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Original quantitative research

Well-being of Canadian Armed Forces members during the COVID-19 pandemic: the influence of positive health behaviours

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Abstract

Introduction: The COVID-19 pandemic has been linked to increased depression, anxiety and other adverse mental health outcomes. Understanding the behaviours that positively influence health is important for the development of strategies to maintain and improve well-being during the pandemic.

Methods: This study focussed on Canadian Armed Forces Regular Force members (N = 13 668) who participated in the COVID-19 Defence Team Survey, administered between April and May 2020. The use of positive health behaviours and the extent to which such behaviours were associated with anxiety, depression and self-reported change in health and stress levels compared to before the pandemic were examined.

Results: Depression and anxiety were experienced by 14% and 15% of the sample, respectively, while 36% reported that their mental health had gotten worse since the pandemic started, and close to half reported worse physical health and stress levels. The most common behaviours respondents reported engaging in to maintain or improve their health were exercising outdoors, healthy eating and connecting with loved ones. Although most behaviours were associated with better health outcomes, meditation and connecting with loved ones showed associations with worse health.

Conclusion: Engaging in behaviours such as exercise and healthy eating was generally associated with better health outcomes. Unexpected relationships of meditation and connecting with loved ones are discussed in terms of their use in stressful times among those with mental health issues, past research on coping strategies and impacts of the pandemic and physical distancing on social connections. The findings may have implications for strategies to promote healthy behaviours during the remainder of the pandemic and similar crises in the future.

Keywords: *mental health, coping, positive health behaviours, military, COVID-19, stress, depression, anxiety*

Highlights

- This study examined health behaviours and indicators among Canadian military personnel early in the COVID-19 pandemic.
- The most common behaviours used to improve or maintain health were exercising, healthy eating and getting enough sleep. Many of these behaviours were associated with more favourable mental and physical health and lower stress levels.
- Results provide valuable information on the prevalence of health-promoting behaviours and their associations with indicators of well-being.
- The findings point to key areas that could be targeted in future health promotion programs and interventions to preserve or improve health and to maintain operational readiness among military personnel.

Introduction

Research conducted since early in the COVID-19 pandemic has shown its substantial impacts on mental health. For example, increased depression and anxiety among Canadians were reported early in the pandemic,[1] and fewer Canadians reported good or excellent mental health compared to before the pandemic.[2] In addition, declines in mental health compared to before the pandemic were found in United States military veterans.[3]

Health-promoting behaviours, or those activities engaged in to maintain or improve one's health, can have a positive impact on well-being in normal times. However, the public health measures taken to curb the spread of the virus, including stay-at-home orders, limitations on social gatherings and restricted access to recreational resources, may have affected the ability or motivation to engage in such behaviours, with subsequent impacts on mental and physical health. Although much of the research on the individual consequences of the pandemic has focussed on its effects on mental health, less attention has been paid to health-promoting behaviours, including the extent to which the pandemic and associated public health measures have affected engagement in behaviours to promote or maintain health. Given the increasing evidence of the mental health toll of the pandemic, it is important to

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focus efforts on mitigating the mental health impact and managing psychological health over the longer term.

A wealth of research has underscored the importance of positive health behaviours for mental and physical health and well-being. For example, physical activity is associated with lower levels of stress, depression and anxiety,[4] and has shown efficacy as a treatment for depression and anxiety.[5,6] Higher fruit and vegetable consumption is associated with lower risk of cardiovascular disease, cancer and depression, as well as greater psychological well-being.[7] Sleep is particularly important for health, as poorer sleep health has been found to be associated with a greater risk of anxiety and depression.[8] Social behaviours are also important to both physical and mental health,[9] and social health can buffer against adverse mental and physical health outcomes in the face of stress.[10] Indeed, lack of social support was one of the key factors associated with increased severity of mental health issues among military veterans during the pandemic,[11] and larger pre-pandemic social network size was protective of increased psychological distress among veterans during the pandemic.[3] Other behaviours, including meditation and connecting with one's spirituality, have also been associated with positive health outcomes.[12-14]

Health-promoting behaviours can have positive impacts on the maintenance or improvement of mental and physical health. However, changes in these behaviours may have occurred during the pandemic due to disruptions in normal activities, such as limitations on social gatherings and closures of fitness and recreational facilities, including those normally used by military members. Several studies have found both positive and negative changes in health behaviours during the pandemic, although most have assessed them retrospectively. For example, while several studies found increases in healthy eating,[15-17] other research suggested increased consumption of junk food and reduced physical activity early in the pandemic.[18]

As well, several studies have found decreased physical activity compared to before the pandemic.[19-21] In addition, increased sedentary behaviour and social isolation were found early in the pandemic,[19] as well as negative changes in sleep.[22] In fact, studies show a notable proportion of individuals have been impacted by sleep problems during the pandemic: a systematic review estimated the global pooled prevalence of sleep problems during the pandemic at 35.7%.[23]

Decreased engagement in positive behaviours can have subsequent impacts on health. For example, reduced physical activity and sleep since the pandemic began have been associated with greater symptoms of depression, anxiety and stress.[22] Decreased physical activity has also been linked to worse psychological well-being[20] and increased feelings of loneliness,[24] while increased sedentary behaviour has been associated with worse physical and mental health.[25] Among military health care workers in China, poor sleep quality and duration during the pandemic have been identified as major risk factors for depression, generalized anxiety and somatic symptoms.[26] Negative changes in diet and physical activity during the pandemic have also been associated with worse subjective well-being.[15]

On the other hand, increased engagement in such behaviours can result in positive changes in health. Inactive people who spent more time in outdoor physical activity during the pandemic showed reduced anxiety,[27] and increased physical activity during the pandemic has also been associated with better physical health.[25] Healthy eating and physical activity were protective factors for adverse mental health outcomes in a sample of health care workers during the pandemic.[28] As well, physical activity, diet and sleep were all found to be protective for mental well-being early in the pandemic in a university sample, with physical activity being the strongest predictor.[29]

It is clear from research carried out over the past year that the COVID-19 pandemic has had substantial impacts on mental health, as well as on engagement in health-promoting behaviours. However, there has been little research conducted specifically on mental health and health behaviours of actively serving military personnel during the pandemic. Importantly, recent prospective research has shown that mental health of military veterans declined during the pandemic.[3] Although the military faced many of the same public health restrictions as the general population, including physical distancing requirements, restricted travel and reduced access to fitness amenities, members of the military also faced unique issues that might have made them more vulnerable to mental health difficulties. For example, many were deemed to be in "essential" positions, which required them to continue to work at their usual location. Others faced being deployed or preparing to deploy on operations including those in support of the long-term care facilities in various parts of the country where they might be expected to face emotionally difficult situations.

Understanding the prevalence of health-promoting behaviours and their associations with indicators of well-being can provide insight into key areas that can be targeted in health promotion programs and interventions in order to maintain health and operational readiness among military members throughout this pandemic and other significant potentially stressful events. To this end, the goal of this study was to examine the engagement in positive health behaviours by Canadian Armed Forces (CAF) Regular Force members early in the COVID-19 pandemic, and the association of behaviours with indicators of well-being including depression, anxiety and perceived changes in mental health, physical health and stress levels since the start of the pandemic.

Methods

Participants

This study focussed on Regular Force members (N = 13 668) who completed the COVID-19 Defence Team Survey. Demographic and military characteristics of the sample are shown in Table 1. Most respondents were men (82.0%), between 25 and 44 years old (64.8%), and married or living common-law (61.6%). Approximately half of the sample consisted of junior non-commissioned members (NCMs). A small percentage was deployed in support of the long-term care facilities in Ontario and Quebec (Operation LASER; 7.0%) or on another operation (1.2%). Approximately half had children aged under 18 years at home.

Procedure

A convenience sampling strategy was used to collect data between April and May 2020, whereby members of the Defence Team (i.e. CAF members and civilian employees of the Department of

TABLE 1
Descriptive characteristics of the Regular Force sample (N = 13 668) responding to the COVID-19 Defence Team Survey, April to May 2020

Characteristics	n	%
Gender		
Men	11 252	82.0
Women	2 285	16.8
Gender diverse	167	1.2
Age (years)		
≤ 24	1 644	12.1
25–34	4 719	34.6
35–44	4 114	30.2
45–54	2 552	18.7
≥ 55	601	4.4
Dependent children		
No	6 072	50.5
Yes	5 940	49.5
Marital status		
Married/common-law	8 400	61.6
Single/divorced/widowed	5 233	38.4
Rank		
Junior NCM	6 622	48.6
Senior NCM	3 226	23.7
Junior officer	2 082	15.3
Senior officer	1 700	12.5
Deployment status		
Not currently deployed	12 510	91.8
Deployed on Operation LASER	957	7.0
Deployed on another domestic or international operation	163	1.2

Abbreviation: NCM, non-commissioned member.

National Defence [DND]) were invited via several means, including chain of command emails and departmental website links, to participate in an online survey. Consent to participate in the anonymous survey was implied. The research was approved by the DND Social Science Research Review Board.

Measures

Positive health behaviours were assessed using 10 items adapted from Statistics Canada's "Impacts of COVID-19 on Canadians" Data Collection Series.[30] Respondents rated whether, since the start of the pandemic, they had been doing any of the behaviours (i.e. meditation, exercise, healthy eating, getting enough sleep, artistic expression, connecting with loved ones, connecting with spirituality and learning something new) for their mental health, physical health or both. Responses were dichotomized into "yes" (i.e. engaging in the behaviour for their health) or "no" (i.e. not engaging in that behaviour).

Anxiety was assessed using the 2-item Generalized Anxiety Disorder scale (GAD-2).[31] Respondents were asked how often during the last two weeks they had been bothered by the symptoms "feeling nervous, anxious or on edge" and "not being able to stop or control worrying." Depression was assessed using the 2-item Patient Health Questionnaire (PHQ-2).[32] Respondents were asked how often during the last two weeks they had been bothered by the symptoms "little interest or pleasure in doing things" and "feeling down, depressed or hopeless." For both scales, established cut-off scores of 3 or greater were used to indicate probable anxiety and probable depression.

Perceived changes in mental health, physical health and stress levels were assessed by single items asking respondents to rate their mental health, physical health and stress levels, respectively, compared to before the start of the pandemic.[30] Since the main goal of this analysis was to examine the association of behaviours with worse health outcomes, responses were dichotomized into "significantly worse than before/slightly worse than before" versus "the same as before/slightly better than before/significantly better than before," in order to examine the predictors of perceived decline in health since the beginning of the pandemic.

Analyses

The data were weighted by sex, rank, first official language and respondents' organization to ensure that the sample was representative of the CAF Regular Force population. Multivariate logistic regression analyses were used to explore the association between the independent variables (i.e. engagement in health behaviours) and the outcome variables (depression, anxiety, worse mental health, worse physical health and worse stress levels). Sociodemographic covariates that were expected to be associated with the outcomes of interest (i.e. gender, age, dependent children, marital status and rank) were included in the first step. Multicollinearity was examined using variance inflation factors and correlation coefficients; neither indicated the presence of multicollinearity.

Results

The prevalence of anxiety, depression and self-rated changes in health and stress levels since the pandemic began are shown in Table 2. Overall, 14.3% and 14.5% of the sample screened positive for depression and anxiety, respectively. Slightly over one-third (36.3%) reported worse mental health since the outset of the pandemic, and close to half reported worse physical health (46.9%) and worse stress levels (45.3%).

The prevalence of engagement in positive health behaviours is shown in Table 2. The most common behaviours respondents reported engaging in for their

TABLE 2
Prevalence of health indicators and engagement in health-promoting behaviours among Regular Force respondents to the COVID-19 Defence Team Survey, April to May 2020

Health indicators	n	%
Probable depression	1 953	14.3
Probable anxiety	1 978	14.5
Mental health **worse**[a] **since pandemic**	4 947	36.2
Physical health **worse**[a] **since pandemic**	6 401	46.9
Stress levels **worse**[a] **since pandemic**	6 184	45.3
Behaviours		
Exercising outdoors	11 522	86.8
Healthy eating	11 022	83.2
Connecting with loved ones	10 573	79.9
Getting sufficient sleep	10 046	75.7
Exercising indoors	9 840	74.3
Learning something new	5 765	43.7
Artistic expression	4 039	30.6
Meditation	2 870	21.9
Connecting with my spirituality	2 258	17.2
Other	1 245	11.5

[a] Includes response options "Slightly worse than before" and "Significantly worse than before."

mental health, physical health or both were exercising outdoors (86.8%), healthy eating (83.2%) and connecting with loved ones (79.9%). Getting sufficient sleep and exercising indoors were also reported by approximately three-quarters of respondents. Learning something new was reported by close to half of respondents, while artistic expression, meditation and connecting with spirituality were less frequently endorsed.

Table 3 presents the adjusted odds ratios (aORs) for predicting depression and anxiety, with all variables included in the model. Odds of depression were higher among those who were younger, without children and junior non-commissioned members (NCMs). Anxiety was higher among women, those with children and those in the middle age group (i.e. 35–44). Engaging in exercise, healthy eating, getting enough sleep, connecting with loved ones and learning something new were all associated with lower odds of depression, while those who reported meditating for their health were 2.15 times more likely to meet the cut-off for depression (95% confidence interval [CI]: 1.88–2.46). Exercise, getting enough sleep and learning something new were associated with lower odds of anxiety, while those who reported meditating were 2.19 times more likely to experience anxiety (95% CI: 1.92–2.50).

Table 4 presents the aORs for predicting self-rated worse mental health, physical health and stress levels since the start of the pandemic, with all variables included in the model. Odds of reporting worse mental health were higher for women, the middle age group (35–44) and for officer ranks. Odds of reporting worse physical health were greater for the older age groups, those without children and officer ranks. Odds of worse stress levels since the pandemic were higher for women, age groups older than 24, those with dependent children at home, married respondents and junior NCMs. Exercising indoors and getting enough sleep were associated with better outcomes across all three dependent variables. Outdoor exercise was associated with better physical health and stress levels, while healthy eating was associated with better mental and physical health. Artistic expression was associated with better physical health. Connecting with one's spirituality was associated with better mental health, while learning something new was associated with better mental health and stress levels. Those who reported engaging in meditation were more likely to report worse mental health (aOR = 1.49; 95% CI: 1.34–1.65) and stress levels (1.42; 1.28–1.57) since the start of the pandemic. Similarly, those who reported connecting with loved ones reported worse health outcomes across all three variables, with adjusted odds of 1.28 (1.15–1.42), 1.16 (1.05–1.28) and 1.15 (1.03–1.27) for worse mental health, physical health and stress levels, respectively.

Discussion

This study examined behaviours in which CAF Regular Force personnel engaged to maintain or improve their health early in the pandemic. Results indicated that the most common behaviours were exercising, healthy eating and getting enough sleep. Not surprisingly, many of these behaviours were associated with more favourable mental and physical health and lower stress levels. Notable exceptions included meditation, which was associated with greater likelihood of depression and anxiety symptoms, as well as a worsening of mental health and stress levels since the pandemic, and connecting with loved ones, which was associated with a worsening of mental health, physical health and stress levels.

In order to sustain operational readiness, military personnel are expected to maintain high levels of physical fitness and health. It is therefore not surprising that a large majority reported exercising (74.3% indoors, 86.8% outdoors) and healthy eating (83.2%) in order to improve their health, and in seemingly greater proportions than members of the Canadian general population. For instance, results of a Canadian survey conducted around the same time indicated that only 40% of Canadians had exercised indoors, 57% had exercised outdoors and 23% had changed their food choices to improve their physical or mental health.[30] High levels of engagement in such behaviours may have in part related to operational training or ongoing efforts to maintain operational readiness among CAF members. However, motivations for engaging in such behaviours may also have been based on a variety of other factors. In a US study, the primary factors reported as motivations for increased engagement in positive health behaviours included having more time and the need for stress relief. On the other hand, decreased engagement in positive health behaviours was also

TABLE 3
Associations of health behaviours with depression and anxiety among Regular Force respondents to the COVID-19 Defence Team Survey, April to May 2020

Characteristic	Model 1: Depression	Model 2: Anxiety
	aOR (95% CI)	aOR (95% CI)
Gender		
Men	Ref	Ref
Women	1.14 (0.99–1.32)	**1.88 (1.65–2.15)**
Age (years)		
≤ 24	Ref	Ref
25–34	0.93 (0.76–1.15)	1.26 (0.99–1.61)
35–44	1.12 (0.89–1.40)	**1.43 (1.11–1.85)**
45–54	0.87 (0.68–1.12)	1.25 (0.95–1.64)
≥ 55	0.69 (0.47–1.00)	1.13 (0.78–1.65)
Dependent children		
No	Ref	Ref
Yes	**0.86 (0.76–0.98)**	**1.21 (1.07–1.37)**
Marital status		
Married/common-law	Ref	Ref
Single/divorced/widowed	1.34 (0.99–1.30)	0.95 (0.83–1.10)
Rank		
Junior NCM	Ref	Ref
Senior NCM	**0.66 (0.56–0.78)**	0.92 (0.78–1.08)
Junior officer	**0.77 (0.66–0.90)**	0.91 (0.78–1.06)
Senior officer	**0.62 (0.49–0.78)**	0.97 (0.79–1.20)
Health behaviours		
Meditation	**2.15 (1.88–2.46)**	**2.19 (1.92–2.50)**
Exercising outdoors	**0.75 (0.65–0.87)**	**0.77 (0.67–0.90)**
Exercising indoors	**0.78 (0.69–0.89)**	**0.81 (0.72–0.92)**
Healthy eating	**0.85 (0.74–0.98)**	1.04 (0.90–1.21)
Getting sufficient sleep	**0.34 (0.30–0.38)**	**0.35 (0.31–0.40)**
Artistic expression	0.97 (0.85–1.11)	1.13 (0.99–1.28)
Connecting with loved ones	**0.83 (0.73–0.96)**	0.94 (0.82–1.08)
Connecting with my spirituality	0.97 (0.83–1.14)	1.00 (0.85–1.17)
Learning something new	**0.75 (0.66–0.85)**	**0.72 (0.64–0.81)**

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; NCM, non-commissioned member; Ref, reference category.

Note: Bolded results are statistically significant.

commonly attributed to increased worry or stress.[21]

The associations of many of the behaviours with more favourable health and well-being are in line with results of multiple studies. Regarding exercise, an Australian study found that negative changes in physical activity and sleep were associated with a higher likelihood of reporting symptoms of depression, anxiety and stress.[22] Similarly, the association of change in physical activity with well-being among Canadians has been examined,[27] although the researchers explored such associations among participants identified as either active or inactive based on reported levels of physical activity and found that changes in physical activity were only associated with well-being outcomes among Canadians who were not generally physically active. Specifically, physically inactive Canadians who became more active reported higher levels of social, emotional and psychological well-being.

Getting enough sleep yielded the strongest associations with health and well-being indicators. Sleep is now recognized as a fundamental component of optimal health. Inadequate sleep has been found to be involved in the onset or exacerbation of several chronic illnesses.[33] Accordingly, ensuring sleep health has been identified as a critical measure for preserving overall health during the pandemic.[8]

Despite many studies pointing to the beneficial effects of meditation on well-being,[13] use of meditation was found to be associated with poorer, rather than better, mental health. One possible interpretation for this is that Regular Force personnel who were experiencing worse mental health were engaging in meditation to manage their symptoms. A US population study indeed found that use of mindfulness or spiritual meditation was more likely among individuals with depression.[34] This same study also found that close to one-third of those who practised mindfulness meditation did so to treat a specific condition, and the vast majority (i.e. just over 90%) did so for stress management or emotional well-being. Meditation is also increasingly being integrated into clinical practice to treat mental health conditions.[35] Thus, its observed link with poorer mental health in our study may reflect a greater adoption of meditation among personnel who were more prone to experiencing, or were experiencing, poorer mental health more so than reflecting a negative impact of meditating on health and well-being.

Like meditation, social connectedness has been linked with better well-being, including lower levels of psychological stress during the COVID-19 lockdown.[36] Yet, connecting with loved ones was found to be associated with higher odds of reporting worse health and stress. While we initially assumed that connecting with loved ones could serve as a proxy for social connectedness, it is possible that this indicator fell short in this regard. Research on social support has emphasized the importance of considering not only the quantity, but also the quality of social support that individuals receive, with evidence suggesting that quality of support is more important as a protective factor against depression.[9,37] Thus, CAF members may have spent a considerable amount of time connecting with loved ones, but it is not clear whether the quality of these connections met their needs, particularly early in the pandemic when many connections

TABLE 4
Associations of health behaviours with self-reported changes in health and stress levels since before the pandemic among Regular Force respondents to the COVID-19 Defence Team Survey, April to May 2020

Characteristics	Model 3: Worse mental health	Model 4: Worse physical health	Model 5: Worse stress levels
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Gender			
Men	Ref	Ref	Ref
Women	**1.24 (1.12–1.39)**	1.10 (0.99–1.22)	**1.36 (1.23–1.52)**
Age (years)			
≤ 24	Ref	Ref	Ref
25–34	1.17 (0.99–1.37)	0.95 (0.82–1.11)	**1.30 (1.11–1.53)**
35–44	**1.21 (1.01–1.44)**	0.86 (0.73–1.01)	**1.51 (1.27–1.79)**
45–54	1.07 (0.89–1.30)	**0.75 (0.63–0.90)**	**1.41 (1.17–1.71)**
≥ 55	0.94 (0.73–1.22)	**0.76 (0.60–0.97)**	**1.42 (1.11–1.83)**
Dependent children			
No	Ref	Ref	Ref
Yes	1.02 (.93–1.12)	**0.85 (0.78–0.93)**	**1.34 (1.23–1.47)**
Marital status			
Married/common-law	Ref	Ref	Ref
Single/divorced/widowed	0.98 (0.89–1.09)	0.92 (0.84–1.01)	**0.79 (0.71–0.87)**
Rank			
Junior NCM	Ref	Ref	Ref
Senior NCM	1.00 (0.89–1.13)	0.92 (0.82–1.03)	1.12 (1.00–1.26)
Junior officer	**1.34 (1.20–1.50)**	**1.14 (1.02–1.27)**	**1.30 (1.16–1.45)**
Senior officer	**1.41 (1.21–1.64)**	**1.28 (1.10–1.48)**	**1.67 (1.43–1.94)**
Health behaviours			
Meditation	**1.49 (1.34–1.65)**	1.10 (0.99–1.22)	**1.42 (1.28–1.57)**
Exercising outdoors	0.92 (0.82–1.04)	**0.73 (0.65–0.82)**	**0.84 (0.74–0.94)**
Exercising indoors	**0.84 (0.77–0.92)**	**0.64 (0.58–0.70)**	**0.79 (0.72–0.86)**
Healthy eating	**0.83 (0.74–0.93)**	**0.47 (0.42–0.53)**	1.03 (0.92–1.15)
Getting sufficient sleep	**0.39 (0.35–0.42)**	**0.60 (0.55–0.66)**	**0.39 (0.36–0.43)**
Artistic expression	1.01 (0.92–1.11)	**0.90 (0.82–0.99)**	1.06 (0.96–1.16)
Connecting with loved ones	**1.28 (1.15–1.42)**	**1.16 (1.05–1.28)**	**1.15 (1.03–1.27)**
Connecting with my spirituality	**0.87 (0.77–0.98)**	1.00 (0.89–1.12)	0.97 (0.86–1.09)
Learning something new	**0.75 (0.68–0.82)**	1.01 (0.93–1.10)	**0.73 (0.67–0.79)**

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; NCM, non-commissioned member; Ref, reference category.

Notes: Worse mental health, physical health and stress levels includes response options "Slightly worse than before" and "Significantly worse than before."

Bolded results are statistically significant.

were likely virtual due to physical distancing requirements.

Further, researchers have noted the importance of social relationships for mood, describing it as a "'two-way street' between the person and his or her social network."[38,p.300] To the extent that CAF members' discussions with loved ones centred on stressors associated with the pandemic and the influx of information from media, these interactions may have exacerbated negative emotions. This may especially have been the case among CAF members who used social media to connect with loved ones, as frequent interactions with social media during the pandemic have been associated with depression and anxiety.[39]

Strengths and limitations

Beyond its large sample size, the strengths of this study include its focus on a large range of health-promoting behaviours and health indicators, including validated measures for depression and anxiety symptoms.[31,32] This was also the first study to examine health behaviours and indicators among Canadian military personnel early in the pandemic and capture the impacts when public health measures to restrict the spread of COVID-19 were newly in place. Nevertheless, a few limitations must be noted.

As the survey was intended to be broad in scope and focussed on a range of topics in addition to mental health, in order to keep

it at a reasonable length and reduce the burden to participants, only abbreviated measures and select questions were included. As a result, health behaviours were assessed using single items that did not reflect frequency or duration of engagement. No additional information was collected on pre-existing behaviours or conditions, making it impossible to assess change in health-promoting behaviours. In terms of the health indicators used as outcomes in this study, a positive screen on the PHQ-2 or GAD-2 does not necessarily indicate a diagnosis of depression or anxiety, as these are intended to be brief screening tools,[31,32] while self-reported changes in mental health, physical health and stress levels were based on retrospective recall. Future research using more detailed measures of health behaviours, including variables to assess the extent and frequency of such behaviours, is needed.

As illustrated in the preceding discussion on the unexpected associations of meditation and connecting with loved ones with poorer health and well-being, the cross-sectional nature of the survey poses a considerable challenge for the interpretation of findings. Without a clear sense of the direction of associations, including the direction of the relationship between positive behaviours and mental health, the specific mechanisms and pathways linking health behaviours and indicators remain unclear. Longitudinal research is needed in order to determine the causality of relationships between the variables, as well as the impact of the pandemic itself on health behaviours and mental health.

Due to time constraints, we did not use probabilistic sampling, limiting our ability to make inferences about the CAF population. However, the demographic composition of the sample reflected the population well, and statistical weights were applied to account for differences. In addition, the study focussed only on Regular Force members and is therefore not generalizable to all military personnel within the CAF. Further research will focus on members of the Reserve Force as well as civilian Defence Team employees. Finally, the survey was administered early in the pandemic when physical distancing and other public health measures were only recently in place. Findings may therefore only reflect the context at that specific point in time.

Conclusion

This was the first study to examine health behaviours and indicators among Canadian military personnel in a pandemic context. Results provide valuable information on the prevalence of health-promoting behaviours and their associations with indicators of well-being, thereby shedding light on key areas that could be targeted in future health promotion programs and interventions. Behaviours found to have the strongest associations with well-being hold promise as modifiable factors that could be leveraged to preserve or improve health and maintain operational readiness among military personnel in a pandemic context.

Conflicts of interest

The authors have no conflicts of interest to declare.

Authors' contributions and statement

KS and JL were involved in conceptualizing the study design. KS conducted the analysis of the data, and both authors were involved in interpretation of the results. Both authors contributed to drafting and revising the paper and approval of the final manuscript for submission.

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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