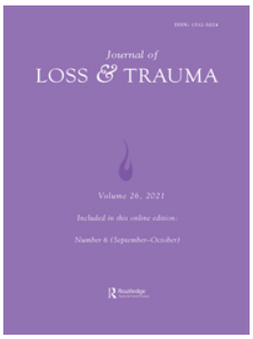

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International Perspectives on Stress & Coping

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/upil20

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To cite this article: Grace McKeon, Ruth Wells, Zachary Steel, Veronique Moseley & Simon Rosenbaum (2021) Self-Reported Physical and Mental Health of Informal Caregivers of Emergency Service Workers, Journal of Loss and Trauma, 26:6, 507-518, DOI: 10.1080/15325024.2020.1845020

To link to this article: https://doi.org/10.1080/15325024.2020.1845020

Published online: 11 Nov 2020.

JOURNAL OF LOSS AND TRAUMA
2021, VOL. 26, NO. 6, 507–518
https://doi.org/10.1080/15325024.2020.1845020

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Self-Reported Physical and Mental Health of Informal Caregivers of Emergency Service Workers

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ABSTRACT

Emergency service workers (ESWs) are at increased risk of experiencing mental health symptoms. Little is known about the health impact of providing informal care to ESWs (e.g., their family and friends). We aimed to examine the health of Australian ESWs and their informal caregivers compared to the general population, using baseline data from ESWs enrolled in an intervention study. Outcomes included psychological distress, sleep, quality of life and physical activity. Participants were $n = 30$ informal carers and $n = 34$ ESWs. Results highlighted that the health of informal caregivers of ESWs is compromised compared to general Australian population data. Interventions should be expanded to include informal caregivers.

ARTICLE HISTORY
Received 1 October 2020
Accepted 27 October 2020

KEYWORDS
Emergency service workers; first-responders; informal caregivers; families; partners; mental health; physical activity; distress

Introduction

Emergency service workers (ESWs) including police, firefighters and paramedics are regularly exposed to traumatic events, putting them at a significantly increased risk of poor mental health (Berger et al., 2012). One in 10 ESWs is diagnosed with posttraumatic stress disorder (PTSD), and one ESW dies by suicide in Australia approximately every four weeks (NCIS, 2019). In addition to routine operational stressors, emergency service work is often accompanied by high levels of unpredictability, long work hours, shift work and overtime. This can create secondary stress in multiple life domains including family relationships (Cowlishaw et al., 2010).

Partners, family members and friends play an import role in providing support to ESWs and are paramount to reducing the impact of highly stressful work. A 2010 meta-analysis showed that social support is a resilience factor in the aftermath of exposure to potentially traumatic events (Prati & Pietrantoni, 2010). Receiving social support is a predictor of well-being and post-traumatic growth, and a strong protective factor against developing

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PTSD (Charuvastra & Cloitre, 2008). Further, those who have higher levels of family support are less likely to take mental health stress leave following exposure to a traumatic event (Regehr et al., 2002). The care provided by family members or close friends rather than a professional is referred to as "informal caregiving." This type of care takes significant pressure off the health system and the estimated economic value of informal mental health caregiving in Australia is $14.3 billion per year (Diminic et al., 2017).

While it is well established that those in caring roles (e.g., for older adults or military personnel) (Pinquart & Sörensen, 2003; Vitaliano et al., 2003) face increased mental and physical health risks, the impact of caring for someone in the emergency services is unclear. There are over 80,000 full time (Harvey et al., 2015) and 420,000 volunteer (Statistics ABo, 2007) ESWs in Australia, and therefore many family members who may also be affected by the stress their loved ones experience. There is existing evidence that shows that a military career can dramatically impact the lives of family members and loved ones (MacDonell et al., 2016), with several studies finding high rates of mental disorders among the partners of Vietnam veterans (O'Toole et al., 2010; Yambo & Johnson, 2014). Given the many similarities between emergency services and the military, including their stoic characteristics and regular exposure to distressing situations, it has been suggested that the same may be true in the families of ESWs (Roth & Moore, 2009; Varker et al., 2018). While qualitative studies of ESWs and their partners have shown that the job stress experienced at work negatively impacts relationships at home, there is limited quantitative data focused on the carers and loved ones of ESWs (Burke, 1993; Regehr, 2005).

Therefore, the aim of the present study was to examine the health of the informal caregivers of ESWs compared to the general Australian population, using baseline data from an intervention study that recruited both ESWs and their informal caregivers. Our secondary aim was to compare the health status of informal caregivers to the ESWs. Mental health was assessed through levels of psychological distress, depression, anxiety and stress symptoms, sleep quality, quality of life. Physical health was assessed through physical activity levels and sedentary behavior which are strong predictors of health outcomes. It was hypothesized that the health profiles of the informal caregivers of ESWs would be poorer than the general population.

Method

We used baseline data from an intervention study testing the effects of a mental health informed physical activity program for ESWs at risk of, or experiencing poor mental health and their informal caregivers (McKeon

et al., 2019). Between October 2018 and March 2020, $N = 34$ ESWs and $N = 30$ informal carers (overall $N = 64$) were recruited to the trial. Participants were recruited through *Behind the Seen,* a not-for-profit community organization that aims to raise awareness of the mental health issues facing ESWs and their families. *Behind the Seen* posted the study advertisement on their Facebook page. The advertisement stated that researchers were seeking ESWs to volunteer to participate in an online program to learn about the effects of increased physical activity on wellbeing. ESWs who were interested in participating were asked to nominate an informal caregiver to participate in the program with them. This study was approved by the UNSW HREC committee (HC180561). All participants provided informed consent.

Informal caregivers were required to meet the following inclusion criteria; (i) aged 18–65 years, (ii) absence of any absolute contraindications to exercise (Medicine ACoS, 2013), (iii) internet access, (iv) English speaking, (v) and have at least weekly in person contact with the ESW who nominated them. Participants were screened using the physical activity vital sign and the Kessler 10 (K10) for psychological distress. Participants experiencing very high levels of psychological distress (scoring >30 in the K10) and who were not receiving treatment or whose medications had changed in the past four weeks were excluded and referred to a local health professional. No carers were excluded based on this inclusion criteria.

Measures

Data from all questionnaires were self-completed online through the *MetricWire* mobile phone application.

Psychological distress

The Kessler-10 (K10) questionnaire was used to assess levels of psychological distress (Kessler et al., 2002). It consists of 10 items scored on a five-point Likert scale with total scores ranging from 10 to 50. Scores were grouped into 4 levels of psychological distress; a score of 10–15 indicates low, 16–21 moderate, 22–29 high and 30–50 very high based on the risk of being diagnosed with a mental disorder corresponding to these scores (Andrews & Slade, 2001). In the general Australian population, approximately 60.8% of adults experience low levels of psychological distress while 13% of adults experience either high or very high levels of distress (Statistics ABo, 2018). The K-10 has excellent psychometric properties, including high internal consistency ($\alpha = 0.93$; Kessler et al., 2002) and discriminant validity (Furukawa et al., 2003).

Depression, anxiety and stress

The 21-item Depression Anxiety and Stress Scale (DASS-21) was used to assess mental health symptoms (Henry & Crawford, 2005). A total score and three separate subscales, each with 7 items, were calculated to identify severity ratings for depression, anxiety and stress. Participants were asked to use 4-point severity/frequency scales to rate the extent to which they have experienced each state *over the past week*. Higher scores represent more severe symptoms. For the depression domain, scores of 0–4 are considered normal, 5–6 mild, 7–10 moderate, 11–13 severe and >14 extremely severe. For anxiety, 0–3 is considered normal, 4–5 mild, 6–7 moderate, 8–9 severe, and >10 extremely severe. For stress, 0–7 is normal, 8–9 mild, 10–12 moderate, 13–16 severe, and >17 extremely severe. Australian general population norms are 2.57 (SD 3.86) for depression, anxiety 1.74 (SD 2.78) for anxiety and 3.99 (SD 4.24) for stress (Crawford et al., 2011). The psychometric properties of the DASS have been comprehensively evaluated, and it has been found to be valid, consistent, and responsive to treatment (Lovibond & Lovibond, 1995).

Sleep quality

The Pittsburgh sleep quality index was used to assess participants quality and patterns of sleep in the past month (Buysse et al., 1989). Seven subscores were calculated ranging from 0 to 3 to yield a global score that can range from 0 to 21. A sum of 5 or greater indicates a "poor" sleeper. The Australian population mean is 6.3 (SD 3.4) (Buysse et al., 2008). The components of the PSQI have shown to have a high degree of internal consistency ($\alpha = 0.83$) (Buysse et al., 1989).

Quality of life

The Assessment of Quality of Life-6D scale (AQoL-6D) was used to assess the quality of life (Richardson et al., 2012). A total simple psychometric score for health-related quality of life and profile scores on the different dimensions were calculated. Scores can range from 20 to 99 with higher numbers representing better quality of life. The Australian general population mean is 84.37 (SD 11.5) (Maxwell et al., 2016). The AQoL-6D questionnaire has achieved construct validity and provides a sensitive description of health related quality of life (Richardson et al., 2012).

Physical activity

The Simple Physical Activity Questionnaire (SIMPAQ) is a 5-item clinical tool designed to assess physical activity among populations at high risk of

sedentary behavior (Rosenbaum et al., 2020). For the purpose of this study, the SIMPAQ was adapted into an online version using MetricWire. Total moderate-vigorous physical activity (MVPA) per week and sedentary time per day were assessed. Fifty-five percent of the Australian population meet the World Health Organization recommendations of 150 min of MVPA per week (Statistics ABo, 2015).

Statistical analysis

Analysis was performed using SPSS V25. Descriptive statistics including means (SD) for continuous outcomes and frequencies n (%) for categorical data were calculated. Where possible, normative values from the general Australian population using published data were used as a comparator. Independent samples t-test (continuous variables) and Chi Square (categorical variables) were used to determine if there was a significant difference between ESWs and their informal carers. Significance was set at $p < 0.05$.

Results

Demographics

$N = 30$ informal caregivers and $N = 34$ ESWs ($N = 64$ in total), were included in this study. The demographic characteristics of the study sample are summarized in Table 1. The majority of informal carers (77%) were female and the mean age was 43.6 (SD 11.9, range = 24–62) years. $N = 22$ (73%) were life partners to the ESW, $n = 5$ (17%) were close friends and $n = 3$ (10%) were other family members. $N = 8$ (27%) were working as a business professional, $n = 6$ (20%) in home duties, $n = 6$ (20) in emergency services, $n = 4$ (13%) allied health/medical and $n = 6$ (20%) other. The participants were informal carers of $n = 15$ (44%) firefighters, $n = 13$ (38%) ambulance and $n = 6$ (18%) police.

Self-reported health

Table 2 summarizes the self-reported physical and mental health outcomes for both the informal caregivers and the ESWs.

Psychological distress

Among the informal caregivers, 67% ($n = 20$) were experiencing moderate to very high levels of psychological distress, with nearly one-third of participants ($n = 9$, 30%) experiencing very high levels of distress. This is higher

Table 1. Participant demographics (n =64).

Characteristic n (%)	Carers (n=30)	First responders (n=34)
Age		
18–30	5 (17)	6 (18)
31–40	9 (30)	8 (23)
41–50	6 (20)	6 (18)
51–60	9 (30)	12 (35)
60+	1 (3)	2 (6)
Sex		
Male	7 (23)	24 (71)
Female	23 (77)	10 (29)
Current smoker		
Yes	4 (13)	5 (15)
No	26 (87)	29 (85)
Relationship		
Partner	22 (73)	
Close friend	5 (17)	
Family member	3 (10)	
Marital status		
Married	18 (60)	18 (74)
Single	3 (10)	6 (18)
De-facto	8 (27)	10 (29)
Other/prefer not to say	1 (3)	
Profession		
Police	4 (13)	6 (18)
Fire		15 (44)
Ambulance	2 (7)	13 (38)
Business	8 (27)	
Home duties	6 (20)	
Allied health/medical	4 (13)	
Other	6 (20)	

than the general population where 13% are reported high or very high levels of distress (Statistics ABo, 2018). There was no significant difference for total K10 scores between the ESWs and their informal caregivers, t (62) = 1.5, $p = 0.06$. A chi-squared test for the different categories was significant χ^2 (3, $N = 64$) = 10.9, $p = 0.012$.

Depression, anxiety and stress

Mean scores as assessed by the DASS-21 for the informal caregivers were 4.8 (SD 4.5) for depression, 3.9 (SD 3.7) for anxiety and 7.2 (SD 5.3) for stress. These mean scores were categorized as mild depression, mild anxiety and normal stress (Crawford et al., 2011). Scores on each of the DASS-21 subscales were worse than the Australian population norms. Scores were not statically different between the ESWs and their carers in any of the DASS-21 categories.

Sleep

The informal caregivers mean PSQI scores were 8.8 (SD 4.0), indicating worse sleep than the Australia general population mean of 6.3 (SD 3.4). Scores indicate that the majority (73%) were experiencing poor sleep quality, compared to 100% of the ESWs.

Table 2. Participant self-report questionnaire outcomes ($n = 64$).

Outcomes (mean (SD))	Carers ($n = 30$)	First responders ($n = 34$)	Difference between groups
K10			
K10 total	20.7 (8.8)	23.5 (6.0)	$p = 0.06$
Low distress *n* (%)	10 (33)	5 (14)	
Moderate distress *n* (%)	11 (37)	8 (24)	
High distress *n* (%)	2 (7)	14 (41)	
Very high distress *n* (%)	7 (23)	7 (21)	**$p = 0.01$**
DASS-21			
Total score	15.9 (12.8)	20.6 (10.7)	$p = 0.74$
Depression score	4.8 (4.5)	7.4 (4.5)	$p = 0.97$
Anxiety score	3.9 (3.7)	4.7 (3.5)	$p = 0.90$
Stress score	7.2 (5.3)	8.5 (4.7)	$p = 0.46$
PSQI			
Global score—mean (SD)	8.1 (4.3)	14.3 (3.2)	**$p = 0.04$**
Poor sleep quality *n* (%)	22 (73)	34 (100)	$p = 0.00$
AQoL-6D			
Total score—mean (SD)	79.1 (10.8)	73.7 (10.4)	$p = 0.63$
SIMPAQ			
Sedentary time (hours/day)	13.2 (4.5)	9.2 (3.6)	$p = 0.29$
MVPA (min/week)	127.3 (157.9)	87.4 (145.8)	$p = 0.08$
Walking (min/week)	73.8 (74.7)	46.5 (41.8)	**$p = 0.01$**
Meeting health guidelines (>150 min/week) *n* (%)	9 (30)	5 (14)	$p = 0.16$

Note: K10: Kessler 10; DASS-21: Depression, Anxiety and Stress Scale; PSQI: Pittsburgh Sleep Quality Index; AQoL-6D: Assessment of Quality of Life 6-dimensions; SIMPAQ: Simple Physical Activity Questionnaire.
Bold text indiciates values that are significant.

Quality of life

The informal carers were also experiencing poor quality of life 79.1 (SD 10.8), compared to the general population mean of 84.37 (SD 11.5). The emergency service workers were experiencing lower quality of life than the general population, however, no statistical difference was found between the informal caregivers and ESWs.

Physical activity

The informal carers mean sedentary time was 13.2 (SD 4.5) hours per day. The informal caregivers were less active than the general population, with only 30% of the participants meeting the physical activity guidelines of 150 min of moderate to vigorous activity per week compared to 55% in the general population. Fourteen percent of the ESWs were meeting the guidelines and the difference between the groups was not significant.

Discussion

The aim of the present study was to examine the health of informal carers of ESWs who participated in an intervention study and where possible to compare this to Australian norms. Our secondary aim was to compare results to their ESW partners. Overall, our data confirmed our hypothesis that informal caregiving appears to be associated with poor health outcomes, in

comparison to the general population. Work and family are interrelated, and our data suggest that the occupational stressors related to emergency service work may impact upon partners and informal caregivers.

While it is well understood that ESWs experience poor mental health, our data draws attention to the needs of caregivers experiencing similarly compromised health outcomes. Of particular concern, roughly one in three of the informal caregivers were experiencing high or very high levels of psychological distress, compared to 13% of the general Australian population (Statistics ABo, 2018). Similarly, 73% of the caregivers reported poor sleep quality, and their mental health symptoms and quality of life were poorer than the general population.

Our results are in line with previous research showing that increased occupational stressors can cause negative emotional spill over into family life, impacting marital behavior (Story & Repetti, 2006). In addition to traumatic events, shift work is a likely contributing factor to the negative spill over. There is a strong relationship between shift work and work family conflict, particularly among rotating shift workers (Lovibond & Lovibond, 1995). Shift work and the requirement to respond to unpredictable emergencies adversely impact numerous aspects of family life, including marital and parental roles, leisure and social opportunities, and home routines (Roth & Moore, 2009). It is also possible that some of the coping mechanisms adopted by ESWs have negative impacts on relationships. For example, emotional numbing is a strategy often used to help emergency workers cope with tragic events by minimizing emotions and focusing on the cognitive aspect of the job. In veteran populations, emotional numbing has shown to impair communication and family relationship quality (Ruscio et al., 2002).

In addition to the poor mental health outcomes, high levels of sedentary behavior were reported among the carers and only 30% were meeting the WHO physical activity guidelines. Physical inactivity and sedentary behavior are strong indicators of physical morbidity. The consequences of inactivity include an increased risk of chronic health conditions such as heart disease, diabetes and all-cause mortality (Lee et al., 2012). It is evident that this population appear to be particularly vulnerable and need targeted interventions to address these health outcomes. Given the well-documented relationship between physical activity and mental health, lifestyle interventions may play an important role in helping to protect and treat carers physical and mental health.

Limitations

Limitations of the present study include the limited sample size which is unlikely to be representative of the entire population because of the

recruitment procedure. The carers included may represent a biased sample of people who were willing to sign up as a support person to a physical activity program. The extent of their caregiver duties and the length of their relationship is also unknown. In regard to the sample, $N = 6$ were also ESWs themselves who are likely to also experience distress related to their occupation. While the majority of carer participants were female, this is in line with the gendered nature of caregiving in Australia (Health AIo, 2019). Finally, the study is cross-sectional and therefore we cannot infer causality of being a carer. Future research should consider a dyadic analysis of the physical and mental health outcomes of emergency workers and their informal caregivers.

Conclusions

Informal caregivers are contributing unpaid labor to the emergency services industry. By and large, they are women (77%), who play an important role in both supporting the mental health of ESWs and offsetting public health costs. To the best of our knowledge, this is the first study to look at the impact of caregiving on the family and friends of emergency service workers. Consistent with other research on the impact of caregiving among other populations, high rates of psychological and physical morbidity were observed among the informal caregivers of ESWs. Despite the small sample size, the alarmingly high rate of psychological distress highlights an urgent need for additional support for the family members of ESWs. There has been an increase in organizational support systems developed for ESWs over the past few years, however, these generally neglect family members. Treatment approaches should consider extending to target the whole family unit who play important role in supporting ESWs.

Disclosure statement

The authors declare no conflicts of interest.

Funding

Funding was received to support this study from the Elderslee Foundation. GM is funded by a Suicide Prevention Australia Scholarship. SR is funded by an NHMRC Early Career Fellowship [APP1123336].

Notes on contributors

Grace McKeon is an accredited exercise physiologist and a PhD candidate within the school of psychiatry at the University of New South Wales. Her work focuses on the role of physical activity to improve the mental health of vulnerable groups including emergency service

workers and their families. She is interested in how we can use digital technologies (e-health) to deliver lifestyle interventions.

Dr Ruth Wells is a clinical psychology registrar and a Research Fellow in the School of Psychiatry at the University of New South Wales, Sydney. They apply an ecological framework to global mental health issues and work to promote community-based approaches to psychosocial well-being, such as addressing human rights, social participation or staff care, which may supplement standard psychological approaches. Ruth brings a critical lens to the design of research with culturally and linguistically diverse communities through participatory action research.

Professor Zachary Steel holds the St John of God Chair of Trauma and Mental Health a partnership between Richmond Hospital, the School of Psychiatry UNSW and the Black Dog Institute. He heads a program of clinical research into the impact of trauma on veterans, first responders, refugees, asylum seekers and civilian populations. He has established a highly cited research program that has investigated the prevalence, social determinants, and intervention models for mental health problems within Australia and the Asia-Pacific region.

Veronique Moseley is an accredited social worker with 30 years of experience in program development, implementation and evaluation. Veronique is also the co-founder of Behind the Seen, a non-profit organsation focusing on the mental helaht of emergency servcies and their familes.

Associate Professor Simon Rosenbaum is Scientia Associate Professor in the School of Psychiatry, UNSW Sydney, Australia. His research focuses on developing interventions targeting the physical health of people experiencing mental illness, with a focus on modifiable risk factors such as physical activity.

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