MFS HEALTH & WELLBEING STUDY

EXECUTIVE REPORT

THE UNIVERSITY of ADELAIDE

CENTRE FOR TRAUMATIC STRESS STUDIES

Centre for Traumatic Stress Studies

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1 KEY FINDINGS

The MFS data presented in this report are ***weighted estimates***, and as such they reflect rates which are representative of the entire MFS population.

Mental Health

12-month Mental Disorder:

- An estimated 17.1% of the entire MFS met ICD-10 criteria for a mental disorder in the previous 12-months, with anxiety disorders the most common disorder class (12.7%) followed by affective disorders (5.7%) and alcohol disorders (3.0%).
- The most common 12-month disorder type in the MFS was PTSD (5.8%) followed by panic attacks (5.6%), and depressive episodes (5%).

Lifetime Mental Disorder:

- Approximately 50% of the entire MFS were estimated to have met ICD-10 criteria for any mental disorder in their lifetime, with alcohol disorders having the highest lifetime prevalence, followed by affective disorders, then anxiety disorders.

Trauma Exposure and PTSD:

- Lifetime trauma exposure was high in the MFS, particularly in relation to event types likely to be experienced in the workplace such as seeing someone badly injured or killed (76.7%) and experiencing a man-made disaster (58.7%).
- While the estimated risk for PTSD was generally greatest for those traumatic events that were least prevalent (such as reporting purposely or accidentally injuring or killing someone), PTSD was also elevated among those MFS members who reported experiencing traumas that they would most commonly be exposed to in the course of their duties such as dealing with a deceased person and mass casualties. These events are of particular importance in terms of their cumulative impact on MFS members.

Impacts on Functioning:

- Mental disorder and symptoms had most impact on MFS member's functioning in the family and social domains, with less effect on workplace functioning.
- Affective disorders in general had the greatest impact on work functioning, while comorbid affective and anxiety disorders, and anxiety disorder specifically had the greatest impact on functioning in the social and family domains.
- Family functioning was most impaired in those with panic disorder, alcohol dependence and specific phobia.
- While the 12-month prevalence of alcohol disorders was low in the entire MFS, alcohol disorders were associated with impairments in work and social functioning.

Current Psychological Distress:

- The majority of the MFS, about two thirds of the population, recorded low levels of current psychological distress on the K10, however the remaining third reported moderate to high levels of current distress.

12-month Suicidal Ideation and Behaviour:

- 10% of the MFS reported some form of suicidal ideation in the previous 12 months however there was a very low population prevalence of suicide plans and attempts (under 1%).

Physical Health

- The physical health of the MFS was found to be generally good, consistent with the requirement that firefighters are capable of performing their roles

Doctor Diagnosed Physical Health Conditions:

- The most prevalent doctor diagnosed physical health conditions in the MFS were high cholesterol (13.3%), high blood pressure (10.4%), sinus problems (9.8%), skin cancers (8.9%), osteoarthritis (5.9%) and hearing loss (5.9%).
- On average, MFS members reported having 1 to 2 doctor diagnosed conditions.
- Doctor diagnosed physical health conditions increased with age and length of service. Station officers and senior management also had higher numbers of conditions compared to firefighters, consistent with an overall accumulation of physical health complaints with age.
- There was substantial comorbidity between doctor diagnosed physical health conditions and 12-month mental disorder in the MFS, where for the majority of physical conditions at least 20% of those endorsing the condition met criteria for at least one comorbid mental disorder.
- The comorbidity between doctor diagnosed physical conditions and 12-month mental disorder tended to be greater for lower prevalence physical conditions.

Physical Injuries:

- The most prevalent form of physical injury sustained while on duty and while attending emergencies were musculoskeletal, with just over one third of the MFS estimated to have sustained a musculoskeletal injury while on duty or attending an emergency during their career.
- 10% reported sustaining a wound, cut, bleeding or bruise and much lower proportions (6% or less) reported dislocations or fractures, thermal stress, other injuries, burns or smoke inhalation.
- Rates of injuries were greater in relation to emergency callouts, with substantially higher rates of wounds (20%), thermal stress (13%), smoke or gas inhalation (13%) and burns (10%).

Occupational Factors

Workplace Trauma Exposure

- Workplace trauma exposure is an inherent part of MFS service with 76% of the workforce reporting exposure to 10 or more critical incidents during their career, and 6.1% reporting more than 30 critical incidents.
- Almost all MFS personnel have witnessed death on the job (95.6%), with almost 76% reporting feeling threatened on the job.
- The workplace events most highly associated with current levels of psychological distress were events involving injury to MFS members themselves, and events requiring attendance at mental health incidents.

Occupational Stress

- Occupational Stressors were also commonly reported by MFS members, however the direction of the relationship between mental health symptoms and self-reported occupational stress remains undetermined.
- The three most common sources of occupational stress reported by MFS members were job skill concerns (83.0%), co-worker conflict (80.7%), and sleep issues (79.7%).

Occupational Factors and Mental Health

- The relative impact of workplace exposures, occupational stressors and lifetime trauma differs depending on whether the outcome is a diagnosable disorder or current symptoms of psychological distress or PTSD.
- When examining the relative impact of these three factors, lifetime trauma is the strongest predictor of 12-month ICD-10 disorder. Current psychological distress is most strongly predicted by occupational stressors, and workplace exposures are the strongest predictors of current self-reported symptoms of PTSD.

2 BACKGROUND

The South Australian Metropolitan Fire Service (MFS) workforce provides a critical role in protecting and caring for the community. They are highly respected in the broader community and this is reflected in the role of a firefighter being a sought-after occupation. As an organisation, the MFS aims to recruit a healthy workforce and to sustain the capacity of fire officers throughout their careers.

The nature of a firefighter's work involves significant challenges and risks to both their physical and psychological wellbeing. Firstly, the tasks of suppressing fires, containing toxic hazards, assisting in the aftermath of motor vehicle accidents, and retrieval and rescue operations place firefighters in hazardous environments which pose obvious risks of injury. Furthermore, performing these roles requires the maintenance of high levels of physical fitness.

Secondly is the less tangible but equally real threat of psychological strain and traumatic stress. Inevitably, firefighters will encounter situations in which people have either been overcome by smoke inhalation and died, or been grievously injured/burned. There is significant psychological risk associated with the experiences of attempted rescues and witnessing of severe injury and death. In particular, incidents involving children and/or multiple fatalities represent a significant long-term risk to firefighters' mental health. The very real and continuous threat of physical injury and death to the firefighters themselves also represents a further enduring source of psychological stress in the occupation.

Due to the physical and psychological occupational hazards involved in firefighting and the increasing risk of illness over the lifespan, it is inevitable that health-related impairments may emerge in the workforce. Consequently, it is critical to map the cumulative burden and long-term costs of these workplace exposures over the course of a firefighter's career.

The MFS Health and Wellbeing Study was undertaken by the Centre for Traumatic Stress Studies (CTSS) to map the mental and physical health and resilience of the current MFS workforce to assist in the recruitment and ongoing management of the health and welfare of its firefighters.

2.1 Aims of the Report

The key objective of the MFS Report was to establish an accurate profile of the mental and physical health of the South Australian Metropolitan Fire Service (MFS). To achieve this objective, the report aimed to:

- Describe the characteristics of the MFS workforce and to determine the levels of diagnosable mental disorder in this population.
- Examine the functional impact of these mental disorders on MFS personnel, both in the workplace, socially and at home.
- Describe the physical health of the MFS, as well as physical injuries sustained in relation to MFS service.
- Examine the comorbidity between physical and mental health conditions in the MFS.
- Identify the occupational hazards and risks for MFS firefighters, particularly their lifetime exposure to traumatic events, and workplace exposures, and their relationship with mental health.

3 METHODOLOGY

3.1 Study design

A two-phase research design was used, with a self-report survey administered to the entire MFS, which was followed with a structured phone interview aimed at estimating diagnosable mental disorder within the MFS population.

3.1.1 Phase 1: Self-report survey

In phase 1, MFS personnel were screened for mental health symptoms, psychological distress, physical health symptoms, workplace exposures and occupational stressors, via a 60-minute self-report questionnaire.

3.1.2 Phase 2: Diagnostic interview

All phase 1 completers were invited to participate in a telephone interview using the Composite International Diagnostic Interview (CIDI) Version 3 (World Health Organization Computer Assisted Psychiatric Interview CIDI Version 3) (Kessler & Ustun, 2004), which provided an assessment of mental disorders based on the World Health Organization International Classification of Diseases, 10th revision (ICD-10) (World Health Organization, 1994).

3.2 Sample

A total of 1061 eligible participants were drawn from two nominal rolls and comprised all currently serving full-time MFS personnel, and all currently serving retained MFS personnel in 2014. Firefighters who had not yet completed MFS firefighting recruitment training were excluded from the study. Additionally, 10 MFS members were excluded from the sample due to an absence of demographic data for these individuals.

3.3 Response rates

3.3.1 Phase 1 survey respondents

A total of 578 MFS personnel completed the self-report survey. As basic population characteristics were known (sex, age, rank), it was possible to compare personnel who responded to the survey with personnel who did not, allowing weighting of the data to provide estimates of prevalence that were representative of the entire MFS.

The total survey response rate was 54.5%. This comprised 85% career males, 13% retained males, and 2% females. Responders were older and of higher ranks than non-responders, and response rates were greater for career compared to retained members, with relatively equal response vs non-response rates for females.

3.3.2 Phase 2 CIDI interview respondents

All 578 members who completed a survey were invited to participate in a CIDI interview. Of those invited, 63.8% (N=369) completed the interview. A description of the response rates for the study are shown in Figure 3.1.

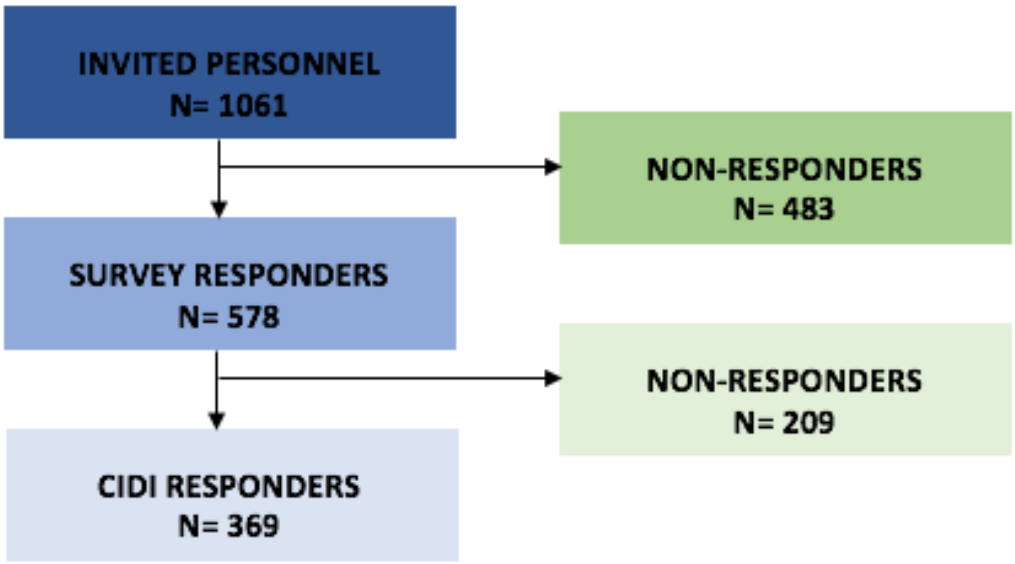

Figure 3.1: Response rates for MFS Health and Wellbeing Study

4 SOCIO-DEMOGRAPHIC CHARACTERISTICS

4.1 Demographic characteristics

The vast majority of the entire MFS (97.5%) were male, with 80.2% career firefighters, and 19.8% retained.

At the time of completing the study, the largest proportion of the MFS population were aged between 35 and 54 years (60.5%), followed by 22.2% aged between 55 and 64 years. Lower numbers of personnel (15.8%) were in the youngest age bracket of 19-34 years. A very small number of MFS personnel were aged over 65.

The majority of the MFS were firefighters (24.7%) or senior firefighters (44.2%), just under one quarter (24.7%) were station officers and approximately three percent in senior command or management positions.

The majority of MFS members reported being in a significant intimate relationship (92.5%), with nearly 70% of these in a couple relationship with dependent children. Most MFS members reported completing secondary education, with three quarters having a post-high school or tertiary qualification.

4.2 Service characteristics

The majority of MFS personnel had served for five or more years, with one third having served for more than 25 years (34.1%). Just over thirteen percent of the population had served for under 5 years.

Nearly 40% of the MFS workforce reported other emergency service experience, with CFS and ADF service the most common, followed by other unspecified services, police and ambulance. Twice as many retained members reported experience with ambulance service. Approximately one quarter of female MFS personnel reported experience with the CFS.

The majority of the MFS workforce reported working rotating day and night shifts (71.9%), with only 8% of the population working day shift only.

At the time of completing the survey, only an extremely small proportion of the workforce reported being on sick leave (1.4%). Approximately three percent of the workforce reported currently being on workers compensation.

5 MENTAL HEALTH

The primary aim of this study was to examine the mental health of the South Australian MFS, by obtaining estimated prevalence of ICD-10 anxiety (panic attack, panic disorder, agoraphobia, social phobia, specific phobia, generalised anxiety disorder, obsessive compulsive disorder, posttraumatic stress disorder), affective (depressive episodes, dysthymia, bipolar affective disorder), and alcohol disorders (alcohol harmful use, alcohol dependence) (World Health Organization, 1994). This chapter details the prevalence of 12month and lifetime ICD-10 disorder, 12month self-reported suicidality, and current psychological distress in the entire MFS. In addition, the impact of ICD-10 mental disorder on work, social and family functioning is also described.

5.1 12-month ICD-10 disorder

Table 5.1 Estimated prevalence of 12-month ICD-10 anxiety, affective, alcohol, any disorder in the MFS

12-month ICD-10 Disorder	All MFS (N =1061)		
	Weighted n	%	95% CI
Any anxiety disorder	134	12.7	(9.7, 16.4)
Panic attack	60	5.6	(3.6, 8.7)
Panic disorder	19	1.8	(1.0, 3.3)
Agoraphobia	14	1.4	(0.7, 2.8)
Social phobia	33	3.1	(1.5, 6.3)
Specific phobia	33	3.1	(1.9, 5.2)
Generalised anxiety disorder	14	1.3	(0.6, 2.7)
Obsessive compulsive disorder	15	1.4	(0.7, 3.1)
Posttraumatic stress disorder	61	5.8	(4.1, 8.1)
Any affective disorder	61	5.7	(4.1, 8.0)
Depressive episodes	53	5.0	(3.6, 7.1)
Dysthymia	2	0.2	(0.1, 1.0)
Bipolar affective disorder	7	0.7	(0.2, 2.4)
Any alcohol disorder	32	3.0	(1.9, 4.6)
Alcohol harmful use	17	1.6	(0.8, 3.0)
Alcohol dependence	15	1.4	(0.8, 2.6)
Any disorder	182	17.1	(13.8, 21.1)

Note: 95%CI: 95% Confidence Interval,

Table 5.1 presents the estimated prevalence of 12-month ICD-10 mental disorder in the entire MFS. An estimated 17.1% of the MFS met criteria for a diagnosable mental disorder in the previous 12 months. Anxiety disorders were the most common 12-month disorder group (12.7%) followed by affective disorders (5.7%). The 12-month prevalence of alcohol disorders (3.0%) was extremely low in the entire MFS. The most common 12-month disorder diagnosis in the MFS was PTSD (5.8%) followed by panic attacks (5.6%), and depressive episodes (5%).

5.1.1 PTSD and Trauma Exposure

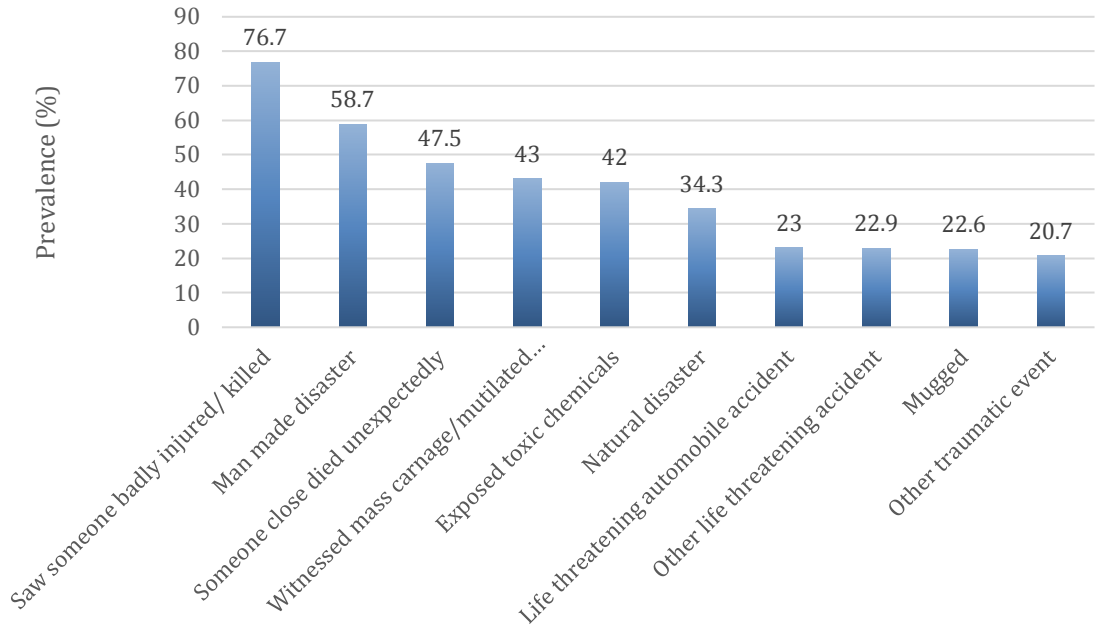

Figure 5.1 Ten most reported lifetime traumas in the entire MFS

Figure 5.1 shows the ten most commonly reported lifetime traumas in the MFS. Overall lifetime trauma exposure was high, particularly in relation to event types most likely to be experienced in the workplace. These were seeing someone badly injured or killed (76.7%), experiencing a man-made disaster (58.7%), having someone close to them die unexpectedly (47.5%), witnessing mass carnage/mutilated bodies (43%) and being exposed to toxins (42.0%).

5.1.1.1 Prevalence of post-traumatic stress disorder from specific event types

The relative risk for PTSD associated with exposure to each trauma type, was calculated for individuals who met criteria for 12-month PTSD. There was a significantly increased risk of PTSD for events which are commonly experienced on duty such as dealing with a deceased person and mass casualties. Non-work related intimate interpersonal traumas such as someone close dying unexpectedly, witnessing domestic violence as a child, being beaten by parent, being beaten by spouse, and being beaten by another were also associated with a significantly increased risk of PTSD.

5.2 Functional impacts of ICD-10 mental disorder

Table 5.2 Work, social and family disruption and 12-month ICD-10 mental disorder

	Any mental disorder		Any affective disorder		Any anxiety disorder		Any alcohol disorder	
	M	(95% CI)	M	(95% CI)	M	(95% CI)	M	(95% CI)
Disrupt work	2.74	(2.03, 3.46)	3.59	(2.47, 4.70)	2.68	(1.81, 3.55)	3.05	(1.45, 4.64)
Disrupt social	3.21	(2.49, 3.93)	4.17	(3.23,5.11)	3.41	(2.48, 4.33)	3.41	(1.81,5.00)
Disrupt family	3.36	(2.65, 4.07)	4.35	(3.45,5.26)	3.47	(2.57, 4.37)	3.68	(2.01,5.34)

The functional impacts of 12-month mental disorder on work, social and family domains are presented in Table 5.2. Having a 12-month ICD-10 mental disorder was associated with low to moderate levels of disruption across all domains, with disruption most apparent in the family domain and least apparent in the work domain.

In the work domain, self-reported disruption was lowest for anxiety disorders, and highest for affective disorders. Similarly, family disruption was highest amongst those with a 12-month affective disorder. Disruption in the social domain was somewhat higher than disruption to work functioning, and was greatest for those with a 12-month affective disorder.

Functional impact within each of the work, social and family domain for each 12-month mental disorder diagnosis was also examined. Impairment in work functioning was greatest among those with alcohol dependence, followed by social phobia and specific phobia. Impairment in social functioning was greatest in those with panic disorder, followed by those with alcohol dependence. Family functioning was most impaired in those with panic disorder, alcohol dependence and specific phobia.

5.3 Suicidality

Table 5.3 Estimated prevalence of 12-month suicidality in the entire MFS

	All MFS (N=1061)	
	Weighted n	**% (95% CI)**
Suicidal ideation	108	10.1 (8.5, 12.1)
Felt life not worth living	97	9.8 (8.1, 11.8)
Felt so low thought about committing suicide	48	4.9 (3.7, 6.4)
Suicide plan or attempt	7	0.7 (0.4, 1.5)
Suicide plan	6	0.6 (0.3, 1.3)
Suicide attempt	2	0.2 (0.0, 0.6)
No ideation, Plan or attempt	887	89.0 (86.9, 90.9)

Table 5.3 presents self-reported suicidality in the MFS, including suicidal ideation, suicide plans and suicide attempts in the previous 12 months. An estimated ten percent of the entire MFS reported some form of suicidal ideation in the previous 12 months. Despite the high rates of ideation, this did not necessarily translate into attempts, with very low population level prevalence estimates for plans and attempts (under 1%).

In general, suicidality increased with years of service, with the highest prevalence among those with 15-24 years of service (16.1%,). Rates of suicide plans and attempts again were extremely low, and clustered among those with 5-14 years of service (1.5%) and 25+ years of service (0.5%).

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5.4 Current psychological distress

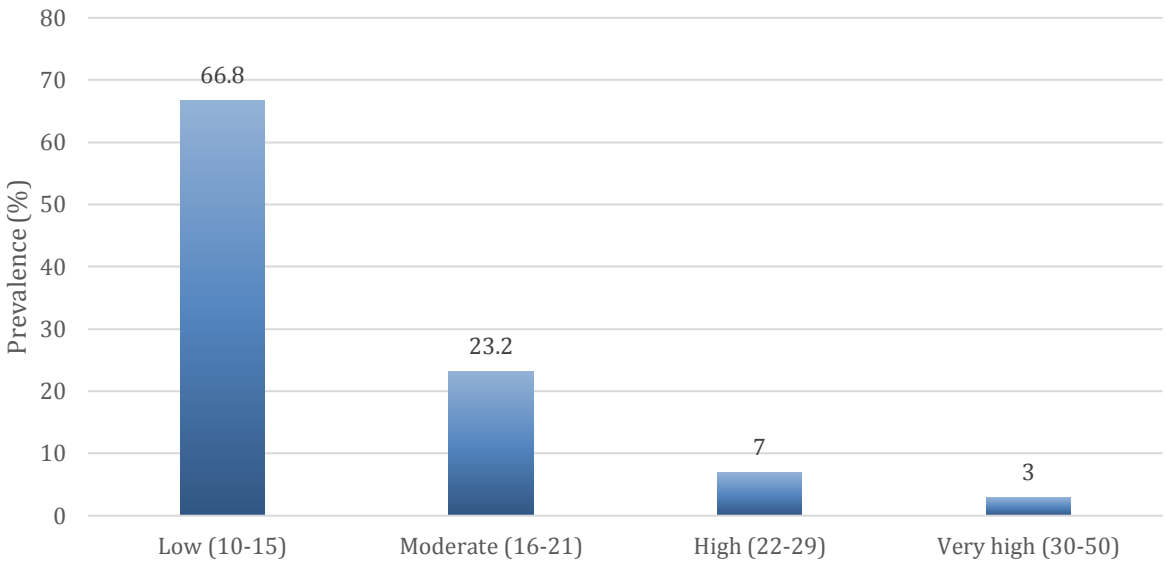

Figure 5.2 K10 risk categories in the MFS

Figure 5.2 presents current self-reported psychological distress reported by the entire MFS. While the majority of the MFS, about two thirds of the population (66.8%), recorded low levels of psychological distress, just over one fifth (23%) reported moderate distress, and approximately 10 percent reported high or very high levels of current psychological distress.

5.5 Lifetime ICD-10 mental disorder

Table 5.4 Estimated prevalence of lifetime ICD-10 Affective, Anxiety, and Alcohol disorders

	All MFS (N =1061)	
Lifetime ICD-10 Disorder	**Weighted n**	**% (95% CI)**
Any affective disorder	232	21.9 (18.2, 26.0)
Any anxiety disorder	161	15.2 (12.5, 18.3)
Any alcohol disorder	311	29.3 (25.4, 33.5)
PTSD	138	13.1 (10.4, 16.2)
Any mental disorder	527	49.7 (45.0, 54.3)

Table 5.4 presents the estimated prevalence of lifetime ICD-10 mental disorder for the entire MFS. Just under 50% met ICD-10 criteria for any mental disorder in their lifetime. The most common disorder category was alcohol disorders, with an estimated lifetime prevalence of just under 30%. This was followed by affective disorders (21.9%) then anxiety disorders (15.2%). The estimated prevalence of lifetime posttraumatic stress disorder for the MFS was 13.

6 PHYSICAL HEALTH

The prevalence of a range of self-reported physical health outcomes was also examined among the MFS, including doctor diagnosed physical health conditions, physical and mental health comorbidity, and physical injuries sustained in relation to MFS service.

6.1 Doctor diagnosed physical health conditions

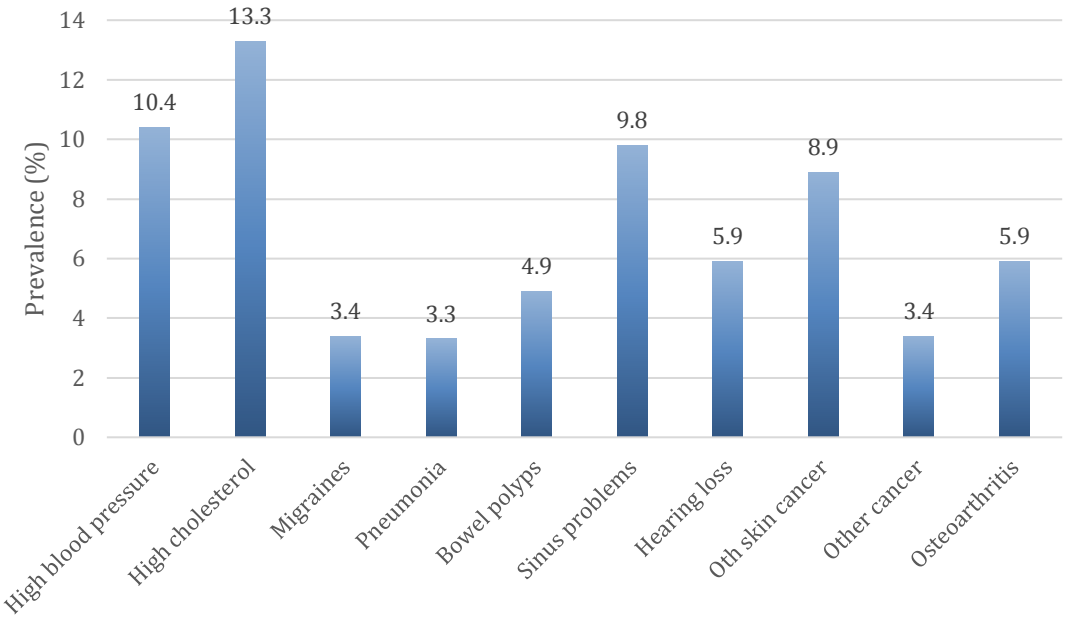

Figure 6.1 Estimated Prevalence of top 10 doctor diagnosed physical health conditions among the MFS

The physical health of the MFS was found to be generally good, consistent with the requirement that firefighters are capable of performing their roles. Figure 6.1 shows the top 10 doctor diagnosed conditions reported among the MFS. The most prevalent physical health conditions were high cholesterol (13.3%), high blood pressure (10.4%), sinus problems (9.8%), skin cancers (8.9%), osteoarthritis (5.9%) and hearing loss (5.9%). Approximately 20% of the workforce were estimated to have a self-reported metabolic syndrome related disorder (hypertension, high cholesterol, diabetes).

On average, MFS members reported having 1 to 2 doctor diagnosed conditions. There was an association between age, rank and length of service and the number of physical health conditions reported, where higher numbers of health conditions were reported among members who were older, of higher ranks, and with greater length of service. Overall, these findings reflected the relative age of the MFS population, and suggest an accumulation of physical health complaints with age.

6.1.1 Prevalence of comorbid physical and mental disorder

The comorbidity between doctor diagnosed physical health conditions, 12-month ICD-10 mental disorder, and psychological distress among the entire MFS is summarised below.

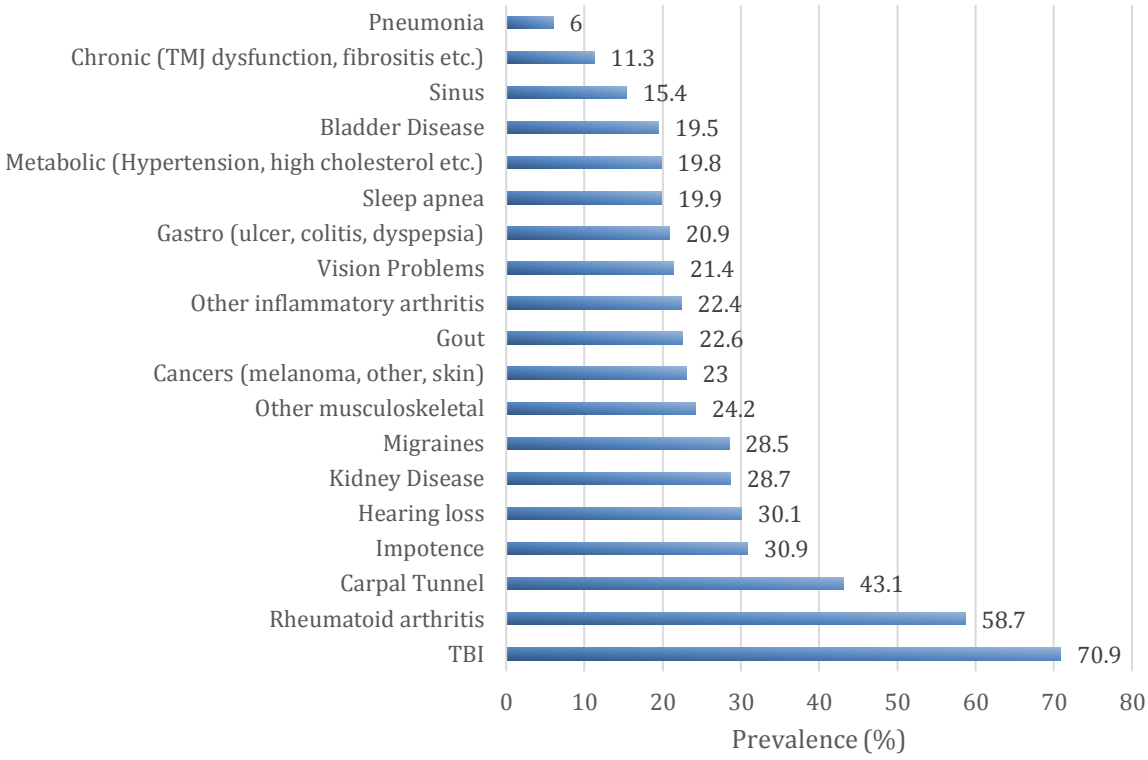

Figure 6.2 Rank ordered physical and mental disorder comorbidity

For most physical conditions, there was significant comorbidity with diagnosable mental disorders, where for the majority of physical conditions at least 20% of those endorsing the condition met criteria for at least one comorbid mental disorder.

Figure 6.2 presents in rank order, those physical conditions with the greatest degree of mental disorder co-morbidity. The comorbidity between doctor diagnosed physical conditions and 12-month mental disorder tended to be greater for lower prevalence conditions. For example, an estimated 70.9% of the MFS who reported a doctor diagnosed traumatic brain injury also met criteria for a 12-month mental disorder. Nearly 60% of those with rheumatoid arthritis (58.7%), 43.1% of those with carpal tunnel syndrome, 30.9% of those with impotence, 30.1% of those with hearing loss, 28.7% of those with kidney disease, met criteria for a 12-month ICD-10 mental disorder. While migraines had low prevalence in the MFS (2.5%), 28.5% of those with migraine were estimated to also have a comorbid mental condition

With some exceptions (bladder disease, sleep apnoea) the findings for current self-reported psychological distress levels followed a similar pattern to that of 12-month mental disorder comorbidity, being highest among those individuals with kidney disease, hearing loss, impotence and carpal tunnel.

These findings together highlight the role of traumatic stress exposure in pain-related and other physical health conditions

6.2 Physical Injuries

The prevalence of self-reported physical injuries sustained while on duty across MFS members careers varied by injury type, with approximately one third of the MFS estimated to have sustained a strain, sprain or muscular pain in the course of duty, while just over 10% reported sustaining a wound, cut, bleeding or bruise. Much lower proportions (6% or less) reported dislocations or fractures, thermal stress, other injuries, burns or smoke inhalation. This pattern of injuries reported by the MFS mirrors those from international studies which show that the majority of injuries suffered by firefighters worldwide are musculoskeletal, and superficial wounds (Jahnke et al., 2013; Katsavouni et al., 2015).

Table 6.1 Estimated rates of injuries sustained while on duty or attending an emergency during MFS career

	All MFS (N=1061)			
Injuries	**On Duty**		**Attending an Emergency**	
	Weighted n	**% (95% CI)**	**Weighted n**	**% (95% CI)**
Burn (no smoke inhalation)	49	4.6 (3.7, 5.8)	112	10.6 (9.1, 12.3)
Smoke/gas inhalation (no burn)	27	2.6 (1.8, 3.6)	139	13.1 (11.4, 15.0)
Burn and smoke inhalation	10	0.9 (0.6, 1.5)	17	1.6 (1.1, 2.3)
Other respiratory distress	18	1.7(1.1, 2.7)	39	3.7 (2.8, 4.7)
Wound, cut, bleeding or bruise	129	12.2 (10.6, 14.1)	212	20.0 (17.9, 22.2)
Dislocation or fracture	65	6.2 (4.9, 7.7)	65	6.1 (4.9, 7.6)
Strain, sprain or muscular pain	359	33.8 (31.5, 36.3)	337	31.7 (29.3, 34.2)
Thermal stress	55	5.2 (4.0, 6.7)	144	13.6 (11.7, 15.8)
Other injury	55	5.2 (4.1, 6.5)	58	5.5 (4.4, 6.8)

Table 6.1 shows the most prevalent form of injuries sustained while on duty and while attending emergencies among the MFS.In general, the pattern of injuries reported being sustained while attending an emergency was similar to those sustained while on duty, however rates of some injuries (for example, wounds (20%), thermal stress (13%), smoke or gas inhalation (13%) and burns (10%)) were higher whilst attending emergencies. An estimated 6.1% of the MFS reported sustaining a dislocation or fracture whilst attending an emergency over the course of their career. Thus, while a large part of the burden of injury for the MFS was clearly linked to emergency callouts, there is still a significant level of morbidity associated with general duty.

7 OCCUPATIONAL FACTORS

This section presents the prevalence of self-reported workplace exposures (potentially traumatic events) and occupational stressors in the MFS. The association between these occupational factors and mental health was also examined.

7.1 Workplace exposures

Participants were presented with a list of 44 workplace events reflecting duty-related incident stressors (workplace exposures) (Beaton et al., 1998). They were asked to indicate whether or not they had ever experienced any of these events during their career as an MFS firefighter, and how many times they had experienced each event. The 44 workplace events were grouped into the following 8 exposure categories:

1. **Witnessed death:** witnessed co-worker/child/adolescent/adult injury or death; MVA death, callout mutilated bodies/ murder/ completed suicide; adult DOA, body removal.
2. **Operational problems:** inappropriate dispatch; bystanders distressed/interfering; callout prominent media; significant operational problems
3. **Threat to self:** direct exposure to chemicals; threats or fear of violence; physically at risk; direct exposure bodily fluids
4. **Attended injury:** fire with multiple burn victims; prolonged contact with casualty; aided sexual assault victim; callout attempted suicide
5. **Disaster:** community natural disaster; callout industrial accident
6. **Call out where mental health issues (of non-MFS personnel) were a concern:** mental health issues were a concern
7. **Personally relevant event:** co-worker fire death (not witnessed); co-worker non-fire death (not witnessed); aided injured friend/relative; witnessed co-worker injury; co-worker injury (not witnessed); casualty resembled self/family)
8. **Injury to self:** experienced career changing injury; received 3rd degree burn; received head injury; received fracture; received musculoskeletal strain.

The total number of exposures were then grouped into the following four categories: Low (0-9), Moderate (10-19), High (20-29), Very High (30-44).

Table 7.1. Estimated number of workplace exposures across MFS career

Number of Workplace Exposures	Weighted n	%	95% CI
Low (0-9)	255	24.1	21.7. 26.6
Moderate (10-19)	424	40.0	37.2, 42.8
High (20-29)	317	29.8	27.6, 32.2
Very high (30-44)	64	6.1	5.0, 7.4

Table 7.1 presents the total estimated number of different workplace exposures reported by the MFS during their career. As would be expected, the prevalence of workplace exposures across the career of MFS members was generally high. Seventy-six percent of the MFS workforce reporting exposure to 10 or more critical incidents during their career. Nearly thirty percent (29.8%) reported exposure to 20 or more, and 6.1% reporting more than 30 critical incidents.

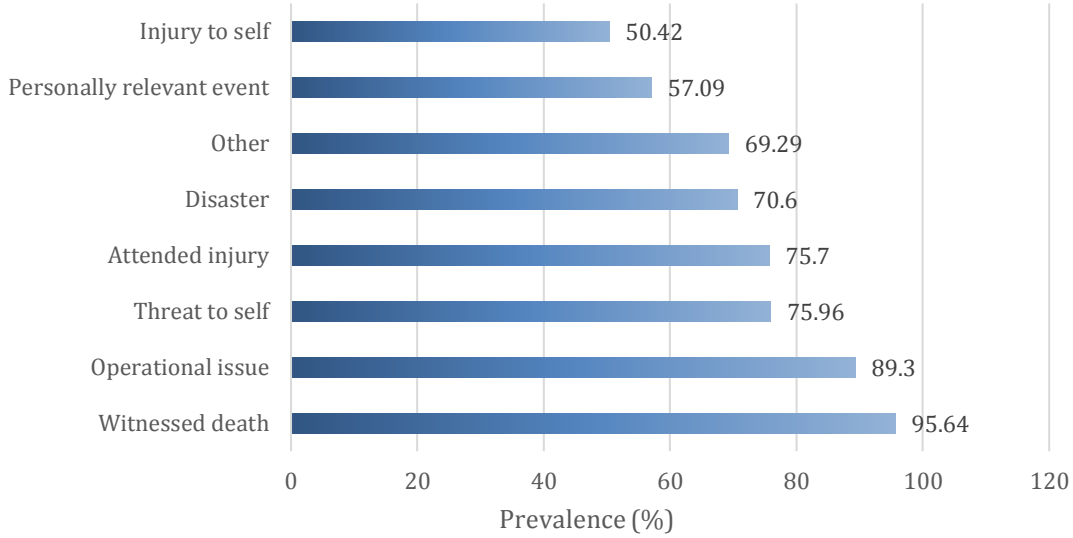

Figure 7.1: Estimated prevalence of lifetime workplace exposures in the MFS (rank ordered).

Figure 7.1 presents the estimated lifetime prevalence of workplace exposure types for the entire MFS in rank order. The most commonly reported workplace exposure was witnessing death, which was experienced by more than 95.64% of the MFS. This was followed by experiencing operational issues such as dealing with intrusive media and managing distressed bystanders (89.3%), and experiencing threats against themselves (75.96%). Three quarters of MFS members reported attending an injury event, and 70.6% reported attending a disaster.

The relative impact of workplace exposures on current self-reported psychological stress was also examined. Interestingly the most prevalent events did not emerge as significant predictors of current psychological distress. The workplace events most highly associated with current levels of psychological distress were events involving injury to MFS members themselves, and events requiring attendance at mental health incidents.

7.2 Occupational stressors

The occupational stressors on-the-job and/or related to one's employment as a fire-fighter were examined. Respondents indicated whether or not they had experienced a particular type of occupational stressor within their past 10 shifts from a list of 57 stressors from the Occupational Stress Scale (SOOS) (Beaton, 1993). These 57 occupational stressors were grouped into the following 14 categories:

1. **Conveying tragic news:** informing loved ones of injury/death; conveying tragic news to survivors

2. **Discrimination:** discrimination; harassment
3. **Tedium:** lack of novelty/boredom; dislike duties
4. **Second job stress:** carry-over stress from second job; too much responsibility
5. **Threats to personal safety:** threats to personal safety; increased personal risk; concerns re personal injury/death
6. **Management/labour conflicts:** anxious/demanding colleague; conflict with senior ranks; management/labour conflicts
7. **Substandard equipment:** substandard equipment; equipment
8. **Family/financial strain:** pay-related financial strain; carry-over family stress
9. **Past critical incidents:** lack of control over victim injuries; sensory recollection of injured/dying; thoughts re disturbing events; exposure to death/dying; exposure to injury/mutilation
10. **Reduction in force/wage/benefit:** cuts to force/budget; reduction in force/benefits/wages
11. **Poor health habits:** poor diet; lack of exercise
12. **Sleep issues:** poor sleep quality; inadequate sleep at work; sleep disruption; loss of sleep
13. **Co-worker conflict:** work personality conflicts; lack of camaraderie; substandard crew member; conflicts with lower ranks
14. **Job skill concerns:** concerns regarding latest technology; perfectionism concerns; concern regarding meeting MFS standards; concern re inadequate skills; concern regarding making mistakes.

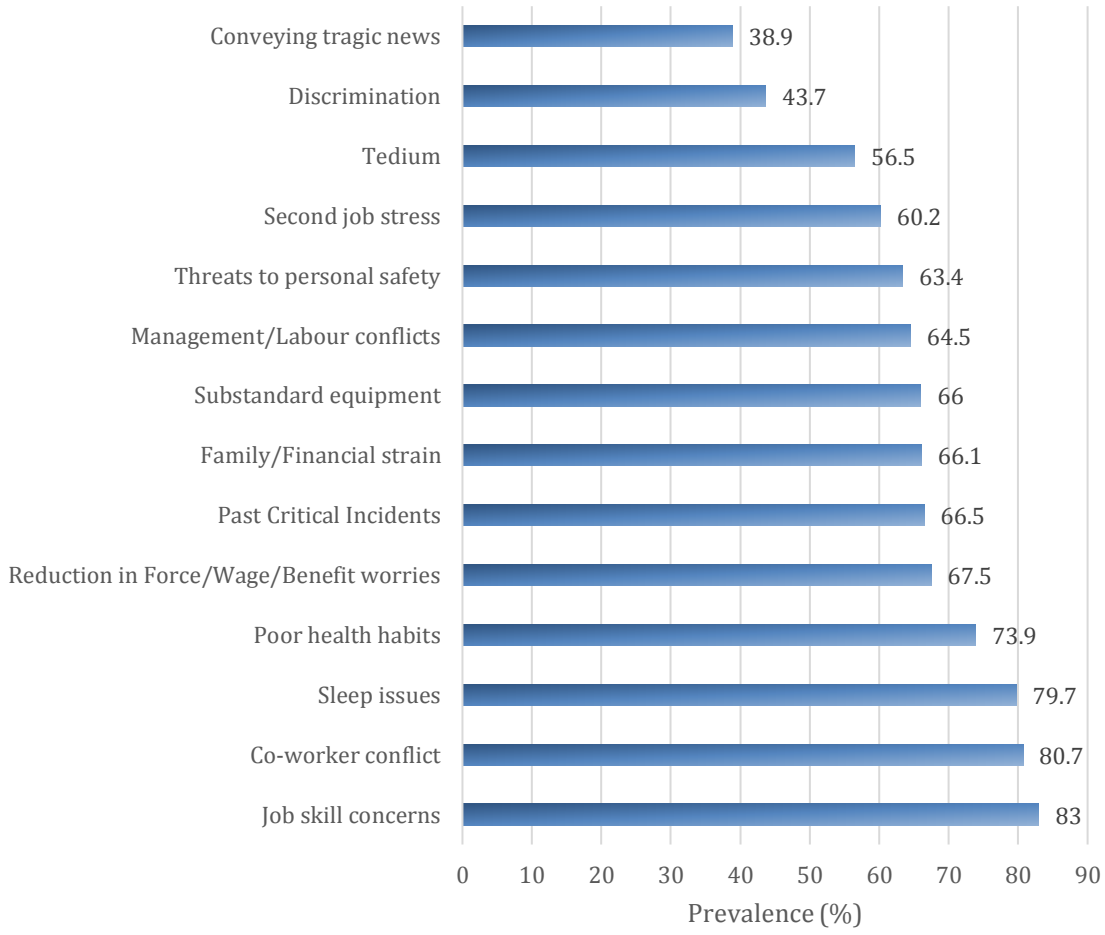

Figure 7.2 Estimated prevalence of occupational stress in the MFS.

Figure7.2 summarises sources of occupational stress reported by the MFS members. The estimated prevalence of all occupational stressors was high among the MFS. The most commonly reported sources of occupational stress were job skill concerns (83%), co-worker conflict (80.7%), sleep issues (79.7%) and poor health habits (73.9%). Between 60 and 70% of MFS personnel reported experiencing concern over second job stress, threats to personal safety, management/labour conflicts, substandard equipment, family/financial strain, past critical incidents, and reduction in force/wage/benefit worries. Furthermore, even the least prevalent stressors (conveying tragic news (38.9%), discrimination (43.7%) and tedium (56.5%)) were commonly endorsed. It is important to also consider these occupational stressors as manifestations of stress in their own right. As such, the extent of self-reported occupational stress may serve as an indicator of stress and distress more generally.

7.3 The contribution of workplace exposures, occupational stressors and lifetime trauma to mental health

The relative contribution of workplace exposures, occupational stressors and lifetime trauma to 12-month ICD-10 mental disorder, current psychological distress (using the K10 total score), and current posttraumatic stress symptom (measured by the PTSD checklist (ref)) were examined using a logistical regression analysis. The results of this analysis found that the relative impact of these factors differed, depending on whether the outcome was a diagnosable disorder or current self-reported symptoms of psychological distress or PTSD.

This study found that lifetime workplace exposures of a traumatic nature were a significant burden and cause of psychological distress in the MFS. The workplace events most highly associated with current levels of psychological distress were events involving injury to MFS members themselves, and events requiring attendance at mental health incidents. Thus, incidents which involved a significant element of personal threat, including situations where firefighters were injured themselves, are a particular source of stress. In fact, dealing with severely injured or mentally ill members of the public appeared to be more problematic than dealing with death.

When examining the relative impact of workplace exposures, occupational stressors and lifetime trauma on mental disorders, this study found that lifetime trauma exposure conveyed the greatest risk of diagnosable 12-month ICD-10 mental health disorder. In contrast, current psychological distress was most strongly predicted by occupational stressors, while workplace exposures were the strongest predictors of current self-symptoms of PTSD.

The association between workplace exposure and posttraumatic stress symptoms suggests that these everyday critical incidents are not without psychological consequences, and highlights the importance of early symptom recognition and intervention (McFarlane & Bryant, 2007). These results also represent a correlation between occupational stress and psychological distress. Taken together, this suggests that issues such as co-worker conflict and job skill concerns could be indicative of deeper distress, and a flag for follow-up with an individual.

8 IMPLICATIONS

8.1 Mental health

Seventeen percent of the MFS workforce were estimated to have had a mental disorder diagnosis in the last 12 months. While rates of diagnosable mental disorder in the MFS are similar to the general Australian community, they still carry a significant personal cost, which appears to be most apparent in the individual's social and family domains of functioning. Nevertheless, interpersonal costs are significant, and unless they are recognised and dealt with, are likely to manifest indirectly in the workplace, through increased workplace conflict and general dissatisfaction with the work environment.

From a management perspective, programs in emergency services have appropriately been focused on traumatic stress and the consequence of these exposures in the workplace. In terms of maintaining the general capacity of the workforce however, it is important to note that in this study, work-related functional impairment was particularly related to depressive disorders. At the present time, the nature of the Workers' Compensation Legislation in South Australia creates a significant barrier to the management of risk among those within the workplace who suffer from anxiety and depression. Furthermore, the continued exposures of the workplace represent additional risk to these individuals. Even with effective treatment, they remain at risk of further exacerbation of their condition if they continue to be exposed to significant traumatic stressors. A strategy that recognises this risk within the workers' compensation liabilities of the MFS is important to consider.

An important finding was that 10% of the MFS reported suicidal ideation in the last 12 months. This represents an area that requires specific focus because of its negative effect on quality of life and morale. In particular, it highlights the need to provide adequate care for those in the MFS with psychiatric disorders, particularly to help firefighters manage the circumstances of dealing with death and severe injury in the course of their work duties. Evidence suggests these exposures may have a particular association with the risks of suicidal ideation (Bryan et al., 2017; Hom et al., 2017; Kimbrel et al., 2016). This is a domain that warrants ongoing monitoring in the context of an intervention program.

This study also found that while the majority of the MFS reported low levels of current psychological distress, just over one fifth (23%) reported moderate distress, and approximately 10 percent reported high or very high levels of current psychological distress. This highlights the prevalence of sub-syndromal symptoms within the MFS population. Individuals who have these levels of distress are at risk of further exacerbation of their symptoms with subsequent stress exposures. They also represent a group of individuals who are particularly likely to benefit from early intervention, as treatment at lower levels of distress is more likely to result in positive outcomes. However, it is difficult to motivate people with lower levels of distress to seek care because their symptoms are relatively mild and they often adapt by minimising their symptoms (Robbins & Kirmayer, 1991). These findings highlight the importance of having an active mental health literacy program that encourages individuals to self-monitor and maintain psychological fitness in the workplace.

8.2 Physical health

The findings for the self-reported physical health complaints of firefighters in this study should be viewed in the context of the individual's mental health. There is increasing evidence that trauma exposure increases the probability of a range of medical conditions, and mental health conditions such as PTSD carry with them significant burdens of physical comorbidity (Glaesmer et al., 2011). These associations are more apparent in older age groups as the accumulation of life experiences (including trauma exposures), and the risk of chronic ill health increases (McFarlane, 2010). There is an important interaction between cumulative trauma exposure and age which is likely to emerge at an earlier stage in the lives of firefighters because of the nature of their employment-related exposures. Thus, it is critical that physical illness in the workplace is addressed within this broader mental health context. Equally, the risks of continued trauma exposure in such individuals requires a management strategy.

Approximately 20% of the MFS had metabolic condition, and at a workforce level, this represents a major pool of risk for future cardiovascular disease (Michopoulos et al., 2016). Particularly in the older age group, the associated risks and morbidity should also be the focus of workplace intervention programs.

Muskuloskeletal injuries were the most common injury sustained by the MFS during the course of duty. While recovery from strains, sprains and muscular aches and pains are generally fairly rapid, sustaining such injuries during an emergency callout, where the nature of the event is potentially threatening and distressing, increases the risk of psychological injury. While the relationship between specific injuries and mental health was not specifically examined in this report, the substantial literature focussed on the comorbidity between injury and mental disorder symptoms highlights the need to consider their co-occurrence. When managing work related injuries, the potential for a related psychological injury should also be considered (Bryant R.A. et al., 2010). Therefore, a general organisational focus on maintaining physical and psychological fitness and wellbeing as a preventative mechanism is needed.

These findings raise important questions about how to advise firefighters on how to optimise their health in the longer term in the face of the stresses and strains of their occupation. An important issue to ascertain with individual firefighters having developed certain medical conditions is the potential costs to them of continued employment, given their medical condition (Gola et al., 2013; Michopoulos et al., 2015).

When firefighters join the MFS they are in excellent physical health as required by recruiting standards. The maintenance of these fitness standards depends on a legitimately injured firefighter being able to access long-term compensation if they are unable to continue in their role. The recent changes in Workers' Compensation Legislation have introduced a 30% impairment to qualify for compensation. This situation is inadequate as this level of impairment is markedly greater than that which makes a firefighter unfit for duty. If the MFS are to maintain adequate levels of occupational fitness, this situation poses a very strong disincentive to declare injuries and illnesses, even if the firefighter is no longer able to meet the required fitness standards.

8.3 Occupational factors

The workplace exposures examined in this study show that the expected duties of MFS service have the potential to result in psychological distress. A particularly significant finding

was that the exposure types most strongly related to psychological distress were events involving injuries or threats to self, and interestingly, callouts involving individuals with mental health issues.

Almost all the MFS reported witnessing death on the job. MFS officers are highly trained to manage the psychological impact of attending to injuries or deaths. However, there may be particular circumstances where issues such as personal identification with the victim, particularly where children are involved or where there is grotesque or horrendous injury, or in situations of high threat to the firefighter, where training may not provide psychological protection.

This study also revealed that situations where MFS members feel threatened, are injured, or must deal with a situation they may not feel equipped to manage, are particularly stressful. When considering the potential impact of workplace exposures on the workforce, the MFS should pay particular attention to those critical incident scenarios that may have not been fully addressed in training, and may leave the firefighter with a sense of undermined competence.

One type of event that was found to be particularly distressing were call outs to emergencies where a mental health issue had to be dealt with. This situation can be unpredictable and challenging particularly if they involve threats of violence, or threatened or actual suicide. With limited inpatient facilities available within the SA mental health care system, emergency services personnel are increasingly having to deal with severely mentally ill individuals. This task may be one for which they are largely unprepared and untrained.

These findings taken together suggest that MFS members should be provided with adequate training to help them deal with situations that are an extreme test of their competence and performance. Furthermore, adequate support and follow up must be provided in the aftermath of events of this nature, to address both the physical injury and the psychological consequences.

With regard to occupational stressors, job skill concerns and co-worker conflict were the most frequently reported occupational stressors in the MFS workforce. There is evidence that these types of stressors are associated with psychological symptoms, where individuals with depression and anxiety feel less confident about their capacity and become more reactive in the workplace. Equally, inadequate training to deal with aggressive and/or inappropriate behaviour of colleagues can be significantly detrimental to an individuals' mental health. An exploration of the job skill concerns reported in this study therefore an important avenue to be followed up.

Self-reported poor health habits were also identified as being a significant occupational stressor by 74% of firefighters. A further exploration of these health habits and identifying opportunities at an organisational level of intervening in this domain should be a priority.

When examining the contribution of the different types of stressors to diagnosable mental disorder, this study found that lifetime trauma exposures play a predominant role in mental disorders. In particular, the number of lifetime trauma exposures are risk factors for mental health problems. Equally, the impact of related workplace exposures places a cumulative burden of trauma exposure during an MFS member's career, their mental health and functioning.

This study found that the relative impact of workplace exposures, occupational stressors, and lifetime trauma differed depending on whether the outcome was a diagnosable mental disorder, or current symptoms of psychological distress, or current PTSD symptoms. In these

domains, all 3 areas of cumulative stressors have a significant effect. This highlights that in the absence of an actual mental disorder diagnosis, these stressors still carry a general health burden.

Occupational stressors are critical to workplace satisfaction and productivity. The levels of distress documented here are relatively typical of the issues dealt with in large organisations. Issues such as bullying, discrimination and workplace conflict need to be carefully identified and effectively managed to lessen the effect of the traumatic exposures already experienced in the workplace. These stressors are often the primary focus of people's distress, rather than complaint about the traumatic exposures experienced in one's role as a firefighter.

Having an active strategy that equips MFS leadership to resolve conflict in the workplace, as well as optimising a healthy working environment are likely to have a positive effect on morale. Thus, the results of this study highlight the importance of the MFS developing an effective personnel management strategy based on ongoing monitoring of the occupational environment and worker morale.

9 RECOMMENDATIONS

9.1 General recommendations

- The strategies to optimise health promotion in the MFS should utilise proven and developed workplace programs. They should address the existence of different groups in the workforce with a focus on age and risk, with different messaging required according to risk. This should involve provision of information about the emergence of diseases with age so that firefighters are aware of the probability of both age and service related injuries impacting the reality of reaching a desired retirement age. This approach should be part of a program that assists firefighters in planning transition to retirement or other employment.
- A program of surveillance should be established to ensure the benefits of the interventions that are accepted and implemented.
- The issues related to workplace mental health are not confined to the MFS. The MFS has the potential to provide more general leadership in systems of care and workplace programs. Equally programs developed by other Government agencies and emergency services should be identified and utilised by the MFS with the necessary modifications
- A strategy should be developed for communicating the notion of mental fitness. This should be developed akin to the idea of physical fitness to address early symptoms of distress (such as sleep disturbance and intrusive memories). Early intervention strategies to address sub-syndromal symptoms to sustain mental fitness should be developed. This approach should be combined with a strategy for firefighters to think about their mental health on a spectrum rather than simply being “well”, or “unwell”.
- The provision of mindfulness training to assist in managing arousal (with strategies such as breathing regulation and control) should be considered as a resource for the MFS workforce. Strategies should also be drawn from proven techniques utilised in sports psychology to deal with anticipatory anxiety. The ADF employs similar mindfulness programs, which could be developed as an adapted program relevant to the needs of the MFS workforce.

9.2 Recruitment and promotion

- A comprehensive assessment of past psychiatric history and exposures to traumatic stress should be undertaken as part of recruitment.
- Promotion provides an opportunity for training in managing workplace stressors and identifying potential signs of emerging psychological distress. Promotion should also be seen as an opportunity for further training in mental health literacy to allow those in command to monitor the mental health and wellbeing of the workplace.

9.3 Leadership

- While technical and management skills are central aspects of leadership attributes and training, the maintenance of morale and the health of the workforce is also of critical importance. Occupational health and safety should be seen from a broad perspective where the integral nature of physical and mental health of fire officers is seen as central to operational readiness and capacity. Regular updates and training in emerging knowledge in these domains should be part of the ongoing support for those in management positions.
- The strategies of addressing workplace conflict and the early intervention strategies in the MFS require review. Specific training for those in leadership roles in managing observed difficulties in the workforce and conflict should be considered. Strategies that manage these both from a HR/disciplinary and also a mental health perspective should be considered.
- The health and welfare strategies need to be developed in parallel to management initiatives to ensure an integrated a cohesive program.

9.4 Gender issues

- The specific mental health of female firefighters is not discussed in this report because of the small size of this group and the potential for the identification of individuals. However, they were identified as a group at particular risk which is in keeping with the known greater risk of PTSD (Christiansen & Elklit, 2008). There is increasing acceptance of females taking high stress positions such as combat roles in the Defence Force. They are a group who may benefit particularly from regular psychological support and mental health literacy programs particularly because of their minority status in the workplace.

9.5 Health maintenance – risk assessment

- Existing health maintenance strategies within the MFS need to be reviewed, particularly for those with physical injuries or medical conditions. A strategy to address dietary and physical preventative strategies at workforce level should be considered, particularly in the older age groups.
- The maintenance of psychological fitness requires use of both group-based strategies and those focused on individuals. Those individuals with self-appraised concerns of their mental health are more likely to be responsive to the provision of intervention strategies. The uptake of these programs will be optimised by emphasising the importance of a dimensional approach to mental health and the importance of addressing early symptoms to maintain operational capacity.
- Due to the fitness requirements for firefighters, it is important that self-appraisal skills are taught to ensure a self-recognition of the potential barriers to capacity and performance. With increasing age, these issues are an aspect of planning for retirement. A program for planning and supporting the transition to retirement should be developed, particularly for those with health conditions that carry a significant risk of worsening morbidity.

Refer to the MFS Health and Wellbeing Study Final Report for further detailed recommendations regarding mental health literacy and training; trauma and stress exposure; early intervention; treatment and return to the workforce; recruitment; health maintenance and risk assessment; annual assessments; leave, workplace size, and overtime; rostering and exposure; management of difficult members of the public and exposure to suicides; and performance management.

10 CONCLUSION

The Metropolitan Fire Service firefighters provide a critical role in protecting and caring for the community. They are highly respected in the broader community and this is reflected in the role of a firefighter being a sought-after occupation. The engagement of the MFS Senior Leadership in allowing the conduct of this study also highlights the awareness and concern about the health and welfare of the firefighters.

In the last two decades, there has been a dramatic increase in the information available as to the risk factors and possible interventions that can be used to improve the occupational health and welfare of individuals within the emergency services. In particular, the interaction between cumulative trauma exposure, and mental and physical health has become far better established. Traumatic exposure has the capacity to lead to significant physiological, immunological, and epigenetic dysregulation. This highlights the importance of having an integrated approach to managing the physical and mental health of members of our community who place themselves in harm's way for our protection. The focus on workers' compensation and limiting liabilities at times has meant the importance of the more positive interventions that are possible in the workplace have not received optimal funding or attention from government. Allowing the conduct of a research program such as this provides an important basis for the further development of appropriate programs. These also have a general relevance for the other emergency services.

A further challenge is to optimise the collective skill base for assisting the emergency services in Australia. These are state based organisations where each organisation has to coordinate and manage its own occupational health programs. This undermines the potential economies and congregation of expertise that could occur if these programs were organised across services at a national level. There is the risk of a fragmented and individualised approach which is not necessarily based on the appropriate use of the composite evidence and knowledge base which is available to inform such programs. A service such as this provides a window where a methodology that has been utilised both in the Australian community and other occupational groups such as the Australian Defence Force can provide links as to how to draw from programs that addressed similar problems in other populations. This highlights the importance of having organisations with broad expertise in these areas that can be provided to the agencies that are caring for their workforce.

The capacity of fire to impact negatively on people's health has long been understood and was well documented by Samuel Pepys in his famous diary which included the Great Fire in London. In the aftermath of that catastrophe, he described many of the symptoms that we understand today as posttraumatic stress disorder. The challenge for the future is to ensure that individuals who volunteer their services to protect the community, pass through their career and leave with their health intact, both from a physical and psychological perspective. This should be optimised through the health programs provided by their employer.

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