

Health Promotion and Chronic Disease Prevention in Canada

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Foreword

Stephanie Priest, MM, Acting Director General, Centre for Mental Health and Wellbeing

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This special issue of *Health Promotion and Chronic Disease Prevention in Canada* brings together a short collection of papers that touch on various aspects of posttraumatic stress disorder (PTSD) treatment and the understanding of its symptoms and health impacts.

PTSD is a complex mental health condition that has far-reaching impacts not only on the individuals affected, but also on families, communities and populations. While not everyone who experiences one or more traumatic events will develop PTSD, it is well documented that some populations and occupational groups are at higher risk as a result of exposures to traumatic events through their work or environment. The COVID-19 pandemic further underscored that populations are not equally impacted.¹ Over the course of the pandemic, some groups, such as health care workers, first responders and public safety personnel (PSP), many of whom were exposed to possible trauma and moral injury, emerged as populations of concern. Data gathered during the second year of the pandemic showed that 7% of Canadian adults screened positive for probable PTSD,² and this prevalence was higher among frontline workers.³

Building our understanding of what interventions work and how to implement them in order to address and improve the lives of those who live with PTSD remains an important priority for the Government of Canada. To that end, the Federal Framework on Posttraumatic Stress Disorder (“the Framework”), launched on 22 January 2020, was designed to support and advance collaboration, research and best practices. The Framework represents the culmination of engagement with over 200 stakeholders and partners at the April 2019 National PTSD Conference and ongoing collaboration across over 15 federal government departments. It articulates a shared vision “where people living with PTSD, those close to them, and those at risk of developing PTSD, are recognized

and supported along their path toward healing, resilience, and thriving.”^{4,p.15}

The role of research and evidence-building, as well as having strong mechanisms by which research is connected to action, are fundamental to achieving this vision. On the heels of the Framework’s release, the Canadian Institutes of Health Research (CIHR) Institute of Neurosciences, Mental Health and Addiction (INMHA) hosted the Posttraumatic Stress (PTS) Knowledge Gaps Consensus Workshop in 2020. The workshop was developed and informed by the voices of people with lived and living experience to examine the role of research to improve outcomes for those with posttraumatic stress.⁵ The Framework and CIHR PTS workshop helped establish a path for ongoing collaboration to translate knowledge into practice prior to the onset of the COVID-19 pandemic. The subsequent events of COVID-19 have since highlighted the disproportionate effects of the pandemic on certain populations and groups, which also prompted the need to better understand their experiences to effectively target efforts to address trauma and PTSD.

In this special issue, three of the research papers focus on the importance of building our collective understanding of various groups exposed to posttraumatic stress, moral distress and stigma. These groups include first responders (Testa et al.⁶) the airport firefighter community (Barry et al.⁷) and respiratory therapists (D’Alessandro-Lowe et al.⁸). Through qualitative analyses in two of the studies, we also learn about barriers and facilitators associated with help-seeking behaviours. Finally, the importance of understanding the links between physical and mental health are explored in Singh et al.’s literature review and case study on cardiac function and PTSD.⁹

Recognizing that language evolves and matters greatly if we are going to collaborate to improve outcomes for people living with PTSD, the special issue also presents, as a supplement, version 3.0 of the “Glossary of

Terms: A Shared Understanding of the Common Terms Used to Describe Psychological Trauma” (“the Glossary”).¹⁰ The first published version of the Glossary was developed by the Canadian Institute for Public Safety Research and Treatment (CIPSRT) and was made publicly available through the Federal Framework on PTSD report.¹¹ This latest document is intended to help set the groundwork for shared language that can be used across sectors and to build a broader common understanding of key terms around trauma.

Frameworks, strategies and action plans do not change systems by themselves. It also takes adaptive implementation along with ongoing evaluation and research to tailor policy, programs and practice to the needs of different subpopulations and groups. Together, these papers and version 3.0 of the Glossary contribute to the growing body of evidence and knowledge that will help stakeholders better understand and respond to the differential impacts of PTSD in Canada.

Statement

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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Original qualitative research

Applying the Theoretical Domains Framework to identify police, fire, and paramedic preferences for accessing mental health care in a First Responder Operational Stress Injury Clinic: a qualitative study

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Abstract

Introduction: First responders and other public safety personnel (PSP; e.g. correctional workers, firefighters, paramedics, police, public safety communicators) are often exposed to events that have the potential to be psychologically traumatizing. Such exposures may contribute to poor mental health outcomes and a greater need to seek mental health care. However, a theoretically driven, structured qualitative study of barriers and facilitators of help-seeking behaviours has not yet been undertaken in this population. This study used the Theoretical Domains Framework (TDF) to identify and better understand critical barriers and facilitators of help-seeking and accessing mental health care for a planned First Responder Operational Stress Injury (OSI) clinic.

Methods: We conducted face-to-face, one-on-one semistructured interviews with 24 first responders (11 firefighters, five paramedics, and eight police officers), recruited using purposive and snowball sampling. Interviews were analyzed using deductive content analysis. The TDF guided study design, interview content, data collection, and analysis.

Results: The most reported barriers included concerns regarding confidentiality, lack of trust, cultural competency of clinicians, lack of clarity about the availability and accessibility of services, and stigma within first responder organizations. Key themes influencing help-seeking were classified into six of the TDF's 14 theoretical domains: environmental context and resources; knowledge; social influences; social/professional role and identity; emotion; and beliefs about consequences.

Conclusion: The results identified key actions that can be utilized to tailor interventions to encourage attendance at a First Responder OSI Clinic. Such approaches include providing transparency around confidentiality, policies to ensure greater cultural competency in all clinic staff, and clear descriptions of how to access care; routinely involving families; and addressing stigma.

Highlights

- To the best of our knowledge, this is the first theoretically driven, structured qualitative study using an implementation science determinant framework to systematically examine barriers and facilitators facing first responders and other public safety personnel trying to access a mental health service.
- Concern regarding the cultural competency of clinicians was identified as a significant barrier.
- Responding to calls involving individuals with mental health disorders may inform first responder attitudes and stigma towards psychological difficulties.
- Our results can assist in developing a model of care that may be broadly applicable to other first responder and public safety service providers across Canada.

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Keywords: *Theoretical Domains Framework, behaviour change, implementation science, public safety personnel, first responders, mental health, content analysis*

Introduction

First responders and other public safety personnel (PSP; e.g. correctional workers, firefighters, paramedics, police, public safety communicators)¹⁻³ are frequently exposed to potentially psychologically traumatic events, and at rates much higher than the general population.⁴⁻⁸ This puts them at increased risk for mental health disorders, such as mood and anxiety disorders, substance misuse, and posttraumatic stress disorder (PTSD).^{4,9-12} While prevalence estimates of mental health problems, suicidal ideation (12.5%–14.1%), and plans (4.1%–5.1%) vary among PSP, they significantly exceed the prevalence rate of 10.1% for diagnoses of any mental health disorder within the general population.^{4,11,13-17} Among a large sample of Canadian PSP, 23.2% screened positive for current PTSD.¹¹ Nearly half of PSP also screened positive for symptoms of one or more mental health disorders.¹¹

Many individuals who may benefit from mental health care may not engage or access care.^{18,19} A World Health Organization study showed that a lack of perceived need for care and attitudinal barriers, mainly involving stigma, were the most common reasons for not getting help.²⁰ A systematic review on barriers to care and mental health stigma among first responders (a subset of the broader PSP category consisting of firefighters, paramedics, rescuers, and police¹) identified concerns regarding confidentiality and potential negative career impacts as the most commonly reported stigma-related barriers.²¹ Other barriers included scheduling issues and a lack of awareness of where to access care.

A study of Canadian first responders and other PSP thematically analyzed optional, open-ended responses within a more extensive online survey on mental health disorders.²² A major theme was that PSP who sought care were felt to be “abusing the system,” which acted as a barrier to treatment. A study of Canadian police officers’ perceptions of mental health was conducted using semistructured interviews with 116 participants and included a self-report survey examining stigma,

masculinities, and organizational culture in police services.²³ This study found that most respondents reported that stigma existed in their workplaces and that reporting mental illness was “high risk.”

A qualitative study including 32 firefighters and paramedics in Arkansas assessed perceptions of mental health problems and engagement in mental health services.²⁴ The participants were selected through convenience sampling and had not accessed mental health services. This study found that barriers to accessing mental health care included a perception among respondents of being unable to show weakness, concerns regarding confidentiality, negative experiences with therapists, lack of access, and the need to protect their families from the traumas of the profession for fear of burdening them. Facilitators to accessing care included feeling they were not alone, having positive experiences with therapists, receiving recommendations from others, and family, friends, or administrators noticing an increase in the severity of problems.

Another qualitative study of 48 US police officers, half of whom had accessed mental health services, asked how and why they had engaged with help.²⁵ The study predominantly focussed on organizational strategies to encourage mental health care. The main findings included preventing negative consequences, removing stigma in the workplace, and developing treatment that was viewed as relevant and trustworthy.

Although the studies we reviewed above were helpful in beginning to identify barriers and facilitators among first responders, few previous studies have focussed on preferences for help-seeking and accessing mental health care. These studies were also somewhat limited in that they were not systematic in their efforts and did not use integrative theoretical frameworks. We are not aware of any previous studies that have used an implementation science framework to facilitate the development and implementation of mental health-related services in occupational health settings or specifically for first responders. Nor did these studies employ a theory-driven, systematic approach to removing barriers to care. Therefore, we conducted our study to determine how best to provide acceptable and accessible mental health care to first responders. Specifically,

we wanted to determine what factors would encourage first responders to access mental health care. To address this question, we used the Theoretical Domains Framework (TDF)²⁶ to guide all aspects of this research to determine, if a First Responder Operational Stress Injury (OSI) Clinic were available, what factors might encourage or discourage first responders from accessing this resource. This study is part of a broader research program to deliver effective mental health services for first responders. Information regarding the conceptualization, refinement, and validation of the TDF have been presented elsewhere.^{27,28}

The TDF is an influential framework derived from the synthesis of 33 theories of behaviour and behaviour change²⁶⁻²⁸ that systematically addresses fundamental barriers and facilitators to behaviour change.^{26,29} This framework was chosen as it could target a specific behaviour (accessing mental health care) while accounting for the setting in which the potential intervention (a First Responder OSI Clinic) is being implemented.^{26,30} The TDF can also generate theoretically informed targets for interventions and increases the chances that the study results can be replicated and are transferable.

This study included the prospective application of the 14 domains of the TDF, which provide a clear and comprehensive consolidation of influences of behaviour that are rooted in techniques of behaviour change and behavioural theories, in order to inform the clinic’s implementation.^{26,27} The objective of the study was to identify critical barriers and facilitators impacting first responders’ help-seeking behaviour and access to mental health care to inform the development, implementation, and long-term sustainability of the First Responder OSI Clinic.

Methods

Ethics approval and consent to participate

Ethics approval was granted by the Ottawa Health Science Network Research Ethics Board at The Ottawa Hospital (reference number: 20180903-01H). Written informed consent was obtained from all participants.

Design

This qualitative study used semistructured, one-on-one interviews, based on the TDF,

with a sample of first responders from the City of Ottawa's tri-services (Ottawa Fire Service, Ottawa Paramedic Service, and Ottawa Police Service), in Ontario, Canada.

Participants

Participants were recruited in the city of Ottawa, which has a population of approximately one million,³¹ and had approximately 3581 municipal first responders (1537 career and paid volunteer firefighters, 564 paramedics, and 1480 sworn police officers) during the study period. Eligible participants were firefighters, paramedics, and police officers from the City of Ottawa's tri-services. Individuals who were not currently employed by one of the services, including retirees, those on long-term disability, and those younger than 18 years were not eligible.

Participant recruitment and dissemination of study-related information were facilitated by accessing established networks in Ottawa's first responder communities (e.g. peer support groups within the tri-services and the First Responder Mental Health Network Collaboration). Five first responders known to the research team were initially approached to participate in this study. A snowball sampling technique was then used to identify additional potential participants. Participants were purposively sampled to capture a broad range of experiences related to help-seeking and accessing mental health care.

Participants identified through purposive sampling were invited to suggest frontline first responders who had previously sought treatment for a mental health disorder or were members of their respective peer support group. Participants were also invited to suggest others who had experienced poor mental health and had not attended treatment, in addition to soliciting the perspectives of first responders who disagreed with the clinic's implementation or held conflicting beliefs regarding the clinic. The intent was to further extend the range of potential experiences and perceptions captured in the sample. Participating services provided the option of compensating time for members to engage in the interviews. We added participants from each service until data saturation was reached and then completed three more interviews per existing recommendations.^{32,33}

Interview guide

The behaviour of interest was potential attendance at a First Responder OSI Clinic. Study team members had significant clinical (SH, RNC) and research experience (VT, RNC, IC, DF, AH, SL, MJH, SH) with first responder populations. Some of the authors had previously worked with first responders, military, and Veteran populations (VT, RNC, IC, DF, AH, SL, MJH, ZC, SH); two of the authors are paramedics (SL is a Commander and an Advanced Care Paramedic, and ZC is a Primary Care Paramedic); and one is a Veteran (AH). The paramedic portion of this study forms part of the first author's (VT) master's thesis, of which JJ was the primary supervisor. The team collaborated to develop a semistructured interview guide³⁴ based on the 14 domains of the TDF.^{26,27} The interview guide was designed to assess the perspectives of frontline first responders, and interview questions prompted reflection and identification of key beliefs about the behaviour for each TDF domain and details about how each domain affected the behaviour. Probing questions were then used to explore details in further depth.

Procedure

The semistructured, face-to-face interviews were conducted individually from June to October 2019 and lasted between 36 and 156 minutes ($M = 96.59$, $SD = 33$). The interviews (by VT and AB) took place at times and locations most convenient for participants and where confidentiality could be maintained. Audio of all interviews was recorded and later transcribed by an external professional transcription company and were de-identified.* All transcripts were then assessed by the respective interviewer (VT, AB) for transcription fidelity. The Consolidated Criteria for Reporting Qualitative Research³⁵ checklist guided the reporting of this qualitative research.

Analysis

All interviews were analyzed using NVivo 12 Pro³⁶ software and guided by content analysis recommendations.^{37,38} No additional TDF domains were identified after reviewing the transcripts and independently coding an interview transcript. A

coding guideline was developed, including definitions for TDF domains and constructs, and applied examples. Independent coders (VT, AB, ZC, PB, JM) used a directional approach to content analysis³⁹ and each interview transcript was coded by two independent coders. Each utterance (i.e. bit of spoken language) was coded into the relevant TDF domain(s) and was guided by the coders' understanding of the TDF and relevant domain(s)⁴⁰ in NVivo. Coding differences were resolved by discussion. The coding was supervised by SH, who acted as the third-party reviewer to consult as an arbitrator if consensus could not be reached. Coders linked responses with specific beliefs that appeared in one or more transcripts to generate belief statements. The statements were intended to capture the core thoughts expressed by participants,⁴⁰⁻⁴² which were used to provide insight into the perceived role of the TDF domain in influencing behaviour.

Transcripts were analyzed separately for police, fire, and paramedics. Data analysis revealed that data saturation was reached within the 24 interviews. Verification of whether thematic saturation was reached was determined when no new barriers or facilitators were produced on help-seeking and accessing mental health care, signaling that there were no new themes, findings, concepts, or problems.⁴³

Domains likely to explain attendance at a First Responder OSI Clinic were identified by frequency of specific beliefs across transcripts, occurrence of conflicting beliefs that would indicate variation in first responder behaviour, and evidence of strong beliefs affecting the behaviour.^{26,40,42,44}

Results

Participants

Participants included 24 first responders (70.8% men) across the three sectors; the remainder of the sample included participants who self-identified as female or as nonbinary (Table 1).

The proportion of women who engaged in the study was in line with the gender demographics in frontline first responder roles in the tri-services in Ottawa. The high proportion of men to women in these

* Transcribed data presented as illustrative quotes (in the Results and in Table 2) have been minimally edited to remove details such as position and details of trauma, as they were particular to individuals and could potentially identify them.

TABLE 1
Demographic characteristics of first responder participants in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Demographic characteristics	N	(%)
Gender		
Female	6	(25.0)
Male	17	(70.8)
Nonbinary	1	(4.2)
Occupational group		
Firefighters	11	(45.8)
Paramedics	5	(20.8)
Police	8	(33.3)
Mean age, in years (SD)		
Firefighters	42.5 (10.9)	
Paramedics	40.4 (9.8)	
Police	49.5 (7.1)	
Total	44.4 (9.9)	
Primary subgroup		
Sought treatment for a mental health disorder	12	(50.0)
Peer support member	9	(37.5)
Frontline member (who was not a member of peer support or had not sought treatment)	3	(12.5)

Abbreviation: SD, standard deviation.

sectors differs based on occupation type and level of seniority. For example, at the time of this study, approximately 30% of frontline paramedics were women. The paramedic service had the highest proportion of women within the tri-services.

A total of 3619 utterances from 24 interviews were coded into the 14 domains. Key themes from the interviews were clustered into six of the 14 theoretical domains: environmental context and resources; knowledge; social influences; social/professional role and identity; emotion; and beliefs about consequences (Table 2).

Environmental context and resources

All first responders declared their interest in and support for an OSI clinic; however, several significant barriers to help-seeking and accessing mental health care were identified. All first responders emphasized the need for the clinic to protect their confidentiality, particularly from their colleagues and management. Arranging for individual first responders to go into the clinic alone and speak to their clinician directly, without interaction with other staff members, was one suggestion for accomplishing this. Police participants especially emphasized fear of being exposed while accessing mental health care. The clinic's location was also considered important for supporting confidentiality. Participants stated it should not be located

at or near any hospitals with emergency departments where first responders are known in their professional capacity: "I'm using the word 'covert' ... I don't know how you set that up, and whether you're feeding into the stereotype ... that doesn't matter at this point. We have to keep this now as it starts to open up very, very private" (Firefighter 3).

All participants indicated uniforms could be triggering for first responders. However, there were conflicting opinions about making the clinic uniform-free. Firefighters and paramedics agreed that the clinic should be uniform-free, citing the benefits of avoiding potential triggering cues; differentiating between work and personal time; removing identifiers and protecting confidentiality; and reducing the impact of rank. Other paramedic participants indicated that a uniform-free environment might create a barrier for clients who need to attend appointments while on shift, necessitating multiple clothing changes. Police also indicated that a uniform-free environment might be a barrier when attending appointments while on duty because of specific vocational requirements, such as acting in their capacity as police officers while on duty.

Participants also expressed frustration about the lack of continuity of available services. Participants reported that the currently available internal and external resources,

including their respective Employee Assistance Programs (EAP) and the Workplace Safety and Insurance Board, are difficult to navigate, unavailable when needed, and insufficient, as the clinicians within these programs are not well trained to address the specific needs of first responders. A one-size-fits-all approach for EAP designed for all employees within a municipality was repeatedly described as insufficiently culturally sensitive: "EAP, they don't have a clue ... when you start calling them with our kind of stuff, they're not interested in hearing that because [the] last thing you want to hear is something about an 8-month old dead baby floating in a bathtub" (Paramedic 2). Police reported that because they have access to unlimited coverage for psychological services, they could access more appropriate care as a function of having the ability to choose their clinicians.

Knowledge

All participants indicated that specialized clinicians for first responders need to have sector-specific knowledge of the workplace and first responders' roles (i.e. cultural competence). The knowledge domain here refers to the clinician's knowledge. Suggestions for developing cultural competence, the process by which individuals and systems respectfully and effectively respond, can be strengthened by developing sector-specific knowledge such as going on multiple ride-alongs within each service, spending time in the workplace observing the day-to-day stressors, and learning the terminology.

Several participants described learning first responder terminology as important for effective communication. "[Clinicians] should be aware of the culture... Just because we're all first responders does not mean we're all the same.... They have to be: (a) aware of the culture; (b) ... of the language that we use ... and what kind of stress that first responders are under in their respective fields" (Firefighter 9).

Some firefighters and police officers suggested that having clinicians who are former first responders would be beneficial: "It would be beneficial to have police officers who are counsellors, psychologists, or social workers ... so that they can relate ... when we're speaking as a police officer, and nobody really knows what it's like" (Police 1). Police officers reported that clinicians who have prior experience

TABLE 2
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
Environmental context and resources	A first responder clinic should protect clients' confidentiality	"You could tell them what room they're going to be in, so they could just go directly to the room, as opposed to waiting in a lobby ... because I think some of them are maybe embarrassed about doing it in the first place." (F5)	7	[What could facilitate accessing mental health care?] "Knowing that the confidentiality is there, that your workplace won't know about it if they don't need to." (PA5)	3	"If you put it in with a lot of other facilities ... it increases the anonymity of the reasons why officers or members may want to go there. So, it's not necessarily identified that, oh, so and so is walking to this one lone house or building and that's the OSI Clinic and everybody goes.... If you have a standalone [clinic], then it's very easily the confidentiality goes down.... If you put it into ... a City of Ottawa site or facility whereby there's lots of other things going on, it increases your anonymity." (P2)	7
	The first responder clinic should be uniform-free	"You want to be as anonymous as possible.... If you're walking in there in a uniform, you're straight up identifying yourself ... it should just be as anonymous as possible. I think if you had everybody show up in normal civilian clothing, it would keep some anonymity to it.... Especially, if you're in the hall, you're in the waiting room ... and I see there's a paramedic there. If we're in uniform, we'll recognize each other..." (F6)	9	[uniform-free?] "I think that would probably be best, the reason being, depending on how it's set up, there's a good chance you will probably run into somebody you may know, and a uniform might not be what they need to see that day. It may not bode well ... they might be okay with you, especially if you're still at work and seeking help for anxiety that's one thing, but if you're then crossing paths with someone who never wants to see a uniform again, may not be a good idea. So, I think more for the protection of kind of others." (PA5)	5	"We've had officers have their guns taken away. So, if they're coming to you for assistance, I don't think they should be in a uniform. If they're on duty, I get it ... they're coming here for an hour, fine. Leave the uniform on, take away the gun. If you're off duty, then there's no need for the uniform. You shouldn't be in uniform anyways, unless you're going to work. And then again, your firearm should be at work." (P4)	4
		—		"If it's uniform-free then it takes away any identifiers ... there are people that can't even set foot into our headquarters ... having it uniform-free might be a good idea ... a con to that is if someone was coming during their shift ... how would that work for that person? ... either or but you would hate to trigger someone that's there if someone else came in uniform." (PA4)		"If a first responder's having a bad day or had a bad call ... why not have that option that they can show up [in uniform]? ... It's important that your folks and the members that are accessing this clinic have an understanding that yeah, uniforms may happen. Some people have a real negative reaction to uniforms as a result of moral injuries on the job... That could be triggering, as you know. So, I think if people that are going to be accessing it are given that heads-up [there may be uniforms]." (P2)	

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
		—		“I think it should be uniform-free. As soon as you start wearing a uniform there’s ranks visible and that may change people’s perception ... everyone’s on the same level playing field.” (PA2)		“If you start saying you can’t bring your gun in while you’re working in uniform, that’s going to be a problem, because if you have a concern for someone being armed in there, then that concern should be brought to the organization to say they shouldn’t be armed. And that doesn’t breach confidentiality, but that’s a careful thing that might screw your program ... most people that are going to be coming and using your service are probably going to be off work ...” (P6)	
	Current mental health services available to first responders may be inadequate, and service providers may not be well equipped or trained to address their specific needs	“The City has EAP [employee assistance program] ... for EMS [emergency medical services] and fire based on a budget that they receive ... we’ve had pretty good response from the membership that individuals have sought out marriage counselling, addictions, financial guidance.... But any time you get into anything a little bit more meat and potatoes... mental health ... it fell so grossly short.” (F10)	5	“When I called to talk to EAP ... I think it was like 3 to 4 weeks before I could get in ... and then when I did see that counsellor ... she was traumatized by what I was telling her and I’m like okay, this did not go as planned. So, I never went back. I felt so bad for having done that. I thought it was a place where I could go ...” (PA4)	5	“I’ve heard so many horror stories of officers going to see EAP and their counsellors ... We’ve come a long way.... I’ve heard stories of counsellors being ... in tears because the cops are telling them this is what I’m dealing with and they’re almost like throwing up their hands—I don’t know what to do with you.” (P2)	4
		“I’ve personally gone to EAP for help before, and I’ve never went back after the first visit ... they were totally useless for me ... in my session, basically they said, ‘Yeah, I don’t know anything about that. You should go see a good professional.’” (F9)		“In my experience, and I’m going to be blunt, EAP is a joke. You get three sessions. This is not a broken bone. You can’t fix it right away. It takes time. It takes a relationship. Fixing something in three sessions is ridiculous.” (PA3)		[Ottawa police have unlimited coverage for psychological services in their benefits] “The great thing with Ottawa Police right now is we have unlimited psych in our benefits, and the great thing about that is you can pick who you want to pick.... And you should be able to pick which doctors.” (P6)	

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
	Therapists at a first responder clinic should be educated and have knowledge of the working conditions of first responders	"I don't need somebody wanting to listen with enthusiasm ... having the right people in the right place and aware of what we are, and who we are, what kind of our special needs are ... that's not something that an individual's going to necessarily pick up on a half-day session at the training centre ..." (F10)	10	"... for that simple fact that you're not traumatizing them ... I went to see a counsellor and was telling them about a call.... I left there feeling like I had traumatized her, and she was so upset.... She had no clue how to help me ... you don't want the person who's there to seek help [to] feel like they injured somebody that's trying to help." (PA4)	5	"When they come on the ride-a-long ... I'm [therapist] here to learn. I'm not here to analyze you ... they hear the lingo ... and they give you that idea of maybe they're just telling a story and then when we interject 10 f-bombs, it's not bravado, it's maybe a way of coping because we use humour. Sometimes we use it inappropriately, but when it's used within the confines of our police family or people, it's not derogatory, but it's helping us cope ... especially in the moment ... having a little understanding of that and maybe a little patience for it would help ... training somebody to deal specifically with this, they probably need to be exposed to all of it ... ride-a-longs with the police and then they spend a lot of time with the medics and ... with the firefighters ..." (P7)	8
		—		"A significant one is understanding the job, so familiarity with a particular role and the stresses related to that role. I have worked with mental health professionals of all backgrounds who it's very quickly obvious that they don't quite understand the pressures and the needs and the day-to-day life of a paramedic. It's very difficult to relate, and that can be anywhere from shift work to end of life care ..." (PA3)		"Credibility is going to be huge. I would rather go to the doctor who's had lots of experience with first responders ... they should go to our PDC [Professional Development Centre] and go through some of the use of force scenarios ... the more you become part of us and part of that family, so I would encourage them to go on ride-a-longs." (P6)	
	A first responder clinic should be discreet and not located at a hospital with an emergency department	"... NDMC [National Defence Medical Centre], I think it would be fine, because I think it's a neutral location.... Parking is open, easy, huge parking lot, and it's neutral ground ... it's not a clinic anymore. It's not a hospital anymore. It's an administrative building ... it would be a good spot." (F9)	6	"If it's at the General or the Civic, we see too many of our colleagues walking around ... I walk past how many people that I know from emerge [emergency department] or my own colleagues from there [see] me coming in. When you see somebody in civies at the hospital, [it's like] 'Hey what [are] you doing? What [are] you up to?' 'Oh, I'm going up to the OSI Clinic.' 'Oh.' And then we're back to stigma, right?" (PA2)	5	"I would like a bricks and mortar facility someplace, centrally located that is nondescript, that is not attached to any hospitals but is affiliated with a hospital.... My people will never walk into a mental health hospital to receive care.... If you have a nondescript building that's centrally located someplace, with ample parking ... they can walk in and they can see a friendly face, potentially a peer support coordinator or people they get to know, and they're welcome there and that's where they get their treatment ... it's not sterile and it's not hospital-like and it's certainly not a bunch of people with lab coats walking around ... That is not going to go over well with my people, because they don't see themselves as crazy, right? Or they're afraid of people labelling them 'crazy' ..." (P8)	7

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
Knowledge	It is important for clinicians to have knowledge of the culture and working environment of first responders	—		“... a safe place ... [where] we're not going to run into patients that we've picked up on the road.” (PA4)		“You've got to be going to a place where it's going to be safe and that you feel I'm not going to be exposed. One of the big risks for me in stuff like that, and others, is who am I going to bump into when I go to your clinic? Who's going to know?” (P6)	
		“We have, and I think EMS [emergency medical services] and police have similar type things ... what we call 'Fire Ops 101' ... [it] was developed [for] media, politicians that sort of stuff. It's grassroots ... bring them in and show them what it's really like. We put them in the bunker gear ... we take them into the burn building and they get to put out a mock car fire, but they get to feel what the heat's like ...” (F10)	9	“... learning the lingo, it would be great, too, if they were able to come for some ride-outs in our workplace to see like what we face every day, either the challenges of the calls or ... of shift work ... of not eating, challenging just the constant go, go, go, not being able to finish paperwork ... having that firsthand experience to be like 'Oh yeah, I know what they're talking about now.'” (PA4)	2	“The big approach is the exposure.... It doesn't have to just be on the road. It could be ... you guys are going to come down and they're going to run you through our use of force day ... so you get to do the scenarios and you get to do the decision-making scenarios where it's are you going to shoot or are you not going to shoot? ... The decision-making made under duress and say like, 'Okay, I get that. I was really scared' because you've never been exposed to it and 'I shot that guy because I was scared.' 'Well, he was just drinking a bottle of wine on a corner and you shot him.' (P7)	8
		“Then, those clinicians talk to each other, and they share their experiences. 'Wow. Okay, that makes sense.' They'll start speaking their language. 'I saw this, and I saw this. This team I spent the day with told me this, and this police officer I spent the day with told me this, and these two paramedics I spent the day with told me this.' Now, all these clinicians are going to have a much better understanding ...” (F8)		“One of the things that attracts me to the idea of this program ... is that you'll have people who ... they really deal with a lot of first responders and the types of problems that we have, so they become more proficient in it. So, you don't have to do catch up all the time ... I can explain this particular aspect of my job and they'll know what I'm talking about right away. And I know that takes time, but that's really good. That's huge.” (PA3)		—	
	First responders are good at responding to the initial traumatic event, but not the long-term consequences	—	—	“You just turn it [emotions] off, and you've got a job to do.... Unfortunately, when I realized it was too late ... it took me a long time to get unstuck to get to the point where I could sit with a feeling or an emotion, process it, figure out what I wanted to do.” (PA2)	2	“We often ignore the snowball effect of a traumatic event. We're great at responding to the initial incident and the people right there, but even just take first responders aside. Well, who is supporting the children and husband of that woman who lost her legs? Who is supporting the wife and kids of the first responder who first dealt with that woman who lost her legs?” (P6)	1

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
		—		"I wasn't aware that I was sick until I was deep. And only when I hit what I would call rock bottom, did I seek help and then I started noticing. It's amazing how—at least in my situation—I could delude myself, or just kind of tread water. And it's only in hindsight, so I have significant amount of respect for the ability to be unhealthy and not know it." (PA3)		—	
	First responders can often notice warning signs in their colleagues when they are struggling with their mental health	"When other people look at you, they see those changes, but yet they don't know what it is, because they're not educated.... It presents itself as somebody isolating themselves socially, locking themselves up in the basement ... anger. It can present itself as irritation. It can present itself as addictions, and yet the person might not even realize what's going on. I've heard that from so many different people who have gone through this ... I didn't realize I was irritated, or irritable ... or angry, or judgmental." (F9)	8	"Attendance is a big indicator. Mood, so irritability; isolation is a huge thing. So, somebody stops coming out and somebody stops doing the things that they enjoy. Fear, people expressing fear. Almost fear to go to work. Fear of making a mistake, just expressing very fearful sentiments... Affected home life, home relationships, so my colleague takes me aside and starts talking about how home life has been affected is a big sign; poor memory, apathy." (PA3)	5	"I'm quite aware of the symptoms of mental illness ... how it presents itself sort of day to day, and the anger, the withdrawing from family and friends outside of policing and sort of latching onto the police family instead ... withdrawing from outside of work, drinking ... your common overuse is alcohol, spending money ... not getting enough sleep or time with your family ... those are very common symptoms of stress or ... coping or inability to cope ... being withdrawn, angry ... I've had training in recognizing it, it stands out to me very clearly.... I see someone who comes in with a big rant about something ridiculous that people shouldn't rant about ... I recognize that in hindsight, in myself years ago when I was stressed and I didn't see it that way ..." (P3)	7
	Peer support work provides a base knowledge of mental health, which can be built upon with experience	"Most of my formal training has been through peer support, and there's been some mental health [training]—a program they ran through the fire service, Road to Mental Readiness ..." (F3)	4	"I'm not a mental health professional, but I've had additional training and I've been doing my role for five years ... so I've had lots of hands-on experience." (PA5)	2	"I've taken the Mental Health First Aid. I am a R2MR [Road to Mental Readiness] instructor which deals with all sorts of mental health issues ... attended the Canadian and mental health veterans ... I've presented lots ... I don't diagnose anybody.... But I feel that I have a greater grasp on okay, how serious is this issue that we're dealing with? ... I feel I have a grasp of that ... when I first started this job two years ago, I would say it was limited and I was definitely questioning why they hired me because I'm not a psychologist. I have a couple of courses at university level in psychology.... I didn't feel that I was confident in [it] ... it's a start, right? It's a finger in the dike as the whole dam is exploding around you. That's basically how it feels like at times ..." (P8)	1

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
Social influences	Stigma prevents people from speaking freely about their emotions	“There’s still a limit to the depth that we’re pushing into the stigma ... we’ve scratched the scab off a little bit, but it’s about getting in deeper sort of thing and we’re not truly stigma-free until really everybody can stand up and seek the help when they need to seek the help.” (F10)	9	“I think it’s certainly getting better, but there is a generalized fear, whether that fear’s based in reality or not, I don’t know, but it’s a generalized fear that people will judge you as weak, or not a competent medic, or dangerous to other patients. That’s a huge factor.” (PA3)	5	“A lot of people are very hesitant to use the words mental health ... because the problem is when we deal with mental health, as a police officer, you’re dealing with 3 to 5 percent of the population that have had zero supports in their life that are usually heavily drug addicted and they turn to a life of crime and they have severe mental health problems that have never been addressed ... we deal with them as homeless and in shelters ... [when] we get called, they’re usually at the end of their rope and they are brandishing weapons and they’re trying to hurt us, and so that’s what is left as an impression of mental health on officer’s minds that you’re crazy ... there is a big us and them type of thing.” (P8)	8
		“It [stigma] was almost as traumatic as the call that we went on, because you’re basically being asked to strip naked in front of a bunch of people that you don’t know.” (F4)		—		“There’s a very historically strong police culture related to never showing weakness and being very stoic and always having to be in control.” (P3)	
		“We deal with our own problems ... especially the kind of old school, ‘You just don’t talk about stuff.’ ‘You have a problem, you bottle it up, you shut up, and it will go away.’ ... ‘You just deal with it on your own.’ ... I’ve only been on the job five years, and I notice it’s changing ... it’s changing because it has to change ...” (F6)		—		“I’m off. I need sick leave. I need time ... but I’m afraid to go and ask for time off. Well, why is that? ... It’s because my supervisor has already made comments about so and so being off for “issues” or an operational issue ... because of a bad call. And so, they get that somehow this is maybe an operational stress injury that might need some support. Now it’s also managerial stigma issue ...” (P2)	
	Struggling with your mental health can be an isolating experience	“They don’t know who to talk to about it, and they feel isolated. They feel alone, and then that’s where that social withdrawal comes into play.... You realize you can’t really talk to anybody about it, because you know that they can’t relate or understand it.” (F9)	5	“One of the most cathartic things that I experienced during my journey was multiple professionals saying ‘No, this is normal,’ ‘people go through this,’ or ‘you’re not alone.’ You’re not the only one, and that really helps in terms of feeling like you’re isolated and you’re fighting this all on your own.” (PA3)	2	“When people are suffering, they feel very isolated, they feel very alone, they have no idea how they’re ever going to get better and I’ve actually seen where they’re just sitting in their basement smoking cigarettes and they’re obviously not living any type of life ... their marriage usually implodes, their kids hate them. They’ll never come to work.” (P8)	4

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
		—		—		“One of the greatest stumbling blocks from a police perspective is you don’t want to be seen as weak, and so you take it all in and you actually feel alienated because you think you’re the only one that feels like that.” (P5)	
	People struggling with their mental health may be perceived as weak	“Some [platoon chiefs] are very proactive and are very serious about mental health ... then there’s other platoon chiefs that are old fashioned, ‘Suck it up buttercup.’ There’s captains out there I know very well that are, ‘What are you, a wimp?’ There’s still that mentality for sure.” (F9)	6	“I still think there’s a significant contingent of paramedics who may not believe it ... and the little quips and the verbiage expresses a belief that if you suffer from mental stress, you’re weak, and that you can’t do your job.” (PA3)	4	“[Mental health problems] are very present, but they are also seen as a sign of weakness. So quite often, the people that I have worked with that have manifested with a mental illness, by the time it comes to light, it’s advanced.” (P5)	4
		“Whenever I come back from a call, with everybody in the room, not everybody’s there, but they all make a joke about, ‘Oh, this guy’s suffering this little bit, he should be stronger.’ There’s always comments like that going on, and it makes you feel like, ‘I’m not going to say anything, because he might make fun of me.’” (F1)		“It’s very hard to change the mentality to put your hand up and say, ‘Hey look. No, I need to stop here for a second.’ Medics look at it as a sign of weakness. Medics will ridicule it and make fun of it.” (PA2)		“I wouldn’t ever want to show any kind of weakness or vulnerability at work ... if there was ever kind of a crazy call or a scary call or something that I was uncomfortable with ... I’d never wanted to show any kind of weakness to that.... I would have definitely early in my career bottled things up, not shared my vulnerabilities, not spoken about my emotions, never share that at work.” (P3)	
	Women in first responder sectors face social barriers that men do not	—	1	“As a woman ... it’s harder for us to cry or to ask for help because we’re going to ultimately [be] seen as weak or PMS’ing. I was told that before ... ‘Are you PMS’ing?’ ... I just had somebody die. Like, I feel like it’s completely unrelated ... I feel like, as a woman, we have to look a bit harder than we are because they take advantage of us.” (P1)	1	“It was always the pressure of getting the work done because that was your role and that’s your job, and that’s what you’re being paid to do and it’s the right thing to do, but also not wanting to show any kind of weakness or vulnerability because I was a female officer in the traditionally big tough boys’ role, you know, male role.” (P3)	2

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Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
Social/ professional role and identity	First responders feel they have a duty to work, regardless of how they are feeling	"You kind of do ... at the same time, too, you also know that [if] somebody in another job was having a bad day. They're battling depression ... And it's like things just are not good today, I can't make it into work. We don't have that option." (F10)	1	"Make it or fake it, that's our world.... My job on the road is to turn that off to do my job to the best of my abilities and not let those outside stressors and all those things get to me ... police and fire, exact same ... when it comes down to doing their job, they do their job to the best of their abilities, and they will make it or they'll fake it.... We deal with the consequences after." (PA2)	3	—	
	The stigma of being seen by peers may prevent first responders from seeking care at a first responder mental health clinic	"This person said to me, "Oh, I don't want to go to a clinic, because I don't want anyone knowing that I'm dealing with something.'" (F7)	7	"Take away everything they could be uncertain about. Am I going to meet somebody I know? That's a big one.... Basically, if you can give them enough upfront information that doesn't overwhelm them ... like there's 15 minutes between appointments so you're not going to run into anyone." (PA5)	3	"I've made the decision. I'm going to seek help. One of the worst things I can think of is somebody's going to see me. If you were to schedule people in such a way so that they never meet there's an in-door and an out door ... I walk in through the front. I'm immediately shuffled back to where I'm going to be meeting with my mental health professional. I have my meeting and then they show me the back door." (P5)	7
		—		"A lot of times when people come to this type of clinic or they seek this type of help, anonymity is very important to them at that moment ... speaking from my experience, it's a very vulnerable moment ... seeing somebody that they know or have a professional relationship with or even a social relationship with, can actually scare them away, or would scare them away." (PA3)		"The concern that officers might think that they have mental health problems, and they have a weak mind or they're not capable of doing their job is probably the number one fear.... It's about giving/showing any signs or raising any flags that you are accessing them ... it's the exposure of you accessing them to other members of the public and to your colleagues." (P1)	

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TABLE 2 (continued)
Summary of relevant TDF domains and sample quotes from first responders in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

Domains	Belief statements	Fire		Paramedics		Police	
		Sample quotes	Frequency (out of 11)	Sample quotes	Frequency (out of 5)	Sample quotes	Frequency (out of 8)
Emotion	Emotional and physical impacts of stress and trauma (i.e. physical manifestations—poor sleep, decreased energy)	“It can present itself as anger. It can present itself as irritation. It can present itself as addictions, and yet the person might not even realize what’s going on. I’ve heard that from so many different people who have gone through this firsthand, and including myself ...” (F9)	8	“Until I started my treatment ... every time I would hear a hanging call, I was physically sick to my stomach.” (PA1)	2	“This affects sleep. It affects alertness, irritability, compassion, empathy ... fatigue and ethics, sleep, so it increases your fatigue, ability to interact as far as socially, isolation through the roof ... drowsiness, work functionality and alertness at work, dependence issues on them, sex drive, intimacy ... desire just to even be open to people because you’re so fatigued.” (P2)	7
Beliefs about consequences	Involving spouses or family at the right time in mental health treatment can have beneficial outcomes	“Where a family can be involved, I think it’s really important ... it’s the partner or the spouse that can keep people honest during treatment and going through a treatment protocol. There’s accountability there.” (F10)	10	“[Bettering themselves] it’s hard to do if they don’t have the support of the family ... there needs to be maybe an education piece ... why we’re doing CBT [cognitive behavioural therapy] ... or how to support your person while going through this.” (PA3)	5	“It is the all-encompassing. I know that what affects the individual will affect their family, and we have those ripples in the water.” (P8)	6
		“I don’t know if I’d be here if it wasn’t for my family ... that’s what kept me going.... I know so many guys who have lost their wives, their marriages over this and everything else, and those are the guys who struggle more than anybody, because they’re alone.... Have their parents, have their spouses, bring your best friend in ... spend the day talking about mental health ... the people who are going to be a part of your life are going to learn about it ... they’re going to be the people who are going to influence change in you.” (F2)		“I think in two different ways, one being that you could bring them into specific sessions, and then also having just information sessions is really valuable ... when I went away for treatments, they offered a 2-day course for my spouse to go, where they explained basically PTSD [posttraumatic stress disorder]. They broke it down and they explained what to look for, typical behaviours, that type of stuff and she felt she could relate better, she felt more empowered. And my ability to talk to her about it greatly improved.” (PA3)			

Abbreviations: F, firefighter; P, police officer; PA, paramedic.

Notes: The qualitative datasets generated during and/or analyzed during the present study are not available for sharing. Ethical approval for the current study prevents data sharing.

as police would prevent content from being “lost in translation.” Several participants also indicated that non-clinical staff who interact with first responders need to be culturally competent, including staff answering the phone. Participants also discussed first-hand experiences and knowledge of colleagues who felt they had caused clinicians psychological harm by describing their experiences, reinforcing the importance of cultural competence in ensuring that clinicians who work with first responders are knowledgeable of the sector’s respective culture and vocations:

I realized that he’s [the clinician] not the guy I should be talking to because I watched him turn white on one of my calls and I’m looking at him and going it’s not that big of a call, trust me. And I realized, no, I have to talk to people that know what they’re doing. (Paramedic 2)

You’re looking at some pictures and a video, and you can’t even stomach it. How are you supposed to treat these people who have been through it firsthand and offer some compassion and understanding? (Police 6)

Police, firefighters, and paramedics demonstrated some mental health literacy skills by recognizing warning signs of mental health challenges in their colleagues. However, some also reported feeling unable to identify specific next steps to provide effective help. Enhancing knowledge about how to help was identified as an opportunity for improving mental health. Paramedics indicated that members of their profession know how to hide mental health symptoms (e.g. substance abuse), making supporting peers difficult:

One of the biggest challenges I’ve had is the comorbidity in terms of mental health with addictions, because I find our colleagues are better at hiding the addictions aspect of it than maybe the anxiety, the depression, the other stuff ... that’s been the biggest surprise to me ... I find the addiction has blindsided me in the past that there’s this going on as well, and it’s been surprising. (Paramedic 5)

Participants described that working as a paramedic involves repeatedly responding to mental health calls, which creates a

culture of not wanting people to know about mental health challenges and hiding mental health symptoms for fear of being seen as similar to their patients.

Police and paramedics indicated that first responders are good at initial responses to traumatic events but often lack the knowledge and skills to manage long-term mental health consequences. The absence of these skills was cited as a barrier to help-seeking and identified as an opportunity for improving mental health.

Participants cited lack of clarity regarding sick leave entitlements and employment-related discrimination as barriers to help-seeking. There was also uncertainty about the process of taking leave. Paramedics reported confusion about how many sick days were available and feared being reprimanded for using more than four sick days within six months. A paramedic reported that their interpretation of the sick leave policy included a requirement for a meeting to be held with the paramedic, Supervisor, Commander, and union representative in the case of paramedics who took more than four sick days in six months. Paramedic participants also raised concerns about employment-related discrimination (e.g. limits to career advancement) for taking more than 14 sick days in a year.

Peer supporters from all three services agreed that peer support team members should engage in training surrounding mental health, well-being, and self-care, providing a base knowledge of mental health, which experience can further build upon. However, participants reported varying levels of access to internal and external training opportunities (e.g. mental health training programs, conferences, and information sessions on PTSD). All participants described peer support as a beneficial resource, but not all participants reported feeling comfortable accessing peer support for mental health problems.

Social influences

All participants reported instances of self-stigma and label avoidance, often illustrated by their descriptions of fear of being perceived as weak for either needing or seeking mental health care. Stigma in firefighters was explained as a reluctance to speak freely about their mental health. Paramedics reported that public stigma is deeply entrenched in their work environment. For example, they reported observing

instances of colleagues making fun of or ridiculing those with mental health problems and those who talk about or attempt suicide:

If it’s something like a suicide attempt or suicide ideation ... that’s still a huge stigma within our organization, especially because we deal with patients who have suicidal ideation pretty close to every shift ... we’re, I hate to say, critical of our patients when they don’t succeed. It sounds awful, but we’re like, “You know, this is the fourth time I’ve picked you up. Haven’t you figured out how to take enough pills yet?” ... and then you’re talking to crews after, and the banter back and forth is like, “Really, like with Google, couldn’t you have figured out how to do it properly?” ... then imagine if you were a paramedic in that room who has suicidal thoughts, you’re really not going to open up to anything about that because we’re making fun of people who can’t complete suicide. (Paramedic 5)

Dark humour is commonly used as a coping mechanism for dealing with stress but can reinforce stigma. In addition, participants reported negative judgment of members within the paramedic service who seek mental health care, including those who take psychiatric medication for anxiety or depression. Similarly, in police workplaces, exposure to those with mental illness reinforces stigma in that they do not want to be identified as like the people they interact with when responding to calls: “There is such a negative social stigma, exponentially so with police because that’s all we deal with ... ‘Don’t get too close, you’ll catch crazy.’ It’s seen as a negative” (Police 5). Across all three sectors, it appears that responding to calls involving individuals with mental health disorders, particularly those that are repeatedly for the same individual, may have a significant impact on first responder attitudes and stigma towards psychological difficulties.

Police reported fear of, as well as experience with receiving, unsupportive comments from management. They also reported concerns that their career progression would be blocked if they had a history of mental health problems or if they sought mental health treatment: “Somebody may see an application that’s pretty good ...

'Isn't he the guy that, you know, snapped?' ... they just hear 'mental health injury,' so they're nuts. It's still very simple. Officers are very aware, but internally it's still like, 'Oh God, we might have to deal with that.' ... They won't be trusted because they have mental health problems" (Police 1).

There are also legal confidentiality barriers for police to discuss traumatic events they have witnessed. One participant described the inability to discuss a potentially psychologically traumatic event as a barrier to care if a member is under investigation by the Special Investigations Unit. This participant reported that officers could not engage with people not involved in the event until after the Special Investigations Unit interview under the *Police Services Act*. According to this participant, members can be charged if they do not follow the *Act*.

Firefighters, paramedics, and police officers described struggling with mental health challenges as isolating due to not knowing how to talk to others about their mental health issues or symptoms. This resulted in feeling isolated, alone, and socially withdrawn. Participants' concerns that their mental health challenges would signal weakness to their colleagues and management served as a barrier to care. Police reported not wanting to show any weakness or vulnerability at work. Paramedics expressed concerns about appearing weak for reporting mental health problems after an incident when their partner was not affected by the same event:

There's also the stigma of seeing me and my partner go to a call that's traumatic, and the one person is completely fine, the other person is not ... if I go off work because this really bothered me, but that person doesn't, like do people think I'm weak? ... Do people think there's something wrong with me? ... if one partner's fine, the other isn't, there's that stigma as well ... that comes from peers, it comes from management, it comes from all levels. (Paramedic 4)

Gender was reported as a barrier to seeking mental health services by female participants across all sectors. Female participants reported gender-specific social barriers and perceived a need to appear "tough" or risk being discounted or taken advantage of.

Social/professional role and identity

Both firefighters and paramedics reported their perspectives regarding the duty to serve irrespective of current well-being. Participants reported that the duty to work came first, and any consequences were secondary.

Participants emphasized that the intertwined personal and professional identities must be accounted for when operationalizing mental health care for first responders. "We're the ones who go in and fix things ... for policing, it's a calling, and it's a career. It's not just a job, and it becomes part of your personality and becomes part of you" (Police 6). Participants also reported concerns about being stigmatized if they were seen accessing mental health care and expressed feelings of vulnerability when discussing having sought mental health care.

Emotion

All services reported emotional (e.g. anger, irritability), behavioural (e.g. increased substance use, decreased social interactions), and physical (e.g. poor sleep, impaired daytime functioning, decreased energy, nausea) impacts of cumulative stress from repeated exposure to trauma:

It affected my ability to treat patients properly. It's affected my ability to be professional. It's affected my ability to show up for work consistently. It has significantly affected me in every single facet. Physically, being a paramedic is a very physical job.... Being affected mentally ... it affects sleep, it affects strength, affects the ability to exercise, and take care of myself ... (Paramedic 3)

Beliefs about consequences

All sectors indicated that involving spouses or families at the right time in mental health treatment can have beneficial outcomes. Participants highlighted the value of having their spouses or family understand the requirements of a first responder vocation and being educated about the signs, symptoms, and potential solutions for mental health challenges.

Discussion

Among first responders, the most commonly reported barriers to overcome when

accessing mental health care included fears around confidentiality, lack of trust, lack of cultural competency in services, a lack of clarity about what services were available, how to access those services, and stigma within first responder organizations.

Concerns about potential disclosures causing stigmatization have previously been cited as the most frequent barrier to care.⁴⁵ The emphasis on stigma is consistent with past literature on barriers to care and mental health stigma and its impacts on help seeking and accessing care.^{12,18,21,22,45} The interviews suggest that stigma includes individuals' thoughts, feelings, and behaviours about mental health, and workplace policies and actions. The study's results also offer important insights that may be especially salient in informing concerted efforts to launch tailored interventions and services specific to this population to better protect and sustain their mental health and well-being over the short- and long-term.

The advantage of using a systematic approach based on the TDF is that it addresses a specific behaviour in a specific context (in this case, attending a First Responder OSI Clinic). Based on the results of this study, we have nine recommendations for encouraging attendance at such a clinic (Table 3).

The stigma around mental health must be addressed in first responder organizations. How this should be accomplished remains unclear; however, it is unlikely that just telling first responders about the signs and symptoms of mental illness is enough. This study suggests that educational content that also includes information about the long-term outcomes of mental illness may be helpful. The results serve as a useful resource for first responder organizations to inform service development and delivery of internal and external services. Information on treatment preferences and current treatment options could be utilized to address poor or ineffective treatment uptake and access to care. Areas for future research could include additional mental health training to increase knowledge, decrease cynicism among first responders, and confront unaddressed or lingering organizational-level stigma in first responder organizations, in addition to further research on a larger scale about how first responders wish to obtain mental health care.

TABLE 3
Recommendations to support first responders to access mental health care in study on factors to encourage help-seeking and accessing mental health care, Ottawa, Canada, 2019

1. Confidentiality	Be transparent about confidentiality and the limits of confidentiality when seeing first responders and other PSP, whether face-to-face or virtually.
2. Establishing policies and communication of key information	Establish written policies and information (e.g. posting FAQs online) on confidentiality, including security provisions for online platforms, where any notes are kept and their security, who can access these notes, and when confidentiality may be broken (e.g. if there is a concern related to harm to self or others).
3. Adoption of tailored approaches to physical space design or layout of services	Since participants had significant concerns about sitting in a waiting room with other clients, any mental health services specific to first responders and other PSP should adopt a tailored approach towards offering face-to-face meetings, discussions with potential clients regarding clinic design (i.e. physical layout and waiting room), and whether a uniform-free environment is appropriate. Potential additional suggestions for the physical space design or layout of services for maximum privacy and confidentiality include assessing whether sessions can be heard through vents or doors while clients are sitting outside a therapist's office and adopting the "two-door" approach. One door is designated as the entry point to enter an office, and the other is the exit point.
4. Clinic environment	Clinic administrative staff should be dedicated to sustaining a confidential and culturally competent environment.
5. Sector-specific training to develop cultural competency	Clinicians and administrative staff should receive didactic and experiential training regarding cultures and workplaces of first responders and other PSP to develop awareness, sensitivity, and the necessary skillset to work with this population. ⁴⁶ The most effective methods to accomplish these recommendations remain unclear. Some suggestions include ride-alongs; however, these can be time-consuming and require buy-in from the service or workplace. Clinic policies should also outline opportunities for additional training and supervision to support continued development of cultural competency.
6. Communication about accessing services	Specific policies should be established with different first responder and other PSP organizations. All PSP need to know how to access any clinics dedicated to first responders and other PSP, and to have clear information about what the clinic does and does not do disseminated through a dedicated website for that clinic.
7. Sick leave policies, entitlements, and navigating insurance bodies	First responder and other PSP organizations, as well as employee insurance bodies, need clear and accessible information regarding sick leave policies, entitlements, and how to navigate insurance bodies for mental health-related claims. This information should include detailed implications of doing so (e.g. impact on salary, pensions).
8. Inclusion of families	Involving families as part of any routine assessment should be standard practice.
9. Supports for navigating transitional periods	Clinics dedicated to first responders and other PSP should also design interventions to address role changes and transitions in identity during retirement and other transitional periods.

Strengths and limitations

The results underscore the pervasive and troubling nature of several barriers, particularly concerning the widespread and deeply entrenched nature of stigma in organizational settings. The results serve as a valuable resource for future research and organizations to inform service development and delivery of internal and external services.

Our study has several limitations, which we list here to help guide future research. The semistructured interviews provided an opportunity to gain in-depth and thorough responses from participants but these results reflect members' perspectives within the tri-services in Ottawa, Canada, and may not be generalizable to broader first responder populations. Replicating the study in other cities will inform mental health service delivery and identify organization-specific barriers to care. Additionally, given the small sample size and recruitment methods from tight-knit first responder services, protecting privacy and confidentiality

were paramount. As such, we omitted collecting certain demographic characteristics (e.g. race and ethnicity). A larger study would support assessing demographic dimensions investigating intersectional impacts of other determinants of health on barriers to accessing care in this population.

Conclusion

To the best of our knowledge, this is the first theoretically driven, structured qualitative study using an implementation science determinant framework to systematically examine barriers and facilitators facing first responders and other public safety personnel trying to access mental health services, specifically those tailored to their needs. Our results inform several recommendations for encouraging accessing mental health care, and provide a possible explanation of why, despite a high rate of mental health disorders in this population, some first responders do not access care. Establishing procedures that protect the confidentiality of first responders and

ensure the cultural competency of the clinic staff are potential targets. Other possible interventions include informing organizations about what is available, how to navigate and access mental health care, and the consequences of accessing care. Lastly, there is a need to test suggested interventions to target individual-level behaviour within complex systems, such as changing organizational policies that may reinforce stigma and act as barriers to seeking mental health care.

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Conflicts of interest

The authors declare that they have no conflicts of interest to report with respect to the research, authorship, and publication of this article.

Authors' contributions and statement

VT (Co-Principal Investigator), SH (Co-Principal Investigator), JJ, RNC, IC, AH, SL, DF, MJH, KT, DC—conceptualization, methodology. VT, AB (Research Assistant)—data collection. AB, VT, PB, ZC (Research Assistant), JM—formal analysis. VT—writing—original draft. All authors—writing—review and editing.

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Original qualitative research

“We are unique”: organizational stressors, peer support and attitudes toward mental health treatment among airport firefighters

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Abstract

Introduction: Airport firefighters are responsible for providing emergency responses to aviation incidents on a runway or in the vicinity of an airport, including airplane crashes, mass casualty events, emergency landings and many other concerns on airport grounds. While data exist on the occupational stressors of firefighters and public safety personnel in general, there is a gap in knowledge regarding the experiences of airport firefighters, particularly in relation to their organizational stressors, peer supports and attitudes toward mental health treatment.

Methods: We conducted two focus groups with 10 career firefighters working at an airport in Atlantic Canada in 2019. Focus groups were recorded; the recordings were transcribed and later coded using thematic analysis, which took an inductive, iterative, narrative approach.

Results: Airport firefighters face unique challenges, and operational stressors are overshadowed by organizational stressors. Additionally, peer support is an integral aspect of coping with both organizational stressors and critical incidents. Firefighters were found to have positive attitudes toward mental health treatment in general, but several barriers still remain, such as stigma, fear of being placed on leave and fear of confidentiality breach.

Conclusion: Specialized treatment options for public safety personnel and airport firefighters who engage in serious incidents outside of their regular duties are needed.

Keywords: *firefighters, public safety personnel, occupational stress, organizational stress, peer support, mental health treatment, stigma*

Introduction

Airport firefighters are responsible for responding to aviation incidents including airplane crashes, mass casualty events, emergency landings and many other concerns on airport grounds—they provide emergency responses to all incidents occurring on a runway or in the vicinity of an airport. While this may include fire suppression, it also extends to wildlife control, fighting wildland fires in spaces

adjacent to the runway, providing support in emergency medical events leading to emergency landings and coping with hazardous material containment failure.

As public safety personnel (PSP), airport firefighters are likely to experience a significantly higher number of exposures to potentially psychologically traumatic events (PPTE; e.g. explosions, serious transportation accidents, natural disasters) compared to

Highlights

- Airport firefighters are called on to provide emergency responses to all incidents occurring in the vicinity of an airport, exposing them to potentially psychologically traumatic events (PPTE) that may be exacerbated by organizational stressors.
- Airport firefighters respond to a wide range of calls, from assisting elderly passengers to killing wildlife on the runway.
- To investigate the experiences of airport firefighters as they relate to organizational stress, peer support systems and treatment-seeking behaviour, we conducted focus group discussions.
- Airport firefighters face unique challenges, and operational stressors (e.g. PPTE) are overshadowed by organizational stressors (e.g. conflict with management).
- Barriers to formal treatment exist for these firefighters, and findings reveal their preference for peer support.

the general population.¹ While these PPTE can undoubtedly contribute to mental health concerns among PSP, Ricciardelli and colleagues suggest organizational stressors (e.g. interpersonal work relationships, workload, scarce material resources) serve as an additional, significant source of stress for many PSP, and may exacerbate stress from PPTE or other operational stressors.^{2,3}

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Social support among firefighters has been shown to be beneficial for their mental health and well-being,^{4,5} as the camaraderie that is often experienced among firefighters is a protective factor against occupational stress.^{6,7} The absence of this camaraderie—seen in independent and contract firefighters, for example—can result in what Stanley and colleagues call “thwarted belongingness” (i.e. feeling as though one does not belong; the absence of reciprocal care).⁸ These authors found contract firefighters to be at an increased risk for suicide, statistically explained by thwarted belongingness.⁸ To fill the gap in knowledge about airport firefighting as an occupation, we qualitatively investigated the experiences of airport firefighters at an international airport in Atlantic Canada using focus groups. Our interest was both in the experiences of firefighters with occupational stress and in how firefighters at the airport related to one another—their understanding of camaraderie and social support—as can best be evidenced through collective discussion.

Jeannette and Scoboria indicate that firefighters exposed to more severe events express an increased desire for formal interventions.⁹ Given that airport firefighters may be subjected to extreme events and experiences, we also wished to explore their attitudes toward mental health treatment, formal supports and any barriers associated with seeking treatment.

Literature review

PSP involved in rescue operations for major disasters show higher prevalence rates for posttraumatic stress disorder (PTSD) than the general population, comparable to that of Vietnam and Iraq war veterans in the US.¹⁰ More specifically, rescue workers exposed to a mass casualty airplane crash were found to be at an increased risk of depression, PTSD and acute stress disorder compared to unexposed PSP, with 40.5% of exposed workers meeting the criteria for at least one diagnosis.¹¹ Such findings suggest rescue workers of mass casualty events and other major PPTE face unique occupational stressors with a multitude of impacts on personal wellness.

Occupational stress, or stress experienced as part of employment, can be categorized as either operational and unavoidable, or organizational and preventable.³ Organizational stressors such as tensions with

co-workers and management, shift work and resource limitations have been deemed a contributing factor to psychological distress in PSP, often superseding operational stressors.^{2,7,12} A possible explanation for organizational stressors overriding operational is that the latter may be perceived as a tough but rewarding part of the job, while the former results from bureaucratic rules and regulations, leaving PSP feeling resentful.¹²⁻¹⁴ Operational stress is also considered inherent to fulfilling occupational responsibilities—it’s what one “signs up for”—but organizational stress is avoidable, a collateral consequence of the job, and should be preventable.³

Existing literature, however, does not extend to firefighters responsible for working mass casualty, aviation and other major incidents, such as those employed by airports. Therefore, it remains necessary to discover which organizational stressors are most bothersome for firefighters working at an airport, and how these stressors are experienced relative to stress associated with PPTE.

Informal social and peer support has been found to be a coping mechanism of choice for firefighters.^{9,15} Higher levels of firefighter peer support remain associated with lower levels of occupational stress.¹⁶ Like other PSP, there is a camaraderie associated with firefighter culture, which Tuckey and Hayward define as “feelings of belonging, a sense of shared identity, reciprocal trust and the strong positive bonds that exist within cohesive work groups”^{17,p.6}—a group cohesion that helps mitigate emotional demands at work.^{6,17}

We build on this notion of camaraderie with the concept of the “kitchen table phenomenon”: the kitchen table in a fire station serves as a focal point to which firefighters return after a call and can find unspoken but implicit, reciprocal, social support that enables informal debriefing after critical incidents to alleviate the effects of occupational stress. The kitchen table becomes literally and figuratively a place to heal, acting as a distinct protective factor for firefighters within the public safety community. Firefighters generally do not experience thwarted belongingness due to the substantial social support they receive from one another.^{5,8} Informal peer support by way of the kitchen table may combat occupational stress and even

facilitate formal treatment-seeking.^{7,18} The level of peer support for airport firefighters, however, remains unknown, as is the role of peer support in easing organizational stress.

Another option for coping with occupational stress is formal supports, including employee assistance programs (EAP) and critical incident stress debriefings (CISDs). Gulliver and colleagues found that 81% of their firefighter respondents had been offered mental health services by their employer, but 68% of the total sample would not recommend these services to their colleagues.¹⁵ Sixty-seven percent (67%) of firefighters said they would seek outside support from friends and family, while 60% indicated they would seek private professional services.¹⁵ This is consistent with studies showing that social support is the preferred coping mechanism for firefighters after a critical incident.¹⁹ Conversely, there is evidence to suggest that the more severe a critical incident is for firefighters, the more desire there is for formal interventions such as CISDs.⁹ Since airport firefighters have the potential to be subjected to severe PPTE, it remains critical to examine the formal supports available to them, as well as their attitudes toward these supports.

Firefighting is a rescue profession, which may impede firefighters from asking for help for their mental health and well-being.¹⁸ Researchers identify unwillingness to show perceived weakness as one of the primary barriers to treatment-seeking among a sample of firefighters and paramedics.¹⁸ Another major barrier to treatment is stigma.²⁰ Firefighters report stigma, particularly that tied to mental health, as a barrier to mental health care, more so than other structural barriers, including cost and need for leave.²¹ Additionally, lack of confidentiality and clinicians being unaware of the work culture are notable barriers for firefighters in seeking intervention.¹⁵

The study of the treatment-seeking behaviour of PSP is necessary because research indicates this population may be neglecting their mental health needs. For example, following the Oklahoma City bombing, 181 firefighters were interviewed about their coping mechanisms.¹⁹ Though 72% of the sample reported feeling upset by encounters with children’s remains, only 16% received mental health treatment outside of CISDs.¹⁹ This suggests that

firefighters exposed to serious incidents, such as mass casualty events, might not be receiving the help they need beyond mandatory debriefings. Lacking in the existing research is a qualitative approach to exploring the unique experiences of airport firefighters, the associated organizational stressors and peer support they experience and their attitudes toward mental health treatment.

This study

In our study, we sought to expand knowledge of the personal and in-depth experiences of career airport firefighters and their organizational stressors, interpretations of peer support and attitudes toward mental health treatment using focus groups. Our analytic approach was narrative, and we were keen to unpack how group-based conversation (i.e. in focus groups) encourages accounts that are reflective both of personal experience and of the interconnected social contexts (e.g. informal peer support) in which airport firefighters are, or are not, embedded in their occupational work.

Methods

Ethics approval

Ethics approval was received from the Health Research Ethics Board at Memorial University of Newfoundland (#2018.056).

Procedures

To investigate the realities of organizational stressors and the associated informal peer support—two factors that collectively influence firefighter culture—among airport firefighters, we conducted two focus groups in 2019. Our sample included 10 career firefighters, who self-identified as male ($n = 9$) and female ($n = 1$). There were no pre-existing relationships between the participants and researchers. We recruited participants from an international airport in an Atlantic Canadian province by informing the regional director about the study.

The regional director for airport fire then emailed a notification of the time and place of the focus group to their staff, some of whom elected to participate in a focus group. All participation was voluntary. Signed consent forms were collected at the start of each focus group as well as participant demographic information and information about their occupational tenure,

position and experience (Table 1). Discussions ranged from one to two hours in length; one or two of the authors acted as facilitators. Focus groups were held onsite during work hours. The participants' employer was not present during focus groups and was not privy to whether a staff member participated.

We recorded audio of the focus group discussions, which was then transcribed verbatim; to aid in comprehension and help protect confidentiality, we edited quotes for grammar and speech fillers, without impacting vernacular. We did, however, edit out any "sayings" or details that might identify the speaker to protect the confidentiality of our participants. Participants were not given the opportunity to review the transcripts, as is common practice with focus groups of diverse sizes.

Given that the overarching study was focussed on barriers to mental health treatment-seeking, and that we were asking specifically about PPTE exposure and organizational stressors, we maintained awareness of the sensitive and possibly private nature of some emergent topics. We analyzed transcribed data using an inductive, iterative, narrative approach. We manually highlighted themes as they emerged (i.e. we did not use QSR NVivo and instead used Microsoft Excel and highlighting markers).

We first coded for operational stressors, organizational stressors, peer supports and attitudes toward mental health treatment-seeking more broadly, then we applied a focussed coding strategy to interrogate patterns across responses.²² The process allowed us to capture full narratives, each coded independently, within its context. We unpacked how the organizational stressors and informal peer support interconnected, and how the absence of their interconnection could be challenging and could result in the removal of a possible supportive factor from the firefighter work environment. The authors worked collectively on unpacking themes and synthesizing data, discussing themes of possible contention and ensuring agreement on coding processes and categorizations. We chose this method of analysis because themes were emergent and non-preconceived, and we elected to have the data lead the analysis.^{22,23}

TABLE 1
Demographic characteristics of airport firefighters, study participants from Atlantic Canada, 2019

Baseline characteristic	Airport firefighters	
	n	%
Gender		
Women	1	10
Men	9	90
Marital status		
Single	1	10
Married	7	70
Divorced	1	10
Common-law	1	10
Children ^a	9	90
Highest educational level		
High school/some college	2	20
Trade	4	40
College degree	3	30
University or postgraduate degree	1	10
Organization tenure (years)		
1–10	2	20
11–20	4	40
21–30	3	30
31–40	0	0
41 or more	1	10
Age range (years)		
25–34	1	10
35–44	1	10
45–54	5	50
55–64	3	30
Ethnicity		
White	10	100

^a Reflects the number and percentage of participants with children.

Results

The inductive, iterative and narrative approach to data analysis revealed four broad themes surrounding the experiences of airport firefighters: organizational stressors, the use of formal supports such as EAP, peer support between firefighters and firefighters' attitudes toward mental health treatment.

Organizational stressors for career firefighters at the airport

The experiences of career firefighters working at the airport are similar to other paid fire departments; however, several

unique stressors are present due to the “multifaceted operation” (P9), meaning there are many airport employees across numerous trades, such as electricians and maintenance technicians, all within the same work environment. Tradespeople serve as co-workers for the airport fire team, but participants reported them as often being a source of stress. Participants explained a bothersome assumption many people outside of the fire department make: that firefighters are getting paid to sleep.

You hear gestures like “Bunks in the firehall. [Firefighters] got a place to rest on a twenty-four hour shift. We’d like to have beds in our department.” ... “Well you got the effing bunks in the firehall! You slept last night!” (P9)

The words of participant 9 echo those of other airport firefighters. Such characterizations fail to recognize how little opportunity for rest exists at the airport during shifts. When other tradespeople go home at the end of the workday, airport firefighters are left to respond to emergencies at all hours of the day and night on their 24-hour shifts, merely occupying bunks if they get a break as opposed to sleeping. One firefighter voiced this concern:

Other departments might look at us and say “Oh, they’re sitting around, or they’re doing this” which we’re not. I mean we’re working, we’re doing training, you know, we have daily duties to do just the same as anybody else. But it’s just the misperception about the firehall, and, uh, other departments ... they don’t fully understand the impact of our job and what we actually have to do, or what we could have to do. Just because we’re not out there running with hoses and fighting fires every day, they think, you know, the whole perception is that “They don’t do anything.” And most days we’re flat out. I mean, the captain would know, and myself we’re here in the nighttimes, probably 11:30 at night just trying to catch up on the logs and stuff you’ve done that day. Sticky notes, I got sticky notes all over the place just trying to fill in any gaps in between your calls. The last shift I worked, I did a thirty-six-hour shift, five calls in that thirty-six hours, which was a lot... compared to most shifts you might

get one or two here and there. But there’s five in a thirty-six-hour period. Needless to say, when I got off that morning I was pretty wiped out, like, you know, I’m tired. (P3)

In the above quotation, the firefighter expresses frustration with airport co-workers and describes feeling devalued despite the many tasks they are responsible for on each shift.

The most frequently mentioned stressor for the airport fire team is the full and diverse balance of activities and responsibilities within the ongoing workload, as well as the unpredictability of the job and potential for surge in response requirements. In a given day, the airport firefighters describe having to juggle everything from helping with lost baggage, violent threats, unruly passengers, emergency landings, medical calls—even to dispatching wildlife on the runways. Participant 7 shared a glimpse of what it is like to be responsible for so much and to feel torn between jobs:

We’re responsible for clean runways and no wildlife. So you’re in the medical truck and you’re [told] to hold short of a runway you’re going down and all of a sudden you’re distracted because the captain calls you on another radio and says “You got a medical call at the terminal.” How, all of sudden, you’re supposed to be holding short of a runway? If you go over that line, this guy here in the tower, he’s giving you a pile of shit. And rightly so. There’s two hundred people coming in on an aircraft and you went over a hold short line. So, like, something so simple as that can be a massive stressor. (P7)

As described above, the intense workload of airport firefighters is an organizational stressor for them. They are also in the unique position of being what participant 5 calls “armed firefighters” because they are expected to carry guns through security onto the runway in order to eradicate any wildlife threats.

So if we’re going out for wildlife we gotta go ... screening the vehicles because that’s what Transport Canada says, and he’s coming out and checking me and I have a pump-action twelve gauge and two boxes of shells

there! And I’m like “Well, what are you checking me for? Cause there’s a gun right there.” ... And I’m driving by all these flights, some of them are international flights going to Ireland, and I’m driving ten feet away with a twelve gauge. You know, you just scratch your head and say, “We are unique,” right? (P2)

Participant 2 describes the task that sets airport firefighters apart from most other PSP: the potential to have to take the life of an animal to ensure safety and security at the airport. Clearly, being an airport firefighter comes with diverse tasks beyond firefighting, responsibilities such as dealing with wildlife.

Despite their seemingly never-ending workload, firefighters continued to mention feeling undervalued by the airport employees around them, with one participant giving a harsh example of what another airport worker thought of the firefighters:

I have to say that, in the airport system, I have never felt as degraded as an emergencies service worker as when I have with my co-workers here at the airport.... I was at a concert two weeks ago having a great time with my wife and my family. And I had a young fella come over and say ... “The firehall does fuck all at the airport!” ... Then you gotta lace your boots up and come in in the morning and respect your co-workers. And I do, because it’s the right thing. But there’s always in the back of my mind, like I said, that bothers me big time. (P9)

Another firefighter, participant 7, agreed, stating they feel as though there is a target on their backs even though “we’re all working for the same organization.” Participants described feeling deeply affected by these comments, highlighting the emotional toll that frequent devaluation, degradation and humiliation can have on an employee.

Sadly, an organizational stressor airport fire teams frequently addressed is “minimum staffing”; there are often not enough staff working on a given shift to meet their occupational responsibilities in a safe and effective manner. Participants described feeling frustrated with management while

trying to voice their concerns about minimum staffing. Participant 7 described the situation as being able to relax when a full crew is on that day, adding that it is helpful to know responsibility is being shared and that “there’s a buddy going with you” when the time comes to respond to serious incidents and medical calls.

The same participant further described the stress of not having a full crew on a given day, explaining the pressure of being the only one responding to an incident, which they describe as difficult, isolating and overwhelming. Participants appreciated how helpful it is to have another colleague to share ideas and problem-solve with: “Me and John are going on a medical call, we can bounce stuff off each other and we can support each other, you know?” (P7). Not having staff available is experienced as detrimental, not only for operational efficiency but also to support the mental health of firefighters. Thus, staffing requires structural and systematic change; as participant 9 suggested, there is a “twenty-five percent turnover” rate at the airport.

Airport firefighters are held responsible for an array of tasks simultaneously (e.g. responding to emergency landings, medical calls and mechanical issues; assisting elderly passengers; eliminating wildlife on the runway; weather checks; driving tests; etc.). Participants suggested that an expectation exists among other airport employees and those assigning the tasks, who perceive firefighters as having an abundance of free time. As a result, firefighters are assigned a plethora of extra tasks—described as enough to fill a new full-time position. Not only are airport firefighters expected to respond to an unpredictable and unknown number of calls, they are now tasked with completing a multitude of other duties in addition to the potential threat of a major incident. A firefighter explained that they do not just feel devalued, but this workload is preventing firefighters from a core part of the job: training for possible events that weigh heavily on them, such as mass casualties.

And so, you know, it gets you away from what you should be doing, which is training harder, training more intense, training for any events ... and the problem is you can’t sit down and get your training, and you can’t get a refresher on this and that

and the other stuff. Why? Because somebody’s always gone out the fire-hall doing the other duties. (P10)

Participant 6 described the heightened anticipation of such events in the present day, as there is an exponential increase in the amount of fuel and passengers:

When we respond to an incident, we are probably the only ones dealing with mass casualties. And that is a big difference than with structural firefighting and that, you know, when we roll on an incident we can anticipate mass casualties.... When we respond here we’re on our own to some extent, so basically there’s a decision we make, when we talk about stress and everything, the decision that each one of us will make at that scene, at that incident, is certainly going to be—determine a final outcome, so that’s stressful.... We’ve been talking about how things have changed, you know with regards to the medical end of it and ... I go back, thirty years ago we had an aircraft ... probably with ninety-seven people on it, X amount of fuel. Today we have airplanes—and our trucks and our response hasn’t changed but we have three times the number of passengers, three times the amount of fuel. Yet we’re dealing with the same equipment, same man power as what we had thirty years ago. (P6)

In the above excerpt, participant 6 details what it feels like to experience anticipatory dread when responding to an incident, compounded by the fact that sometimes they have to do it alone. With an evolving airport and the unpredictability of each call, they constantly worry what they might face and how they will do it with minimal resources. Likewise, participants discussed the unique threat of “communicable disease” (P4) as they are often “the first point of contact” (P3) with passengers from all over the world. Evidently, the unpredictable nature of the heavy workload is a significant stressor for airport firefighters that is made worse by limited resources.

Additionally, firefighters appear to miss training opportunities; for instance, participant 6 mentioned that conferences and workshops were “a thing of the past for us,” that equipment had not been updated

since the 1980s and that technology was lacking. The theme across the airport focus groups suggests that, for every operational stressor such as responding to emergency medical calls, there are a number of organizational stressors—including human and material resource limitations, conflict with airport co-workers and management and feeling devalued as an employee—that otherwise might not be experienced in a typical career fire department, working for municipalities.

Formal supports

As part of the focus groups, airport firefighters were asked about their experiences with formal supports offered to them by their employer. The overall response was neutral to negative. Several participants suggested the EAP, which covers only some of the cost of mental health treatment, gives airport firefighters insufficient help and is not trauma informed.

One thing with the program though, some people used it and said it wasn’t enough. They got through those five or six sessions ... and they needed more and then they had to pay for it out of their own pocket. That was a little bit of an issue. (P1)

Participant 1 describes the limited funds allotted for counselling by the employer under the EAP, which usually consists of approximately six therapy sessions. Given that clients with higher levels of stress may require more sessions to show clinically significant change than those with lower amounts of stress, it is likely that firefighters would need more than six sessions to show significant change.^{24,25} Participants also felt that the EAP is too formulaic and fails to allow firefighters to spontaneously ask for help:

Well, you know, this EAP program and stuff, it’s a resource we can use, but when you’re categorized by an appointment that you have to show up to at a certain time and then you get in there and ... you know, at the one-hour mark ... like, this shit don’t take an hour. You know what I mean? Then go away until next week. (P7)

The participant draws attention to session limitations in both duration of each session and the overall number of sessions

that negatively affect their recovery. Across both focus groups, the overarching attitude toward EAP was that some firefighters have benefited from EAP, while others have not. Participants did feel the service has improved and is better than nothing, but maintained EAP was insufficient in addressing their complex needs. Their experiences suggest airport firefighters need a more tailored approach to treatment support, that is, the opportunity to seek treatment when they perceive the need for it, in ways that are convenient and accessible and from what they perceive to be a reliable provider.

Informal or peer supports

To cope with the negative comments being made by airport employees in other departments, firefighters turn to each other for informal support.

They know that we're a really tight-knit group. And that's one thing that they, people in other departments, have commented on, saying "My god, every time I walk in here you all get along so well." But if you walk through the door some days it's not that, because we do have our times that we've been nose to nose and just, whatever, just kind of butting heads. But in the fire service there's an understanding, and you have to have that comfort there that we know that if that alarm goes, me and Jeff could be having out right here just tit-for-tat, just disagreeing on something, which we have. But if that alarm goes, when we go out there I know that he's got my back and I've got his. And you have to have that, right? (P3)

The firefighter reveals a sort of camaraderie across colleagues—the idea that, no matter the stressors faced at work, whether they are organizational in nature or incidents that are inherent to the job, firefighters have each other to rely on. Participants of both focus groups spoke of immense trust within their support system, which we identify as an integral aspect of the kitchen table phenomenon—the closeness that emerges around the kitchen table when all discuss their work and personal lives as well as any challenges they may be facing.

Another aspect of peer or informal support is operational debriefs offered by management (e.g. critical incident stress debriefings [CISDs]), typically occurring after a serious incident. CISDs have been associated with decreased stress levels in firefighters in the crucial weeks following a potentially psychologically traumatic incident.⁶ Our participants expressed positive views of debriefs:

Everyone's reaction is different for this kind of stuff, but I think those initial few hours just after the incident or event are key hours. So if someone's trained to handle the emotions in those few hours, it's key. So I find them, personally, that they work really well. (P4)

Participant 4 here describes the benefit of having immediate support right after a critical incident, especially from somebody beyond management—a peer—who is familiar with psychological trauma and the associated emotions. The support comes from experienced peer counsellors and other firefighters, which this firefighter explained is a helpful way to fill the gap between an incident and a formal clinical treatment session:

In that gap between the incident and when EAP will come in, like we have to phone EAP and if it's a Saturday morning they'll leave a message and get back to you within X amount of hours, but there is a gap. So we bring these guys in for diffusing a meeting after certain traumatic events. So we try to fill in that gap right away if we need a counselling session after a call and that works really well too. There's peer counsellors in the region, firefighters trained in peer counselling that we can avail of as well, with all those sessions. (P4)

The firefighter acknowledges that debriefs are meant to be a temporary, immediate intervention after an incident, when counselling is not yet available or clearly deemed necessary. Not all airport firefighters, however, have had the opportunity to experience the potential benefit of debriefings. For example, participant 1 said, "I've never had one actually," referring to a CISD. For those that had participated in CISDs, the consensus was that they need something "beyond the shift debrief" (P1). To exemplify:

We would have somebody come in here initially to talk, have a debrief, you know, something initially. And then, after that, depending on how the individual feels, I might need some other—someone else to talk to. (P3)

Taken together, participants' words reveal CISDs are generally valued, informing the immediate well-being of firefighters; however, as suggested in the literature, the potential benefits of CISDs are limited and should be further supplemented by regular treatment from a mental health professional.⁹

Attitudes toward treatment and what airport firefighters want to see

Consistent with recent research on mental health stigma among firefighters, we found that attitudes toward mental health concerns have softened and become more accepting over the years.¹⁶ This is evidenced by the words of several firefighters, including participant 7, who stated that "people are starting to be more open about [mental illness] and not be embarrassed about it." However, some level of stigma still exists for firefighters who access psychological help, related to how co-workers perceive those who do seek treatment.

I've certainly seen over the years, you know, there's seven or eight of us now, and someone says, "I need help," and for sure someone else in those old groups says ... "suck it up." We see that lots, like, "Stop being such a wuss ..." (P6)

Participant 6 describes here an age-old story of being dismissed and shamed when expressing a mental health concern at work. Such attitudes internally reinforce the stereotype that firefighters should be strong, stoic and able to cope with any PPTE. When we asked firefighters what would be the preferred location for a mental health treatment clinic, many respondents answered with "offsite," clearly indicating a need to distance treatment from work, which reconfirms the presence of stigma. A participant explained the reason for offsite treatment, saying:

I think if you're going over to the office somewhere and the shrink's in today and someone goes in there for

an hour or two, and next week they're in there for another hour, people ... you know? (P2)

Participant 2 alludes to the stigma of colleagues judging firefighters seen availing themselves of mental health services within the department. Across focus groups, participants talked about their reluctance to acquire communal resource materials, such as an EAP brochure displayed in the firehall, out of fear of co-workers seeing them collecting such information. These feelings of shame and the need for secrecy supports that there is a perceived mental health stigma among firefighters, despite their robust informal peer support network. Notably, however, the perceived stigma may be unwarranted, as many of the respondents spoke highly of the mental health professionals they have spoken to, with some individuals voicing positive attitudes toward treatment: "If we experienced a major incident here, I think we'd be only too happy to step up and see somebody" (P6).

Conversely, participant 9 indicated they felt "ashamed" for receiving counselling years earlier. Since perceived stigma has been shown to induce internalized stigma, it is possible some firefighters foster their own negative attitudes toward treatment as a result of what they assume others around them will perceive.^{26,27}

When we asked the firefighters how the stigma around accessing services could be eliminated, a firefighter responded: "You'll never get rid of stigma" (P2). Demonstrating the diversity of answers, another respondent replied:

Just talkin' about it. You know, around the lunch table.... Like, it's okay to feel sad sometimes, it's okay to feel anxious and anxiety, and it doesn't—I keep reiterating with the guys, you know, it's okay ... if someone feels that comfortable enough to come out and say, you know "This is how I'm feeling." Or that "I do have a bit of anxiety," or, you know, "I feel really depressed someday that I really, you know, I don't want to come to work or I don't feel like I can function at work." That's okay. If they feel like talkin.' (P3)

The kitchen table support system may reduce stigma by normalizing discussions

of mental health and serving to start breaking down treatment barriers, such as the frequently discussed fear of being placed on leave as a result of confiding in mental health professionals. Several participants expressed their hesitancy to seek formal support and share their mental health challenges with professionals, fearing they might be placed on disability or sick leave, lose their pension, be terminated or be excluded from opportunities for promotion. To exemplify, participant 2 said:

Well and there's worry that it might open a can of worms that someone's physically okay, but through this they find out you're not okay, what does that mean? You go off, you gotta find another job? You go on disability or sick leave? So, I guess saying be careful what you wish for there.

When asked whether a psychological screening or check-up might aid in early detection of mental health problems, participant 2 continued to describe their hesitancy to partake in screenings. What should be a source of support for their stressors, mental health treatment, instead appears to perpetuate the organizational stress of job security. There is the additional worry of how seeking treatment might affect financial stability:

If the true diagnosis is given and someone is at the stage where, you know, perhaps they need to make some life changes—years ago in uniformed systems there used to be early retirement options. The military might still have it. But today, in the world, everything is getting away from defined benefits pensions, the security of one's family is being jeopardized, so the reluctance to go to a doctor is still there. Like, do I go and push everything out here? Uh, and potentially lose my income for my family? (P9)

Participant 9's words sparked a larger conversation about how mental health professionals should care for PSP. Advocating that more emphasis on how clients can cope with their stress and live healthy lives while still working on the job is warranted. Here, participant 6 remarked:

I was told by a psychiatrist then that I should not be subject to such trauma

ever again. So what were they going to do with me? Retire me? ... There's no difference now, we got an incident here now with mass casualties, I know that we have people here that it will affect differently. So what do we do with those people? Do we—do they come back to work as firefighters, paramedics?

Although many respondents reported positive experiences with certain mental health professionals, legitimate concerns associated with treatment remained. Specifically, confidentiality is necessary and demanded by participants, given their concerns with trust or, more accurately, the breach of trust.

When discussing what they would like to see as clients availing themselves of mental health services, participants keenly hoped to be seen by professionals that emphasize the importance of confidentiality and continuity of care. Several respondents suggested that the six-session model loosely tied to the EAP does not suffice.

There has to be this trust there that there's not nothing I can't tell you. If it's why I'm feeling this way, or how come I'm feeling this way, but that's not somebody that you can talk to tomorrow or next week when you pick up the phone he's moved on. Whatcha gotta do then? You gotta backtrack and start right back at the first page again ... you get this far up the scale and oh, they're away on holidays for two weeks. So there has to be something ... a permanent structure where you can get into a relationship with a counsellor, a psychologist or an individual of that nature, or whatever this team is, and they know of you. That you're not just that piece of paper. (P10)

Participant 10 describes continuing care with the same provider as invaluable, contributing to a sense of stability, trust and support. The same firefighter also explains that time is required to fully open up to a treatment provider, which is not possible with limitations on sessions. In essence, relationships are just starting to blossom when the sessions are complete and much is left unresolved in terms of mental health support. Participant responses suggest a full-time mental health professional dedicated to treating firefighters would be

welcomed and necessary on a regular basis. Another firefighter pointed out, “Proactive and reactive are two different things” (P7) and that psychological support is needed both consistently and in cases of emergencies, such as mass casualty incidents. In terms of the latter scenario, participant 10 suggested a sort of mobile crisis support team might be beneficial:

Okay, let’s go to the mass casualty incident when we’re here for a week or ten days. Well, it needs to be the airport authority to have retainers in place for hired guns that come out here and deal with us right when we’re off the field for ten hours before we go through the door ... however many individuals, you could have six, seven firefighters here on an individual day working overtime, and the regular crew ... after being in that stuff for ten, twelve hours and then they’re going home to their families. They should be here before we leave the premises ... this timeframe of two weeks of the incident being all over, and it’s all done and saying “How you making out with it all?”

In the above quotation, participant 10 was describing an on-scene mobile response team to treat firefighters after a mass casualty. This participant felt that immediate structured and clinical support, beyond general CISDs, is necessary before airport firefighters return to their homes and families. The practice may help minimize the risk of burnout and potential withdrawal from family.

Across both groups, perhaps the most frequently mentioned desire for treatment was 24/7 accessibility. Firefighters spoke of how they want the ability to reach out to a treatment provider, voluntarily, whenever they feel the need to talk.

I know they have all these crisis hotlines and suicide hotlines and stuff like that. You know, even just looking at in that perspective, you know, the twenty-four hour access. That someone could get up at two o’clock in the morning and not be able to sleep or something’s bothering him, just to be able to pick up that phone and get the hotline just to kind of get someone to help them through that moment, right? You know, until they

can get directed in a way to get some help. (P3)

Giving this population access to mental health support on an as-needed basis would not only address the immediate concerns of firefighters, such as the inability to sleep in the case of participant 3, but would also help give firefighters more autonomy over their treatment-seeking behaviours. Regarding accessibility, firefighters were asked about online access to therapy and other mental health resources. Participant responses here were mixed, with some firefighters expressing interest in being able to speak to someone from the comfort of their own home. Others, however, believed the online option would not work for everyone, specifically older firefighters who are less technologically savvy. Ultimately, the consensus was that there should be a mix of online and in-person support:

In some of those remote areas they don’t have the resources like in a major city, like we would have here probably at our fingertips. So, having something province wide that people could avail of, and you don’t have to physically be within five or ten or fifteen minutes of the facility of some sort. But having that option there as well, it could be a walk-in service, an appointment, a hotline, a video conference, just something to kind of help you get through. (P3)

Additionally, what most participants desired was an affordable, offsite clinic that is specifically for treating various types of PSP. Most agreed that there are shared stressors among firefighters, police, paramedics, etc. Employing treatment staff with an understanding of these stressors and the environment that comes along with being a first responder was also frequently requested. Participants suggested PSP could have their own space to discuss a range of stressors, from operational incidents to family life, in a specialized clinic. Participant 3 described the hypothetical clinic as a “comfort area where people can open up and talk about it and get the help, direction, you know, that they need. Early on, as opposed to, they gotta go off work, you know?” To further justify the need for such a clinic, a firefighter explained, “We are unique, we are different, and that, yeah, there certainly should be some speciality for mass casualties” (P6). Overall,

airport firefighters indicated that they need specialized mental health supports to account for their distinctive operational and organizational stressors.

Discussion

We sought to examine the individual and group experiences of airport firefighters as each relates to their organizational stressors, peer supports and attitudes toward mental health treatment. As we discovered, not only are these firefighters responsible for responding to unpredictable, serious and PPTE on a mass scale (which in itself is a stressor weighing heavily on them), their everyday workload comprises an abundance of extra duties such as interacting with vulnerable and unruly passengers, fielding emergency landings and clearing the runways of animals—the latter is particularly unique. It is worth noting that, although participants lightheartedly joked about their role as “armed firefighters,” killing birds and animals is a concept that they repeatedly mentioned, and should be thought of as potentially psychologically traumatic.

Further, we found that organizational stressors manifest differently in airport firefighters than in municipal firefighters; participants reported heightened conflicts with employees working in different areas of the airport, with one point of contention being the perception that firefighters are paid to sleep on shift, which they vehemently disproved. The persistent negative comments made by airport employees have a significant effect on the firefighters, and might even be considered a form of “workplace mobbing” (i.e. the harassment of a co-worker by other members of an organization, resulting in the devaluation and degradation of the target).²⁸ Feeling devalued and belittled as employees, coupled with other organizational stressors such as human and material resource limitations, was frequently mentioned by participants and seemingly overshadows operational stressors.

Consistent with prior research, we found that peer support is immensely beneficial for firefighters coping with organizational stress.^{4,16} Specifically, airport firefighters provide each other with support in dealing with conflict between themselves and the other airport employees. Firefighters greatly benefit from peer counsellors leading CISDs because of their shared

experiences and understanding of firefighter culture. However, participants agreed that peer counselling should be used to fill the gap between critical incidents and clinical treatment, but not as a replacement for clinical treatment, because both are helpful and necessary.

Lastly, we found that there was a desire for formal mental health treatment among airport firefighters, but several barriers exist: stigma, fear of being placed on leave and fear of confidentiality breach. Airport firefighters expressed interest in a specialized mental health clinic for public safety personnel that is affordable, offsite, available 24/7 and staffed with professionals who understand the associated occupational stressors. Although organizational stressors have a greater impact than occupational stressors, and barriers to treatment remain, it is evident that peer support serves as a healthy coping mechanism for firefighters, and it facilitates treatment-seeking by breaking down some of these barriers. Specifically, the kitchen table phenomenon is a protective factor against both operational and organizational stressors, and it also helps to soften mental health stigma as firefighters share their personal thoughts, feelings, emotions and experiences in a group setting that is bound by safety and trust. However, knowledge is still lacking as to how stress and mental health treatment-seeking interconnect—an area for future inquiry.

Strengths and limitations

To our knowledge, this is the first qualitative study examining the well-being of airport firefighters—a unique subgroup of firefighters who respond to aviation incidents from emergency landings to mass casualty events, and everything in between. Our study is limited by the sample size; thus, we caution against any generalizability of our findings—as is the norm with all qualitative research. In addition, we were unable to do a gender analysis given the small number ($n = 1$) of women in the study and thus future research with a stratified and larger sample is warranted. All data were collected from one international airport in the Atlantic Canada region; additional research including more airports across more jurisdictions would help support our findings and lead to more robust conclusions. Additionally, given that stigma was identified as a barrier to formal support for participants, a potential limitation exists in the use of

focus groups. Individual, semistructured interviews with airport firefighters might be an intriguing line of future inquiry, to examine whether participants feel more comfortable discussing mental health treatment without their peers present.

Conclusion

We build upon the existing literature about public safety personnel and the occupational stressors they experience. Our qualitative study fills a gap in research on airport firefighters, whose organizational stressors have been deemed unique and call for specialized supports. While peer support remains a strong coping mechanism for airport firefighters, our findings reveal that they desire formal mental health treatment in addition to peer support, despite several barriers, primarily stigma. We also propose that barriers to treatment, such as stigma, can be improved by way of the kitchen table phenomenon. Future work should study more Canadian airports to gain insight into how organizational stressors vary, or do not, between airports, and how stress and treatment-seeking behaviours interconnect.

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Conflicts of interest

None of the authors have conflicts of interest to declare.

Authors' contributions and statement

BB—formal analysis, data curation, writing—original draft, and visualization. RR, HC—supervision, conceptualization, methodology, investigation, writing—review and editing, project administration, and funding acquisition.

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Original quantitative research

Canadian respiratory therapists who considered leaving their clinical position experienced elevated moral distress and adverse psychological and functional outcomes during the COVID-19 pandemic

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Abstract

Introduction: Respiratory therapists (RTs) faced morally distressing situations throughout the COVID-19 pandemic, including working with limited resources and facilitating video calls for families of dying patients. Moral distress (i.e. psychological distress when restricted from undertaking a known ethically appropriate course of action) is associated with a host of adverse psychological and functional outcomes (e.g. depression, anxiety, symptoms of posttraumatic stress disorder [PTSD] and functional impairment) and consideration of position departure. The purpose of this study was to understand the impact of moral distress and its associated psychological and functional outcomes on consideration to leave a clinical position among Canadian RTs during the COVID-19 pandemic.

Methods: Canadian RTs (N = 213) completed an online survey between February and June 2021. Basic demographic information (e.g. age, sex, gender) and psychometrically validated measures of moral distress, depression, anxiety, stress, PTSD, dissociation, functional impairment, resilience and adverse childhood experiences were collected.

Results: One in four RTs reported considering leaving their position because of moral distress. RTs considering leaving reported elevated levels of moral distress and adverse psychological and functional outcomes compared to RTs not considering leaving. Over half (54.5%) of those considering leaving scored above the cut-off for potential diagnosis of PTSD. Previous consideration to leave a position and having left a position in the past due to moral distress each significantly increased the odds of currently considering leaving, along with system-related moral distress and symptoms of PTSD, but the contribution of these latter factors was small.

Conclusion: Canadian RTs considering leaving their position due to moral distress reported elevated levels of distress and adverse psychological and functional outcomes, yet these individual-level factors appear unlikely to be the primary factors underlying RTs' consideration to leave, because their effects were small. Further research is required to identify broader, organizational factors that may contribute to consideration of position departure among Canadian RTs.

Highlights

- Roughly 25% of the RTs in our study were considering leaving their position in the spring of 2021 due to moral distress.
- Compared to RTs not considering leaving their position, those considering leaving reported elevated moral distress, functional impairment and adverse psychological outcomes.
- Previous consideration of leaving one's position due to moral distress, having left a position in the past for this reason, system-level moral distress and PTSD symptoms significantly increased the odds of considering leaving; however, the contribution of system-level moral distress and PTSD symptoms were each small.
- Broader, organizational issues may play an additional role in consideration of position departure among Canadian RTs, and is an area for future research.

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Introduction

Respiratory therapists (RTs) are health care professionals (HCPs) with expertise in cardiopulmonary (heart and lung) health.¹ As HCPs who work in a variety of settings (e.g. home care, community clinics, outpatient clinics, emergency departments, operating rooms and intensive care units) and care for patients of all ages,¹ RTs have played a vital role on the frontlines of the COVID-19 pandemic.^{2,3} Indeed, RTs have been at the bedside of COVID-19 patients, contributing to respiratory rehabilitation and physiotherapy (e.g. proning patients – placing those in respiratory distress on their stomachs), caring for patients' physical and emotional needs and guiding patients through recovery when discharge from hospital appeared possible.²

Like other HCPs, RTs had to work with scarce resources, especially during the earlier stages of the pandemic, while also being confronted with morally distressing events such as facilitating video calls between dying patients and their families.^{2,4,5} Moral distress is defined as the psychological distress that may occur when a HCP is constrained from acting in line with knowledge of the ethically appropriate course of action for a given situation.^{6,7} Moral distress is associated with a range of adverse outcomes (e.g. burnout, depression, anxiety, PTSD symptoms, functional impairment) and considering leaving one's position or profession.^{4,5,8,9} Despite emerging knowledge on the psychological and functional impact the pandemic has had on RTs,^{3,10,11} and growing concern over attrition rates among HCPs globally,¹²⁻¹⁵ little is known about the impact of moral distress and its associated outcomes on Canadian RTs' consideration to leave a position during the pandemic. Accordingly, the purpose of this study was to explore the impact of specific types of moral distress and associated psychological and functional outcomes on RTs' consideration to leave a clinical position due to moral distress during the COVID-19 pandemic.

Moral distress and turnover during the COVID-19 pandemic

Moral distress may have various root causes, including patient (e.g. performing

futile treatments at a family's request), unit or team (e.g. poor communication, bullying) and system sources (e.g. poor staffing, lack of adequate resources).⁶ Whereas at the individual level moral distress is associated with depression, anxiety, emotional constriction or detachment, guilt, grief and hopelessness, at the organizational level, moral distress is related to staff shortages, poor organizational culture and HCPs leaving their position or profession¹⁶⁻¹⁸ (see Burston and Tuckett¹⁷ for a full review of outcomes associated with moral distress). Furthermore, the effects of moral distress may increase over time as ongoing instances of moral distress and unresolved past moral distress (i.e. moral residue) may compound to impact individuals and organizations in an increasingly negative way.⁷

HCPs may be at an elevated risk for moral distress and its associated outcomes during extremely stressful times, such as a global pandemic. They may face a multitude of situations in which they are prevented from acting in line with their values.^{4,5,8,9,19,20} Indeed, at the outset of the pandemic, Norman et al.⁵ found that COVID-19-related moral distress among frontline HCPs in New York City stemmed from concerns for family, personal infection and work and was, in turn, related to PTSD symptoms, burnout, functional impairment and interpersonal difficulties in the workplace.

In an investigation of moral distress among over 7000 Australian HCPs between August and October 2020, Smallwood et al.⁴ found that the scarcity of resources, new PPE policies that limited their ability to care for patients, the exclusion of patients' family members and the fear of letting co-workers down should one become infected constituted morally distressing events for HCPs. Petrişor et al.⁸ found that greater self-reported moral distress was associated with greater reports of depression and anxiety symptoms among ICU nurses. Furthermore, system-level sources of moral distress (e.g. feeling unable to provide adequate care due to staff and resource shortages) were more greatly reported by ICU nurses who reported considering leaving their position when compared to their colleagues not considering leaving.⁸ In a related study among a sample of 129 registered nurses conducted in July and August 2020, moral distress related to patient care quality and safety,

as well as to issues in the work environment, predicted intention to leave.²¹

Falatah²² noted that predictors of pre-pandemic turnover among nurses included sociodemographic variables (e.g. age, sex, marital status, nationality), yet during the pandemic, predictors of turnover further included caring for COVID-19 patients, working in COVID-19 divisions, fear of contracting the disease, stress and anxiety. Other predictors of consideration to leave a health care position may include childhood adversity and dissociation, as childhood adversity has been associated with mental and physical challenges in adulthood^{23,24} and those reporting moral distress may also report emotional dissonance or detachment.¹⁷ Furthermore, resilience (i.e. the ability to bounce back in the face of stress) may be protective against moral distress among HCPs,^{25,26} yet at least one study has found that resilience is insufficient to buffer against moral distress among HCPs.²⁷

Study objective and hypothesis

The majority of the literature on HCPs' experiences with moral distress before and during the COVID-19 pandemic has focussed on nurses.^{8,21,28-30} RTs are also direct care providers who commonly face moral challenges and traumatic exposures, including performing and witnessing perceived futile care or being responsible for the removal of mechanical ventilation, resulting in patient death.^{31,32} Given the toll pandemic service has exerted on HCPs and growing concern over attrition rates in health care,¹²⁻¹⁵ there is an urgent need to understand RTs' consideration to leave due to moral distress and its associated outcomes. Accordingly, the aim of this study was to characterize the impact of specific types of moral distress and associated outcomes on RTs' consideration to leave a clinical position due to moral distress during the COVID-19 pandemic. We hypothesized that RTs considering leaving their position because of moral distress would report higher levels of moral distress, adverse psychological and functional outcomes and greater exposure to adverse childhood events, but lower levels of resilience when compared to RTs not considering leaving their position due to moral distress. We further hypothesized that moral distress, adverse psychological and functional outcomes, along with childhood adversity, would be significantly associated with increased odds of

considering leaving a position due to moral distress, whereas resilience would be significantly associated with decreased odds of considering leaving a position due to moral distress.

Methods

Ethics approval

This study is a part of a broader investigation of Canadian HCPs' experiences during the COVID-19 pandemic that was approved by the Hamilton Integrated Research Ethics Board (#12667).

Procedure

Canadian RTs were recruited to participate in an online survey through social media, emails from the Canadian Society of Respiratory Therapists (representing over 4000 RTs) and select hospitals across Canada. Participants had to have contributed to patient care in Canada during the pandemic to participate. RTs accessed the survey on Research Electronic Data Capture (REDCap)^{33,34} software between February and June 2021.

Measures

Demographics

The survey included a demographic form indexing basic demographic (e.g. age, sex, gender, current province/territory of residence) and occupational information (e.g. total years practising, occupational setting).

Measure of Moral Distress—Healthcare Professional

The Measure of Moral Distress—Healthcare Professional (MMD-HP) was used to evaluate moral distress.⁶ The MMD-HP is a 27-item, self-report measure that accounts for both subjective frequency of and distress associated with events. Participants rated their degree of agreement with 27 statements on two 5-point scales assessing (1) the frequency of exposure to an event and (2) the level of distress associated with the event, where 0 represented "Never/None" and 4 represented "Very frequently/Very distressing." Total scores were calculated by summing the product of the frequency and distress ratings for each item. Greater scores indicated heightened exposure to the event and elevated levels of moral distress (Cronbach α = 0.96).

Epstein and colleagues' four-factor structure⁶ including two levels of team-related

sources of moral distress was collapsed into three categories (i.e. patient, team and system) for the sake of parsimony, as per the design of Petrișor et al.⁸ Accordingly, the following subscales were considered in our analyses: patient-related stressors (e.g. "Continuing to provide aggressive treatment for a person who is most likely to die regardless of this treatment when no one will make a decision to withdraw it"); team-related stressors (e.g. "[Working] with team members who do not treat vulnerable or stigmatized members with dignity and respect"); and system-related stressors (e.g. "[Being] unable to provide optimal care due to pressures from administrators to reduce costs").^{6,8} Participants were asked about consideration to leave a clinical position due to moral distress both in the past and the present. The response options for the question "Have you ever left or considered leaving a clinical position due to moral distress?" were: i) "No, I have never considered leaving or left a position," ii) "Yes, I considered leaving but did not leave" and iii) "Yes, I left a position," as per the MMD-HP.⁶ The response options for the question "Are you considering leaving your position now due to moral distress?" were i) "Yes" and ii) "No," as per the MMD-HP.⁶

Depression Anxiety Stress Scale 21

The Depression Anxiety Stress Scale 21 (DASS-21)³⁵ was used to assess symptoms of depression, anxiety and stress. Participants rated 21 items on a scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time") with reference to the past week. The DASS-21 yields mutually exclusive scores for depression, anxiety and stress³⁵ (Cronbach α = 0.93).

Posttraumatic Stress Checklist 5

The Posttraumatic Stress Checklist 5 (PCL-5)³⁶ was used to measure the presence and severity of symptoms of posttraumatic stress disorder (PTSD). Participants used a 5-point scale ranging from 0 ("Not at all") to 4 ("Extremely") to rate their degree of past-month agreement with 20 statements assessing symptoms consistent with PTSD as indexed in the DSM-5³⁷ (Cronbach α = 0.94).

Multiscale Dissociation Inventory

The Multiscale Dissociation Inventory (MDI)³⁸ was used to measure features of dissociation. Specifically, only the disengagement and emotional constriction

subscales of the MDI were used for our study, given the theorized relation of these subscales to RTs' consideration of leaving their position.¹⁷ The MDI is a 30-item, self-report measure yielding six scales of dissociative symptomatology, including disengagement, depersonalization, derealization, emotional constriction, memory disturbance and identity dissociation. Participants rated their degree of past-month agreement with 30 items on a 5-point scale ranging from 1 ("Never") to 5 ("Very often") (Cronbach α = 0.95).

World Health Organization Disability Assessment Schedule 2.0

The 12-item version of the World Health Organization Disability Assessment Schedule 2.0 (WHODAS)³⁹ served as a measure of functional impairment. The WHODAS captures health-related disability across six domains of functioning, including cognition, mobility, self-care, getting along, life activities and participation. Participants rated degree of impairment experienced over the past month for 12 statements using a scale ranging from 0 ("None") to 4 ("Extreme or cannot do"). Simple scoring of the WHODAS was used for this study³⁹ (Cronbach α = 0.88).

Brief Resilience Scale

The Brief Resilience Scale (BRS) was used to assess resilience (i.e. one's ability to "bounce back" in the face of stressful events).⁴⁰ Participants rated their degree of agreement with six items related to resilience on a 5-point scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"), such that higher scores indicated a higher degree of resilience (Cronbach α = 0.90).

Adverse Childhood Experiences Scale

The Adverse Childhood Experiences Scale (ACES) was used to assess exposure to childhood adversity.⁴¹ The ACES is a 10-item, self-report scale assessing exposure to common adverse life events, including physical, sexual or emotional abuse; neglect; domestic violence; parental separation or divorce; substance abuse in the household; or a mentally ill or incarcerated family member. Participants indicated whether they had experienced the events in childhood (Yes = 1, No = 0); higher scores represent greater exposure to childhood adversity⁴¹ (Cronbach α = 0.75).

Data preparation

Three-hundred and four (N = 304) survey responses were received between February

and June 2021. After removing incomplete entries, 213 RTs were included in the final dataset for this manuscript. Missing data were addressed with multiple imputation⁴² using Statistical Product and Service Solutions (SPSS), version 27.0.⁴³ Only items that contributed to a scale's total score were imputed; demographic data and yes/no responses (e.g. to a question such as "Are you considering leaving a clinical position due to moral distress?") were not imputed.

Data analysis

Descriptive statistics were examined to characterize the sample, and then the data for those considering and those not considering leaving their clinical position due to moral distress were compared via a series of chi-square or Fisher exact tests. A series of independent sample *t* tests (with Holm-Bonferroni corrections and Cohen *d* for effect size) were conducted to compare psychological and functional measures between those considering and not considering leaving. To assess the relation between moral distress and theoretically relevant variables (i.e. depression, anxiety, stress, PTSD, dissociation, resilience, functional impairment) bivariate correlations were run with the MMD-HP total score. Finally, a binary logistic regression model was constructed to identify the associations between moral distress, theoretically relevant variables and consideration to leave a position due to moral distress.

Results

Sample

Two-hundred and thirteen (*N* = 213) participants were included in the analysis; 25.8% (*n* = 55) of the sample reported that they were currently considering leaving their position due to moral distress. Of the total sample, 42.3% (*n* = 90) reported that they had considered leaving their position due to moral distress in the past but did not actually leave, while an additional 13.1% (*n* = 28) reported considering and ultimately leaving a position in the past due to moral distress. Demographic and occupational information for the total sample, stratified by current consideration to leave a position due to moral distress, is presented in Table 1.

TABLE 1
Demographic information stratified by RTs currently considering/not considering leaving a position due to moral distress, survey on moral distress during the COVID-19 pandemic, February to June 2021

Variable	Considering leaving due to moral distress (<i>n</i> = 55)		Not considering leaving due to moral distress (<i>n</i> = 158)	
	Frequency	Percentage	Frequency	Percentage
Sex and gender^a				
Female	48	87.3	134	84.8
Male	7	12.7	23	14.6
Age (y)				
20–29	12	21.8	39	24.7
30–39	18	32.7	54	34.2
40–49	15	27.3	36	22.8
50–59	10	18.2	25	15.8
60–79	0	0.0	< 5	—
Population group^b				
Caribbean	0	0.0	< 5	—
East Asian	< 5	—	8	5.1
First Nations, Inuit, Métis	< 5	—	< 5	—
Latin American	0	0.0	< 5	—
Middle Eastern	< 5	—	< 5	—
South Asian	< 5	—	< 5	—
Southeast Asian	0	0.0	< 5	—
European	49	89.1	136	86.1
Other (e.g. "Canadian," "Caucasian")	< 5	—	7	4.4
Marital status				
Legally married, common law, or domestic partnership	39	70.9	107	67.7
Single, never married	12	21.8	38	24.1
Separated, divorced or widowed	< 5	—	12	7.6
Missing	0	0.0	< 5	—
Province/territory				
British Columbia	12	21.8	24	15.2
Alberta	7	12.7	35	22.2
Saskatchewan	< 5	—	8	5.1
Manitoba	< 5	—	7	4.4
Ontario	20	36.4	56	35.4
Quebec	< 5	—	< 5	—
New Brunswick	< 5	—	0	0.0
Prince Edward Island	0	0.0	< 5	—
Nova Scotia	5	9.1	19	12.0
Newfoundland and Labrador	< 5	—	< 5	—
Northwest Territories	0	0.0	< 5	—
Nunavut	0	0.0	< 5	—

Continued on the following page

TABLE 1 (continued)
Demographic information stratified by RTs' current consideration of leaving a position, survey on moral distress during the COVID-19 pandemic, February to June 2021

Variable	Considering leaving due to moral distress (n = 55)		Not considering leaving due to moral distress (n = 158)	
	Frequency	Percentage	Frequency	Percentage
Occupational role^b				
Staff therapist	44	80.0	131	83.4
Senior therapist or leadership	8	14.5	15	9.6
Management	< 5	—	6	3.8
Educator	12	21.8	22	14.0
Consultant or research	0	0.0	< 5	—
Sales	0	0.0	< 5	—
Student	< 5	—	< 5	—
Policy or government	0	0.0	< 5	—
Other	< 5	—	< 5	—
Total years practising				
Student	< 5	—	< 5	—
0–5	11	20.0	43	27.2
6–10	10	18.2	28	17.7
11–15	8	14.5	28	17.7
16–20	10	18.2	19	12.0
21–25	5	9.1	19	12.0
26–30	7	12.7	6	3.8
Over 30	< 5	—	11	7.0
Missing	0	0.0	< 5	—
COVID-19 unit				
Yes	41	74.5	110	69.6
No	14	25.5	48	30.4
Occupational setting^b				
Hospital	53	96.4	134	85.4
Community	7	10.9	26	16.6
Student rotations	0	0.0	< 5	—
Other	< 5	—	7	4.5
Patient populations^b				
Adult care	55	100.0	151	96.2
Pediatric	29	52.7	82	52.2
Neonatal	26	47.3	79	50.3
Employment status^b				
Full-time	38	69.1	116	74.8
Part-time	14	25.5	34	21.9
Casual	5	9.1	13	8.4
Self-employed	< 5	—	< 5	—
Unemployed	< 5	—	< 5	—

Abbreviations: RT, respiratory therapist; y, years.

Note: Cells with frequency counts of fewer than 5 participants are masked to protect anonymity.

^a All participants reported a cisgendered identity. Sex and gender have been collapsed to remove redundancy.

^b Participants were permitted to select multiple options.

Comparison of RTs considering and not considering leaving due to moral distress

Consideration to leave was not associated with any demographic variables (p values > 0.05). There was a significant association between past and current consideration of leaving a position due to moral distress [$\chi^2(2) = 50.6$, $p < 0.001$; Cramer $V = 0.49$, $p < 0.001$].

All psychological and functional measures (MMD-HP, DASS-21, PCL-5, MDI, WHODAS, BRS) significantly differed between those considering and those not considering leaving due to moral distress. Those not considering leaving scored significantly higher on the BRS but significantly lower on the remaining measures in comparison to those considering leaving their position (Table 2). There were no differences in ACES scores between those considering ($M = 2.13$, $SD = 2.02$) and not considering leaving ($M = 1.78$, $SD = 2.14$); however, power was insufficient to assay differences in ACES scores between the two groups ($\beta = 0.18$). Notably, 54.5% of the 55 participants who indicated that they were currently considering leaving their position due to moral distress and 13.3% of the 158 participants who did not report currently considering leaving their position due to moral distress scored above the PCL-5 cut-off.

Moral distress and associated variables

Bivariate correlations were run to assess the relationship between moral distress and its theoretically associated outcomes, mentioned earlier. MMD-HP total scores were significantly positively correlated with all DASS-21 subscale scores, PCL-5, and disengagement and emotional constriction subscales of the MDI and WHODAS scores, but significantly negatively correlated with BRS scores. MMD-HP total scores were not significantly correlated with ACES (Table 3).

Consideration of leaving due to moral distress

Simple binary logistic regressions

Simple binary logistic regressions were conducted to predict consideration of leaving independently from the variables of interest and to determine variables to include in the final predictive model (Table 4). Sex/gender, working on a COVID-19 unit and total years practising did not significantly impact consideration to leave.

TABLE 2
Comparing outcome variables between respiratory therapists currently considering and not considering leaving their current position due to moral distress, survey on moral distress during the COVID-19 pandemic, February to June 2021

	Not considering leaving due to moral distress (n = 158)		Considering leaving due to moral distress (n = 55)		<i>t</i>	<i>df</i>	<i>p</i> value	<i>d</i>
	M	SD	M	SD				
MMD-HP patient	37.46	20.48	54.24	24.76	−4.52	81.19	< 0.001	−0.775
MMD-HP team/unit	46.38	34.03	81.82	43.97	−5.44	77.71	< 0.001	−0.962
MMD-HP system	32.60	22.21	57.91	26.08	−6.95	211.00	< 0.001	−1.088
DASS-21—depression	10.61	7.91	16.18	10.82	−3.51	75.06	< 0.001	−0.637
DASS-21—anxiety	7.87	6.31	11.75	8.94	−2.97	73.59	0.004	−0.547
DASS-21—stress	14.57	7.61	20.80	9.61	−4.35	79.13	< 0.001	−0.760
PCL-5	18.22	13.26	33.98	17.97	−5.97	75.48	< 0.001	−1.079
MDI disengagement	10.96	3.92	12.91	4.31	−3.09	211.00	0.004	−0.484
MDI emotional constriction	8.37	3.60	10.44	4.90	−2.86	75.23	0.005	−0.519
WHODAS	7.73	6.28	13.18	6.98	−5.38	211.00	< 0.001	−0.840
BRS	3.45	0.80	3.19	0.72	2.09	0.02	0.030	0.327
ACES	1.78	2.14	2.13	2.02	−1.04	211.00	0.300	−0.163

Abbreviations: ACES, Adverse Childhood Events Scale; BRS, Brief Resilience Scale; *d*, Cohen *d*; DASS-21, Depression Anxiety Stress Scale 21; *df*, degrees of freedom; M, mean; MDI, Multiscale Dissociation Inventory; MMD-HP, Measure of Moral Distress—Healthcare Professional; PCL-5, Posttraumatic Stress Checklist for DSM-5; SD, standard deviation; WHODAS, World Health Organization Disability Assessment Schedule 2.0.

Past consideration of leaving a position due to moral distress significantly increased the odds of current consideration to leave for this reason, such that those who had considered leaving their position in the past were almost 30 times as likely to be currently considering leaving when compared to those who had not considered leaving in the past (odds ratio [OR] = 29.33, 95% CI: 8.64–99.55). Those who had left a position in the past due to moral

distress were 12 times more likely to be currently considering leaving their position compared to those who had never considered leaving (OR = 12.27, 95% CI: 2.99–50.36).

All three sources of moral distress and the psychological and functional variables significantly independently increased the odds of consideration to leave due to moral distress (Table 4). Higher scores on

the BRS significantly decreased the odds of considering leaving a position due to moral distress (OR = 0.66, 95% CI: 0.45–0.98). ACES did not significantly increase the odds of consideration to leave (OR = 1.08, 95% CI: 0.94–1.24).

Multiple binary logistic regression

A multiple binary logistic regression model was created to assess factors associated with increased odds of consideration to

TABLE 3
Bivariate correlations of respiratory therapists' moral distress and theoretically associated outcomes, survey on moral distress during the COVID-19 pandemic, February to June 2021

	1	2	3	4	5	6	7	8	9	10
1 MMD-HP total	—									
2 DASS-21—depression	0.380**	—								
3 DASS-21—anxiety	0.477**	0.653**	—							
4 DASS-21—stress	0.422**	0.740**	0.653**	—						
5 PCL-5	0.551**	0.673**	0.650**	0.663**	—					
6 MDI disengagement	0.341**	0.609**	0.547**	0.578**	0.645**	—				
7 MDI emotional constriction	0.308**	0.599**	0.502**	0.451**	0.548**	0.572**	—			
8 WHODAS	0.340**	0.599**	0.515**	0.540**	0.609**	0.537**	0.521**	—		
9 BRS	−0.240**	−0.432**	−0.475**	−0.383**	−0.520**	−0.434**	−0.343**	−0.429**	—	
10 ACES	0.101	0.168*	0.082	0.129	0.166*	0.179**	0.149*	0.285**	−0.120	—

Abbreviations: ACES, Adverse Childhood Events Scale; BRS, Brief Resilience Scale; DASS-21, Depression Anxiety Stress Scale 21; MDI, Multiscale Dissociation Inventory; MMD-HP, Measure of Moral Distress—Healthcare Professional; PCL-5, Posttraumatic Stress Checklist for DSM-5; WHODAS, World Health Organization Disability Assessment Schedule 2.0.

* Significant at *p* < 0.05

** Significant at *p* < 0.01

TABLE 4
Simple binary logistic regressions of respiratory therapists' current consideration to leave due to moral distress, survey on moral distress during the COVID-19 pandemic, February to June 2021

	<i>B</i>	SE	Wald	<i>p</i> value	OR	95% CI
Sex/gender	0.16	0.46	0.12	0.725	1.18	0.48–2.92
COVID-19 unit	0.25	0.36	0.48	0.489	1.28	0.64–2.56
Total years practising	0.10	0.08	1.41	0.234	1.10	0.94–1.29
Past consideration to leave (no; ref)			30.47	< 0.001		
Past consideration to leave (yes; 1)	3.38	0.62	29.37	< 0.001	29.33	8.64–99.55
Past consideration to leave (yes and left; 2)	2.51	0.72	12.10	< 0.001	12.27	2.99–50.36
MMD-HP patient	0.03	0.01	19.96	< 0.001	1.04	1.02–1.05
MMD-HP team/unit	0.02	0.00	26.05	< 0.001	1.02	1.01–1.03
MMD-HP system	0.04	0.01	31.97	< 0.001	1.04	1.03–1.06
PCL-5	0.06	0.01	31.49	< 0.001	1.07	1.04–1.09
MDI disengagement	0.11	0.04	8.78	0.003	1.12	1.04–1.21
MDI emotional constriction	0.12	0.04	9.81	0.002	1.13	1.05–1.21
DASS-21—depression	0.07	0.02	13.90	< 0.001	1.07	1.03–1.11
DASS-21—anxiety	0.07	0.02	10.68	0.001	1.07	1.03–1.12
DASS-21—stress	0.09	0.02	18.96	< 0.001	1.09	1.05–1.14
WHODAS	0.12	0.03	21.90	< 0.001	1.12	1.07–1.18
BRS	−0.41	0.20	4.23	0.040	0.66	0.45–0.98
ACES	0.08	0.07	1.07	0.300	1.08	0.94–1.24

Abbreviations: ACES, Adverse Childhood Events Scale; *B*, unstandardized beta; BRS, Brief Resilience Scale; CI, confidence interval; DASS-21, Depression Anxiety Stress Scale 21; MDI, Multiscale Dissociation Inventory; MMD-HP, Measure of Moral Distress—Healthcare Professional; OR, odds ratio; PCL-5, Posttraumatic Stress Checklist for DSM-5; ref, reference group; SE, standard error; WHODAS, World Health Organization Disability Assessment Schedule 2.0.

Note: Years practising was an ordinal variable treated as continuous for the model.

TABLE 5
Multiple binary logistic regression of respiratory therapists' consideration to leave due to moral distress, survey on moral distress during the COVID-19 pandemic, February to June 2021

	<i>B</i>	SE	Wald	<i>p</i> value	OR	95% CI
Past consideration to leave (no, ref)			17.22	< 0.001		
Past consideration to leave (yes, 1)	2.77	0.67	16.95	< 0.001	15.88	4.26–59.24
Past consideration to leave (yes and left, 2)	1.99	0.81	6.00	0.014	7.34	1.49–36.19
MMD-HP patient	0.01	0.01	1.15	0.285	1.01	0.99–1.03
MMD-HP team/unit	−0.01	0.01	0.49	0.484	0.99	0.98–1.01
MMD-HP system	0.04	0.01	8.09	0.004	1.04	1.01–1.06
PCL-5	0.05	0.02	4.42	0.036	1.05	1.00–1.10
MDI disengagement	−0.08	0.08	0.97	0.324	0.93	0.80–1.08
MDI emotional constriction	0.03	0.07	0.21	0.644	1.03	0.90–1.18
DASS-21—depression	−0.04	0.04	1.02	0.312	0.96	0.89–1.04
DASS-21—anxiety	−0.09	0.04	4.07	0.044	0.91	0.84–0.99
DASS-21—stress	0.06	0.04	1.84	0.175	1.06	0.98–1.15
WHODAS	0.07	0.04	3.05	0.081	1.07	0.99–1.16
BRS	−0.03	0.35	0.01	0.931	0.97	0.49–1.93

Abbreviations: *B*, unstandardized beta; BRS, Brief Resilience Scale; CI, confidence interval; DASS-21, Depression Anxiety Stress Scale 21; MDI, Multiscale Dissociation Inventory; MMD-HP, Measure of Moral Distress—Healthcare Professional; OR, odds ratio; PCL-5, Posttraumatic Stress Checklist for DSM-5; ref, reference group; SE, standard error; WHODAS, World Health Organization Disability Assessment Schedule 2.0.

leave due to moral distress. Because the simple binary logistic regressions found no relationships, sex/gender, working on a COVID-19 unit, total years practising and ACES were excluded from this model.

The model significantly predicted consideration to leave [$\chi^2(13) = 96.7, p < 0.001$] with 92.4% sensitivity and 65.5% specificity, yielding a classification of 85.4%. Past consideration to leave, MMD-HP system-related sources, PCL-5 and DASS-21 anxiety scores significantly predicted current consideration to leave (Table 5). Specifically, the odds of considering leaving one's position were 15.88 (95% CI: 4.26–59.24) times greater for those who had considered leaving a position in the past due to moral distress compared to those who had never considered leaving a position in the past for this reason. The odds of considering leaving one's position were 7.34 (1.49–36.19) times greater for those who had left a position in the past due to moral distress compared to those who had never considered or left a position in the past due to moral distress. The odds of considering leaving one's position were 1.04 (1.01–1.06) times greater for every one unit increase in system-related sources of moral distress. The odds of considering leaving one's position were 1.05 (1.00–1.10) times greater for every one unit increase in PCL-5 scores. The odds of considering leaving one's position were 0.914 (0.84–0.99) times less for every one unit increase in DASS-21 anxiety scores.

Discussion

The purpose of this study was to characterize the impact of moral distress and its associated psychological and functional outcomes on Canadian RTs' consideration to leave a clinical position due to moral distress during the COVID-19 pandemic. One in four RTs in our study reported considering leaving their clinical position for this reason, 12 to 16 months after the beginning of the pandemic in Canada. Despite the focus on considering leaving due to moral distress, the reports on leaving among other HCPs during the pandemic are consistent with our findings. For example, of nearly 700 frontline nurses in the Philippines assessed in early 2021, 25.8% indicated their desire to leave their position,⁴⁴ while 26.6% of ICU nurses in Romania reported considering resigning between October 2020 and February 2021.⁸ Interestingly, Fronda and Labrauge⁴⁴ reported that whereas approximately one

in four nurses in the Philippines reported considering leaving their position in early 2021, one in five also reported considering leaving their profession entirely.

Research on turnover among Canadian HCPs during the COVID-19 pandemic is scarce, yet consistent with the present picture of Canadian RTs. Of 1705 Canadian nurses residing in Quebec surveyed between July and November 2020, 29.5% reported a high degree of intention to leave their work setting and 22.3% reported intending to leave their profession entirely.⁴⁵ In a second study conducted between May and June 2021, 425 critical care nurses from across Canada reported elevated symptoms of PTSD, depression, anxiety, stress and burnout, with 22% reporting intending to quit their current position.⁴⁶ Ongoing surveillance of turnover intention is required to assess the extent to which the Canadian health care system will continue to be impacted beyond the pandemic period.

We found that RTs considering leaving their positions due to moral distress did report heightened moral distress along all three levels of distress assayed (i.e. patient, team/unit, system) and elevated symptoms of PTSD, depression, anxiety, stress, dissociation (i.e. emotional constriction, emotional disengagement) and functional impairment when compared to their counterparts not considering leaving because of moral distress. Critically, more than half of the RTs considering leaving scored above the cut-off on the PCL-5, indicative of potential PTSD. By comparison, only 13.3% of the RTs who were not considering leaving their position scored above the PCL-5 cut-off. Moreover, RTs considering leaving their position due to moral distress reported lower levels of resilience compared to those RTs not considering leaving. Notably, although resilience scores were statistically different between RTs considering and not considering leaving their clinical positions, the true difference in mean scores on the resilience measure was only 0.26, representing a potentially minute clinical difference. Our findings demonstrate that RTs considering leaving are in need of adequate mental health supports, given elevated distress and adverse outcomes.

Although RTs who were considering leaving their position due to moral distress reported significantly greater adverse

psychological and functional outcomes than their counterparts who were not considering leaving, such variables actually contributed very little to the final predictive model of consideration to leave. Rather, past consideration to leave was the only statistically significant predictor to substantially increase the odds of current consideration to leave. RTs who had considered leaving or had actually left a position in the past had 16- and 7-times greater odds, respectively, of currently considering leaving a position due to moral distress, when accounting for other predictors. Of importance, however, wide confidence intervals for the odds ratios for past consideration to leave suggest instability of model fit and demonstrate that further information is required to understand this effect. System-related moral distress and PTSD symptoms significantly increased the odds of consideration to leave a position, but their contributions to the overall model were small.

We posit that although RTs considering leaving their position due to moral distress were actually characterized by greater moral distress, adverse psychological symptoms and functional impairment than their counterparts not considering leaving, these individual-level factors may not be sufficient for understanding the factors driving RTs' consideration to leave. Rather, it is possible that broader, more external factors, such as workplace or organizational issues, may play a more central role in RTs' consideration of leaving a position. Indeed, perceived organizational support, ethical work climate, job commitment and job satisfaction are associated with decreased turnover intention among nurses,⁴⁷ and a recently published systematic review revealed the importance of adverse working conditions and organizational support, in addition to psychological stress responses, in turnover intention among HCPs during the COVID-19 pandemic.⁴⁸

The role of broader, organizational factors in influencing consideration to leave may be further reflected in our findings that past consideration of leaving along with having left a position in the past both predicted RTs' current consideration. A continuity of organizational or system issues could contribute to the continuity in consideration to leave both in the past and present. While we cannot rule out that individual-level factors may contribute to consideration to leave, additional research

is needed to better understand RTs' and other HCPs' consideration to leave through study of not only individual-level factors, such as psychological symptoms, functioning and resiliency, but also through careful consideration of broader, organizational factors.

Morally distressing experiences in health care will persist during and beyond the pandemic period, increasing risk of moral distress and, by association, adverse psychological and functional outcomes and turnover intention. Data collection for this study took place from February to June 2021, during the second wave of the pandemic in Ontario, Canada. Epstein and colleagues⁶ theorized the crescendo effect, by which moral distress increases over time as residual distress in the aftermath of distressing events compounds and gradually rises.

Furthermore, in Litz and Kerig's⁴⁹ heuristic continuum of moral stressors and outcomes, moral distress, although impairing, is posited to elicit a less damaging response than moral injury. Moral injury has been defined as a psychological, social, emotional and existential response to events in which one transgresses or witnesses a transgression of deeply held moral values and is associated with PTSD, depression, anxiety and suicidal ideation or attempts.⁵⁰⁻⁵³ Without adequate mental health supports for RTs and other HCPs, the continuity of our health care system is at risk.

Evidence-based interventions to mitigate moral distress are lacking.⁵⁴ A recent systematic review found only 16 studies on interventions to address moral distress among HCPs.⁵⁴ While this systematic review pointed toward educational interventions, consultation services, self-reflection exercises, grand rounds and facilitated discussions to reduce moral distress, all studies were limited by methodological constraints, rendering a lack of consensus on adequate interventions for moral distress at this time.⁵⁴ *Moral Stress Amongst Healthcare Workers During COVID-19: A Guide to Moral Injury*, prepared by the Phoenix Australia Centre for Posttraumatic Mental Health and the Atlas Institute for Veterans and Families (<https://www.moralinjuryguide.ca>) may inspire the development of a stepped-care model of supports, ranging from prevention to intervention. These efforts will also be necessary at the team and institutional

levels and may include rotating staff between high- and low-stress roles, promoting a supportive culture and arranging rosters for shift workers, facilitating open discussions about moral and ethical challenges, encouraging self-care and celebrating success may also prove critical in mitigating moral distress.

Health care organizations and leaders are urged to encourage self-screening for signs of mental illness and deteriorating mental health (see, for example, Road to Mental Readiness Continuum),⁵⁵ as well as provide organizational support and the encouragement of formal assessments and treatment where needed (see D'Alessandro et al.⁵⁶ for a summary of organizational considerations to bolster against COVID-19-related moral injury in health care workers). In the absence of such targeted approaches, turnover may increase among Canadian RTs as a result of continued exposure to morally distressing events in the workplace. As empirical evidence of interventions for moral distress remains poor, adequate retention efforts that acknowledge RTs' experiences with moral distress during the pandemic are urgently needed to ensure our RTs are supported and able to continue providing care beyond the COVID-19 pandemic.

Strengths and limitations

To our knowledge, this is the first study to investigate consideration to leave a position due to moral distress among Canadian RTs during the COVID-19 pandemic. This study had several strengths, including indexing a range of psychological and functional outcomes and experiences that theoretically may relate to consideration to leave a position.

Findings from this study must be interpreted in the context of several limitations. Our results may not be generalizable to the entire population of Canadian RTs, as our sample comprised mainly female RTs from Ontario. Future work should replicate this design with a representative sample of Canadian RTs. Additionally, the MMD-HP was not altered for use during the pandemic timeframe, but rather the original scale prompt was used, asking participants to rate their general experience with each morally distressing item. Therefore, it is not clear whether reports of moral distress in this study were specific to the pandemic context or representative of RTs' careers more broadly.

Furthermore, reports of "past" consideration to leave a clinical position could have occurred within the COVID-19 pandemic timeframe, as data collection took place approximately a year into the pandemic in Canada. Researchers looking at this question in future may wish to ask participants about their experiences during the pandemic exclusively to better understand the effects of COVID-19-related moral distress on consideration of leaving and psychological outcomes.

Furthermore, past diagnosis of mental illness was not controlled for, thus rendering it unclear at present to what extent past history of mental illness contributed to consideration to leave among RTs during the second year of COVID-19 pandemic. Future researchers should therefore consider the unique impact of pre-pandemic illness to shed light on its potential role as a risk factor for considering leaving one's position.

Finally, as our results suggest (including wide confidence intervals for odds ratios in the final model demonstrating instability in model fit) we must acknowledge that factors beyond moral distress may impact consideration to leave a position, including job satisfaction, organizational support and absenteeism. Future work should consider the impact of moral distress on intent to leave in the broader context of workplace factors.

Conclusion

One in four RTs sampled in Canada 12 to 16 months after the onset of the pandemic were considering leaving their position due to moral distress. These individuals reported significantly greater psychological and functional impacts than their counterparts who were not considering leaving a position. Although the sample of RTs considering leaving their position due to moral distress may be characterized by diminished mental health and well-being, our findings suggest that individual-level factors are not sufficient to understand consideration to leave among RTs. Adequate mental health supports and further research into factors related to job turnover are critical to ensuring RTs' well-being and the continuity of our health care system.

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Conflicts of interest

MM is a Director at Cambridge Memorial Hospital, the Research Institute of St. Joseph's Healthcare Hamilton and St. Joseph's Healthcare Hamilton Foundation. KH received a novice researcher grant from Hamilton Research Institute for ultrasound study in respiratory therapists. SR is employed by the Atlas Institute for Veterans and Families. HS and CO are employed by Homewood Health, Inc. AM is the Executive Vice President at Homewood Health, Inc.

Authors' contributions and statement

AD—conceptualization, data curation, formal analysis, investigation, methodology, project administration, writing—original draft, writing—review and editing. KR, AB—conceptualization, investigation, methodology, project administration, writing—original draft, writing—review and editing. BE—formal analysis, writing—review and editing. YX—data curation, methodology, writing—review and editing. MP, MA, IB, HM, FF, KH, YL—methodology, writing—review and editing. DS—formal analysis, writing—review and editing. FH, SR, CO, HS, AM, AH—conceptualization, writing—review and editing. RM—conceptualization, resources, software, supervision, writing—review and editing. RL—conceptualization, funding acquisition, writing—review and editing. MM—conceptualization, funding acquisition,

resources, software, supervision, writing—review and editing.

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Original quantitative research

Cardiac function and posttraumatic stress disorder: a review of the literature and case report

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Abstract

Introduction: Posttraumatic stress disorder (PTSD) can induce an elevation in sympathetic tone; however, research pertaining to the cardiac cycle in patients with PTSD is limited.

Methods: A literature review was conducted with PubMed, MEDLINE and Web of Science. Articles discussing changes and associations in echocardiography and PTSD or related symptoms were synthesized for the current review. We have also included data from a case report of a male participant aged 33 years experiencing potentially psychologically traumatic events, who wore a noninvasive cardiac sensor to assess the timing intervals and contractility parameters of the cardiac cycle using seismocardiography. The intervals included systolic time, isovolumic contraction time (IVCT) and isovolumic relaxation time (IVRT). Calculations of systolic (IVCT/systole), diastolic (IVRT/systole) and myocardial [(IVCT + IVRT)/systole] performance indices were completed.

Results: The review identified 55 articles, 14 of which assessed cardiac function using echocardiography in patients with PTSD symptoms. Cardiac dysfunction varied across studies, with diastolic and systolic impairments found in patients with PTSD. Our case study showed that occupational stress elevated cardiac performance indices, suggesting increased ventricular stress and supporting results in the existing literature.

Conclusion: The literature review results suggest that a controlled approach to assessing cardiac function in patients with PTSD is required. The case study results further suggest that acute bouts of stress can alter cardiac function, with potential for sustained occupational stress to induce changes in cardiac function. Cardiac monitoring can be used prospectively to identify changes induced by potentially psychologically traumatic event exposures that can lead to the development of PTSD symptoms.

Keywords: *echocardiography, seismocardiography, PTSD, case study, systole, diastole, myocardial performance indices, autonomic nervous system*

Introduction

Research relating to cardiovascular function associated with posttraumatic stress disorder (PTSD) and other posttraumatic stress injuries remains very limited. Changes in autonomic nervous system function due to PTSD have been documented extensively, and most of the associated meta-analyses have focussed on heart rate variability (HRV).^{1,2} In patients

with PTSD, one meta-analysis evidenced that the root mean square of successive differences, as well as high frequency (HF) and low frequency (LF) parameters, were decreased during baseline rest, with HF also decreased during acute stress.³ The meta-analytic results also showed the LF/HF ratio was increased during rest in people with PTSD, indicating a reduction in parasympathetic tone.³

Highlights

- Research on cardiac cycle timing intervals and posttraumatic stress disorder (PTSD) is very limited.
- Systolic and diastolic dysfunction is documented in PTSD; however, there is much variation in the literature on cardiac function in PTSD.
- Potentially psychologically traumatic events (PPTE) can increase myocardial performance index, in part due to shortened systolic time.
- PPTE can result in elevated cardiac stress, and this can be easily and noninvasively monitored using seismocardiography.

HRV can be a useful indicator of emotional and physical stress;⁴ however, as HRV reflects the regulation of autonomic balance,⁵ the mechanism by which cardiac function is altered cannot fully be answered by HRV alone. Understanding how PTSD interacts with cardiac function (particularly right and left ventricular function and cardiac cycle timing intervals) may provide useful prospective diagnostic tools. Assessing cardiac function is usually done with echocardiography, a commonly used method for assessing cardiac dysfunction.⁶ A study with 28 female participants, 14 of whom had PTSD and 14 of whom did not, demonstrated significantly impaired end-diastolic pressure and left ventricular suction power in the PTSD group.⁷ The suction power of the heart is usually measured as the velocity of propagation in early diastole, and when combined with impaired end-diastolic pressure, the measurements indicate left ventricular

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diastolic dysfunction which can be caused by emotional stress.⁷

Cardiac disease-induced PTSD has been studied, with much of the research focusing on PTSD following an acute cardiac event such as a myocardial infarction.⁸ However, clinical studies utilizing echocardiography for cardiac assessment to document changes in cardiac cycle parameters as a primary measurement in occupational and stressful environments are very limited. Potential research barriers to using cardiac magnetic resonance imaging and echocardiography include the cost, time and access to technicians.⁹ There are alternative methods for analyzing cardiac function and cardiac cycle timing intervals using ballistocardiography (BCG) or seismocardiography (SCG).¹⁰⁻¹⁴ Analyses using BCG or SCG allow for identifying cardiac cycle parameters on every heartbeat during data collection and are relatively cost-effective.¹⁵ SCG has been correlated with stroke volume¹⁶ and total systolic time and pre-ejection period,¹⁷ and has been used to document changes in cardiac function related to long and acute COVID-19,^{15,18} acute sport-related concussion¹⁹ and hypertrophic cardiomyopathy.²⁰ Furthermore, normative data on the cardiac cycle using the SCG have also been published.²¹

The cardiac cycle timing intervals are known to change with age and sex. There is an increase in isovolumic relaxation time (IVRT) with age, which in turn leads to an increase in myocardial performance index (MPI) as well. MPI tends to increase from 0.38 to 0.53, and IVRT from 78 ms to 109 ms, for individuals aged 20 to 39 and 60 or above, respectively.²² There are also differences between males and females for systolic time and MPI as well.²² Cardiac remodelling and the demographics of the individuals can also alter these timing intervals as per the requirements of the sport. Specifically, relative to the normative data for males and females, athletes in their early twenties exhibit different mean values at an IVRT of 82 ms and 97 ms, and an MPI of 0.41 and 0.46, respectively.²¹

This study was designed to present a brief review of the literature on PTSD and cardiac function to provide insight on the importance of monitoring cardiac performance that could be applied to stressful occupational settings, such as those of public safety personnel (e.g. border services

personnel, correctional workers, firefighters, paramedics, police, public safety communicators).²³ We provide a proof-of-concept case report of changes in cardiac function measured by SCG technology following a series of acute occupational stressors.

Methods

Literature review

We conducted a database search using the keywords [(echocardiography) OR (ejection fraction) OR (left ventricular) OR (right ventricular)) AND ((PTSD) OR (post traumatic stress disorder))] in PubMed, MEDLINE and Web of Science. The date range was from database inception to 30 April 2022. Given the limited number of studies, all studies that included echocardiography parameters were included for our review. The review is meant to be narrative in nature and to summarize the available literature. The search was completed by one author (JS), and a reference review of the included articles was also conducted to find articles that fit the criteria.

Case report

Ethics approval

This study was approved by the University of Regina Research Ethics Board (REB# 2020-073) and the participant signed an informed consent form.

Participant and equipment

The participant, a rehabilitation physiotherapist in a hospital environment, completed data collection during a baseline period. The participant continued to collect daily cardiac data using a noninvasive cardiac sensor (LLA Recordis, LLA Technologies, Langley, BC, CA) to record the vibrations of the sternum resulting from the heart contraction.¹⁵ The cardiac sensor was snapped into a single adhesive electrocardiogram (ECG) gel electrode and placed one centimetre above the xiphoid process on the sternum of the chest directly over the skin. The cardiac data were collected for one minute while the participant was in a supine resting position. The participant collected data once per day for one month.

Data analyses

The recorded data were analyzed offline. The data analysis details have been previously reported.¹⁵ Briefly, a first order Butterworth bandpass filter with a low

cut-off frequency of 1 Hz and high cut-off frequency of 30 Hz was applied to the signal. Analysis of fiducial points of the cardiac cycle was completed using an independent, proprietary algorithm (LLA Technologies Inc). The fiducial points included the mitral valve closure (MVC), aortic valve opening (AVO), aortic twist (ATT), aortic systole, rapid ejection period (REP), aortic valve closure (AVC), ventricular untwisting, mitral valve opening (MVO), atrial systole (AS) and contractile twist force (TF). After the extraction of morphological features, temporal features were calculated (milliseconds [ms]) including diastole (MVC – MVO timing), systole (AVO – AVC timing), isovolumic contraction time (IVCT; MVC – AVO), isovolumic relaxation time (IVRT; AVC – MVO) and end of REP. Every heartbeat within the one-minute data collection was analyzed.¹⁵

Common performance indices were calculated following the calculation of the temporal features. Specifically, the systolic performance index (SPI) was calculated as IVCT/systole, the diastolic performance index (DPI) was calculated as IVRT/systole, and the myocardial or heart performance index (or Tei index) was calculated as (IVCT + IVRT)/systole.^{15,24,25}

The participant recorded data on three separate occasions (“incidents”) that included experiencing a prominent occupational stressor, that is, a potentially psychologically traumatic event: (1) Incident A—the participant exhibited psychological work-related distress due to suicidal tendencies of a client; (2) Incident B—the participant exhibited psychological work-related distress again due to a bomb scare/potential terrorism issue; and (3) Incident C—the recording average over an unusually stressful work week. As the participant collected data daily, a two-day average prior to the potentially psychologically traumatic event exposure is presented as the baseline.

Case study rationale

The CARE case report guidelines²⁶ were followed for this case study. The case study presented in this paper provides examples of occupational stress in a participant who experienced three highly stressful events to illustrate the effects of PPTE on cardiac function. However, this participant did not experience PTSD, but repeated bouts of acute stress, which can have a potential long-lasting effect on the heart. In fact, the Royal Canadian Mounted

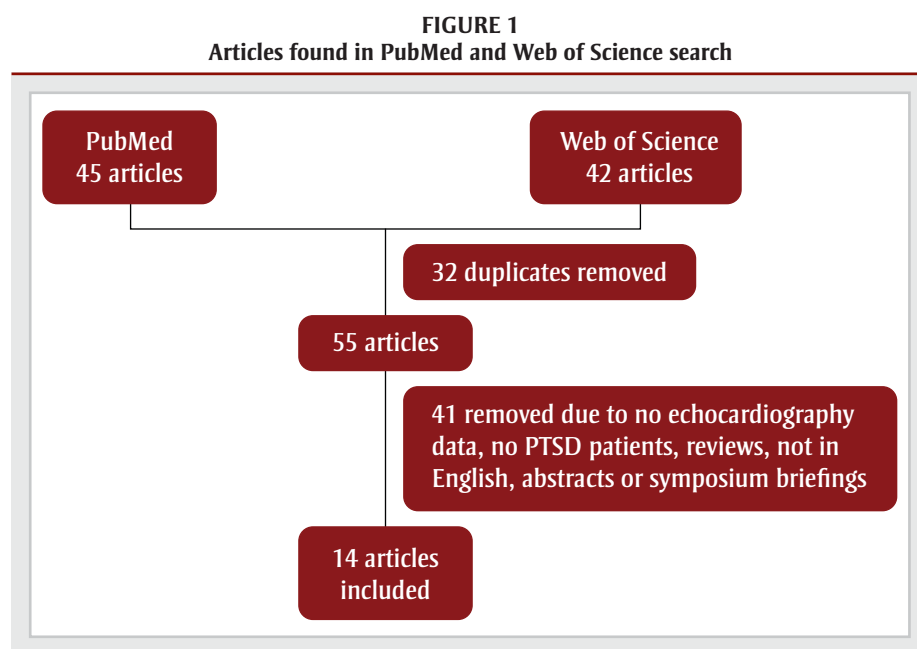
Police (RCMP) has recently developed a study protocol that observes exposure to PPTE, which can cause posttraumatic stress injuries.²⁷ Furthermore, exposure to PPTE can result in PTSD.^{28,29} For example, nurses often experience PPTE, with the exposures being associated with mental disorders such as PTSD.²⁹ Eliminating or even reducing potentially psychologically traumatic event exposures may reduce the prevalence of PTSD among nurses by up to 56.7%.²⁹ The impact of these PPTE on the cardiac cycle are not well understood. The case study presented here serves as a proof of concept that potentially psychologically traumatic event exposures can induce acute changes to cardiac function, which explains altered cardiac function in PTSD following repeated stressors.

Results

Literature review

Figure 1 is a flow diagram of our search, which resulted in 45 studies from PubMed/MEDLINE and 42 studies from Web of Science. Of these 87 studies, 32 were duplicates, resulting in 55 articles found from the literature search. Seven of the studies were case studies, 1 was focussed on cardiac biomarkers, 1 was a symposium briefing, 5 had an emphasis on anatomical changes of the brain, 2 contained electrocardiogram (ECG) data as the primary measure, 2 used animal models and emphasized molecular pathways, 2 were not written in English, 5 were review articles, 1 concentrated on acute stress disorder, and 18 were mainly concerned with PTSD symptom development following a cardiac procedure or observing the progression of PTSD symptoms following surgical procedures or anesthesia. None of the 10 articles that were found in the Web of Science (and not in PubMed) were included in our review, as four studies did not include echocardiography data, 1 did not include a population with PTSD, 1 was a review, 1 was an abstract, and 3 focussed on anatomical changes of the brain. As per Figure 1, 41 of the 55 articles were removed, resulting in 14 articles in this review.

The PubMed search also resulted in one study centred around echocardiographic changes due to PTSD, evidencing left ventricular diastolic function impairment specific to the end-diastolic pressure and left ventricular suction power in participants



Abbreviation: PTSD, posttraumatic stress disorder.

Note: The search of PubMed and Web of Science databases covered the time from database inception to 30 April 2022.

with PTSD.⁷ The article by Hieda and colleagues⁷ was the study most reflective of echocardiographic results due specifically to PTSD in the absence of other cardiac dysfunction. The participants did include three women who were menopausal in the PTSD group and one woman who was menopausal in the control group, which can potentially influence cardiac function.⁷

Takotsubo cardiomyopathy

Many of the case studies identified for this review described Takotsubo cardiomyopathy or reverse Takotsubo cardiomyopathy (Table 1), a condition with myocardial infarction-like symptoms due to stress that leads to apical ballooning (i.e. enlargement of the left ventricle). Most patients (i.e. 3 of 4) developed left ventricular abnormalities following exposure to a motor vehicle accident,³⁰ physical assault,³¹ vigorous arguments³² or serving in Iraq and subsequently being diagnosed with PTSD.³³ A prospective study with Takotsubo patients evidenced that the impairments in left ventricular ejection fraction had returned to normal at three-month follow-up.³⁴

Previous cardiac complications

Studies with participants who have multiple cardiac complications can also provide some indirect insights into the relationship between PTSD and cardiac function (Table 1). For example, patients with mitral regurgitation have reported higher PTSD symptoms, but without statistically significant differences between patients with (n = 44)

and without (n = 144) PTSD;³⁵ however, cardiac disease was a confounding variable because patients with PTSD also reported more somatic symptoms. PTSD was associated with increased mortality when comparing 111 970 veterans who had heart failure and reduced ejection fraction but no PTSD to 11 039 veterans with heart failure and reduced ejection fraction and PTSD.³⁶ No other cardiac data was provided that discriminated between patients with and without PTSD.

In a study of patients (n = 128) with implantable cardioverter-defibrillators, being female and having impaired left ventricular ejection fraction was statistically significantly related to PTSD severity;³⁷ unfortunately, the cardiac data and psychological data were collected within 30 days of each other instead of on the same day. A study of coronary heart disease found statistically significant differences in left ventricular ejection fraction between patients with (n = 95) and without (n = 927) current PTSD, possibly due in part to damaged ventricular function.³⁸ There is evidence that patients with acute myocardial infarction following percutaneous coronary intervention who had left ventricular ejection fraction < 50% are more likely to have PTSD;³⁹ however, studies of post-myocardial infarction patients have also shown no statistically significant differences between patients with (n = 40) and without (n = 19) PTSD.^{40,41}

TABLE 1
Summary of relevant cardiac and PTSD studies in the literature review

Author	Sample size	Population	Age (average $\pm$ SD), in years	Main results	Strengths/limitations
Hieda et al., 2019 ⁷	28	14 women with PTSD and 14 women without PTSD as controls (diagnosed using the CAPS-5 scale); no other cardiac comorbidities	43.9 $\pm$ 11.6	PTSD showed greater E/e' (end-diastolic pressure) and decreased Vp (LV suction power during the early phase of diastole), suggesting impaired LV diastolic function	• Direct echocardiographic measurements • Female population only • 3 menopausal women in PTSD group and 1 in control, which can influence results
Sawatari et al., 2016 ³⁷	128	Outpatients with implantable cardioverter-defibrillators; 103 males	59 $\pm$ 16	Being female and impaired LVEF were found to be related to PTSD severity, which was more obvious when LVEF < 35%	• Presence of implantable cardioverter-defibrillators makes it difficult to assess and provides an extra influence on cardiac function • Echocardiography and questionnaire data were not collected on the same day • Patients were on many medications
Bayer-Topilsky et al., 2013 ³⁵	266	186 patients (134 males) with moderate to severe mitral regurgitation and 80 controls (38 patients with normal cardiac function and 42 patients with mild mitral valve prolapse; 64% had mild mitral regurgitation)	60 $\pm$ 13	Greater PTSD scores in mitral regurgitation patients and no significant differences in echocardiographic measures	• No causal link can be implied as this is a prospective study • Only 42 of the 186 test subjects had PTSD • PTSD group had greater somatic symptoms due to cardiac complications
Ilhan et al., 2013 ⁴⁴	24	12 PTSD patients (11 females) and 12 healthy controls	28.4 $\pm$ 7.5	No significant differences in LV function using transthoracic echocardiography	• Small sample size • Primary focus on electrocardiogram parameters • Limited demographic information
Xue et al., 2012 ⁴³	891	91 military veterans with PTSD (89 males)	66 $\pm$ 13	Decreased left ventricular end-systolic diameter and increased ejection fraction for PTSD participants at baseline	• Only baseline echocardiograms (no echocardiogram data on follow up) • Focus on cardiac biomarkers of injury • Unequal sample sizes per group (those with compared to without PTSD)
Waldenborg et al., 2011 ³⁴	13	9 patients with Takotsubo cardiomyopathy with cardiac data (all female)	Range from 69–74	Impairments in left ventricular ejection fraction was back to normal during the 3-month follow-up	• Small sample size • No other echocardiographic data • No direct comparison to PTSD
Cohen et al., 2009 ³⁸	1022	95 patients with current PTSD (72 males) and 927 without current PTSD	61 $\pm$ 11	No significant differences in left ventricular ejection fraction or ischemia	• Unequal sample sizes • PTSD can increase cardiovascular disease risk • No causal implications • Other cardiac complications
Guler et al., 2009 ⁴⁰	394	69 patients completed diagnostic interview and 40 had PTSD	61 $\pm$ 10	Left ventricular ejection fraction was not found to be a predictor of PTSD status	• Unequal sample sizes • No causal implications • Post myocardial infarction • Ventriculography technique was used for left ventricular ejection fraction
Lakusic et al., 2007 ⁴²	68	34 male veterans with myocardial infarction history and PTSD, and 34 male veterans with myocardial infarction history and no PTSD	49 $\pm$ 8	No significant differences in echocardiography assessments	• Primary focus on ECG monitored heart rate variability • Myocardial infarction can influence results

Continued on the following page

TABLE 1 (continued)
Summary of relevant cardiac and PTSD studies in the literature review

Author	Sample size	Population	Age (average $\pm$ SD), in years	Main results	Strengths/limitations
Pedersen et al., 2003 ⁴¹	227	112 patients (33 females) four to six weeks post myocardial infarction, and 115 healthy controls; 25 patients and 8 controls qualified as PTSD	60 $\pm$ 9.7	Left ventricular ejection fraction not associated with PTSD diagnosis	• Self-assessed psychological measures • Myocardial infarction may have affected responses • Unequal sample sizes

Abbreviations: CAPS-5, clinician administered PTSD scale; E/e', ratio of early mitral inflow velocity to mitral annular early diastolic velocity; LV, left ventricular; LVEF, left ventricular ejection fraction; PTSD, posttraumatic stress disorder; SD, standard deviation; Vp, velocity of propagation.

Notes: Only studies with echocardiography measurements in PTSD patients are included. No case studies are included.

Finally, a reference review of the articles identified another study that used echocardiography data and heart rate variability to assess cardiac function in patients with PTSD and a pre-existing history of myocardial infarction.⁴² The results evidenced no statistically significant differences in the end-diastolic diameter of the left ventricle or the left ventricular ejection fraction between patients with (n = 34) and without (n = 34) PTSD.⁴²

The remaining studies with patients who had cardiac complications focussed on questionnaires or did not have echocardiographic data (Table 1).

PTSD only

Baseline echocardiography has also been used to show decreased left ventricular end-systolic diameter and increased ejection fraction for military veterans with PTSD (n = 91) in comparison to military veterans without PTSD (n = 800).⁴³ Other research results indicate no statistically significant differences in echocardiography parameters between patients with PTSD (n = 12) and healthy controls (n = 12),⁴⁴ although the results were likely mediated by the small sample size.

There is nonclinical evidence suggesting that increased sympathetic autonomic tone (as assessed by heart rate variability) is induced during stress;⁴⁵ however, the information provided by heart rate variability is very limited and cannot be used to describe the direct underlying mechanisms or functional morphology. The echocardiography research with PTSD suggests that impaired left ventricular diastolic function is associated with PTSD in the absence of comorbid cardiac concerns. Most studies that provide echocardiographic data involve patients with pre-existing cardiac complications. Prospective studies are required to assess for mechanical cardiac changes among persons with PTSD

who do not have pre-existing cardiac complications, such as the RCMP Study Protocol.²⁷

Case report using seismocardiography

Participant

The participant was a male aged 33 years (BMI = 29 kg/m²) working in both a clinical health rehabilitation setting and an office. The participant had no smoking history, drank socially and was sedentary during stressful work time.

Incident A

Incident A involved the participant learning that one of his clients at the rehabilitation hospital where he worked was suicidal. The participant worked closely with his client to help them deal with and recover from the suicidal experience, and in the process the participant also experienced psychological distress. A seismocardiogram recording was taken the morning following the incident. Heart rate was similar to baseline; therefore, the cardiac timing changes are not influenced by any heart rate variations. Of the abnormal values in cardiac timing, IVCT was prolonged to 57 ms (48%), and systolic time was reduced to 218 ms (-24%). Reductions in AS to MVC (-47%) and REP (-26%) in the absence of an elevated HR were also found and are suggestive of inadequate maintenance of ventricular pressure. The change in systole consequently impacts the performance indices, with the elevations in MPI (60%), SPI (93%) and DPI (47%) all suggesting elevated cardiac stress.¹⁵ The cardiac stress elevation is further exemplified by the increase in twist force (milligravity [mG]).

Incident B

Incident B involved a bomb threat at the participant's workplace, and resulted in psychological distress. The participant was not involved with the clearance of the bomb threat; however, because of the

threat, the workplace was more stressful than expected. The participant was required to take precautions and clear the area quickly. Once the bomb threat was cleared, the participant returned to work. The recording was taken during resting conditions after work. Similar to Incident A, an increase in IVCT to 49 ms (26%) and a decrease in systole to 220 ms (-23%) were seen. As Incident A also suggested, the acute distress implies that there were issues with maintaining adequate ventricular pressure, and this is further supported by the reductions in AS to MVC to 14 ms (-32%) and REP to 53 ms (-36%) in the absence of an elevated heart rate. Given the decreased systolic time period, there was an increase in the performance indices, with MPI at 0.63 (48%), thus suggesting that cardiac stress was elevated. This elevation in cardiac stress is further shown by the increase in TF to 12 mG (68%).

Incident C

Incident C involved distress owing to a week of elevated occupational stress due to unexpected changes to workplace requirements, difficult and highly stressful working conditions and sustained anxiety. During this week, the participant's heart rate was similar to baseline. As the presented data is an average of the data for the week, the increase in IVCT to 46 ms (19%) and decrease in systole to 234 ms (-19%) was not the same magnitude of change compared to Incidents A and B. However, as seen from the decrease in REP to 65 ms (-21%) and the increase in both MPI and TF to 0.59 (38%) and 11 mG (53%), respectively, issues with maintenance of ventricular pressure and elevations in cardiac stress were still prevalent.

All findings from the cardiac cycle parameters for each variable are available in Table 2.

Discussion

Variable results

Research on PTSD patients and cardiac function as the primary outcome is currently limited. The literature review results suggest that cardiac dysfunction varies from study to study. For example, diastolic⁷ and systolic^{37,43} impairments were found in patients diagnosed with PTSD, even though other research results suggest that parameters such as LVEF are not associated with PTSD.^{34,38,41,42,44} Despite the varying results, most studies have not correlated echocardiography parameters with PTSD as a primary research outcome.

Implications from case report using seismocardiography

This case study serves as a proof of concept that impairments in the cardiac cycle timing intervals can occur during acute occupational stressors. Exposures to PPTE and other cumulative stressors can lead to chronic mental health challenges, including but not limited to PTSD,^{28,29} therefore, early detection of cardiac dysfunction can help reinforce proactive health care behaviours. We have observed that sustained complications with maintaining ventricular pressure can lead to complications with LV suction power in women with PTSD.⁷ Our case study results

suggest that the potential diastolic dysfunction present in PTSD can result from elevated cardiac stress accumulated during the acute period.

The changes noted in the cardiac profile for PPTE in our case study are due to elevated acute stress. Elevations in IVCT (19% to 48%) and TF (53% to 73%), and reductions in systole (–19% to –24%), AS to MVC (–14% to –47%) and REP (–21% to –36%), all suggest that acute stress resulted in cardiac complications in trying to maintain adequate ventricular pressure. Increased IVCT implies systolic complications and limitations in building ventricular pressure gradients. Considering the Wiggers model,⁴⁶ acute stress appears to prolong the time required to build up ventricular pressure to overcome the opening of the aortic valve, and once AVO occurs, there is an elevated TF, which is required to sustain stroke volume (and cardiac output) in a reduced systolic time period.

Therefore, as supported by other research in which reduced ejection time was a predictor of cardiac complications, including all-cause mortality and heart failure,⁴⁷ sustained psychological stress can result in prolonged periods of shortened ejection time, thereby heightening the risk for cardiac disease and serving as an indicator

that a posttraumatic stress injury may have occurred. Importantly, the changes in the cardiac cycle intervals all occurred with no increase in HR. Altered cardiac cycle intervals are expected when HR is increased (for example, reduced timing intervals during exercise), and therefore, the case study findings directly imply altered systolic and diastolic function in this participant.

The MPI can reflect cardiac stress.¹⁵ The MPI is directly related to both IVRT and IVCT, and is inversely related to systolic time [(IVCT + IVRT)/systole].^{24,25} Given the changes to systolic time and IVCT in this participant, the acute stress experienced by our case study participant resulted in an elevated MPI. An elevated MPI appears common among people with a history of major adverse cardiac events and is also useful for predicting major adverse cardiac events in the general public.⁴⁸ Pro-inflammatory cytokines are associated with cardiac cycle timing intervals and the MPI.⁴⁹ While our findings are currently limited to our case study, the mechanisms suggest that elevated psychological stress can elevate pro-inflammatory cytokine release, which can impair cardiac function. Psychological stress has been associated with several posttraumatic stress injuries, as evidenced by journalists exposed to PPTE.⁵⁰ Chronic exposures to occupational stressors among public safety personnel and military personnel has been shown to elevate levels of circulating cytokines and impair blood brain barrier integrity.⁵¹ The changes may result from physical complications (e.g. sleep deprivation, exhaustion) alone or in combination with acute exposures to PPTE, which appear to be associated with elevated risk for PTSD.⁵¹ More research is required for a better understanding of the cardiac cycle timing intervals in patients with PTSD.

Strengths and limitations

The literature review was extensive and provided a background of the research available pertaining to echocardiography and PTSD. Furthermore, our case study highlights the novel insights of altered cardiac timing intervals in PPTE, which will impact the performance indices (i.e. MPI, SPI, DPI) reported. These findings, which imply that acute occupational stress can have a direct impact on the cardiac cycle,

TABLE 2
Cardiac cycle timing intervals and magnitude of change from baseline for all three incidents for the case study participant

Cardiac indices	Baseline	Incident A	Incident B	Incident C
Heart rate (bpm)	70	71 (1)	73 (4)	68 (–3)
IVCT (ms)	39	57 (48)	49 (26)	46 (19)
IVRT (ms)	83	91 (10)	91 (10)	90 (9)
Systole (ms)	287	218 (–24)	220 (–23)	234 (–19)
Diastole (ms)	459	454 (–1)	471 (3)	496 (8)
MVO to E (ms)	12	8 (–3)	8 (–17)	10 (–10)
AS to MVC (ms)	20	11 (–47)	14 (–32)	18 (–14)
REP (ms)	82	61 (–26)	53 (–36)	65 (–21)
MPI	0.43	0.68 (60)	0.63 (48)	0.59 (38)
SPI	0.14	0.26 (93)	0.22 (63)	0.20 (47)
DPI	0.29	0.42 (47)	0.41 (44)	0.39 (36)
AS (mG)	6	5 (–4)	5 (–11)	5 (–18)
TF (mG)	7	12 (73)	12 (68)	11 (53)

Abbreviations: AS, atrial systole; AS to MVC, atrial systole to mitral valve closure; bpm, beats per minute; DPI, diastolic performance index; IVCT, isovolumic contraction time; IVRT, isovolumic relaxation time; mG, milligravity; ms, millisecond; MPI, myocardial performance index; MVO to E, mitral valve open to E wave; REP, rapid ejection period; SPI, systolic performance index; TF, twist force.

Note: All data are presented as the mean value for each incident (% change from baseline).

have not been reported previously in the literature.

However, the case study approach does limit the generalizability of the study. The research available in the literature is conflicting and therefore there are difficulties in understanding the mechanism of cardiac dysfunction following PTSD. Furthermore, there is much variation in the methodology, sample population and outcome variables in the known literature. Finally, one of the two articles excluded for language included echocardiography assessment, which may have further enhanced our understanding of cardiac function and PTSD. Therefore, there is a need for more consistent research with respect to similar patient populations and research methodologies that can allow for a more accurate comparison of altered cardiac function in PTSD.

Conclusion

Research about cardiac cycle timing intervals and cardiac function in PTSD is nascent; nevertheless, the available literature suggests cardiac function assessments can provide new insights into posttraumatic stress injuries. We provided an overview of the published research, indicating that variations in relationships between PTSD and cardiac function appear to depend on study design. Our case study report exemplifies how PPTE appear to alter cardiac function. Prolonged stress, without rehabilitative intervention, can further impair systolic and diastolic function, resulting in a heightened risk for cardiac disease, and arguably potentiating posttraumatic stress injuries.

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Conflicts of interest

The authors have no conflicts of interest to declare.

Authors' contributions and statement

JS, JPN—conceptualization, data curation, formal analysis, methodology. JPN—resources,

funding acquisition. JS, JPN, NC—writing—original draft, writing—review and editing.

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In Memoriam – Honouring Dr. Ivan Barry Pless, OC, BA, MD, DSc (Hon), FRCP(C), FRCPCH (Hon), FCAHS



Health Promotion and Chronic Disease Prevention in Canada (the HPCDP Journal) mourns the loss of one its most dedicated and longstanding Associate Scientific Editors, Dr. Barry Pless.

At nearly 91 years young, Barry Pless succumbed to complications of a fall-related hip fracture and, sadly, passed away at the Royal Victoria Hospital in Montreal, Quebec, on Tuesday, August 1, 2023. Barry had an impact on many people and organizations, as evidenced by the breadth of his accomplishments and connections. He co-authored well over 300 scholarly scientific publications; supervised more than 30 graduate students; peer-reviewed for at least 20 journals; and served on numerous national boards, including for Safe Kids Canada and Mothers Against Drinking and Driving (MADD Canada). Professionally, he was a paediatrician, an epidemiologist, a researcher, Professor Emeritus at McGill University and a fierce advocate for child health and safety.

In 1990, Dr. Barry Pless played a pivotal role in the establishment of the [Canadian Hospitals Injury Reporting and Prevention Program](#) (CHIRPP). Formed initially with 10 participating hospitals, CHIRPP has since expanded to include 20 hospital sites, conducting national sentinel health surveillance, research and reporting on injuries and poisonings. Barry subsequently went on to become the founding Editor-in-Chief of the journal [Injury Prevention](#), a role which he occupied from 1995 to 2008.

Throughout his career, he made landmark contributions to the fields of ambulatory pediatrics, clinical epidemiology, childhood chronic diseases and injury prevention in Canada. In fact, his work and engagement on so many public health issues garnered him distinguished recognition as a Member of the Order of Canada in 1993, as well as another prestigious promotion to Officer of the Order of Canada in 2017.

Dr. Barry Pless joined the HPCDP Journal as an Associate Scientific Editor in 2013, when it was circulated under the title *Chronic Diseases and Injuries in Canada*. Barry came to be known as an outspoken and trusted subject matter expert, consistently holding the journal to high editorial standards and always encouraging efforts on research, practice and policy fronts. He remained a committed editor for 10 years, continuing to provide scientific reviews for manuscripts up until the time of his hospitalization in June 2023.

The following quote was shared in a eulogy for Barry by his son during his funeral services. It is a fitting aphorism for how Barry viewed his role, including that as an Associate Scientific Editor for our journal:

“He that wrestles with us strengthens our nerves and sharpens our skills. Our antagonist is our helper.”

– Sir Edmund Burke (*Reflections on the Revolution in France* [1790], Volume III, p. 195).

Barry Pless was a dear mentor, colleague and person of exceptional character with a passion for knowledge and life. He will be missed and remembered.

Call for papers: Generating stronger evidence to inform policy and practice: natural experiments on built environments, health behaviours and chronic diseases

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Guest editors: Dr. Stephanie Prince Ware (Public Health Agency of Canada), Dr. Gavin McCormack (University of Calgary)

HPCDP Journal Editors: Robert Geneau and Margaret de Groh (Public Health Agency of Canada)

Where we work, learn, play, eat and live has important implications for health. The built environment has been associated with the development of chronic disease, and with health behaviours often seen as critical pathways for this relationship.^{1,2} Built environments refer to components of the physical environment that are human-made or human-modified and include structures and buildings, recreation facilities, green spaces and parks, transportation systems and community design.

Natural experiments are interventions that occur without a researcher's ability to manipulate the intervention or exposure to the intervention.^{3,4} Natural experiments offer the opportunity to evaluate the effects of "naturally occurring" interventions such as changes to the built environment (e.g. creation of a new bike path, park improvements, infrastructure changes to schools or workplaces, construction of a new recreation facility or grocery store) on health behaviours and chronic disease risk. Natural experiments are often more practical for investigating the health impacts of environmental interventions when compared to traditional experimental studies (e.g. randomized controlled trials). Compared to cross-sectional studies, natural experiments provide a means to generate rigorous evidence to better establish causality, as well as to understand the implementation of interventions in "real-world" scenarios.

This special issue answers the 2017 Canadian Public Health Officer annual report's call to further evaluate the health impacts of community design features in Canada.⁵ This special issue resonates with the expanding scholarly and policy-oriented interest in the utility of natural experiments as a critical tool in advancing the body of evidence and for informing interventions to improve public and population health.^{6,7} Specifically, the objective of this special issue on natural experiments is to provide timely evidence to further understand the effectiveness of built environment interventions on health behaviours and chronic disease prevention in a Canadian context.

Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice is seeking relevant topical research articles that present new findings or synthesize/review existing evidence on natural experiments of the built environment (or related policies) that influence health behaviours with implications for chronic disease prevention in Canada.

Relevant topic areas include, but are not limited to:

- Built environments, including community or neighbourhoods, workplaces, schools, transportation infrastructure, home environments, recreation environments, parks, playgrounds, green spaces, public open spaces, natural environments and seniors' residences.
- All health-related behaviours, including physical activity, sedentary behaviour, sleep, food consumption, smoking and substance use.
- Chronic diseases and health-related outcomes, including body mass index, fitness, blood pressure, blood lipids, blood sugar, injuries, falls, mental health, stress, depression, anxiety, Alzheimer's disease, dementia, obesity, metabolic syndrome, cardiovascular disease, cancer, diabetes and lung disease.

International submissions will be considered if they include Canadian data, results (e.g. as part of multi-country studies or global comparisons) and/or evidence-based discussion of implications for community or population health in Canada.

Consult the Journal's website for information on article types and detailed [submission guidelines for authors](#). Kindly refer to this call for papers in your cover letter.

All manuscripts should be submitted using the Journal's ScholarOne Manuscripts online system. Pre-submission inquiries and questions about suitability or scope can be directed to HPCDP.Journal-Revue.PSPMC@phac-aspc.gc.ca.

Submission deadline: November 30, 2024

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Other PHAC publications

Researchers from the Public Health Agency of Canada also contribute to work published in other journals and books. Look for the following articles published in 2023:

Bartlett S, Bataineh J, **Thompson W**, et al. Correlations between weight perception and overt risk-taking among Canadian adolescents. *Can J Public Health*. 2023. <https://doi.org/10.17269/s41997-023-00778-1>

Catherine NLA, MacMillan H, Cullen A, [...] **Tonmyr L**, et al. Effectiveness of nurse-home visiting in improving child and maternal outcomes prenatally to age two years: a randomised controlled trial (British Columbia Healthy Connections Project). *J Child Psychol Psychiatry Allied Disciplines*. 2023. <https://doi.org/10.1111/jcpp.13846>

Chen SX, Lee MJ, McVea DA, et al. Deconstructing stress leave. *BCMJ*. 2023;65(5):156, 159. <https://bcmj.org/worksafebc/deconstructing-stress-leave>

Chen SX, Lee MJ, McVea DA, et al. Risk of mortality among people with schizophrenia during the 2021 heat dome. *BCMJ*. 2023;65(5):158-9.

Fahim C, Prashad AJ, Silveira K, **Rodin R**, **Subnath M**, **Rolland-Harris E**, et al. Dissemination and implementation of clinical practice guidelines: a longitudinal, mixed-methods evaluation of the Canadian Task Force on Preventive Health Care's knowledge translation efforts. *CMAJ Open*. 2023;11(4):E684-95. <https://doi.org/10.9778/cmajo.20220121>

Graham E, **Gariépy G**, **Orpana H**. System dynamics models of depression at the population level: a scoping review. *Health Res Policy Syst*. 2023;21(1):50. <https://doi.org/10.1186/s12961-023-00995-7>

John S, Joseph KS, Fahey J, **Liu S**, et al. The clinical performance and population health impact of birthweight-for-gestational age indices at term gestation. *Paediatr Perinat Epidemiol*. 2023. <https://doi.org/10.1111/ppe.12994>

Kew CL, Washington TR, **Bergeron CD**, et al. Caregiver strain among non-Hispanic Black and Hispanic male caregivers with self-reported chronic health conditions. *Ethnicity Health*. 2023. <https://doi.org/10.1080/13557858.2023.2222341>

Kota K, Chomienne MH, **Geneau R**, et al. Socio-economic and cultural factors associated with the utilization of maternal healthcare services in Togo: a cross-sectional study. *Reproductive Health*. 2023;20(1):109. <https://doi.org/10.1186/s12978-023-01644-6>

Liu L, **Batomen B**, **Pollock NJ**, **Contreras G**, **Jackson B**, **Pan S**, **Thompson W**. Suicidality and protective factors among sexual and gender minority youth and adults in Canada: a cross-sectional, population-based study. *BMC Public Health*. 2023;23(1):1469. <https://doi.org/10.1186/s12889-023-16285-4>

Toupin-April K, Gaboury I, Proulx L, [...] **Sachs H**, et al. "I'd like more options!": interviews to explore young people and family decision-making needs for pain management in juvenile idiopathic arthritis. *Pediatric Rheumatology*. 2023;21(1):74. <https://doi.org/10.1186/s12969-023-00849-0>

Yao X, **McFaull SR**, **Champagne AS**, **Thompson W**. An interrupted time series analysis of trends in opioid-related emergency department visits from pre-COVID-19 pandemic to pandemic, from the Canadian Hospitals Injury Reporting and Prevention Program. *BMC Public Health*. 2023;23(1):1483. <https://doi.org/10.1186/s12889-023-16414-z>

