



PREVALENCE AND PREDICTORS OF MENTAL HEALTH IN FIREFIGHTERS

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ABSTRACT

PREVALENCE AND PREDICTORS OF MENTAL HEALTH IN FIREFIGHTERS

Firefighters' role in emergency management exposes them to a range of stressors. It is recognised that a small but sometimes significant proportion of firefighters will develop mental health problems that may create significant distress and costs to the individual and the fire service. However, the literature is inconclusive not only about the prevalence of the commonly experienced mental health disorders associated with exposure to potentially traumatic events (Heinrichs et al., 2005; Del Ben et al., 2006; Regehr et al., 2003), but also about the range of factors associated with their development (Marmar et al., 2006; Meyer et al., 2012; Di Gangi et al., 2013).

This paper presents the findings of a longitudinal study of mental health in Australian firefighters that is being conducted in the course of a PhD. 335 firefighters from four Australian fire services completed a self-report survey twice, 12 months apart, and 300 firefighters participated in a structured clinical interview. The purpose of the study was to establish the prevalence rates, and the factors which contributed to the development of posttraumatic stress disorder, depression, anxiety and alcohol disorder in this sample of career and volunteer firefighters.

The presentation will address the following key questions:

- What is the prevalence of the most common posttraumatic mental health problems, namely - posttraumatic stress disorder, depression, anxiety and alcohol use disorders, amongst this sample of Australian firefighters?
- How does the mental health of volunteer and career firefighters in this sample differ?
- What is the relative contribution of demographic factors, exposure to traumatic events, operational and organisational factors to poor mental health outcomes?
- Which factors are most significant in contributing to firefighters' better and worse mental health?
- What are the implications of these findings for fire services?

End User Statements

'I believe what you are proposing will be of great use to our industry ... ACT Fire and Rescue would be very keen to be involved in your study.' *Paul Swain AFSM Chief Officer ACT Fire and Rescue*

'AFAC can see great value in this project and are very supportive and willing to be consulted as required.' *Stuart Ellis AM CEO AFAC*



INTRODUCTION

Firefighters' role in emergency management exposes them to a range of stressors. It is recognised that a small but sometimes significant proportion of firefighters will develop mental health problems that may create significant distress and costs to the individual and the fire service. However, the literature is inconclusive not only about the prevalence of the commonly experienced mental health disorders associated with exposure to PTEs (Wagner et al., 1998; Heinrichs et al., 2005; Del Ben et al., 2006; Regehr et al., 2003), but also about the individual, operational and organisational risk and protective factors associated with their development (Marmar et al., 2006; Meyer et al., 2012; Di Gangi et al., 2013).

BACKGROUND

The existing literature has examined the impact of four contributing factors on psychological outcomes. The most commonly recognised and researched are the risks associated with attendance at *potentially traumatic events* (PTEs) including fire, hazardous material, accidents, and natural and human made disasters. Secondly, a range of *individual* factors have also been investigated, including prior trauma, prior psychological adjustment, family history of psychopathology (Ozer et al, 2003), negative and critical self-appraisals (Bryant & Guthrie, 2007), sense of helplessness, unemployment and younger age (Bryant & Harvey, 1995; 1996), low levels of perceived support (Meyer et al, 2012), coping styles and personality. Thirdly, and less researched are those aspects of firefighters' daily work that involve the impact of more routine *operational* variables such as role, shift work, time critical responses, 'command and control' leadership, autonomy and control, fatigue, and working in uncomfortable conditions, downtime between jobs, and attendance at non-emergency jobs. The fourth and least researched factor, involves the impact of firefighters' working in an *organisation*, such as culture, leadership capability, relationships, staffing and resourcing, red tape and dealing with change.

The aims of this research were to establish the prevalence rates of posttraumatic stress disorder (PTSD), depression, generalised anxiety disorder (GAD) and alcohol use disorder (AUD), and explore the relative predictive ability of individual, PTE exposure, operational and organisational factors on these four mental health disorders.

METHOD

335 career and volunteer firefighters from four Australian fire services participated in the longitudinal study, which incorporated the completion of an on-line self-report survey at baseline and follow-up, 12 months apart. 297 firefighters participated in a diagnostic interview. This design was chosen as it best addressed the aims of the study. The survey included seven main sections comprising background information and consent, demographic and personal information, firefighter service details, mental health and other health measures, operational and organisational checklist and psychological safety measure, exposure to acute stressor list, and satisfaction with health section. The mental health measures used were the PCL-5 for PTSD, Patient Health Questionnaire (PHQ-9) for depression, Generalised Anxiety Disorder (GAD-7) for generalized anxiety disorder (GAD), and Alcohol Use Disorders Identification Test (AUDIT-C) for alcohol use disorder (AUD). Survey data was imported from Survey Monkey into SPSS-22 where it was screened, exploratory data



analyses were conducted on all main variables, and reliability analyses were conducted on the measures used in the study.

To address the aims of the study as outlined above, frequencies (percentages) for the prevalence rates for each mental health disorder and the results of a series of hierarchical multiple regressions conducted to develop best fit models to explain the specific mental health outcomes will be presented.

RESULTS

Prevalence rates for PTSD, depression, GAD and AUD

Overall, around a sixth of career and a seventh of volunteer firefighters met criteria for any psychiatric disorder in the previous 4 weeks. The following percentages of career firefighters met criteria for PTSD, depression, GAD, alcohol abuse and alcohol dependence respectively: 3.3%, 5.5%, 3.3%, 3.3% and 5.5%. While for the volunteer firefighters, 1.9%, 4.4%, 6.8%, 2.4% and 3.4% met criteria for PTSD, depression, GAD, alcohol abuse and alcohol dependence respectively.

Predictors of PTSD, depression, GAD and AUD

For the *career* firefighters, the baseline measure of PTSD was the greatest predictor of PTSD (beta .493, $p \leq .001$). This was followed by low job satisfaction associated with operational aspects of their job (beta = -.480, $p \leq .005$) and exposure to more potentially traumatic events (PTEs) in the previous 12 months (beta = .353, $p \leq .003$). For the *volunteer* firefighters the only statistically significant predictor was the baseline measure of PTSD (beta = .540, $P \leq .000$).

For the *career* firefighters, low job satisfaction associated with operational aspects of their job was the greatest predictor of depression (beta = -.548, $p \leq .001$), followed by the baseline measure of depression (beta = .390, $p \leq .006$), and then exposure to more PTEs in the previous 12 months (beta = .381, $p \leq .004$). For the *volunteer* cohort, the baseline measure of depression was the greatest predictor of depression (beta = .573, $p \leq .001$), followed by experiencing more recent life events (RLEs) in the previous 12 months (beta = .151, $p \leq .017$).

The only significant predictor for GAD for both *career* and *volunteer* firefighters was the baseline measure of anxiety (career: beta .547, $p \leq .001$; volunteer: beta .637, $p \leq .001$).

For the *career* cohort, the baseline measure of alcohol use was the greatest predictor of alcohol use (beta = .544, $p \leq .001$). This was followed by rank, where being a firefighter as opposed to a manager (beta = -.244, $p \leq .003$) and experiencing more RLEs in the previous 12 months (beta = .204, $p \leq .009$) predicted greater alcohol use. The baseline measure of alcohol use was the only significant predictor of alcohol use for the *volunteer* cohort (beta = .831, $p \leq .000$).

DISCUSSION

Prevalence rates of PTSD, depression, GAD and AUD

The prevalence rates for having any current psychiatric disorder in this sample are 16.5% for career firefighters and 14.1% for volunteer firefighters. This compares with



approximately 20% in the general population and 17.1% in a South Australian Metropolitan Fire Service (MFS) study (Van Hooff et al, 2017) who had any disorder in the past 12 months, and 13.1% in the Fire and Rescue New South Wales (FRNSW) study (Harvey et al, 2016) who had any current psychiatric disorder. Table 1 summarises the prevalence rates for the four mental health disorders and provides a comparison with the rates found in the general population. The prevalence rates for PTSD in the career and volunteer firefighters are low in comparison with the Australian general population (National Survey of Mental Health and Wellbeing, 2007) and with other Australian firefighter studies (Bryant & Harvey, 1995; 1996; Dean et al, 2003; McFarlane & Papay, 1992; Harvey et al, 2016; Van Hooff et al, 2017). There is controversy in the literature as to whether being in a voluntary firefighting role is a risk or protective factor (Wagner and O'Neill, 2012; Dean et al, 2003). The results from this study indicate that they were less impacted than the career firefighters. The prevalence rates for depression in both cohorts of firefighters is higher than in the general population but very similar to that found in two recent Australian career firefighter studies (Harvey et al, 2016; Van Hooff et al, 2017). The prevalence rates for GAD in both the career and volunteer firefighters are higher than both those found in the general population and found in the recent MFS study. The alcohol abuse prevalence rates for the career and volunteer firefighters were lower than those found in the general population, but higher than that found in the MFS study, however, alcohol dependence rates for both cohorts were higher than those found in the general population and in the SA study. In both cases, the rate was more than double that found in the general population.

The most common disorders identified were depression and alcohol dependence in the career firefighters, and depression and GAD in the volunteer firefighters.

Table 1 Prevalence of PTSD, depression, generalised anxiety disorder and alcohol use disorder

Diagnosis	Career		Volunteer		General population	
	N	%	N	%	Males	Total pop
	91	31%	206	69%		
Any psychiatric diagnosis	15	16.5	29	14.1		20%
PTSD	3	3.3	4	1.9	4.6%	6.4%
Depression	5	5.5	9	4.4	3.1%	4.1%
GAD	3	3.3	14	6.8	2.0%	2.7%
AUD						
Alcohol abuse	3	3.3	5	2.4	3.8%	2.9%
Alcohol dependence	5	5.5	7	3.4	2.2%	1.4%

Note: All disorders were assessed using the MINI Neuropsychiatric Interview (n=297), except PTSD, which was assessed by the CAPS interview (n=297). CAPS = Clinician-Administered PTSD Scale; PTSD = Posttraumatic stress disorder; GAD = General Anxiety Disorder; AUD = Alcohol Use Disorder; Rates in general population are based on diagnosis within previous 12 months. As all career firefighters were male, comparison is made with rates from males in general population, while volunteer firefighters rates are compared with rates from total population (National Survey of Mental Health and Wellbeing, 2007).

Predictors of PTSD, depression, GAD and AUD

It was somewhat unexpected for both career and volunteer firefighters that no individual predictors such as gender, age, education or amount of personal support received were statistically significant in predicting any of the mental health



outcomes. However, the baseline measures for PTSD, depression, GAD and AUD always predicted the follow-up measure for both *career* and *volunteer* firefighters and this finding supports the regular assessment of such disorders so as to identify and treat them as early as possible.

Greater exposure to PTEs in the previous 12 months for *career* firefighters predicted both PTSD and depression, indicating the need for firefighters and fire services to monitor and manage as best they can the number of PTEs that firefighters attend, and to provide appropriate support services.

Experiencing more RLEs in the previous 12 months predicted depression for *volunteer* firefighters and alcohol use for *career* firefighters. Firefighters should be mindful that stressful life events increase their vulnerability to develop these mental health disorders. It was unexpected based on previous literature that RLEs were not found to be a significant predictor of PTSD, as cumulative life stress has been found to contribute to the development of PTSD (Breslau et al, 1999; Brewin et al, 2000).

For the *career* firefighters low job satisfaction associated with operational aspects of the job predicted PTSD and depression. In fact, for depression, it contributed a greater amount of the total variance in depression than did exposure to PTEs, and for PTSD almost contributed as much variance. Thus, it is important for firefighters to develop self-awareness as to when their operational job satisfaction is poor and for managers to have conversations with their staff which help to identify any negative changes in attitude to their work. Not addressing this issue has the potential to have significant and deleterious effects on *career* firefighters' mental health.

Given that *career* firefighters were identified at greater risk than managers of developing alcohol use disorder, targeting alcohol management programs for this group of staff would be beneficial. It was somewhat surprising that no other operational factors such as rank or length of service (LOS) were not significant predictors, as holding a supervisory rank in the fire service has been linked with the development of PTSD (Armstrong, 2014) and LOS has been identified as a predictive factor in mental health outcomes, including posttraumatic stress (Chamberlain and Green, 2010).

It was also surprising that the organisational variables including low job satisfaction resulting from organisational aspects of the role or level of psychosocial safety climate in the fire service were not predictors, as these factors have previously been identified as predictors of poor mental health (Corneil et al, 1999; Meyer et al, 2012; Tuckey and Hayward, 2010; Bailey et al, 2015).

CONCLUSION

Although the prevalence rates for PTSD in both the *career* and *volunteer* firefighters in this study were low in comparison with other firefighter studies, a focus still needs to be maintained by fire services as well as firefighters on identifying and managing the known predictors which include the baseline measure of PTSD for both cohorts of firefighters, and additionally for *career* firefighters, PTE exposure and low job satisfaction associated with operational aspects of the firefighting role. The most common disorders identified were depression and alcohol dependence in the *career* firefighters, and depression and GAD in the *volunteer* firefighters. For the



career firefighters, in addition to baseline measure of depression, low job satisfaction because of operational aspects of firefighting and exposure to more PTEs in the previous year predicted depression, and being a firefighter as opposed to a manager and experiencing more RLEs in the previous year predicted greater alcohol use disorder. The only additional predictor to the baseline measures for the volunteer firefighters was number of stressful life events (RLEs) experienced in the previous year which predicted depression.

The results highlight the need for a joint approach by fire services and firefighters to take responsibility for creating a culture within fire services that encourages and supports the early identification and appropriate management of changes in work attitudes such as job satisfaction and mental health symptoms.

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