † p < 0.01.

Table 4. Adjusted Odds of Past Year and Lifetime Suicidal Behaviors by Public Safety Personnel Category

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Past-year suicidal attempts were extremely infrequent, making meaningful comparisons impossible. In general, Paramedics reported statistically significantly higher past-year and lifetime suicidal behavior prevalence than all other PSP categories, but they were comparable to Correctional Workers. Municipal police, RCMP, and Firefighters were generally statistically comparable.

Discussion

Results from the current study provide initial estimates on the prevalence of suicidal ideations, plans, and attempts amongst a large sample of diverse Canadian PSP. A substantial proportion of the overall sample reported past-year or lifetime suicidal ideation (10.1%, 27.8%), planning (4.1%, 13.3%), and attempts (0.3%, 4.6%). The results appear to be the first information extending Canadian-specific PSP beyond the two extant policing samples to include data from Correctional

Workers, Firefighters, Paramedics, and Call Centre Operators/Dispatchers. Understanding the prevalence of such behaviors can also inform clinicians about the importance of assessing for suicide risk in PSP populations.

There were several sociodemographic factors associated with suicidal behaviors among PSP. Women were more likely than men to report lifetime suicidal ideation, plans, and attempts, which is consistent with previous evidence from the general population (Findlay, 2017; Mustard et al., 2010). Workplace access to lethal means appears to be a specific risk factor for women, but not for men (Stanley et al., 2016). Reports of systemic stressors specific to women PSP, such as sex-based discrimination and sexual harassment (Franklin, 2007; Ménard & Arter, 2014; O'Connor, Schaefer, Morabito, & Tobin-Gurley, 2011; Pacholok, 2009; Sinden et al., 2013; Taylor et al., 2016), imply a series of additional risk factors that may interfere with other efforts to boost resilience (Oliphant, 2016); however, in general, men die by suicide at a higher rate than women (Milner, Currier, LaMontagne, Spittal, & Pirkis, 2017; Milner, Witt, Maheen, & LaMontagne, 2017). Understanding differences between men and women, including how to manage increased risk in women may be particularly important given recent efforts to increase the proportion of women in PSP (O'Connor et al., 2011).

Participants who were in married/common-law relationships were significantly less likely to report suicidal behaviors than participants who reported being single or separated/divorced/ widowed, which is consistent with previous evidence from the general population (Findlay, 2017; Mustard et al., 2010; Statistics Canada, 2017). Positive, supportive relationships can reasonably be expected to serve as protective or resiliency factors for mental health that therein reduce risk for suicidal behaviors (Afifi et al., 2016). The relationship between marriage and suicide in the general population may be more significant for men than women (Kposowa, 2000), but separation or divorce may increase suicide risk for both men and women (Ide, Wyder, Kolves, & De Leo, 2010).

Accordingly, providing systemic supports for maintaining healthy marital relationships, or establishing other social support systems for nonmarried/cohabiting people, may be important in bolstering PSP resilience.

The inverse relationship between age and suicidal behaviors seen in the general population (Findlay, 2017; Mustard et al., 2010; Statistics Canada, 2017) was also identified for PSP. Broadly

speaking, increasing age was associated with fewer reported instances of past-year suicidal ideation and planning; however, only three differences were statistically significant. Increasing age was also associated with fewer lifetime suicidal plans and attempts, but there were no differences in suicidal ideation. The results suggest thoughts about suicide may not be changing with experience, but reactions to those thoughts. In other words, older PSP may be developing better coping mechanisms that could benefit younger PSP; however, the inverse relationship with years of service may be caused by higher attrition for persons who experience suicidal behaviors early in service. For PSP specifically, the pattern may also be influenced by unmeasured cohort effects, such as differences between those who remain in service and those who leave before retirement age. Such early departures may occur for diverse reasons, including difficulties with mental health, but may warrant additional dedicated attention (e.g., exit interviews; postdeparture policies; Blekesaune & Solem, 2005).

In the current PSP sample, there were almost no significant differences in past-year or lifetime suicidal behaviors based on provincial region, ethnicity, education, or urban/rural work location. The only exception was that past-year suicidal planning for PSP in Eastern Canada was significantly lower than for PSP in Western Canada. Despite the complex interactions, PSP leaders should take steps to bolster resilience in minority groups in culturally appropriate fashions (Ungar, 2011).

Previous evidence from the general population is mixed with respect to relationships between suicidal behaviors and each of ethnicity (Clarke, Colantonio, Rhodes, & Escobar, 2008; Loo, 1986; Ungar, 2011), rural locations (Hirsch, 2006), and education (Lorant et al., 2005; Pompili et al., 2013). Nevertheless, PSP leaders should consider taking steps to promote resilience in ways that are congruent with the diverse needs of their membership. For example, psychoeducation about suicidal behaviors may reduce stigma and increase care-seeking (Corrigan, Morris, Michaels, Rafacz, & Rusch, 2012; van der Feltz-Cornelis et al., 2011).

Past-year suicidal behaviors are relatively underreported in the extant population literature (Statistics Canada, 2012) and PSP literature (Stanley et al., 2016). The past-year evidence comes from the 2012 Canadian Community Health Survey assessing participants ages 15 to 24, with estimated prevalence for suicidal ideation of 5.8%, suicidal planning at 2.2%, and suicidal attempts at less than 1.0% (Statistics Canada, 2012). The available PSP evidence comes from a large sample ($n = 1180$)

of Norwegian ambulance personnel (i.e., comparable to the Paramedics category in the current study) wherein past-year suicidal ideation was estimated at 8.3%, severe ideation (arguably planning) at 1.9%, and attempts at 0.4% (Sterud et al., 2008). In the current sample, the self-reported prevalence of past-year suicidal ideation (i.e., 10.4%), planning (i.e., 4.1%), and attempts (i.e., 0.3%) across all PSP categories appears higher than or comparable to prevalence for the general population and the Norwegian sample; however, Paramedics in the current sample reported much higher past-year prevalence than both the general population and the Norwegian sample for suicidal ideation (i.e., 15.4%), planning (i.e., 7.1%), and attempts (i.e., 0.9%).

Across all PSP categories in the current sample, the self-reported prevalence of lifetime suicidal ideation and plans (i.e., 27.8%; 13.3%) appear higher than prevalence identified by previous researchers for general population samples (i.e., ideation ranging from 12.5%–14.1%; planning ranging from 4.1%–5.1%), for military samples (i.e., ideation ranging from 14.5%–16.3%; planning ranging from 5.5%–6.7%; Sareen et al., 2016; Statistics Canada, 2017), and for one of the few prospective population-based surveys, conducted with data from the Netherlands (ideation 11%; attempts 2.9%; Sareen et al., 2005). The current proportions also appear comparable to, or higher than, results from the recent review (Stanley et al., 2016); specifically, current ideation ranged from 7–9%, lifetime ideation from 23–25%, and lifetime severe ideation of 6%, which might be comparable to planning.

The prevalence of self-reported lifetime suicide attempts for Municipal/Provincial Police (2.1%), RCMP (2.4%), and Firefighters (3.3%) appear comparable to, or lower than, lifetime prevalence rates identified by previous researchers for general population samples (3.1–4.0%), military samples (i.e., rates ranging from 2.5–3.5%; Sareen et al., 2016; Statistics Canada, 2017), and the recent review study (i.e., rates ranging from 1–2%; Stanley et al., 2016). In contrast, prevalence of lifetime self-reported suicide attempts among Correctional Workers (8.1%), Paramedics (9.8%), and Call Centre Operators/Dispatchers (8.6%) appear higher than previous estimates.

The prevalence of suicidal behaviors across PSP categories may result from several different factors. For example, increased exposure to potentially traumatic events can increase risk for suicidal behaviors (Stein et al., 2010) and PSP are at increased risk for such exposures to be chronic (Galatzer-Levy et al., 2011; Komarovskaya et al., 2011); however, traumatic exposures

alone are likely insufficient to explain the differences between PSP categories. In the general population, mental health disorders appear to increase risk for suicidal behaviors (Nock et al., 2008; Nock, Hwang, Sampson, & Kessler, 2010). PSP may be experiencing substantial levels of clinically significant mental health disorders (Asmundson & Stapleton, 2008; Carleton et al., 2017; Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Haugen, Evces, & Weiss, 2012; Horswill, Jones, & Carleton, 2015; Oliphant, 2016). A recent study suggested a substantial portion of PSP screened positive based on self-reported measures for one or more mental health disorders, with positive screening for depression being very common for Correctional Workers, Paramedics, and Call Centre Operators/Dispatchers (Carleton et al., 2017). High prevalence of depression, posttraumatic stress disorder, and substance abuse could contribute to the high rates of suicidal behaviors (Angst, Angst, & Stassen, 1999; Cherpitel, Borges, & Wilcox, 2004; Kryszynska & Lester, 2010; Sokero et al., 2005; Wilcox, Conner, & Caine, 2004). Finally, organizational stressors (e.g., low control, demands without sufficient resources, lack of supervisory support, coworker disharmony) may also have a substantial impact on suicidal behaviors and mental health and may differ between PSP types (Houdmont, 2017; LaMontagne & Milner, 2017; Milner, Spittal, et al., 2017).

Perceptions of hopelessness, helplessness, inescapability, grief, and guilt have been identified as increasing risk for suicidal behaviors in the general population (Beck, Brown, Berchick, Stewart, & Steer, 1990; Bryan, Morrow, Etienne, & Ray-Sannerud, 2013; Nock et al., 2008; Nock et al., 2010; Shear et al., 2011). There may be systemic differences across PSP categories with respect to such risk factors that help to explain the different self-reported rates of suicidal behaviors. For example, Correctional Workers may well experience particularly high levels of hopelessness, helplessness, and inescapability as a function of their work environments (W. Berger, Addis, Reilly, Syzdek, & Green, 2012). Paramedics may be particularly likely to witness human suffering that they feel personally accountable to relieve (W. Berger, Addis, et al., 2012), which can potentiate guilt and helplessness (Jonsson & Segesten, 2004; Williams, 2012). Similarly, Call Centre Operators and Dispatchers may experience a greater sense of helplessness coupled with exposure to suffering and a sense of personal accountability, both to the general population they serve as well as the PSP they support, all of which may potentiate symptoms (Adams, Shakespeare-Finch, & Armstrong,

2015; Shakespeare-Finch, Rees, & Armstrong, 2015). There may also be broad organizational and provincial differences with respect to the perceived and actual access to mental health care for PSP. Such differences may serve as diverse risk factors for suicidal behaviors. Conversely, there may be specific differences that enhance relative resilience to suicidal behaviors for Firefighters, Municipal/Provincial Police, and Royal Canadian Mounted Police (e.g., resource access, training mechanisms, social supports). In any case, there appears to be a clear need for additional research identifying specific risk and resilience factors for suicidal behaviors, including variables associated with individual PSP (e.g., age) and systemic variables (e.g., organizational supports) that may differentially impact PSP categories.

Limitations

There are several limitations for the current research that provide important directions for future research. First, the sample was self-selected; that is, despite proportional demographic representativeness, the reported proportions may not represent all Canadian PSP. Further, the sampling method prohibited knowing the actual response rate. Second, responses were based on anonymous self-report to a web survey and a substantial proportion of the participants who began the survey did not proceed far enough to be asked the questions related to suicide. Why the respondent did not complete that survey cannot be determined; that said, incompletes may have been due to the length of the survey and the suicide questions coming toward the middle of the survey. Relatedly, the reliability and validity of Web based self-reports relative to clinician administered interviews remains ambiguous (Bethlehem, 2010). Third, persons who died by suicide were necessarily unable to participate, which means estimates of suicide attempts refer only to persons who did not die, potentiating a systemic underestimation of the number of suicide attempts. Future research should work to integrate estimations of Canadian PSP who have died by suicide. Fourth, participants may underreport symptoms, including suicidal behaviors, even when anonymous (Berger, Addis, et al., 2012; Hunt, Auriemma, & Cashaw, 2003). PSP concerns with stigma may have facilitated underreporting of suicidal behaviors (Halpern et al., 2009; Henderson et al., 2016; Karaffa & Koch, 2016); however, the anonymous research design may have also improved accuracy (Ashbaugh et al., 2010). PSP may also necessarily actively avoid attending to mental

health symptoms with sufficient skill over time that symptoms are minimized (Furnham & Traynar, 1999) or manifest in other ways (e.g., somatic symptoms; (Mund & Mitte, 2012). Future research should use clinical interviews consistent with previous data collections (Sareen et al., 2016; Stanley et al., 2016) and broadly assess for direct and indirect indicators of mental disorders. Fifth, the current survey design was modelled based on questions from the Statistics Canada's (2013) Canadian Community Health Survey (Statistics Canada, 2016); nevertheless, direct comparisons with other data sets may be compromised because of differences in data collection methods. Despite this caveat, the high prevalence in the current, relatively large sample is important evidence justifying further research with more robust assessments (e.g., interviews with Statistics Canada sampling methods). Sixth, lifetime suicidal behaviors were assessed without assessing age of onset; so, the behaviors may have occurred prior to beginning PSP service. Notwithstanding, the past-year data suggests a substantial proportion of the lifetime suicidal behaviors likely occurred during PSP service. Future research should assess rates before and after service to better assess relationships between suicidal behaviors and service. Relatedly, future research should directly ask participants whether the suicidal behaviors are associated with service. Seventh, previous research has identified significant differences based on latitude rather than longitude, with higher rates of suicide at higher latitudes (e.g., (Lawrynowicz & Baker, 2005). The current sample data did not allow for such assessments, so future research should evaluate the influence of latitude on suicide among PSP. Eighth, future research should simultaneously assess the interactive effects of mental health, traumatic events, and organizational stressors on suicidal behaviors among PSP (Houdmont, 2017). Those effects should be used to further inform established workplace suicidal prevention recommendations (Milner, Page, Spencer-Thomas, & Lamotagne, 2015). Finally, there were odds ratios within the results that may have been statistically significant with a larger sample size (e.g., $OR = 1.70$, $CI = [0.94-3.08]$; suicide attempts for "a university degree/4 year college or higher" vs. "high school or less education"). More nuanced assessments of differences across categories and interactions with other variables (e.g., sex, age) would require a larger sample.

Summary

The large diverse Canadian PSP sample is an important and novel strength of the current study. Other strengths include the use of established items from Statistics Canada for assessing both past-year and lifetime suicidal behaviors associated with risk (i.e., ideation, planning, attempts). Many participating PSP reported prevalence of lifetime suicidal behaviors that appear higher than estimates from the general population, the Canadian military, and some PSP from the recent review (Loo, 1986; Sareen et al., 2016; Stanley et al., 2016; Statistics Canada, 2017). Men, older PSP, and married PSP appeared less likely to report several suicidal behaviors. Odds of suicidal behaviors appeared lowest for Municipal/Provincial Police and highest for Correctional Workers and Paramedics. Despite using items from Statistics Canada (Statistics Canada, 2016), the current PSP estimates should only be considered preliminary because of the self-selected sample and the online nature of the survey. Nevertheless, the current results offer important insights for clinicians and policymakers, and provide important foundations for future research (e.g., investigating the differences across PSP categories to identify the diverse underlying factors). Overall, the current results underscore the need to develop solutions that include broad and nuanced strategies for successfully managing suicidal behavior risk for PSP, including the rapid and broad dissemination of psychoeducation. The large proportion of Canadian PSP reporting suicidal behaviors lends strong support to urgent calls for a National Action Plan with heavy emphasis on rigorous and robust research, including a full epidemiology study, to better understand PSP mental health needs and ultimately reduce risk for death by suicide (Oliphant, 2016; Picard, 2016).

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Footnotes

1

Rural was defined as persons who reported their work location as being a Farm or Acreage, Village or Hamlet (~1–200 citizens), Small Town (~200–800 citizens), or First Nation community; in contrast, Urban was defined as persons who reported their work location as being a Town (~800–7,000 citizens), Big Town (~7,000–20,000 citizens), Small City (~20,000–100,000 citizens), City (~100,000–300,000 citizens), or Large City (~300,000 + citizens).

Special thanks for recruitment support provided by the (alphabetically): Badge of Life Canada, Behind the Red Serge, Canadian Association for Police Governance (CAPG), Canadian Association of Chiefs of Police (CACP), Canadian Association of Fire Chiefs (CAFC), Canadian Institute for Military and Veteran Health Research (CIMVHR), Canadian Ministry of Public Safety and Emergency Preparedness, Canadian Police Association (CPA), Community Safety Knowledge Alliance, Correctional Service of Canada (CSC), Families of the RCMP for PTSD Awareness, First Responder Mental Health Network Collaboration, International Association of Firefighters (IAFF), Justice Institute of British Columbia, Mental Health Commission of Canada, Mood Disorders Society of Canada, Nova Scotia Operational Stress Injury Clinic - Capital Health, Paramedic Association of

Canada (PAC), Paramedic Chiefs of Canada (PCC), Royal Canadian Mounted Police (RCMP), Tema Conter Trust, Union of Solicitor General Employees (USGE), and Wounded Warriors Canada. All authors made substantial contributions consistent with the International Committee of Medical Journal Editors. The details describing the contributions are presented below alphabetically by last name. Initial project design was a collaborative effort based on the following contributors, each of whom was responsible for overseeing their area-specific domains for assessment, all of whom reviewed, revised as necessary, and approved the final design in its entirety: Abrams, Afifi, Asmundson, Beshai, Brunet, Carleton, Cramm, Dobson, Duranceau, Griffiths, Groll, Hatcher, Jones, Keane, LeBouthillier, MacPhee, Ricciardelli, Sareen, Stewart, Weekes. Implementation was a collaborative effort primarily driven by: Abrams, Afifi, Asmundson, Carleton, Duranceau, Griffiths, Groll, Hozempa, Jones, LeBouthillier, MacPhee, Ricciardelli, Sareen, Stewart, Weekes. Analysis for the current article was a collaborate effort primarily driven by each of the following: Afifi, Asmundson, Carleton, Cramm, Hozempa, Sareen, Taillieu, Turner; however, area-specific analytic information was provided by different authors as required. Write up for the current article was a collaborate effort primarily driven by each of the following: Asmundson, Afifi, Carleton, Sareen, Taillieu, Turner; however, *all* authors reviewed the document and provided detailed feedback that was ultimately integrated into the submitted manuscript. All authors also approved the submitted version of the manuscript. The study was approved by the University of Regina Institutional Research Ethics Board (File 2016-107). We complied with Canadian Psychological Association ethical standards in the treatment of our sample. The survey was available for voluntary participation from 09/01/2016 to 01/31/2017. All interested persons were directed to a website with study details and were required to explicitly indicate consent before proceeding. There are no details, images, or videos relating to an individual person presented in the current manuscript. The data sets generated and/or analysed during the current study are not publicly available due guarantees made in the data collection consent form regarding protections to ensure participant confidentiality. R. Nicholas Carleton's research is supported by the Canadian Institutes of Health Research (CIHR) through a New Investigator Award (FRN: 285489). Tracie O. Afifi's research is supported by a CIHR New Investigator Award and Foundation Scheme Award. This research was also funded in part by the Ministry of Public Safety and Emergency Preparedness through the Policy Development

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