2019

Factors associated with anxiety, depression, burnout, and PTSD in Australian paramedics

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This thesis is presented in partial fulfilment of the degree of

Master of Science (Medical Science)

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School of Medical and Health Sciences

2019

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ABSTRACT

Background

Paramedics are at higher risk of anxiety, depression, burnout, and PTSD compared to the general population. Factors that have been associated with mental disorders include occupational stress, fatigue, sleep quality, chronic pain, physical activity, perceived social support, and overall quality of life. To date only a few of these factors have been investigated simultaneously in Australian paramedics.

Aim

This study aimed to investigate occupational stress, fatigue, sleep quality, chronic pain, physical activity, perceived social support, and overall quality of life, and their associations with anxiety, depression, burnout and PTSD in Australian paramedics.

Methods

Sixty-three paramedics, working for ambulance services in Australia, participated in this cross-sectional, self-reported study. Participants completed a questionnaire booklet composed of a demographics questionnaire, the Beck Anxiety Inventory, the Beck Depression Inventory-II, the Maslach Burnout Inventory - Human Services Survey, The Posttraumatic Stress Disorder Checklist - Civilian Version, the Emergency Medical Services Chronic Stress Questionnaire, the Chalder Fatigue Scale, the Pittsburgh Sleep Quality Index, the Orebro Musculoskeletal Pain Questionnaire, the Compendium of Physical Activities, the Multidimensional Scale of Perceived Social Support, and the Quality of Life Index.

Results

The prevalence of anxiety, depression, burnout and PTSD was higher in this study than what is reported in the general population of Australia. Moreover, the majority of these paramedics had one or more co-occurring mental disorders. Paramedics who reported higher levels of anxiety, depression and PTSD also reported increased occupational stress, greater levels of fatigue, poorer sleep quality, lower perceptions of social support, and significantly lower quality of life. Paramedics with burnout had significantly higher occupational stress and fatigue, and a lower quality of life when compared with paramedics without burnout. In addition, chronic pain was associated with increased levels of anxiety and depression.

Conclusions

Future research should be targeting interventions aimed at improving organisational and operational stress, fatigue, sleep quality, chronic pain and social support to improve anxiety, depression, burnout, and PTSD in Australian paramedics.

ACKNOWLEDGMENTS

I would like to thank several people that have supported me throughout the completion of my Masters degree.

To my supervisors Professor Moira Sim, Dr. Travis Cruickshank and Dr. David Coall, I am grateful for the time, support, guidance and patience you have provided over the past few years. I would also like to thank you Professor Russell Jones for your time, support, and guidance in the early years of my candidature.

To my father, mother, and two sisters (Meg and Ally), I would like to thank you for the love, support and companionship throughout my life. It really means a lot to me that you have all allowed me to flourish and achieve my goals. No doubt we will be having many more family BBQ's and fun times in the years to follow.

To my loving partner, Dani, and her wonderful family, I would like to thank you also for the love, support and companionship over the years. It has been a tremendous pleasure to be part of a family that also is supportive of my endeavours.

To my best friend Mitch, I would like to thank you for the good times and the companionship you have provided over the last two decades. I really appreciate your friendship and support. I certainly have to make up for the footy games missed over the past few years. To my wonderful friends met during my academic pursuits, Aaron, Leslie and Pauline, I greatly appreciate the fun times we have had over the past few years. I look forward to our friendships progressing in the next chapter.

I would also like to thank Edith Cowan University for providing me with an excellent experience in my undergraduate and postgraduate degrees.

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1.0 Introduction

Paramedics, as first responders who provide lifesaving medical treatment in emergency situations, are vital members of the healthcare workforce. As part of their role, paramedics are routinely exposed to traumatic events, human suffering, violence, abuse, and other stressors such as shift work, and conflict at work (National Coronial Information System, 2015). These work stressors have a negative impact on their mental wellbeing, adversely affecting their performance at work, personal life, and overall quality of life (Courtney et al., 2010; Courtney et al., 2013; Lawrence et al., 2018; Wild et al., 2016).

The prevalence of anxiety, depression, and posttraumatic stress disorder (PTSD) is significantly higher in paramedics than in the general population in Australia (see **Table 1**). Burnout is another mental disorder that is prominent in the literature for other health professionals (Wolf and Rosenstock, 2017) and has only recently been investigated in Australian paramedics.

Factors associated with anxiety, depression, burnout, and PTSD in paramedics include organisational and operational stressors, fatigue, sleep quality, chronic pain, physical activity, and social support (Clohessy and Ehlers, 1999; Courtney et al., 2010; Courtney et al., 2013; Donnelly, 2012; Donnelly et al., 2016; Donnelly et al., 2014; Rahimi et al., 2015; Wild et al., 2016). In previous research, many of these factors have been examined in isolation rather than in combination, and few have been assessed in Australian paramedics. The purpose of this thesis was, therefore, to comprehensively evaluate a combination of factors associated with anxiety, depression, burnout, and PTSD in Australian paramedics.

Table 1. Prevalence of anxiety, depression, and PTSD in the general and paramedic populations of Australia.

Mental disorder	**% in general population**	**% in paramedics**
Anxiety	11.2[a]	13.8 – 26.2[c, d]
Depression	8.9[a]	16.0 – 42.7[c, d]
PTSD	4.4[b]	8.9[c]

[a] *Australian Bureau of Statistics (2015)*

[b] *McEvoy et al. (2011)*

[c] *Lawrence et al. (2018)*

[d] *Courtney et al. (2010) & Courtney et al. (2013)*

1.1 Mental Health

Mental health has been defined as the capacity to maintain fulfilling relationships, perform activities productively, and maintain adaptability to adversity and change (Keyes, 2005; World Health Organization, 2003). Deviations from a state of good mental health may result in a mental disorder. The Diagnostic and Statistical Manual 5th edition (DSM-5) defines a mental disorder as a syndrome characterised by a clinically significant disturbance to one's cognitive function or emotion regulation, and that these are associated with significant distress or disability in a social, occupational or other important context of an individual's life (American Psychiatric Association, 2013d). In addition to this, mental problems exist that do not meet the criteria for a disorder, but still result in significant impairment in normal living (Burton et al., 2012).

1.1.1 Anxiety

Anxiety is characterised by feelings of apprehension toward an object or situation (Leyfer and Brown, 2011). Anxiety is a normal response to a stressor and is thought to facilitate mental and behavioural adaptation to these stressors (Rego et al., 2009). Anxiety may become a disorder if the worry is excessive and persistent enough to have a detrimental effect on a

person's quality of life (Burton et al., 2012). Several categories of anxiety disorders exist (e.g. social phobias and panic disorders), that largely differ by the source of apprehension (Leyfer and Brown, 2011). For example, the source of worry for a generalised anxiety disorder (GAD) comes from a collection of situations (e.g. work, social interactions). The criteria for generalised anxiety disorder (GAD) may be met if persistent and excessive worrying occurs for no less than six months (American Psychiatric Association, 2013a). The worry must be difficult for the person to control and may be accompanied by the following symptoms: restlessness or being "on edge", fatigue, difficulty in concentration, irritability, muscle tension, and difficulty in initiating or maintaining sleep. At least three of these symptoms must be present for a diagnosis of GAD (American Psychiatric Association, 2013a).

The gold standard method of diagnosing anxiety is through clinical interview (American Psychiatric Association, 2013a) which requires a lot of investment in time for researchers and participants alike. With this limitation in mind, the literature addressing mental health at population level use questionnaires based around the frequency and severity of symptoms of anxiety. Work by Bennett et al. (2004) found that anxiety was present in 22% of emergency workers in the United Kingdom using the Hospital Anxiety and Depression Scale (HADS). The prevalence of anxiety in Australian paramedics vary due to different methodologies being used in the research. Using the Depression Anxiety Stress Scale (DASS-21), two studies have shown that mild to severe anxiety is present in 24.6 – 26.2% of paramedics in Victoria, Australia (Courtney et al., 2010; Courtney et al., 2013). Lawrence et al. (2018) employed another self-reported method of investigation. Participants in their nation-wide investigation were asked if they had ever been diagnosed with a mental health condition by a doctor or a mental health professional and, if so, they were asked if they still had this condition. Of the paramedics in the study, 13.8% reported that they currently had anxiety, which is comparable to the 11.2% reported in a national survey of the general Australian population, conducted by

the Australian Bureau of Statistics (2015). In the national survey, the prevalence of anxiety was measured by asking participants whether or not they had been diagnosed with a mental illness, and if so, if this was diagnosed by a doctor or other healthcare professional. The differences in the prevalence of anxiety may therefore reflect the difference between individuals that know they have anxiety and those that do not consider themselves as having anxiety but are identified on self-reported tools that measure levels of anxiety. Another factor that may influence the prevalence of mental disorders in paramedic populations is the fact that there may be many individuals with higher levels of a mental disorder that have left the workforce and are therefore not captured in the research.

Research investigating anxiety at the population level usually employs the use of dimensional tools that measure the general symptoms of anxiety rather than identifying specific anxiety disorders. For this reason, anxiety will refer to the general symptoms of anxiety rather than a specific anxiety disorder in this thesis.

1.1.2 Depression

Depression is a mood disorder characterised by depressed mood, psychomotor retardation, weight changes, insomnia, energy loss, anhedonia (loss of pleasure), feelings of worthlessness, suicidal ideation, and/or reductions in cognition (e.g. decision making; American Psychiatric Association, 2013b; Widiger and Edmundson, 2011). A diagnosis of major depressive disorder (MDD) requires at least five of these symptoms to be present for at least one two-week episode, with at least one of the symptoms being anhedonia or depressed mood (American Psychiatric Association, 2013b).

As with anxiety, the gold standard method for diagnosing depression is through clinical interview (American Psychiatric Association, 2013b). Only one study to date has used a phone-

based clinical interview to assess the incidence and prevalence of depression among trainee paramedics in the United Kingdom. The two-year prospective study found as many as 10.6% of trainee paramedics in the London Ambulance Service were diagnosed with MDD within the first two years of their employment (Wild et al., 2016). The prevalence of mid and late-career paramedics has not been formally assessed using clinical interviews. Nevertheless, the prevalence of depression in Australian paramedics varies depending on the methodologies employed. Using the DASS-21, two studies have found mild to severe levels of depression in 36.1 – 42.7% of paramedics in Victoria (Courtney et al., 2010; Courtney et al., 2013). More recently, in an Australia-wide study of emergency service workers, Lawrence et al. (2018) reported a current diagnosis of depression in 16.0% of paramedics. This prevalence is significantly higher than the 8.9% reported in the general population in the national survey conducted by the Australian Bureau of Statistics (2015). Similar to anxiety, differences in prevalence measured may reflect the difference between paramedics that do know if they have depression and those that do not consider themselves to be depressed but show elevated levels of depression.

1.1.3 Burnout

Burnout is a stress-related syndrome (van Dam, 2016) and is a major issue among healthcare professions such as nurses (Garcia-Sierra et al., 2016), doctors (Wolf and Rosenstock, 2017), and emergency service professionals (Tei et al., 2014; West, 2015) including paramedic workers (Stassen et al., 2013; Stein and Sibanda, 2016; Thyer et al., 2018). Burnout is characterised by three distinct symptoms; exhaustion, cynicism, and reduced job efficiency (Bianchi et al., 2015; Maslach et al., 2001). Continuous mental and physical exertion results in exhaustion, which is the primary complaint in burnout (van Dam et al., 2015). Cynicism relates to the detachment of an individual from their occupation and may be

considered as a reaction to exhaustion. The consequences of burnout are broad impacting individuals, organisations and society through absenteeism, presenteeism, high job turnover, and work-related disability (Bianchi et al., 2015; Hakanen and Schaufeli, 2012; Shanafelt et al., 2015; Wild et al., 2016).

Existing literature suggests that burnout affects one-third to one-half of paramedic workers around the globe. Stassen et al. (2013) and Stein and Sibanda (2016) reported burnout in 30% of advanced life support paramedics and student paramedics in South Africa. In Australia, Thyer et al. (2018) reported burnout in 55% of paramedics and identified risk factors for burnout as being female, working in a metropolitan area, and working in the field for 15-19 years. While these studies have shown burnout to exist in a significant portion of paramedic workers, the instrumentation used in the research should be interpreted with caution. Stein and Sibanda (2016), Stassen et al. (2013), and Thyer et al. (2018) used the Copenhagen Burnout Inventory which was developed to measure burnout in working and non-working populations (Kristensen et al., 2005). The World Health Organization defines burnout to be a work-related disorder and is therefore specific to working populations (World Health Organization, 2019). Thus, more research is warranted to determine the prevalence of burnout in paramedics using burnout inventories that were developed specifically for working populations.

1.1.4 Posttraumatic Stress Disorder

Posttraumatic stress disorder (PTSD) is a mental disorder, the onset of which is characterised by one specific type of stressor; the experience of a traumatic event. The experience of the traumatic event may be either personal or vicarious in nature. Key features of PTSD include the re-experiencing of the traumatic event and avoidance behaviour (Adams et al., 2013). PTSD is also characterised by physical symptoms such as chills, breathing difficulty, profuse sweating and rapid heart rate; cognitive/mental symptoms such as confusion,

intrusive images, nightmares, and poor thinking or decision making; emotional symptoms such as agitation, anxiety, depression, fear, irritability or loss of emotional control; and behavioural changes such as increased alcohol consumption, antisocial behaviour, an inability to rest, or social withdrawal (Adams et al., 2013; American Psychiatric Association, 2013c).

Early studies reported that 22% of paramedics suffer from PTSD in the United Kingdom (Alexander and Klein, 2001; Clohessy and Ehlers, 1999). In an Australian study of paramedics, Lawrence et al. (2018) found that 8.9% of their sample population had received a diagnosis of PTSD, which is more than double the 4.4% reported in the general population of Australia (McEvoy et al., 2011). Similarly, a prospective study of London Ambulance Service trainees revealed that 8.3% of trainee paramedics met the diagnostic criteria for PTSD in the first two years of their career (Wild et al., 2016). This was the first study to provide a longitudinal picture of the development of PTSD in paramedic workers using a clinical interview. A cross-sectional study of first year paramedic students in South Africa revealed that PTSD was present in 16% of the studied population (Fjeldheim et al., 2014). Due to the cross-sectional nature of the study, however, it is unclear whether PTSD existed prior to the commencement of their training. Nevertheless, these studies suggest that a significant number of studied paramedics have PTSD in the early years of their career, and that the prevalence of PTSD is higher in paramedic workers than the general population.

As with all mental disorders, PTSD requires diagnosis through clinical interview. In the paramedic literature only one study to date used a phone-based clinical interview for PTSD in trainee paramedics (Wild et al., 2016). For this reason, the prevalence of paramedics with PTSD using a clinical assessment does not currently exist for mid-to-late career paramedics. The other measures of PTSD in the paramedic literature use questionnaires that assess the frequency and severity of PTSD symptoms that align with the DSM criteria. In South Africa, Fjeldheim et al. (2014) used the Davidson Trauma Scale with a cut-off score of 40. In Canada

and the United States of America, Donnelly et al. (2016) and Donnelly et al. (2016), respectively, used a cut-off score of 50 on the PTSD Checklist. These studies used values that correspond with the optimal sensitivity and specificity thresholds of clinical interviews in psychiatric populations (Norris and Hamblen, 2004). One of the major limitations to using these cut-off scores is that the thresholds on these measures vary between populations (e.g. 44 - 50 on the PTSD Checklist; Norris and Hamblen, 2004). Furthermore, the DSM requires assessment of PTSD through symptom clusters (i.e. 1x intrusion symptom - Criterion B, 3x avoidance symptoms - Criterion C, and 2x hyperarousal symptoms - Criterion D; American Psychiatric Association, 1994) which is not met when using a cut-off score approach. While it is recommended that cluster analysis should be used in the assessment of PTSD using the Davidson Trauma Scale and PTSD Checklist (Dickstein et al., 2015; Norris and Hamblen, 2004), no such analysis has been used in the paramedic literature.

1.1.5 Comorbidity of mental disorders

In the community, comorbidity of mental disorders is common (Stein and Sareen, 2015; Tiller, 2013; van Dam, 2016), and adds complexity in treatment and responses to treatment (Tiller, 2013). Some paramedic studies have reported on the presence of two mental disorders in the same study (i.e. Courtney et al., 2010; Courtney et al., 2013; Wild et al., 2016), however they do not specifically report on the prevalence of comorbidity. This neglect of comorbidity may fail to recognise the severity and complexity that comorbidity brings to an individual, and therefore the complex nature of mental disorders among paramedic workers.

1.1.6 Suicide

Suicide is a major issue within the paramedic profession in Australia, contributing toward the unnecessary loss of life and negative impact on families, friends, and the community.

Between 2010 and 2012, twenty-six Australian paramedics committed suicide (National Coronial Information System, 2015). In Western Australia, between December 2013 and March 2015, five paramedics committed (Government of Western Australia, 2016). While anecdotal, some of these suicides have been attributed to the psychological and physical demands of the job (Government of Western Australia, 2016; National Coronial Information System, 2015).

Literature on the factors underpinning suicide in paramedics is limited. Indeed, there has only been one report to date (National Coronial Information System, 2015). This report found that one third of paramedics who committed suicide were suffering from depression at the time of suicide and 31% had documented previous self-harm (National Coronial Information System, 2015), suggesting that depression and self-harm may be risk factors and early indicators of suicidal ideation/tendencies. This finding is not surprising given that one of the greater predictors of suicide in the general population is previous self-harm (Troister et al., 2015).

It is recognised in the general population that a high prevalence of suicidal behaviour exists in people with chronic PTSD (Ferrada-Noli et al., 1998), making it important to understand the factors that increase the risk and severity of PTSD in paramedic workers. Moreover, a greater percentage of participants with PTSD report suicidal behaviour than those with other psychiatric diagnoses alone (Ferrada-Noli et al., 1998). Between 40-57% of individuals with chronic PTSD report suicidal thoughts or behaviour, and co-morbidity with other psychiatric disorders increase the risk of suicide (Panagioti et al., 2009).

Given the available information, it is clear that identifying issues concerning mood and anxiety disorders may play an important role in combating suicide-related loss of life in Australian paramedic workers.

1.2 Factors Associated with Mental Health Outcomes

1.2.1 Trauma in Paramedics

Traumatic events are often experienced by paramedics and include witnessing human suffering, engaging with victims of violence and abuse, seeing someone who is dying, encountering the body of the recently deceased or a decaying corpse (Donnelly and Bennett, 2014; Lawrence et al., 2018; Regehr et al., 2002). Although experiencing a traumatic event is a requisite for the diagnosis of PTSD, the majority of people who experience a traumatic event do not develop PTSD (Skeffington et al., 2016). However, a clear link remains between an increased exposure to traumatic events and increased risk of developing PTSD (Lawrence et al., 2018).

Research conducted in Canadian paramedics (Donnelly et al., 2016) and Emergency Medical Technicians (EMTs) in the United States of America, found a positive association between stress from organisational and operational aspects of the job and PTSD symptomatology (Donnelly, 2012). The significance of this finding is that while exposure to a traumatic event is an important factor for the initiation of PTSD, stress load also plays an important role in the development of PTSD symptomatology.

1.2.2 Stress in paramedic workers

Occupational stress can stem from organisational or operational aspects of the job. Organisational stressors include perceptions about staff shortages, favouritism, a lack of resources, and that leaders only focus on negatives and not positives (Donnelly et al., 2014). Operational stressors include the inherent risks of the job such as working shift work, risk of being injured on the job, and managing social life outside of work (Donnelly et al., 2014).

In order to investigate work place stressors that are common to paramedics, Donnelly et al. (2014) created and validated the emergency medical services chronic stress questionnaire

(EMS-CSQ) in 1,633 EMTs. In their validation study, and confirmed in a later study (Donnelly et al., 2016), Donnelly et al. (2014) found significant positive correlations between organisational and operational stress and PTSD symptomatology.

The effects of chronic work stressors on PTSD and burnout symptomatology were also investigated by van der Ploeg and Kleber (2003) in 123 ambulance personnel in the Netherlands. Their study revealed that a perceived lack of support from supervisors and the high emotional and physical demands of the job were associated with increased PTSD symptomatology. Further to this, the authors revealed that a perceived lack of support from supervisors correlated with increasing emotional exhaustion and depersonalisation while a perceived lack of support from colleagues correlated with decreased personal accomplishment, all of which are important components of burnout.

Studies of paramedics working in Victoria, Australia found that stress was associated with increased anxiety and depressive symptomatology (Courtney et al., 2010; Courtney et al., 2013). Crucially, these studies did not investigate the source of the stress, which may be more informative than a stress score alone. Based on these studies, it seems likely that stress, organisational or operational, may be associated with anxiety and depression in Australian paramedics.

1.2.3 Fatigue

Fatigue is defined as an impaired ability to physically or mentally function relative to normal capacity (Roach et al., 2012) and is a common complaint in individuals suffering with mental disorders (Batterham et al., 2012; van Dam et al., 2015). Furthermore, fatigue is an independent risk factor for the development of depression (Skapinakis et al., 2004). Fatigue is

associated with accidents and near misses in the aviation industry (Roach et al., 2012) and clinical errors in junior doctors (Sokol, 2013).

A study in the United States of America found that 44.5% of their EMT participants had severe mental and physical fatigue (Patterson et al., 2010). In their investigation of fatigue and mental health, Courtney et al. (2010) and Courtney et al. (2013) found significant correlations between fatigue and anxiety and depression in paramedics working in metropolitan and rural areas of Victoria. Interestingly, Sofianopoulos et al. (2011) found no significant correlation between fatigue and depression, however, their paramedic cohort was sampled from a conference which may bias the sample toward a healthier population. Despite the aforementioned associations between fatigue and anxiety and depression, there is a paucity of literature on the associations between fatigue and burnout or PTSD in the paramedic literature.

1.2.4 Sleep

Sleep quality is an important determinant of physical and mental wellbeing. Research shows that poor sleep quality is associated with decreased psychological health (Wong et al., 2013). From the few studies on this topic conducted in paramedics, poor sleep quality is recognised as a significant problem in paramedic workers, with 68–72% of paramedics in Australia reporting poor sleep quality (Courtney et al., 2010; Courtney et al., 2013; Sofianopoulos et al., 2011). This is unsurprising given that paramedics are shift workers, and shift work is accompanied by increased risk of poor sleep quality through sleep loss and constant changes to sleep patterns (Vetter et al., 2015). Decreasing sleep quality has been found to be correlated with increased anxiety, depression, and stress in paramedics (Courtney et al., 2010; Courtney et al., 2013). In London, Wild et al. (2016) reported that paramedics with major depression or PTSD had twice the frequency of self-reported sleep problems than paramedics without mental illness. These studies suggest that sleep quality is a significant factor

underpinning the development and/or exacerbation of mental disorders in paramedic workers. The relationship between burnout and sleep quality, however, has not been established to date in a paramedic population.

1.2.5 Chronic pain

Chronic pain is defined as pain presenting for more than three months (Treede et al., 2019) and includes pain associated with musculoskeletal injury (Bair et al., 2009; Kroenke et al., 2013). Musculoskeletal injury is common among emergency medical service workers, owing to the physical demands of the job (Maguire et al., 2014; Roberts et al., 2015). The prevalence of musculoskeletal pain among EMT workers in the United States of America is 50% (Studnek et al., 2010). In Iran, the prevalence of back, neck and leg pain was found to be 72% (Rahimi et al., 2015). However, the prevalence of chronic pain in Australian paramedics not been explored to date.

Chronic pain is commonly associated with increased anxiety and depression (Costa et al., 2015; Kroenke et al., 2013). Consistent with this phenomenon, Rahimi et al. (2015) reported more severe depression, but not anxiety, in Iranian EMTs who experienced musculoskeletal pain compared to the EMTs without such pain. It is possible that sample size (n = 75) or that there are stronger contributing factors for anxiety, rather than pain, may have reduced the ability to detect differences in anxiety levels in the study population. Similarly, in Canada, paramedics with chronic pain were twice as likely to have depression or PTSD than paramedics without a pain issue (Carleton et al., 2018). Given that Victorian paramedics claim workers compensation 3.2 and 4.3 times more for musculoskeletal injuries than trade workers and nurses (Roberts et al., 2015), respectively, it is likely that chronic pain is also a problem in Australian paramedics. This is a factor that may in turn contribute towards psychological disorders among paramedic workers.

1.2.6 Exercise and physical activity

Physical activity is defined as the use of skeletal muscle to perform a bodily movement, resulting in an increased energy expenditure (World Health Organization, 2018). The definition of physical activity includes activities such as walking, doing household chores (e.g. vacuuming), gardening, work and play (World Health Organization, 2018). The amount of physical activity an individual does has many implications for their health. Increased physical activity is associated with positive health outcomes whereas physical inactivity is associated with increased risk to a range of health issues including obesity, hypertension, coronary heart disease, and is associated with the development of depression and anxiety (Strohle, 2009). Exercise is defined as a deliberate act of increasing physical activity for the purpose of improving health and fitness (Garber et al., 2011). Engaging in exercise for the health benefits is widely accepted as a positive coping mechanism for reducing stress-related problems (Bernstein et al., 2013).

Literature examining physical activity levels of paramedic workers is scarce. Courtney et al. (2010) reported a small negative correlation between physical activity and anxiety, and physical activity and depression in paramedics working in the metropolitan areas of Victoria. In contrast, no significant correlation was reported in paramedics working in rural Victoria (Courtney et al., 2013). It is important to note, however, that these studies did not distinguish between physical activities due to non-exercise related activities (i.e. housework and gardening) or due to exercise, and for this reason it is unclear if exercise behaviour is a contributory factor. If exercise is a factor associated with mental health outcomes this opens up the opportunity for interventions and policies aimed at improving exercise at the organisational level.

1.2.7 Social matters

There is a well-established link between family and social relationships and mental health outcomes. It is known that social and familial support can provide a coping mechanism whereby relationships have the capacity to buffer the effects of distress (Bernstein et al., 2013; Burton et al., 2012). People with good social relationships are less likely to develop depression and are more likely to recover if they do develop depression (Davidson et al., 2016). Further to this, prospective studies have found marital dissatisfaction to be a risk factor for major depression (Teo et al., 2013). Paramedics with PTSD report greater stress from work-family conflict than paramedics that do not experience PTSD (Clohessy and Ehlers, 1999). Work-family conflicts have also been associated with depression in the general population (Allen et al., 2000). The work of Fjeldheim et al. (2014) revealed that a significant decrease in perceived social support was predictive of PTSD in trainee paramedics in South Africa. Previous studies therefore suggest that the social landscape has a significant bearing on the mental health of paramedics, but investigations are limited to studies pertaining to PTSD. It is likely that other mental disorders are influenced by the social landscape and warrant further investigation.

1.2.8 Quality of life

The quality of life for an individual may be measured through their psychological, spiritual, social and economic and familial, and work and health satisfaction (Ferrans and Powers, 1985; Wong et al., 2013). Studies have shown that quality of life is significantly reduced in individuals presenting with depression (Rapaport et al., 2005; Richmond et al., 2014) and PTSD (Moergeli et al., 2012; Rapaport et al., 2005). Depression and PTSD are common issues in paramedics, however, to date only one study has investigated quality of life in paramedics. Wild et al. (2016) reported significantly reduced quality of life in trainee paramedics with major depression or PTSD compared to paramedics without a mental disorder.

The authors employed the use of the Quality of Life Enjoyment and Satisfaction Questionnaire to quantify quality of life. Despite the use of an instrument that measures quality of life across multiple domains, it remains unclear which domain is affected by depression and PTSD. It is likely that mental disorders affect the psychological and health components of quality of life, however, more research is indicated to confirm this assumption.

2.0 Theoretical Framework

An accumulating body of evidence shows that paramedics are more susceptible to mental disorders, including anxiety, depression, burnout and PTSD, than the general population. Previous research has highlighted factors that have been associated with mental disorders in paramedics, including stress, fatigue, sleep quality, chronic pain, physical activity, social matters, and quality of life (see **Table 2**). Much of the research evaluating the factors associated with these disorders have been conducted outside of Australia (**Table 2**, **Figure 1**). To date, there remains a paucity of knowledge on the factors associated with anxiety, depression, burnout, and PTSD in Australian paramedics (**Figure 2**). Furthermore, no study to date has examined all of these factors at the same time in one population. While previous research has examined more than one disorder in the same study, no study to date has reported the prevalence of comorbid mental disorders in paramedic workers.

Table 2. Literature evaluating the factors associated with mental disorders in paramedic workers.

Author	Year	Country	Anxiety	Depression	Burnout	PTSD	Comorbidity	Sample Size	Occupational Stress	Fatigue	Sleep	Chronic Pain	Physical Activity	Social Matters	Quality of Life
Clohessy et al.	1999	England				x		56						x	
Alexander et al.	2001	Scotland				x		110							
van der Ploeg et al.	2003	The Netherlands			x	x		123	x	x					
Bennett et al.	2004	United Kingdom	x	x		x		617							
Courtney et al.	2010	Australia	x	x				342		x	x		x		
Courtney et al.	2010	Australia	x	x				150		x	x		x		
Patterson et al.	2010	USA						119		x	x				
Sofianopoulos et al.	2011	Australia		x				60		x	x				
Donnelly et al.	2012	USA				x		1, 633	x						
Stassen et al.	2013	South Africa			x			40							
Fjeldheim et al.	2014	South Africa				x		131						x	
Rahimi et al.	2015	Iran	x	x				75				x			
Donnelly et al.	2016	Canada				x		162	x						
Wild et al.	2016	England		x		x		386			x			x	x
Stein et al.	2016	South Africa			x			93							
Lawrence et al.	2018	Australia	x	x		x		3, 473							
Thyer et al.	2018	Australia			x			893							
Present study	2019	Australia	x	x	x	x	x	63	x	x	x	x	x	x	x

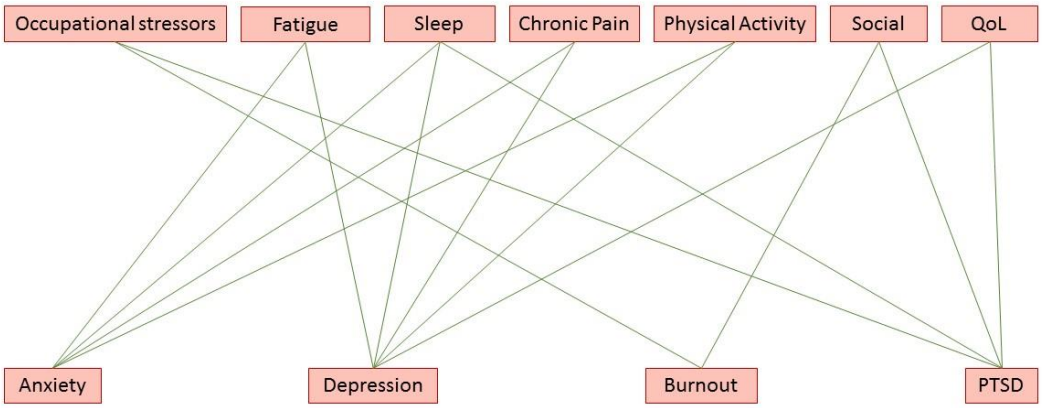

Figure 1. Map of factors correlated in mental health research in paramedic workers (international map).

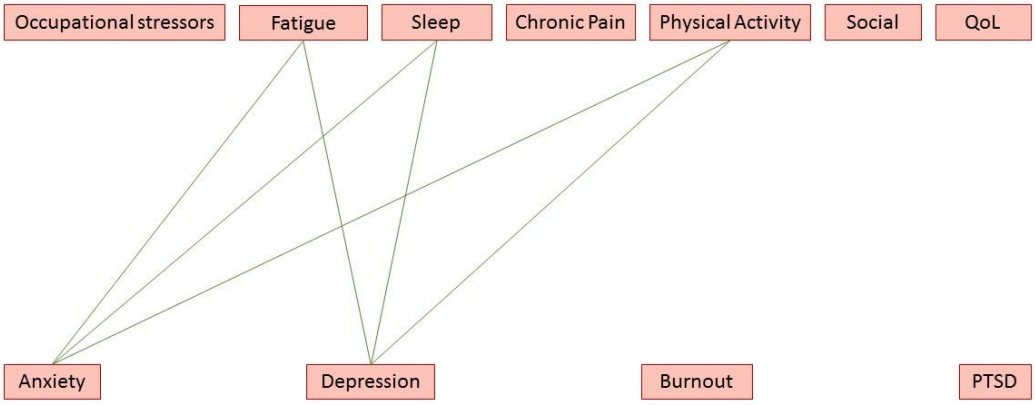

Figure 2. Map of factors correlated in mental health research in Australian paramedic workers.

3.0 Aims

1. To determine the factors associated with anxiety, depression, burnout, and PTSD in Australian paramedics
2. To examine the comorbidity of anxiety, depression, burnout, and PTSD in Australian paramedics
3. To investigate the quality of life of Australian paramedics and the factors associated with decreased quality of life.

4.0 Methods & Materials

4.1 Methods

4.1.0 Study Design

The present study used a cross-sectional design. Recruitment involved the use of a screening process for two reasons. The first, it was deemed important by the Human Research Ethics Committee that participants were to be 'potentially identifiable' so that participants could be notified of their results if they had consented to be contacted. Secondly, it was thought that a screening process would ensure that participants were ambulance employees and that they met the inclusion/exclusion criteria for the study.

Participation in this study was through a paper-based format. A paper-based format was used for several reasons. Firstly, the Beck Anxiety Inventory, the Beck Depression Inventory-II and the Maslach Burnout Inventory used in this trial were not able to be reproduced online for copyright purposes. Secondly, it was thought that greater time and care would be invested in a paper-based questionnaire to extract higher quality detailed information.

All packages, data handling, and data entry were conducted by the MBR student.

4.1.1 Participants

A total of 63 participants contributed to this study, representing 0.5% of the Australian paramedic population (based on a paramedic workforce of 11, 940; Paramedics Australasia, 2012). Participants were required to be currently working for an ambulance service provider in Australia. Participants were required to be over 18 years of age. Exclusion criteria included anyone with neurological, cardiovascular, metabolic or other medical conditions that may confound anxiety, depression, burnout, and PTSD. Participants confirmed that they did not meet exclusion criteria by checkbox on the consent form.

4.1.2 Recruitment

Paramedics were recruited via a recruitment flyer that was promoted and disseminated through major paramedic bodies (Paramedics Australasia and the Australian & New Zealand

College of Paramedicine), local media, third party organisations (Silence of Sirens), representative paramedic unions, and social media. Data were collected between March 2017 and December 2017. Paramedics were directed to express interest in participating in the study by phone or by email. Pre-coded and de-identified packages were mailed to willing participants via post. Packages included an information letter, a consent form, a list with mental health support services, and the assessment booklet. Participants returned the questionnaires and consent forms by return pre-paid envelopes provided.

4.2 Demographics

The demographics questionnaire was composed of general demographic questions (age, gender, and education), questions relating to their work (state in which the paramedic works, years on the force, age at which the participant started their career as a paramedic, working hours and roster), and current medications. An alcohol consumption questionnaire was added to the demographics questionnaire as recommended by National Institute on Alcohol Abuse and Alcoholism (n.d.). A tobacco smoking prevalence questionnaire was also included in the demographics questionnaire (Global Adult Tobacco Survey Collaborative Group, 2011).

From the medications listed by paramedics, the following were considered as psychotropic medication: selective serotonin reuptake inhibitors, serotonin and noradrenaline reuptake inhibitors, monoamine oxidase inhibitors, tricyclic antidepressants, noradrenaline-serotonin specific antidepressants, noradrenaline reuptake inhibitors, benzodiazepines and anticonvulsant medication.

4.3 Organisational and Operational Stress (occupational stress)

Occupational stress was measured with the Emergency Medical Services Chronic Stress Questionnaire (EMS-CSQ, Donnelly et al., 2014). The EMS-CSQ is a self-administered scale

that contains 20 items. Each item contains seven responses, 1 being no stress at all, 4 being moderate stress, and 7 being a lot of stress. Ten items relate to organisational stressors of emergency services work while the other ten items relate to the occupational stressors of the job. The total of the sum scores for individual components and the total questionnaire score can be used, with increased stress corresponding with increased total score. The EMS-CSQ was developed and validated in a paramedic population, and demonstrated good internal reliability in addition to good convergent, discriminant and predictive validities (Donnelly et al., 2014). The Cronbach's alpha in this study is .90.

4.4 Anxiety

Anxiety symptomatology was measured by the Becks Anxiety Inventory (BAI, Beck and Steer, 1993). The BAI is a self-administered anxiety scale containing 21 items. Each item contains a choice of four responses (not at all, it did not bother me much, it was unpleasant, but I could stand it; or I could barely stand it). The participant must select which response best describes their level of symptomology over the past week. A score of 0-7 is "minimal" anxiety; 8-15 is "mild" anxiety; 16-25 is "moderate" anxiety; 26-63 is "severe" anxiety. For the purpose of this thesis, minimal anxiety is interpreted as having no anxiety. The BAI is one of the most commonly used instruments in screening and evaluating anxiety among individuals, and demonstrates good internal reliability with a Cronbach's alpha of .94 (Bardhoshi et al., 2016; Beck and Steer, 1993; Fydrich et al., 1992) and good discriminant validity (Beck et al., 1988). The Cronbach's alpha in the current study is .89.

4.5 Depression

Depressive symptomology was measured by the Beck's Depression Inventory (Beck et al., 1996). The Beck Depression Inventory (BDI-II) is a self-administered depression scale

containing 21 items. Each item contains a question with a choice of four responses. The participant must select the statement which best describes their feelings over the past two weeks. The BDI-II measures both somatic and cognitive symptoms of depression. Each response is summed up and reveals the severity of depression symptoms in an individual. A score of 0-13 is "minimal" depression; 14-19 is "mild" depression; 20-28 is "moderate" depression; and 29-63 is "severe" depression. For the purpose of this thesis, minimal depression is interpreted as having no depression. The BDI-II demonstrates good test-retest reliability and internal reliability with Cronbach's alphas ranging from .73 to .96, and .83 to .96 respectively (Beck et al., 1996; Wang and Gorenstein, 2013). The Cronbach's alpha in this study is .93.

4.6 Burnout

Burnout was measured using the Maslach Burnout Inventory – Human Services Survey (MBI: Maslach et al., 1996). The MBI-HSS consist of 22 items on a 7-point scale. Participants are required to respond to each item by selecting the frequency at which they experience the job-related feeling, ranging from (0) Never, through to (6) every day. The MBI assesses the three components of burnout; emotional exhaustion, depersonalization and personal accomplishment. The MBI is a widely used tool for burnout research (Maslach et al., 2001; Poghosyan et al., 2009). Participants were deemed to have burnout if they scored "high" in two or more components of the MBI with at least a score of "moderate" in the third component. Component sum scores measure the extent of burnout in each individual component. Emotional exhaustion (EE) scores are as follows: Low (0-16); Moderate (17-26); High (27 or more). Depersonalization (DP) scores are as follows: Low (0-6); Moderate (7-12); High (13 or more). Personal accomplishment (PA) scores are reverse-scored as follows: Low (39 or over); Moderate (32-38); High (0-31). The Cronbach's alpha for emotional exhaustion in this study is .91, for depersonalisation is .81, and for personal accomplishment is .68.

4.7 Posttraumatic Stress Disorder

PTSD symptomatology was measured using the PTSD CheckList - Civilian Version (PCL-C; Weathers et al., 1993). The PCL is a 17-item scale that measures posttraumatic stress symptomology with a choice of 5 responses (not at all to extremely). The 17-items correspond with the 17 symptoms of PTSD in the DSM-IV, with a score of 3 (moderate) or more endorsing a symptom. Caseness for PTSD was determined using the DSM-IV criteria (1x intrusion symptom - Criterion B, 3x avoidance symptoms - Criterion C, and 2x hyperarousal symptoms - Criterion D; American Psychiatric Association, 1994; Dickstein et al., 2015) as endorsed by the PCL-C. The minimum score of the PCL is 17 and the maximum score is 85, with higher scores indicating greater severity of PTSD symptoms. The PCL demonstrates good internal reliability with a Cronbach's alpha of .97 (Weathers et al., 1993) and has previously been shown to be valid in the paramedic population (Donnelly et al., 2016). The Cronbach's Alpha in this study was .93.

4.8 Fatigue

Fatigue was measured using the Chalder Fatigue Scale (CFS) developed by Chalder et al. (1993). Participants respond to a 4-point scale regarding their experience of 11 symptoms of fatigue. Responses reflect the extent to which the participant experiences the symptom, ranging from "less than usual", "no more than usual", "more than usual", or "much more than usual" over the past month. Total score from the 4-point Likert scale was used for the correlation matrix (less than usual = 0, no more than usual = 1, more than usual = 2, much more than usual = 3). Using the bimodal approach of analysis, a score of 4 or more was used to identify cases of fatigue (less than usual & no more than usual = 0; more than usual & much more than usual = 1). This questionnaire was developed to measure the severity of total fatigue

and has been found to have good internal reliability as well as both face and discriminant validity (Chalder et al., 1993). The Cronbach's alpha for the CFS in this study is .89.

4.9 Sleep

Sleep quality was measured by the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1988). The PSQI was designed to measure sleep quality over the previous month, discriminating between good and poor sleepers. It is a self-administered questionnaire containing 19 questions related to sleep quality (Buysse et al., 1988). An increasing PSQI score reflects decreasing sleep quality. Participants with scores of 5 or more are considered poor sleepers. The Cronbach's alpha of the PSQI in this study is .74.

4.10 Chronic Pain

Chronic pain was measured by the Orebro Musculoskeletal Pain Questionnaire (OMPQ: Linton and Boersma, 2003). The OMPQ consists of 21 scored questions regarding attitudes, beliefs and behaviours in response to pain, and has satisfactory test-retest reliability (Brown, 2008; Linton and Boersma, 2003). The OMPQ also provides information on the location, severity, and duration of the pain (Linton and Boersma, 2003). We used the first question of the OMPQ *"Have you had any experience with pain or chronic pain within the last month?"* to determine whether a participant was suffering with a pain problem within the last month.

4.11 Physical Activity

A physical activity log was constructed using activities in the Compendium of Physical Activities (Ainsworth et al., 2011). The activity log consisted of exercise, dance, fishing and hunting, household, home repair, leisure, water, volunteering, and religious activities. Participants were required to indicate time spent engaging in the activity over the average week.

Metabolic equivalents (METs) were calculated for each activity as a function of time in minutes multiplied by the task-specific metabolic rate recommended by the Compendium of Physical Activities (Ainsworth et al., 2011). METs reflect the ratio of energy expenditure for a prescribed activity relative to the energy expenditure at rest. In essence, a physically demanding activity such as cycling has an assigned MET value of 8.5, which is 8.5x the metabolic demand for an individual at rest.

4.12 Perceived Social Support

Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MPSS; Zimet et al., 1988). The MPSS consists of 12 questions with 7 responses ranging from very strongly disagree to very strongly agree. The 12 questions relate to the degree in which an individual perceives they receive social support from family, friends, and their significant other (Zimet et al., 1990). A higher score on the MPSS reflects a higher level of perceived social support. The MPSS demonstrates good internal reliability with a Cronbach's alpha ranging from .85 to .91 and a test-retest reliability ranging from .72 to .85. (Zimet et al., 1990). The Cronbach's alpha of the MPSS in this study is .93.

4.13 Quality of Life

Quality of life was measured using the Quality of Life Index (QLI; Ferrans and Powers, 1985). The QLI measures the overall satisfaction and the importance particular aspects are to the individual, across four domains of life: health and functioning, psychological/spiritual, social and economic, and family (Ferrans and Powers, 1985). The Cronbach's alpha for the QLI in this study is .90.

4.14 Pilot Testing

The questionnaire booklet underwent pilot testing by six paramedic academics, each of which timed their participation and provided feedback on the battery. The pilot questionnaires were not returned. The final questionnaire booklet took 30-50 minutes to complete. This piloting contributed toward informing the consent forms and ethics application at the proposal stage.

5.0 Ethics

Ethics approval was obtained from the Edith Cowan University Human Research Ethics Committee (Project Number: 17098).

6.0 Statistics

Statistics were carried out using IBM SPSS Statistics (Version 24, IBM Inc, Armonk, New York, 2016). Normality of study data was assessed using the Shapiro-Wilk's test. Normally distributed data were presented as mean (± SD), non-normally distributed data were presented as median (interquartile range). The factors associated with anxiety, depression, and PTSD symptomatology were analysed by Spearman's Rank Correlation. The factors associated with burnout were analysed by Mann-Whitney U-test since burnout status is categorical. Chi-square tests with continuity correction were used to establish a relationship between chronic pain and burnout since both items are categorical. All correlation coefficients and Whitney U-tests were provided with Cohen's *d* effect sizes.

7.0 Results

A total of 77 packages were posted out to participants with a total of 63 packages returned (81.2% response rate).

7.1 Demographics

Demographic details of the study population can be found in **Table 3**. The participants were 50.8% female, married or in a domestic partnership, from Victoria, held an undergraduate degree, and were full-time employees. They had a mean age of 41.5 years and worked an average of 12.7 years as a paramedic.

A Spearman's Rank Correlation was conducted to determine if any of the continuous demographic variables were associated with mental health outcomes. No statistically significant relationship between demographic variables and measures of anxiety, depression, burnout, or PTSD symptomatology were found. The only exception was PTSD symptomatology and age ($r = .305$, $p < .05$, $d = 0.6$) and PTSD and years worked in the industry ($r = .255$, $p < .05$, $d = 0.5$). A Mann-Whitney U-Test was used to explore these relationships using the DSM-IV criteria for PTSD; results indicated that age was greater for cases of probable PTSD (*Mdn* = 46.5, *IQR* = 39.5 – 55.8) than participants not meeting criteria (*Mdn* = 36.0, *IQR* = 31.0 – 48.0, *U* = 235.00, *p* = .032, *d* = 0.6). Years worked in the industry, however, was not significantly different for cases of probable PTSD (*Mdn* = 14.5, *IQR* = 5.5 – 25.3) compared to participants not meeting criteria (*Mdn* = 8.0, *IQR* = 5.9 – 14.3, *U* = 279.00, *p* = .152, *d* = 0.37).

Table 3. Participant demographics presented as count (%) for categorical data, mean and standard deviation for continuous data.

		Count	%	Mean	Standard Deviation
Gender	F	32	50.8		
	M	31	49.2		
Age				41.5	10.4
Marital_status	Married/domestic partnership	51	81.0		
	Divorced/separated	7	11.1		
	Other	5	7.9		
State	VIC	34	54.0		
	WA	16	25.4		
	Other	13	20.6		
Education	Undergraduate	43	68.3		
	Postgraduate	8	12.7		
	TAFE/VET	9	14.3		
	Other (not specified)	3	4.8		
Employment	Full-time	52	82.5		
	Part-time	11	17.5		
Years worked				12.7	9.8
Rostered hours per rotation				42.4	15.0

7.2 Mental Health Outcomes

Median and interquartile range (IQR) values for anxiety, depression, burnout, and posttraumatic stress measures are provided in **Table 4**. A breakdown of the severity of anxiety, depression, burnout, and PTSD in participants is provided in **Table 5**. Of the 63 participants, 39 participants (61.9%) displayed mild to severe levels of anxiety, depression, burnout, or PTSD **(Figure 3 and Figure 4)**. Comorbidity of mental disorders were observed in the majority of these participants, with 27 (69.2%) meeting the criteria for at least two disorders (**Figure 4, Figure 5 and Figure 6**).

A total of 16 participants (25.4%) were using psychotropic medication, five (31.3%) of whom did not meet the criteria for anxiety, depression, burnout, or PTSD (See **Figure 6**). Nine of the eleven participants (81.8%) under treatment with psychotropic medication met the criteria for two or more mental disorders (**Figure 6**).

Table 4. Medians and interquartile range of Beck Anxiety Inventory, Beck Depression Inventory-II, Maslach Burnout Inventory, and Posttraumatic Check List sum scores.

Outcome	**Median**	**Inter-Quartile Range**
Anxiety (BAI)	6.0	2.0 – 11.0
Depression (BDI-II)	12.0	7.0 – 18.0
Burnout - EE	21.0	16.0 – 31.0
Burnout - DP	12.0	7.0 – 17.0
Burnout - PA	35.0	30.0 – 39.0
PTSD (PCL)	32.0	24.0 – 42.0

BAI = Beck Anxiety Inventory. BDI-II = Beck Depression Inventory-II. EE = emotional exhaustion. DP = depersonalisation. PA = personal accomplishment. PCL = Posttraumatic check list.

Table 5. Anxiety, depression, burnout, and PTSD.

Outcome	Category	Gender				Total	
		F		M			
		Count	N %	Count	N %	Count	N %
Anxiety	None	15	46.9%	22	71.0%	37	58.7%
	Mild	13	40.6%	4	12.9%	17	27.0%
	Moderate	4	12.5%	4	12.9%	8	12.7%
	Severe	0	0.0%	1	3.2%	1	1.6%
	Total	32	50.8%	31	49.2%	63	100.0%
Depression	None	17	53.1%	17	54.8%	34	54.0%
	Mild	8	25.0%	5	16.1%	13	20.6%
	Moderate	5	15.6%	2	6.5%	7	11.1%
	Severe	2	6.3%	5	16.1%	7	11.1%
	DNC	0	0.0%	2	6.5%	2	3.2%
	Total	32	50.8%	31	49.2%	63	100.0%
Burnout	None	23	71.9%	19	61.3%	42	66.7%
	Burnout	9	28.1%	12	38.7%	21	33.3%
	Total	32	50.8%	31	49.2%	63	100.0%
PTSD	None	25	78.1%	21	67.7%	46	73.0%
	PTSD	7	21.9%	9	29.0%	16	25.4%
	DNC	0	0.0%	1	3.2%	1	1.6%
	Total	32	50.8%	31	49.2%	63	100.0%

Did not complete (DNC).

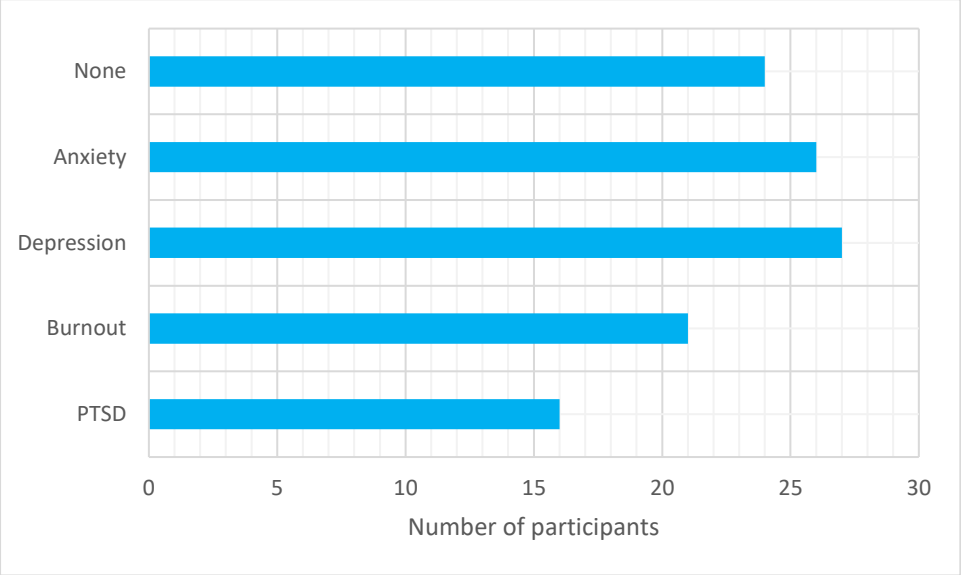

Figure 3. Number of participants with anxiety, depression, burnout, and PTSD.

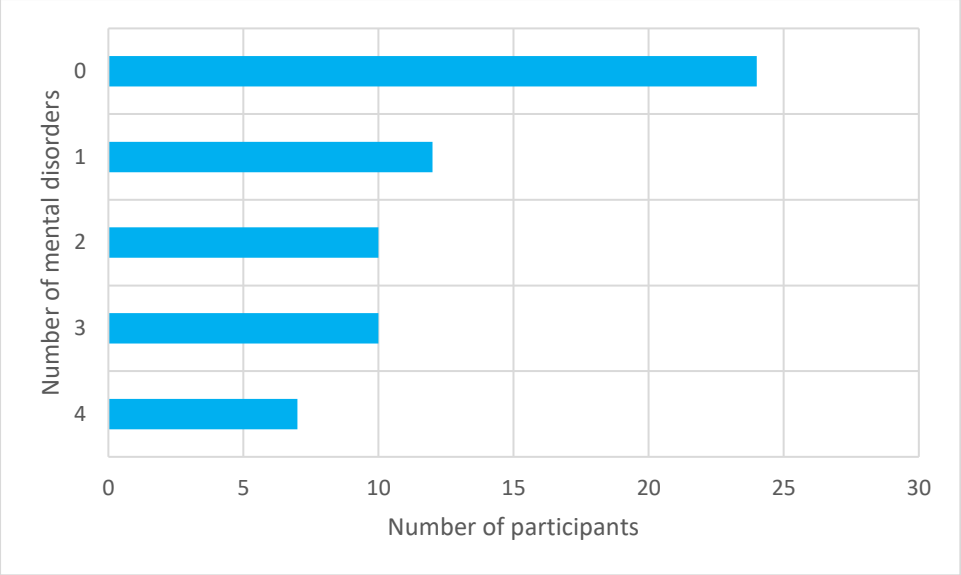

Figure 4. Number of participants with 0, 1, 2, 3 or 4 mental disorders.

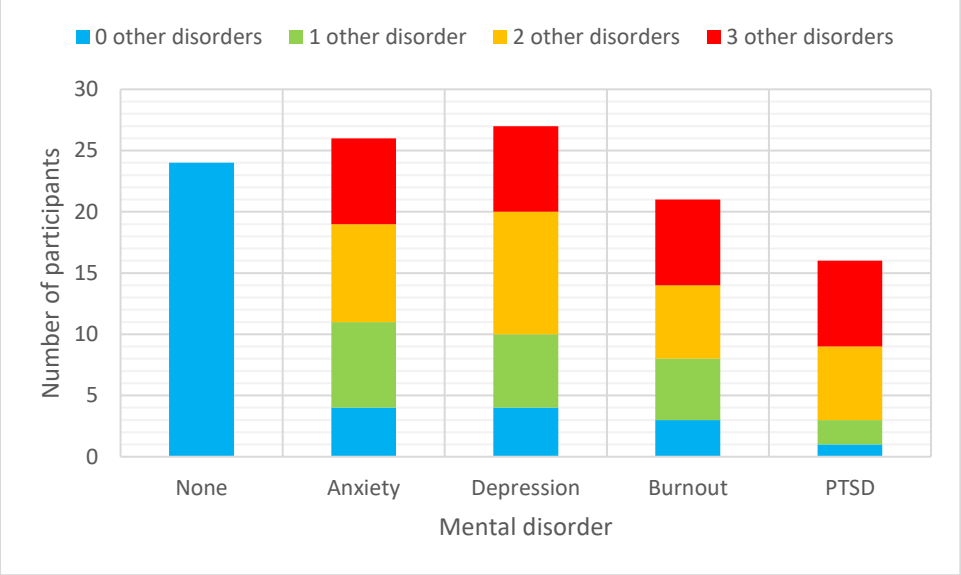

Figure 5. The number of comorbid disorders associated with anxiety, depression, burnout, and PTSD.

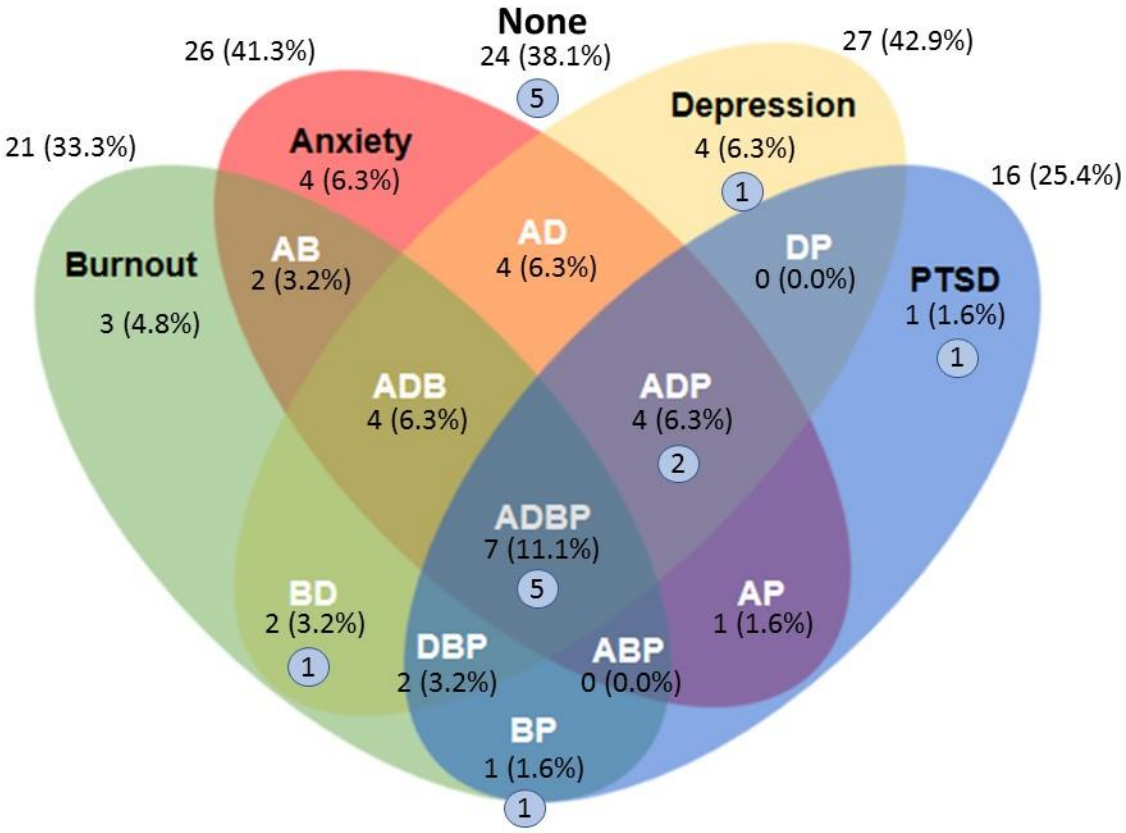

Figure 6. Co-occurrence of anxiety (A), depression (D), burnout (B), and PTSD (P; N=63). Total count and relative percentage to the total study population is presented as N (%). Numbers inside the smaller circles represent the total count of participants within the group who were currently using psychotropic medication.

7.3 Factors Associated with Mental Health Outcomes

The primary aim of this study was to determine the factors associated with anxiety, depression, burnout, and PTSD symptomatology in Australian paramedics. All correlations can be found in **Table 6**.

<u>Anxiety</u>

Paramedics who reported higher levels of anxiety also reported higher occupational stress (r = .574, p < .001, d = 1.40), more fatigue (r = .519, p < .001, d = 1.2), poorer sleep quality (r = -.479, p < .001, d = -1.1), lower perceived social support (r = -.269, p = .033, d = -0.6), and significantly lower quality of life (r = -.621, p < .001, d = -1.6).

Depression

Paramedics who reported higher levels of depression also reported higher occupational stress (r = .659, p < .001, d = 1.8), more fatigue (r = .719, p < .001, d = 2.1), poorer sleep quality (r = -.642, p < .001, d = -1.7), lower perceived social support (r = -.411, p = .001, d = -0.9), and significantly lower quality of life (r = -.772, p < .001, d = -2.4).

PTSD

Paramedics who reported higher levels of PTSD also reported higher occupational stress (r = .712, p < .001, d = 2.0), more fatigue (r = .595, p < .001, d = 1.5), poorer sleep quality (r = -.709, p < .001, d = -2.0), lower perceived social support (r = -.373, p = .003, d = -0.8), and significantly lower quality of life (r = -.636, p < .001, d = -1.6).

Table 6. Spearman's correlation matrix of factors associated with anxiety, depression, burnout, and PTSD.

		Anx.	Dep.	PTSD	EMS-CS	EE	DP	PA	Fa.	Sleep	Physical activity	PSS	QoL
Anx.	r =	1.000											
	Sig.	-											
	N	63											
Dep.	r =	.695**	1.000										
	Sig.	.000	-										
	N	61	61										
PTSD	r =	.710**	.787**	1.000									
	Sig.	.000	.000	-									
	N	62	61	62									
EMS-CS	r =	.574**	.659**	.712**	1.000								
	Sig.	.000	.000	.000	-								
	N	63	61	62	63								
EE	r =	.641**	.689**	.685**	.675**	1.000							
	Sig.	.000	.000	.000	.000	-							
	N	63	61	62	63	63							
DP	r =	.264*	.269*	.252*	.256*	.362**	1.000						
	Sig.	.036	.036	.048	.043	.004	-						
	N	63	61	62	63	63	63						
PA	r =	-.381**	-.338**	-.363**	-.167	-.324**	-.373**	1.000					
	Sig.	.002	.008	.004	.191	.010	.003	-					
	N	63	61	62	63	63	63	63					
Fa.	r =	.519**	.719**	.595**	.476**	.595**	.232	-.341**	1.000				
	Sig.	.000	.000	.000	.000	.000	.068	.006	-				
	N	63	61	62	63	63	63	63	63				
Sleep	r =	.479**	.642**	.709**	.503**	.588**	.183	-.214	.598**	1.000			
	Sig.	.000	.000	.000	.000	.000	.159	.098	.000	-			
	N	61	59	60	61	61	61	61	61	61			
Physical activity	r =	-.039	-.004	-.026	.104	.020	.059	.119	-.085	-.004	1.000		
	Sig.	.769	.978	.843	.428	.880	.654	.367	.520	.978	-		
	N	60	59	59	60	60	60	60	60	58	60		
PSS	r =	-.269*	-.411**	-.373**	-.238	-.215	-.155	.118	-.272*	-.186	.122	1.000	
	Sig.	.033	.001	.003	.060	.090	.226	.355	.031	.152	.353	-	
	N	63	61	62	63	63	63	63	63	61	60	63	
QoL	r =	-.621**	-.772**	-.636**	-.574**	-.596**	-.315*	.425**	-.425**	-.433**	.124	.533**	1.000
	Sig.	.000	.000	.000	.000	.000	.012	.001	.001	.000	.344	.000	-
	N	63	61	62	63	63	63	63	63	61	60	63	63

Anx. = anxiety. Dep. = depression. PTSD = posttraumatic stress disorder. EMS-CS = emergency medical services chronic stress. EE = emotional exhaustion. DP = depersonalization. PA = personal accomplishment. Fa. = fatigue. PSS = perceived social support. QoL = Quality of Life.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Burnout

Compared with paramedics without burnout, paramedics with burnout reported greater occupational stress, higher fatigue, and significantly lower quality of life (**Table 7**). No other significant differences were observed.

Table 7. Cross-tabulation of chronic pain status and burnout status in paramedics.

Factor	No Burnout	Burnout	*p*	*d*
Occupational Stress	70.00 (54.00 – 80.00)	83.00 (67.00 – 91.00)	.016*	0.6
Fatigue	13.00 (11.00 – 16.00)	21.00 (15.00 – 23.00)	.000**	1.1
Quality of Life	22.12 (19.03 – 24.23)	17.73 (16.08 – 20.00)	.001**	-0.9

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

7.3.1 Organisational and Operational Stress

An evaluation of the organisational and operational stressors were conducted in order to determine which organisational and operational stressors were significant to the study population. The median organisational and operational stressor, and total occupational stress scores are provided in **Table 8**.

Of the organisational stressors, feeling like different rules apply to different people, "feeling like you always have to prove yourself to the organisation", constant changes in policy/legislation, staff shortages, bureaucratic red tape, lack of training on new equipment, dealing with supervisors, and leaders over-emphasizing the negatives, were all reported to be moderate to severe stressors (median scores > 4; **Table 8**). Of the operational stressors, shift work, risk of being injured on the job, and fatigue were all reported to be moderate to severe stressors.

Anxiety, depression, burnout and PTSD were significantly associated with increased occupational stress based on total EMS-CSQ scores (**Table 7**). A further analysis of the component scores of the EMS-CSQ was undertaken to determine whether these effects were due to organisational and/or operational stressors. Paramedics reporting higher levels of anxiety, depression, and PTSD also reported higher organisational and operational stress (**Table 9**). Paramedics with burnout reported higher operational stress (Mdn = 40.00, IQR = 33.00 – 46.00) than paramedics without burnout (Mdn = 31.50, IQR = 24.00 – 39.00, $p = .002$, $d = 0.8$). In addition, paramedics with burnout reported non-significant, but higher organisational stress (Mdn = 40.00, IQR = 32.00 – 50.00) compared to paramedics without burnout (Mdn = 35.50, IQR = 29.00 – 43.00, $p = .133$, $d = 0.4$).

Table 8. Organisational stress, operational stress and total EMS-CSQ scores.

EMS-CSQ Question	Median	IQR
Feeling like different rules apply to different people (e.g. favouritism)	4.00	2.00-5.00
Feeling like you always have to prove yourself to the organization	4.00	2.00-5.00
Constant changes in policy/legislation	4.00	3.00-6.00
Staff shortages	4.00	2.00-5.00
Bureaucratic red tape	4.00	2.00-6.00
Lack of training on new equipment	4.00	3.00-5.00
Dealing with supervisors	4.00	2.00-5.00
Lack of resources	3.00	2.00-4.00
Unequal sharing of work responsibilities	2.00	2.00-5.00
Leaders over-emphasize the negatives (e.g. supervisor evaluations, public complaints)	5.00	2.00-6.00
Organizational Stressors Total	**36.00**	**30.00-48.00**
Shift work	4.00	3.00-6.00
Risk of being injured on the job	4.00	2.00-5.00
Managing your social life outside of work	3.00	3.00-5.00
Friends/family feel the effects of the stigma associated with your job	2.00	1.00-4.00
Eating healthy at work	3.00	2.00-5.00
Fatigue	6.00	4.00-7.00
Lack of understanding from your friends and family about your work	3.00	2.00-5.00
Making friends outside of the job	2.00	1.00-4.00
Negative comments from the public	2.00	1.00-2.00
Feeling like you are always on the job	3.00	2.00-5.00
Operational Stressors Total	**34.00**	**28.00-41.00**
EMS-CSQ Total	**72.00**	**61.00-85.00**

NB: Score of 1 = No stress at all. Score of 4 = Moderate stress. Score of 7 = A lot of stress. IQR = interquartile range.

Table 9. Spearman's correlation matrix of anxiety, depression, and PTSD symptomatology and subscale components of the EMS-CSQ.

		BAI	BDI	PTSD
Org	*r*	.513**	.589**	.614**
	d	1.2	1.5	1.6
Op	*r*	.407**	.500**	.590**
	d	0.9	1.2	1.5

Org = Organisational stressors. Op = Operational Stressors.

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

7.3.2 Fatigue

Thirty-five participants (55.6%) scored 4 or more in the bimodal analysis and were therefore deemed to be fatigued. The mean score of the Chalder Fatigue Scale was 15.48 ± 5.36 (± SD).

7.3.3 Sleep

A total of 61 participants (96.8%) completed the Pittsburgh Sleep Quality Index questionnaire. Of these, 48 (78.7%) scored 5 or more and were therefore deemed to be poor sleepers. The mean score of the PSQI was 7.95 ± 4.01 (± SD).

7.3.4 Chronic Pain

A total of 43 paramedics (68.3%) reported chronic pain in the past month. Paramedics reporting chronic pain reported higher anxiety (Mdn = 8.00, IQR = 3.00 – 12.00) than paramedics without chronic pain (Mdn = 4.00, IQR = 1.00 – 6.00, p = .023, d = 0.6). Paramedics reporting chronic pain also reported higher depression (Mdn = 14.50, IQR = 9.00 – 20.00) than paramedics without chronic pain (Mdn = 8.00, IQR = 5.00 – 14.00, p = .040, d = 0.5). PTSD symptomatology was non-significantly higher in paramedics with chronic pain (Mdn = 32.50,

IQR = 26.00 – 42.00) than paramedics without (Mdn = 26.00, IQR = 23.50 – 36.50, p = .091, d = 0.4). Burnout did not differ with chronic pain status (**Table 10**).

Table 10. Cross-tabulation of chronic pain status and burnout status in paramedics.

Burnout	No pain	Chronic pain
No	15	27
Yes	5	16

Chi-square test with continuity correction (X^2 = .449, DF = 1, p = .503)

7.3.5 Physical Activity

The greatest contributing activities to physical activity are exercise, housework, and leisure activities (**Table 11)**. Weekly time investment in these three components can be found in **Table 12**. According to **Table 7**, physical activity was not associated with anxiety, depression, burnout or PTSD symptomatology.

Using Spearman's correlation, further analysis was conducted to explore if there were significant associations between anxiety, depression, PTSD symptomatology, and sub-components of the physical activity questionnaire. Only PTSD symptomatology was significantly correlated with exercise METs (r = -.299, p < .05, d = 0.6). Further exploration of this relationship revealed that this was due to differences in time invested in exercise. Paramedics with PTSD exercised one-third the amount of time as paramedics without PTSD (**Table 13**). There were no differences observed in total physical activity or subscale components of physical activity when comparing paramedics with burnout to those without burnout.

Table 11. Breakdown of contribution to METs. MET values provided are average METs per week.

	Median (IQR)
Exercise	1495.5 (819.0 – 3190.0)
Dance	0 (0)
Fishing and Hunting	0 (0)
Housework	1847.5 (1070.5 – 2730.8)
Home Repair	242.0 (0 – 675.8)
Leisure	1720.5 (1008.8 – 2436.0)
Water Activities	0 (0)
Volunteering	0 (0)
Religious	0 (0)
Total Physical Activity	5731.5 (4376.3 – 9353.0)

Table 12. Weekly time investment in exercise, housework, and leisure activities. Time is provided in minutes per week.

	Median minutes (IQR)
Time invested in exercise	307.5 (210.0 – 600.0)
Time invested in housework	622.5 (357.8 – 1035.0)
Time invested in leisure	1125.0 (720.0 – 1676.25)

Table 13. Mann-Whitney U Test for differences in weekly time invested in exercise. Time is provided in minutes per week.

	No PTSD	PTSD	*p*	*d*
Time invested in exercise	342.50 (240.00 – 600.00)	120.00 (0.00 – 305.00)	.017	0.7

7.3.6 Perceived Social Support

A breakdown of perceived social support results can be seen in **Table 14**. Paramedics perceived greater support coming from their significant other than they did from their family and friends (**Table 15 and 16**). **Table 16** displays the correlations between anxiety, depression, PTSD symptomatology, and subcomponents of the perceived social support questionnaire.

Paramedics reporting higher anxiety reported a lower perception of social support from their friends. Paramedics reporting greater depression reported a lower perception of social support from their significant other, family, and friends. In addition, paramedics reporting higher PTSD symptomatology reported a lower perception of social support from their significant other and their friends. Total perceived social support was no different in paramedics with burnout (Mdn = 72.00, IQR = 54.00 – 79.00) compared to paramedics without burnout (Mdn = 74.00, IQR = 65.00 – 81.00, p = .228, d = 0.3). Of the perceived social support subcomponents, only perceived social support from friends was reportedly lower in paramedics with burnout than paramedics without (**Table 17**).

Table 14. Breakdown of perceived social support scores.

Subscale	Median (IQR)
Significant Other	27.00 (23.00 – 28.00)
Family	24.00 (20.00 – 28.00)
Friends	24.00 (20.00 – 27.00)
Total perceived social support	74.00 (62.00 – 80.00)

Table 15. Mann-Whitney U Test comparisons of perceived social support between significant other, family, and friends.

Comparison groups	*p*	*d*
Significant Other – Family	.037	0.4
Significant Other – Friends	.005	0.5
Family – Friends	.552	0.1

Table 16. Spearman's correlation matrix between anxiety, depression, and PTSD symptomatology and subscale scores of perceived social support.

		Anxiety	Depression	PTSD
Significant Other	*r*	-.206	-.372**	-.415**
	d	-0.4	-0.8	-0.9
Family	*r*	-.214	-.291*	-.244
	d	-0.4	-0.6	-0.5
Friends	*r*	-.275*	-.377**	-.362**
	d	-0.6	-0.8	-0.8

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 17. Comparison of perceived social support from the significant other, family, and friends between paramedics with burnout and paramedics without burnout.

	No burnout	Burnout	*p*	*d*
Significant other	27.00 (24.00 – 28.00)	27.00 (23.00 – 28.00)	.634	0.1
Family	24.00 (20.00 – 28.00)	24.00 (17.00 – 27.00)	.412	0.2
Friends	24.00 (21.00 – 27.00)	22.00 (18.00 – 24.00)	.048*	0.5

* Correlation is significant at the 0.05 level (2-tailed)

7.3.7 Quality of Life

Total and subcomponent scores of the Quality of Life index are provided in **Table 18**. Paramedics reporting higher anxiety, depression, and PTSD symptomatology reported lower scores in the health and functioning, social and economic, and psychological/spiritual subcomponents of quality of life (**Table 19**). Additionally, paramedics reporting higher depression reported lower scores in family-related quality of life. Paramedics with burnout reported a lower quality of life across the health and functioning and psychological/spiritual domains of quality of life (**Table 20**).

Table 18. Quality of Life Index subscale scores.

Subscale	Median (IQR)
Health and functioning	20.00 (15.31 – 23.50)
Social and Economic	21.71 (19.64 – 24.93)
Psychological/Spiritual	19.43 (16.07 – 22.50)
Family	24.30 (21.00 – 27.00)
Total Quality of Life	20.53 (17.93 – 23.83)

Table 19. Spearman's correlations matrix of anxiety, depression, and PTSD scores with subscale components of the Quality of Life Index.

		BAI	BDI	PTSD
Health and Functioning	*r* =	-.673**	-.812**	-.683**
	d =	-1.8	-2.8	-1.9
Social and Economic	*r* =	-.352**	-.535**	-.414**
	d =	-0.8	-1.3	-0.9
Psychological/spiritual	*r* =	-.598**	-.751**	-.617**
	d =	-1.5	-2.8	-1.6
Family	*r* =	-.204	-.302*	-.190
	d =	-0.4	-0.6	-0.4

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

Table 20. Comparison of Burnout status and Quality of Life Index subscale components. Scores are provided as median (IQR).

Subscale component	No burnout	Burnout	*p*	*d*
Health and Functioning	21.58 (18.15 – 27.93)	16.35 (13.25 – 23.50)	.001*	0.9
Social and Economic	22.14 (20.64 – 28.57)	20.57 (17.36 – 26.07)	.053	0.5
Psychological/Spiritual	21.32 (17.42 – 28.29)	16.79 (14.42 – 23.43)	.002*	0.8
Family	25.05 (21.83 – 30.00)	24.00 (19.13 – 28.50)	.170	0.4

Significant at the .01 level (2-tailed)

8.0 Discussion

The primary aim of this investigation was to determine the factors associated with anxiety, depression, burnout, and PTSD. Paramedics reporting higher levels of anxiety, depression, and PTSD consistently reported higher occupational stress, higher fatigue, poorer sleep quality, lower perceptions of social support, and a lower quality of life. Similarly, paramedics with burnout reported higher occupational stress, higher fatigue, and a lower quality of life, but not poorer sleep quality or less social support, compared to the paramedics without burnout. As expected, anxiety and depression symptomatology was higher in paramedics with chronic pain compared to those without. Each factor under investigation in this project will be discussed in detail later in this chapter.

Paramedics experience mental disorders at higher rates than the general population and it is considered a major health issue among paramedic workers (Donnelly, 2012; Donnelly et al., 2014; Lawrence et al., 2018; Wild et al., 2016). Nearly 62% of paramedics in the present study met the criteria for anxiety, depression, burnout, or PTSD, which should be concerning for employers of paramedics given that these disorders are associated with higher levels of absenteeism and presenteeism in the workplace (Sanderson and Andrews, 2006). For paramedics, ongoing efforts are required to ensure that they are able to continue to live their lives productively from a social and occupational perspective.

Of the paramedics that met the criteria for anxiety, depression, burnout, or PTSD, 69% also met criteria of another disorder. While it is known that people with a mental disorder are likely to suffer from additional disorders (Harvey et al., 2015; Stein and Sareen, 2015; van Dam, 2016), this is the first study to investigate and report on mental disorder comorbidity in Australian paramedics. The presence of comorbid mental disorders influence decisions pertaining to the diagnosis and treatment of the patient (Harvey et al., 2015), and should

therefore be an important metric when characterising the mental health of paramedics and other emergency service workers.

The prevalence of anxiety, depression and PTSD reported in this study were higher than what has been reported in previous studies of paramedics working in Australia (Courtney et al., 2010; Courtney et al., 2013; Lawrence et al., 2018). The prevalence of burnout, however, was lower in this study than what has previously been reported (Thyer et al., 2018). Discrepancies in the prevalence of mental disorders between the studies may be partly attributed to differences in the methodological approaches and sample size utilised. To measure the prevalence of anxiety, depression and PTSD, Lawrence et al. (2018) recruited participants through employers of emergency service workers, which may have influenced the self-reported responses in this respect. Further, variations may also be due to the differences between those that know they have a disorder and those that do not consider themselves to have a disorder, but are identified through assessments evaluating the levels of the disorder. To measure burnout, Thyer et al. (2018) used the Copenhagen Burnout Inventory (CBI), whereas the present study used the Maslach Burnout Inventory. Both inventories of burnout measure the underlying physical and psychological fatigue and exhaustion (Kristensen et al., 2005; Maslach et al., 2001), however, the CBI was developed to apply to both working and non-working populations, whereas the MBI – Human Services Survey is restrictive to human service workers. Thus, during the development of the CBI, the language was changed in order to facilitate its' use in a variety of populations (Kristensen et al., 2005), and this change may account for discrepancies in the prevalence of burnout. More importantly, the World Health Organization (2019) has recently recognised burnout as a work-related syndrome, and state that burnout is only recognised as a disorder in the occupational context. It is therefore important that future researchers use inventories that are applied in the occupational context.

Although discrepancies exist between studies in the mental health of paramedics, the prevalence of mental disorders reported in this study, and in others, is indeed higher than what is reported in the general population of Australia (Australian Bureau of Statistics, 2015; McEvoy et al., 2011), suggesting that paramedics may be more prone to mental disorders due to the nature of their occupation.

8.1 Occupational stress

Previous studies of paramedics working in Canada and the USA (Donnelly, 2012; Donnelly et al., 2016) have shown increasing organisational and operational stressors associated with increased PTSD symptomatology. The present study expands upon this knowledge, demonstrating that organisational and operational stress was correlated with not only PTSD symptomatology, but also anxiety and depression. For burnout, however, the pattern of occupational stress was different, with operational but not organisational stress being higher in paramedics with burnout. Given that organisational stress was higher than operational stress, and that organisational stress was higher but not statistically different between paramedics with and without burnout, it is possible that organisational stress is generally high and therefore a ceiling effect is observed.

The interaction between stress and mental health is such that one's resilience, coping mechanisms, and social support can buffer the effects of stress (Bernstein et al., 2013; Burton et al., 2012; Cohen and Willis, 1985). However, in order to reduce the reliance on mechanisms to cope with stress, reducing organisational and operational stress in the workplace may also be a suitable strategy to improve mental health in paramedic workers.

The present study has identified organisational stressors ("feeling like different rules apply to different people", "feeling like you always have to prove yourself to the organisation",

constant changes in policy/legislation, staff shortages, bureaucratic red tape, lack of training on new equipment, dealing with supervisors, and leaders over-emphasize the negatives) and operational stressors (shift work, risk of being injured on the job, and fatigue) that elicit a moderate to severe degree of stress on paramedic workers. It is likely that these factors vary between organisations, however, the present study was unable to evaluate this given the limited sample size. Larger studies are needed to examine the influence of organisational and operational stressors on mental health and whether these vary by organisation.

8.2 Fatigue

More than one half of the paramedics sampled (55.6%) in the present study reported feeling fatigued. This finding aligns with Patterson et al.'s (2010) study in the USA, which found that 44.5% of their EMT population experienced fatigue. This finding is not unexpected, given that paramedics regularly undertake shift work which is associated with greater mental and physical fatigue (Courtney et al., 2010). The high prevalence of fatigue in paramedic workers is of significant concern and requires further investigation given the fatigue-related risk of clinical errors and accidents noted in doctors (Sokol, 2013) and the aviation industry (Roach et al., 2012), respectively.

Multiple studies of Australian paramedic workers have shown significant correlations between fatigue and increased anxiety and depression symptomatology (Courtney et al., 2010; Courtney et al., 2013). The present study confirms these findings and expands on that knowledge base with findings of a significant correlation between fatigue and increased PTSD symptomatology, and a significantly higher level of fatigue in paramedics with burnout.

Findings of increased fatigue in paramedics with a mental disorder is not surprising given that exhaustion is one of the three criteria for burnout (Maslach et al., 2001) and is a symptom

of anxiety (American Psychiatric Association, 2013a) and depression (American Psychiatric Association, 2013b; Widiger and Edmundson, 2011).

As with previous investigations (Courtney et al., 2010; Courtney et al., 2013), the present study revealed a significant positive correlation between fatigue and mental disorders. This leaves the factors that drive fatigue in paramedic workers largely unexplored, but may include elective/non-elective overtime, self-selection of shift work, delayed or skipped meal/rest breaks, and insufficient resources (Courtney et al., 2010; Sofianopoulos et al., 2011). While these may be related to the occupation, there may also be factors external to the occupation that increase fatigue. These may include personal or family/friend related activities such as participating in domestic chores or social activities that interferes with resting and recuperating.

Based on the results from this study, it is recommended that research into interventions aimed at reducing fatigue is warranted, ensuring to pay close attention to the established relationships between shift work, fatigue, sleep, and mental health (Lock et al., 2018).

8.3 Sleep Quality

Several Australian studies have documented poor sleep quality, as measured by the PSQI, in 70% of paramedics (Courtney et al., 2010; Courtney et al., 2013; Sofianopoulos et al., 2011). Consistent with these studies, the present study found that 79% of paramedics sampled had poor sleep quality. Taken together, these studies suggest that the majority of Australian paramedics are poor sleepers. It is therefore expected that the sleep-related health consequences will be higher in paramedic workers than the general population, however, this supposition remains to be tested.

In the context of mental health, several studies have reported associations between poorer sleep quality and increased mental disorder symptomatology in paramedic workers. Consistent

with these studies, the present study found that poorer sleep quality was associated with increased anxiety (Courtney et al., 2010; Courtney et al., 2013), depression (Courtney et al., 2010; Courtney et al., 2013; Wild et al., 2016), and PTSD (Wild et al., 2016). The present study did not find any difference in sleep quality between paramedics with or without burnout, suggesting that burnout is independent of sleep quality.

Paramedics rotate from day shifts to night shifts within their working week designed to facilitate around-the-clock service to the public. Rotating shifts are known to interfere with sleep quality through sleep loss and disruption to the circadian rhythm (Vetter et al., 2015). Changes to shift structure to improve alignment or adjustment between circadian rhythm and sleep/wake times may be challenging to 24-hour service providers and therefore much less feasible than other strategies. Other methods of reducing the impact of shift work on sleep quality include education about good sleep behaviours (i.e. sleeping in a cool, dark and quiet environment, and caffeine and alcohol restriction before bedtime), good health practices (i.e. diet and exercise), and treatment of comorbid mental disorders and other health conditions (Wright et al., 2013). While it is noted in this study and other investigations involving sleep in paramedics that paramedics have poor sleep quality, there remains a paucity of literature on their sleep behaviours and the educational resources provided toward achieving good, productive sleep. Sleep interventions may be worthy of investigation as a strategy to improve mental health in paramedics.

8.4 Chronic Pain

To the best of the author's knowledge, this is the first study to investigate the relationship between chronic pain and mental health in Australian paramedics. More than half of the paramedics (68.3%) reported chronic pain over the past month. The prevalence reported in this study is much higher than the 18% reported in Australian community samples (Currow et al.,

2010), and is comparable to the prevalence reported in EMTs in Iran (Rahimi et al., 2015). Furthermore, the present study has shown that the presence of pain is associated with more pronounced anxiety and depression, and therefore contributes to the overall wellbeing of paramedics in Australia.

Given the cross-sectional nature of the investigation, and the lack of a question relating to the onset of pain and its' relationship with injury at work, the present study could not distinguish between pre-existing or injury-related anxiety and depression. The presence of depression associated with musculoskeletal injury is generally transient in nature (Carnide et al., 2016), however, longitudinal research is required to confirm the nature of the relationship between chronic pain and anxiety and depression in paramedics.

In their analysis of reports made to Safe Works Australia, Maguire et al. (2014) found the risk of serious injury to paramedic workers was seven times higher than the national average across all occupations. Similarly, Roberts et al. (2015) found that paramedics reported more worker's compensation claims than other healthcare workers. Both studies found that musculoskeletal injuries were the most significant contributor to these claims, and attribute the majority of these injuries to the physical demands of the job (e.g. heavy lifting of patient and equipment). In light of these studies, finding a high prevalence of chronic pain is unsurprising, but significant, when it is considered that the present study population consist of working paramedics.

On the experience of chronic pain, the present study did not investigate whether the paramedics were under management of a return-to-work program or rehabilitation intervention aimed at improving social and occupational functioning related to their source of chronic pain. One area of research that would benefit the health and wellbeing of paramedics would be

investigations pertaining to the provision, use, and experience of such programs and their success.

8.5 Physical Activity

Previous studies have reported a negative correlation between physical activity and anxiety and depression symptomatology in Australian paramedics (Courtney et al., 2010; Courtney et al., 2013). The present study could not confirm these associations in this paramedic cohort. However, a significant negative correlation was observed between PTSD and exercise. Indeed, the present study found that paramedics with probable PTSD invested one-third the time on exercise than paramedics without PTSD. Wild et al. (2016) reported significant weight gain in paramedics with PTSD compared to paramedics without PTSD; a lack of exercise specifically related to PTSD may provide a mechanism through which weight is gained. More research is required to understand the factors that influence exercise behaviours in paramedic workers with PTSD.

In addition to finding no association between physical activity and anxiety and depression, the present study found no association between physical activity and burnout. This contradicts findings by Wolf and Rosenstock (2017) who reported a higher risk of low professional efficacy (personal accomplishment) and high emotional exhaustion in medical students reporting low levels of physical activity (Wolf and Rosenstock, 2017). An explanation for inconsistencies between study findings may be due to methodological differences.

Total METs reported in this study were nearly twice as high as that reported in Courtney et al.'s (2013) and Courtney et al.'s (2010) study of Victorian paramedics. The reason for this is potentially because the instrument used in this study was provided to participants in a diary format with a list of physical activities rather than reliance on participant recall. It is likely that the diary reduced the amount of recall bias by prompting participants into selecting the

activities they partake on a weekly basis. Nevertheless, although the instrument used in the present study was much more comprehensive than previous studies in paramedic workers, there is still a possibility of recall bias and inconsistencies in reporting the correct intensity of physical activity. A more direct and objective method of measuring physical activity, such as use of accelerometry, should be used in future research to overcome these methodological challenges (Tudor-Locke and Myers, 2001).

8.6 Perceived Social Support

The present study found that increased anxiety, depression, and PTSD symptomatology was associated with decreased perceptions of social support from their significant other and from friends. The role of social support in the development of mental disorders can be explained by the buffer hypothesis, in which social relationships provide the resources to cope with or alleviate life's stressors (Cohen and Willis, 1985; Cutrona and Russell, 1990). Consistent with this hypothesis, paramedics in Canada report they are most likely to speak to family or friends when dealing with work-related issues (Donnelly et al., 2016). Thus, it seems fitting that paramedics would not be able to buffer work-related stress when their perceptions of support are low.

Because the social support measured in this study is based on the participant's perceptions, it is possible that there is a misalignment between the level of support provided to paramedics and their perception of that level of support. It may be the case that training should be invested toward developing effective communication skills in order to clearly express support required from partners and friends. Nevertheless, more research is required to examine the nature of social support and its' role in the mental health of paramedic workers.

8.7 Quality of Life in Paramedics

To date, only one study has investigated the quality of life of paramedic workers; the authors reported a significantly lower quality of life in paramedics with depression and PTSD (Wild et al., 2016). Consistent with the findings reported by Wild et al., the current study found a lower quality of life in paramedics with higher levels of depression and PTSD symptomatology. Furthermore, the present study expands upon existing knowledge by demonstrating that quality of life is significantly lower in paramedics reporting higher levels of anxiety, and in paramedics with burnout.

Quality of life is a measure of one's satisfaction with the aspects of life that are important to them (Ferrans and Powers, 1985). The present study has shown that anxiety, depression, burnout and PTSD symptomatology are associated with decreased health and functioning, psychological and spiritual and social and economic components of life; mental disorders have broader impact than the signs and symptoms that characterise the disorder and should therefore be measured and treated as such (Rapaport et al., 2005).

8.8 Future research

Most of the literature concerning the mental wellbeing of paramedic workers is confined to cross-sectional research. In light of the findings from the present study, anxiety, depression, burnout, and PTSD symptomatology should be monitored longitudinally against the occupational stress, fatigue, sleep quality, chronic pain, physical activity, perceived social support, and quality of life associated with the job. This will provide insight into the temporal relationships between these risk factors and the onset of anxiety, depression, burnout, and PTSD.

The present study found that there were participants that were being treated with psychotropic medication, who did not display significant psychological symptoms. It is

possible that the participants were on the psychotropic medication for a period of time prior to participation in this study and their symptoms were well controlled with medication and/or psychological therapies, however, this information is not available in this study. Concurrent to developing an understanding of the course and trajectory of mental disorders in paramedic workers, more research is required to understand the efficacy and response to the therapy of mental disorders in paramedic workers.

8.9 Limitations

Although this study took a broad perspective and examined the widest range of mental health predictors in paramedics to date, compared with other studies investigating mental health in paramedic workers, the present study is limited in sample size. Despite a lengthy recruitment period and a targeted recruitment strategy, there were very few paramedics that were willing to participate in this study. Several reasons for this may include survey saturation and fear of organisational retribution.

The cross-sectional nature of this study is another limitation. Throughout this thesis correlations have been identified; however, causality cannot be established from this data. For this reason, more research should be encouraged to determine the longitudinal and directional nature of the associations found in this study and their relationship with the mental health of paramedics.

Another limitation to the present study is the use of DSM-IV criteria for PTSD rather than the current DSM-5 criteria. Previous studies have shown that DSM-5 prevalence was about 1% lower than indicated by DSM-IV (Kilpatrick et al., 2013). Furthermore, participants in the study that met DSM-IV criteria, but not DSM-5, were mostly attributed to changes to Criterion A in the DSM. Given that Criterion A retains direct personal exposure and witnessing

of trauma to others (Pai et al., 2017), it is unlikely that the prevalence of PTSD in this study of paramedics would be affected by the DSM-5 revision.

8.10 Conclusion

In order to address the paucity of literature on the mental health of Australian paramedics, this study investigated the factors associated with anxiety, depression, burnout, and PTSD. With a limited sample size, it was successfully identified that anxiety, depression and PTSD were correlated with higher occupational stress, higher levels of fatigue, poorer sleep quality, lower perceptions of social support, and a lower quality of life. It was found that paramedics with burnout had significantly higher occupational stress, higher levels of fatigue, and a lower quality of life compared with paramedics without burnout. The present study identified that the majority of paramedics with a mental disorder had two or more co-occurring mental disorders, and that comorbidity therefore should be reported and investigated in research concerning the mental health of paramedics. In addition, the current study found that chronic pain was associated with an increase in levels of anxiety and depression. The results suggest that future research should be targeting interventions aimed at improving organisational and operational stress, fatigue, sleep quality, chronic pain and social support to improve anxiety, depression, burnout, and PTSD in Australian paramedics.

References

Adams, B.D., S.A. Davis, A.L. Brown, E.A. Filardo, and M.H. Thomson. 2013. Post traumatic stress disorder (PTSD) in emergency responders scoping study: Literature review. In.

Ainsworth, B.E., W.L. Haskell, S.D. Herrmann, N. Meckes, D.R. Bassett Jr, C. Tudor-Locke, J.L. Greer, J. Vezina, M.C. Whitt-Glover, and A.S. Leon. 2011. 2011 Compendium of physical activities: A second update of codes and MET values. *Medicine and Science in Sports and Exercise* 43:1575-1581.

Alexander, D.A., and S. Klein. 2001. Ambulance personnel and critical incidents - impact of accident and emergency work on mental health and emotional well-being. *British Journal of Psychiatry* 178:76-81.

Allen, T.D., D.E.L. Herst, C.S. Bruck, and M. Sutton. 2000. Consequences associated with work-to-family conflict: A review and agenda for future research. *Journal of Occupational Health Psychology* 5:278-308.

American Psychiatric Association. 1994. Diagnostic and Statistical Manual of Mental Disorders. Author, Washington, DC.

American Psychiatric Association. 2013a. Anxiety Disorders. In Diagnostic and Statistical Manual of Mental Disorders. American Psychiatric Publishing, Arlington, VA.

American Psychiatric Association. 2013b. Depressive Disorders. In Diagnostic and Statistical Manual of Mental Disorders. American Psychiatric Publishing, Arlington, VA.

American Psychiatric Association. 2013c. Trauma- and Stressor-Related Disorders. In Diagnostic and Statistical Manual of Mental Disorders. American Psychiatric Publishing, Arlington, VA.

American Psychiatric Association. 2013d. Use of the Manual. In Diagnostic and Statistical Manual of Mental Disorders. American Psychiatric Publishing, Arlington, VA.

Australian Bureau of Statistics. 2015. National Health Survey: First results, 2014/15. In.

Bair, M.J., M.S. Matthias, K.A. Nyland, M.A. Huffman, D.L. Stubbs, K. Kroenke, and T.M. Damush. 2009. Barriers and facilitators to chronic pain self-management: A qualitative study of primary care patients with comorbid musculoskeletal pain and depression. *Pain Medicine* 10:1280-1290.

Bardhoshi, G., K. Duncan, and B.T. Erford. 2016. Psychometric Meta-analysis of the English version of the Beck Anxiety Inventory. *Journal of Counseling & Development* 94:356-373.

Batterham, P.J., N. Glozier, and H. Christensen. 2012. Sleep disturbance, personality and the onset of depression and anxiety: Prospective cohort study. *Australian and New Zealand Journal of Psychiatry* 46:1089-1098.

Beck, A.T., N. Epstein, G. Brown, and R.A. Steer. 1988. An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology* 56:893-897.

Beck, A.T., and R.A. Steer. 1993. Beck Anxiety Inventory manual. In TX: Psychological Corporation, San Antonio.

Beck, A.T., R.A. Steer, and G.K. Brown. 1996. Manual for the Beck Depression Inventory-II. In TX: Psychological Corporation, San Antonio.

Bennett, P., Y. Williams, N. Page, K. Hood, and M. Woollard. 2004. Levels of mental health problems among UK emergency ambulance workers. *Emergency Medicine Journal* 21:235-236.

Bernstein, D.A., J.A. Pooley, L. Cohen, B. Gouldthorp, S. Provost, J. Cranney, L.A. Penner, A. Clarke-Stewart, and E.J. Roy. 2013. Psychology: an international discipline in context. Cengage Learning Australia Pty Limited, South Melbourne, Victoria.

Bianchi, R., I.S. Schonfeld, and E. Laurent. 2015. Burnout-depression overlap: A review. *Clinical Psychology Review* 36:28-41.

Brown, G. 2008. The Orebro Musculoskeletal Pain Questionnaire. *Occupational Medicine* 58:447-448.

Burton, L., D. Westen, and R. Kowalski. 2012. Psychology. John Wiley & Sons Australia, Milton, Queensland.

Buysse, D.J., C.F.I. Reynolds, T.H. Monk, S.R. Berman, and D.J. Kupfer. 1988. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. *Psychiatry Research* 28:193-213.

Carleton, R.N., T.O. Afifi, T. Taillieu, S. Turner, R. El-Gabalawy, J. Sareen, and G.J.G. Asmundson. 2018. Anxiety-related psychopathology and chronic pain comorbidity among public safety personnel. *Journal of Anxiety Disorders* 55:48-55.

Carnide, N., R.-L. Franche, S. Hogg-Johnson, P. Cote, F.C. Breslin, C.N. Severin, U. Bultmann, and N. Krause. 2016. Course of depressive symptoms following a workplace injury: A 12-month follow-up update. *Journal of Occupational Rehabilitation* 16:204-215.

Chalder, T., G. Berelowitz, T. Pawlikowska, L. Watts, S. Wessely, D. Wright, and E.P. Wallace. 1993. Development of a fatigue scale. *Journal of Psychosomatic Research* 37:147-153.

Clohessy, S., and A. Ehlers. 1999. PTSD symptoms, response to intrusive memories and coping in ambulance service workers. *British Journal of Clinical Psychology* 38:251-265.

Cohen, S., and T.A. Willis. 1985. Stress, social support, and the buffering hypothesis. *Psychological Bulletin* 98:310-357.

Costa, E.C., S. Vale, M. Sobral, and M. Graca Pereira. 2015. Illness perceptions are the main predictors of depression and anxiety symptoms in patients with chronic pain. *Psychology, Health & Medicine* 11:1-13.

Courtney, J.A., A.J.P. Francis, and S.J. Paxton. 2010. Caring for the carers: Fatigue, sleep, and mental health in Australian paramedic shiftworkers. *The Australian and New Zealand Journal of Organisational Psychology* 3:32-41.

Courtney, J.A., A.J.P. Francis, and S.J. Paxton. 2013. Caring for the country: Fatigue, sleep and mental health in Australian rural paramedic shiftworkers. *Journal of Community Health* 38:178-186.

Currow, D.C., M. Agar, J.L. Plummer, F.M. Blyth, and A.P. Abernethy. 2010. Chronic pain in South Australia - population levels that interfere extremely with activities of daily living. *Australian and New Zealand Journal of Public Health* 34:232-239.

Cutrona, C.E., and D.W. Russell. 1990. Type of social support and specific stress: Toward a theory of optimal matching. In Social support: An interactional view. B.R. Sarason, I.G. Sarason, and G.R. Pierce, editors. John Wiley & Sons, Oxford, England.

Davidson, S.K., C.F. Dowrick, and J.M. Gunn. 2016. Impact of functional and structural social relationships on two year depression outcomes: A multivariate analysis. *Journal of Affective Disorders* 193:

Dickstein, B.D., F.W. Weathers, A.C. Angkaw, C.M. Nievergelt, K. Yurgil, W.P. Nash, D.G. Baker, B.T. Litz, and Marine Resiliency Study Team. 2015. Diagnostic utility of the posttraumatic stress disorder (PTSD) checklist for identifying full and partial PTSD in active-duty military. *Assessment* 22:289-297.

Donnelly, E. 2012. Work-related stress and posttraumatic stress in emergency medical services. *Prehospital Emergency Care* 16:76-85.

Donnelly, E.A., and M. Bennett. 2014. Development of a critical incident stress inventory for the emergency medical services. *Traumatology: am international journal* 20:1-8.

Donnelly, E.A., P. Bradford, M. Davis, C. Hedges, and M. Klingel. 2016. Predictors of posttraumatic stress and preferred sources of social support among Canadian paramedics. *Canadian Journal of Emergency Medicine* 18:205-212.

Donnelly, E.A., J. Chonody, and D. Campbell. 2014. Measuring chronic stress in the emergency medical services. *Journal of Workplace Behavioral Health* 29:333-353.

Ferrada-Noli, M., M. Asberg, K. Ormstad, T. Lundin, and E. Sundbom. 1998. Suicidal behavior after severe trauma. Part 1: PTSD diagnoses, psychiatric comorbidity, and assessments of suicidal behavior. *Journal of Traumatic Stress* 11:103-112.

Ferrans, C., and M. Powers. 1985. Quality of life index: Development and psychometric properties. *Advances in Nursing Science* 8:15-24.

Fjeldheim, C.B., J. Nothling, K. Pretorius, M. Basson, K. Ganasen, R. Heneke, K.J. Cloete, and S. Seedat. 2014. Trauma exposure, posttraumatic stress disorder and the effect of explanatory variables in paramedic trainees. *BMC Emergency Medicine* 14:

Fydrich, T., D. Dowdall, and D.L. Chambless. 1992. Reliability and validity of the Beck Anxiety Inventory. *Journal of Anxiety Disorders* 6:55-61.

Garber, C.E., B. Blissmer, M.R. Deschenes, B.A. Franklin, M.J. Lamonte, I.M. Lee, D.C. Nieman, D.P. Swain, and American College of Sports Medicine. 2011. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Medicine and Science in Sports and Exercise* 43:1334-1359.

Garcia-Sierra, R., J. Fernandez-Castro, and F. Martinez-Zaragoza. 2016. Relationship between job demand and burnout in nurses: does it depend on work engagement? *Journal of Nursing Management* 24:780-788.

Global Adult Tobacco Survey Collaborative Group. 2011. Tobacco questions for surveys: A subset of key questions from the Global Adult Tobacco Survey (GATS) 2nd edition. In.

Government of Western Australia. 2016. Chief psychiatrist's review: St John Ambulance paramedic and volunteer suspected suicides. In.

Hakanen, J.J., and W.B. Schaufeli. 2012. Do burnout and work engagement predict depressive symptoms and life satisfaction? A three-wave seven-year prospective study. *Journal of Affective Disorders* 141:415-424.

Harvey, S., G. Devilly, D. Forbes, N. Glozier, A. McFarlane, J. Phillips, M. Sim, Z. Steel, and R. Bryant. 2015. Expert guidelines: Diagnosis and treatment of post-traumatic stress disorder in emergency service workers. In NSW, Australia: The Royal Australian and New Zealand College of Psychiatrists.

Keyes, C.L.M. 2005. Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology* 73:539-548.

Kilpatrick, D.G., H.S. Resnick, M.E. Milanak, M.W. Miller, K.M. Keyes, and M.J. Friedman. 2013. National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-5 criteria. *Journal of Traumatic Stress* 26:537-547.

Kristensen, T.S., M. Borritz, E. Villadsen, and K.B. Christensen. 2005. The Copenhagen Burnout Inventory: a new tool for the assessment of burnout. *Work & Stress* 19:192-207.

Kroenke, K., S. Outcalt, E. Krebs, M.J. Bair, J. Wu, N. Chumbler, and Z. Yu. 2013. Association between anxiety, health-related quality of life and functional impairment in primary care patients with chronic pain. *General Hospital Psychiatry* 35:359-365.

Lawrence, D., M. Kyron, W. Rikkers, J. Bartlett, K. Hafekost, B. Goodsell, and R. Cunneen. 2018. Answering the call: National Survey of the Mental Health and Wellbeing of Police and Emergency Services. In The University of Western Australia, Perth.

Leyfer, O., and T.A. Brown. 2011. The anxiety-depression spectrum. In The Oxford handbook of clinical psychology. D.H. Barlow, editor Oxford University Press, New York, United States of America.

Linton, S.J., and K. Boersma. 2003. Early identification of patients at risk of developing persistent back problem: The predictive validity of the Orebro Musculoskeletal Pain Questionnaire. *Clinical Journal of Pain* 19:80-86.

Lock, A.M., D.L. Bonetti, and A.D.K. Campbell. 2018. The psychological and physiological health effects of fatigue. *Occupational Medicine* 68:502-511.

Maguire, B.J., P.F. O'Meara, R.F. Brightwell, B.J. O'Neill, and G.J. Fitzgerald. 2014. Occupational injury risk among Australian paramedics: An analysis of national data. *Medical Journal of Australia* 200:477-480.

Maslach, C., S.E. Jackson, and M.P. Leiter. 1996. Maslach Burnout Inventory manual. In Consulting Psychologists Press, Palo Alto, CA.

Maslach, C., W.B. Schaufeli, and M.P. Leiter. 2001. Job burnout. *Annual Review of Psychology* 52:397-422.

McEvoy, P.M., R. Grove, and T. Slade. 2011. Epidemiology of anxiety disorders in the Australian general population: findings of the 2007 Australian National Survey of Mental Health and Wellbeing. *Australian and New Zealand Journal of Psychiatry* 45:957-967.

Moergeli, H., L. Wittmann, and U. Schnyder. 2012. Quality of life after traumatic injury: A latent trajectory modeling approach. *Psychotherapy and Psychosomatics* 81:305-311.

National Coronial Information System. 2015. Intentional self-harm fact sheet: Emergency services personnel. In.

National Institute on Alcohol Abuse and Alcoholism. n.d. Recommended Alcohol Questions. In.

Norris, F.H., and J.L. Hamblen. 2004. Standardized self-report measures of civilian trauma and PTSD. In Assessing psychological trauma and PTSD. J.P. Wilson, T.M. Keane, and T. Martin, editors. Guildford Press, New York. 63-102.

Pai, A., A.M. Suris, and C.S. North. 2017. Posttraumatic stress disorder in the DSM-5: Controversy, and conceptual considerations. *Behavioral Sciences* 7:

Panagioti, M., P. Gooding, and N. Tarrier. 2009. Post-traumatic stress disorder and suicidal behavior: A narrative review. *Clinical Psychology Review* 29:471-482.

Paramedics Australasia. 2012. Paramedics in the 2011 census. In Ballarat, Victoria.

Patterson, P.D., B.P. Suffoletto, D.F. Kupas, M.D. Weaver, and D. Hostler. 2010. Sleep quality and fatigue among prehospital providers. *Prehospital Emergency Care* 14:187-193.

Poghosyan, L., L.H. Aiken, and D.M. Sloane. 2009. Factor structure of the Maslach Burnout Inventory: An analysis of data from large scale cross-sectional surveys of nurses from eight countries. *International Journal of Nursing Studies* 46:894-902.

Rahimi, A., H. Vazini, F. Alhani, and M. Anoosheh. 2015. Relationship between low back pain with quality of life, depression, anxiety and stress among emergency medical technicians. *Trauma Monthly* 20:

Rapaport, M.H., C. Clary, R. Fayyad, and J. Endicott. 2005. Quality-of-life impairment in depressive and anxiety disorders. *American Journal of Psychiatry* 162:1171-1178.

Regehr, C., G. Goldberg, and J. Hughes. 2002. Exposure to human tragedy, empathy, and tauma in ambulance paramedics. *American Journal of Orthopsychiatry* 72:505-513.

Rego, S.A., K.L. Muller, and W.C. Sanderson. 2009. Psychopathological mechanisms across anxiety disorders. In Behavioral mechanisms and psychopathology: Advancing the

explanation of its nature, cause, and treatment. K. Salzinger, and M.R. Serper, editors. American Psychological Association, Washington DC, US. 141-173.
Richmond, T.S., W. Guo, T. Ackerson, J. Hollander, V. Gracias, K. Robinson, and J. Amsterdam. 2014. The effect of postinjury depression on quality of life following minor injury. *Journal of Nursing Scholarship* 46:116-124.
Roach, G.D., R.M.A. Petrilli, D. Dawson, and N. Lamond. 2012. Impact of layover length on sleep, subjective fatigue levels, and sustained attention of long-haul airline pilots. *Chronobiology International* 29:580-586.
Roberts, M.H., M.R. Sim, O. Black, and P. Smith. 2015. Occupational injury risk among ambulance officers and paramedics compared with other healthcare workers in Victoria, Australia: Analysis of workers' compensation claims from 2003 to 2012. *Occupational and Environmental Medicine* 72:489-495.
Sanderson, K., and G. Andrews. 2006. Common mental disorders in the workforce: recent findings from descriptive and social epidemiology. *The Canadian Journal of Psychiatry* 51:63-75.
Shanafelt, T.D., O. Hasan, L.N. Dyrbye, C. Sinsky, D. Satele, J. Sloan, and C.P. West. 2015. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clinic Proceedings* 90:1600-1613.
Skapinakis, P., G. Lewis, and V. Mavreas. 2004. Temporal relations between unexplained fatigue and depression: Longitudinal data from an international study in primary care. *Psychosomatic Medicine* 66:330-335.
Skeffington, P.M., C.S. Rees, and T. Mazzucchelli. 2016. Trauma exposure and post-traumatic stress disorder within fire and emergency services in Western Australa. *Australian Journal of Psychology* 69:
Sofianopoulos, S., B. Williams, F. Archer, and B. Thompson. 2011. The exploration of physical fatigue, sleep and depression in paramedics: a pilot study. *Journal of Emergency Primary Health Care* 9:
Sokol, D.K. 2013. Waking up to the effects of fatigue in doctors. *BMJ* 347:
Stassen, W., B.V. Nugteren, and C. Stein. 2013. Burnout among advanced life support paramedics in Johannesburg, South Africa. *Emergency Medicine Journal* 30:
Stein, C., and T. Sibanda. 2016. Burnout among paramedic students at a university in Johannesburg, South Africa. *African Journal of Health Professions Education* 8:193-195.
Stein, M.B., and J. Sareen. 2015. Generalized Anxiety Disorder. *The New England Journal of Medicine* 373:2059-2068.
Strohle, A. 2009. Physical activity, exercise, depression and anxiety disorders. *Journal of Neural Transmission* 116:777-784.
Studnek, J.R., J.M. Crawford, J.R. Wilkins III, and M.L. Pennell. 2010. Back problems among emergency medical services professionals: the LEADS health and wellness follow-up study. *American Journal of Industrial Medicine* 53:12-11.
Tei, S., C. Becker, R. Kawada, J. Fujino, K.F. Jankowski, G. Sugihara, T. Murai, and H. Takahashi. 2014. Can we predict burnout severity from empathy-related brain activity? *Translational Psychiatry* 4:e393.
Teo, A.R., H. Choi, and M. Valenstein. 2013. Social relationships and depression: ten-year follow-up from a nationally representative study. *PloS One* 8:e62396.
Thyer, L., P. Simpson, and B.V. Nugteren. 2018. Burnout in Australian paramedics. *International Paramedic Practice* 8:
Tiller, J.W.G. 2013. Depression and anxiety. *Medical Journal of Australia* 199:28-31.

Treede, I.R.-D., B.W. Rief, B.A. Barke, A.Q. Aziz, H.M. Bennett, W.S.R. Benoliel, W.S.M. Cohen, W.S.S. Evers, W.S.N. Finnerup, W.S.M. First, W.S.M. Giamberardino, W.S.S. Kaasa, W.S.B. Korwisi, W.S.E. Kosek, W.S.P. Lavand'homme, W.S.M. Nicholas, W.S.S. Perrot, W.S.J. Scholz, W.S.S. Schug, W.S.B. Smith, W.S.P. Svensson, W.S.J. Vlaeyen, and W.S.S.-J. Wang. 2019. Chronic pain as a symptom or a disease: the IASP Classification of Chronic Pain for the International Classification of Diseases (ICD-11). *PAIN* 160:19-27.

Troister, T., M.T. D'Agata, and R.R. Holden. 2015. Suicide risk screening: Comparing the Beck Depression Inventory-II, Beck Hopelessness Scale, and Psychache Scale in undergraduates. *Psychological Assessment* 27:1500-1506.

Tudor-Locke, C.E., and A.M. Myers. 2001. Challenges and opportunities for measuring physical activity in sedentary adults. *Sports Medicine* 31:91-100.

van Dam, A. 2016. Subgroup analysis in burnout: Relations between fatigue, anxiety, and depression. *Frontiers in Psychology* 7:

van Dam, A., G. Keijsers, M. Verbraak, P. Eling, and E. Becker. 2015. Level and appraisal of fatigue are not specific in burnout. *Clinical Psychology & Psychotherapy* 22:133-141.

van der Ploeg, E., and R.J. Kleber. 2003. Acute and chronic job stressors among ambulance personnel: predictors of health symptoms. *Occupational and Environmental Medicine* 60:i40-i46.

Vetter, C., D. Fischer, J.L. Matera, and T. Roenneberg. 2015. Aligning work and circadian time in shift workers improves sleep and reduces circadian disruption. *Current Biology* 25:907-911.

Wang, Y.-P., and C. Gorenstein. 2013. Psychometric properties of the Beck Depression Inventory-II: A comprehensive review. *Revista Brasileira de Psiquiatria* 35:416-431.

Weathers, F.W., B.T. Litz, D.S. Herman, J.A. Huska, and T.M. Keane. 1993. The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. In Paper presented at the 9th Annual Conference of the ISTSS, San Antonio.

West, A.L. 2015. Associations among attachment style, burnout, and compassion fatigue in health and human service workers: A systematic review. *Journal of Human Behavior in the Social Environment* 25:571-590.

Widiger, T.A., and M. Edmundson. 2011. Diagnosis, dimensions, and DSM-5. In The Oxford handbook of clinical psychology. D.H. Barlow, editor Oxford University Press, New York, United States of America.

Wild, J., K.V. Smith, E. Thompson, F. Bear, M.J. Lommen, and A. Ehlers. 2016. A prospective study of pre-trauma risk factors for post-traumatic stress disorder and depression. *Psychological Medicine* 46:2571-2582.

Wolf, M.R., and J.B. Rosenstock. 2017. Inadequate sleep and exercise associated with burnout and depression among medical students. *Academic Psychiatry* 41:174-179.

Wong, M.L., E.Y.Y. Lau, J.H.Y. Wan, S.F. Cheung, C.H. Hui, and D.S.Y. MOK. 2013. The interplay between sleep and mood in predicting academic functioning, physical health and psychological health: A longitudinal study. *Journal of Psychosomatic Research* 74:217-277.

World Health Organization. 2003. Investing in mental health. In.

World Health Organization. 2018. Global strategy on diet, physical activity and health. In.

World Health Organization. 2019. QD85 Burn-out. In ICD-11 for Mortality and Morbidity Statistics.

Wright, K.P., R.K. Bogan, and J.K. Wyatt. 2013. Shift work and the assessment and management of shift work disorder (SWD). *Sleep Medicine Reviews* 17:41-54.

Zimet, G.D., N.W. Dahlem, S.G. Zimet, and G.K. Farley. 1988. The multidimensional scale of perceived social support. *Journal of Personality Assessment* 52:30-41.

Zimet, G.D., S.S. Powell, G.K. Farley, S. Werkman, and K.A. Berkoff. 1990. Psychometric characteristics of the multidimensional scale of perceived social support. *Journal of Personality Assessment* 55:610-617.

Appendices

Appendix A – Participant information sheet

Appendix B – Support information sheet

Appendix C – Participant consent form

Appendix D – Demographics questionnaire

Appendix E – Emergency medical services chronic stress questionnaire

Appendix F – Maslach burnout inventory

Appendix G – Beck anxiety inventory

Appendix H – Beck depression inventory-II

Appendix I – PTSD checklist

Appendix J – Chalder fatigue scale

Appendix K – Pittsburgh sleep quality index

Appendix L – Orebro musculoskeletal pain questionnaire

Appendix M – Compendium of physical activity

Appendix N – Multidimensional scale of perceived social support

Appendix O – Quality of life index

Appendix P – Thank you!

Appendix A – Participant Information Sheet

Factors Associated With Anxiety, Depression and PTSD Symptomatology in Australian Paramedics

PARTICIPANT INFORMATION SHEET

Mr Tim Rankin, Prof Russell Jones, Dr Travis Cruickshank

This study is being conducted as part of a Masters by Research qualification. Mr Tim Rankin is the chief investigator and Master by Research candidate. Professor Russell Jones and Dr Travis Cruickshank are supervisors of the project.

Please take time to read the following information carefully and discuss it with your friends, family and clinician if you wish. Ask us any question if some part of the information is not clear to you or if you would like more information. Please do this before you sign this consent form.

Who is funding this study and where will it be conducted?
This study has been supported by Edith Cowan University. This project will be conducted at Edith Cowan University and at participant homes.

Contact persons:
Mr Tim Rankin, Ph: 08 6304 3453 Email: trankin@our.ecu.edu.au
Prof Russell Jones, Ph: 08 6304 2043 Email: russell.jones@ecu.edu.au
Dr Travis Cruickshank, Ph 08 6304 3416 Email: t.cruickshank@ecu.edu.au
All study participants will be provided with a copy of the Participant Information Sheet and a Participant Consent Form for their personal records. You may decide to provide or not provide your consent for the study.

What is the purpose of the study?
The purpose of this study is to identify the factors associated with poor mental health outcomes in Australian paramedics. The data collected from this study will be used to inform the development of procedural and interventional strategies aimed at mitigating mental health problems in Australian paramedics.

Why was I selected for this study?
You were selected for this study as you are a practicing Australian paramedic. This study is suitable for all paramedics working full time or part time for an Australian ambulance service.

Do I have to participate?
There is no obligation or requirement to participate in this study. Declining to participate in this research project **will not** influence your employment in any way.

What is the inclusion/exclusion criteria of the study?
To be eligible for participation in this study you must be practicing as a paramedic, on a full time or part time basis, for an ambulance service operating in Australia. If you meet the inclusion criteria of the

study, it is important that you do not have a neurological, cardiovascular, metabolic or other medical condition that may result in extraneous psychiatric findings.

How long will it take to complete the questionnaires?
It should take between 30-50 minutes to complete. This can be done across two days, in the comfort of your home if required.

What will happen if I decide to participate in this research study?
As a participant, you will be asked to complete a collection of self-report questionnaires designed to examine your mental health (anxiety, depression and post-traumatic stress disorder), well-being and lifestyle (stress, burnout, fatigue, sleep, chronic pain, physical activity, social networks, and quality of life).

What are the costs to me?
There are no monetary costs associated with participation.

What are the potential benefits associated with participating in this study?
The results of this study will provide new and vital information on the factors associated with mental health problems in Australian paramedics. Identification of such factors will help to enable the development of procedural and interventional strategies aimed at improving mental health outcomes and overall quality of life in both populations.

What are the potential disadvantages and or risks of taking part in this study?
The questions in this study require you to reflect on your own mental health and wellbeing. This may at times be emotionally confronting. It is important that if you have any concerns for your mental health, please do not hesitate to contact the researchers or follow the guidelines on the Support Information Sheet provided.

What information do I need to know about answering the questionnaires?
The information collected within this study has the potential to inform policy regarding paramedics. Therefore, we ask for you to provide as accurate information as possible to ensure any detected mental health issues are accurate and not mispresented.

Will my results be confidential?
All participants will be assigned a personalised deidentification code. These codes will be assigned by associate researchers involved in the study. The purpose of this deidentification process is to ensure that your personal information remains strictly confidential and that the primary investigator remains blind to cohort results and is therefore not subject to data bias.
Collected data will be securely stored in filing cabinets at Edith Cowan University. Electronic data will be password encrypted and only accessible to researchers with Edith Cowan University Human Research Ethics Committee approval.

What will happen to my data after the study?
All data will be stored on password encrypted databases on computers at Edith Cowan University for a maximum of five years. After five years the data will be permanently destroyed.

Will my data be used for future research after the study?
There is a possibility that researchers (not involved in this study) may be interested in analysing and reporting on the data collected from this study. You may decide whether or not you wish for your data to be re-used in future research, provided that ethics has been approved for the future project.

Do I have access to my results after the study has been completed?
You may request to have a copy of your results for your own personal records. This request must be addressed to researchers involved in this research study. The contact details of primary investigators for this project are detailed at the bottom of the information letter.

What if I would like extra information or independent advice about participation in the research study?
The contact details for the primary and associated investigators and Edith Cowan University are included at the end of this information sheet.

What if I decide to no longer participate in the study?
You may withdraw from the study at any time without prejudice and do not need to provide a reason. You are not obligated to complete the questionnaires once they have been sent to your postal address. A gentle reminder email will be sent six to eight weeks after the questionnaires have been sent to ensure that you have either received, require assistance or have returned the package containing the information letter and the questionnaires.

What will happen to the results upon conclusion of the study?
We will advise you of the general study outcomes by a report and public seminars. Results will also be written into manuscripts for peer review in medical, psychological and scientific journals and disseminated at research seminars and conferences.

Who has reviewed the study?
Approval to conduct this research has been provided by the Edith Cowan University (ECU) Human Research Ethics Committee. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time.
If you have any questions or require further information about the research, please contact:
Mr Tim Rankin, Ph: 08 6304 3453 Email: trankin@our.ecu.edu.au
Prof Russell Jones, Ph: 08 6304 2043 Email: russell.jones@ecu.edu.au
Dr Travis Cruickshank, Ph 08 6304 3416 Email: t.cruickshank@ecu.edu.au

In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting either the Human Research Ethics Office at ECU on (08) 6304 2170 or research.ethics@ecu.edu.au.

We greatly appreciate your contributions and service to the community.

Appendix B – Support Information Sheet

Support Information Sheet

If you are at all concerned for your mental health and well-being it is very important that you consult with your personal or familial GP whom you trust.

There are many agencies and groups that can offer you further support and information. The following list provides the details of just a few:

Beyond Blue
www.beyondblue.org.au/

Beyond Blue is the national initiative to raise awareness of anxiety and depression, providing resources for recovery, management and resilience.
Helpline: 1300 22 4636
Online chat and email support is also available

SANE Australia
www.sane.org/

SANE Australia is a national charity helping all Australians affected by mental illness lead a better life – through support, training, and education.
Helpline: 1800 18 SANE (7263)
Online chat is also available

Sirens of Silence Charity Inc.
www.sirensofsilence.org.au

This charity was founded in 2015 to raise awareness of Anxiety, Depression, PTSD and Suicide Prevention within the Ambulance Industry.

The Black Dog Institute
www.blackdoginstitute.org.au

The **Black Dog** Institute is a world leader in the diagnosis, treatment and prevention of mood disorders such as depression and bipolar disorder. The website contains lots of information, links and access to support groups.

Appendix C – Participant Consent Form

FACTORS ASSOCIATED WITH ANXIETY, DEPRESSION AND PTSD SYMPTOMATOLOGY IN AUSTRALIAN PARAMEDICS:

PARTICIPANT CONSENT FORM

1. I (the participant) have read the information contained in the Information Letter and any questions I have asked have been answered to my satisfaction. I understand that my participation is voluntary and that I may withdraw at any time without penalty. Y ☐ ☐ N
2. I understand that the information I provide will be kept in the strictest confidence by the researchers, unless obliged to release this information by law. Y ☐ ☐ N
3. I understand that I will be asked to complete self-report questionnaires regarding my mental health and wellbeing. Y ☐ ☐ N
4. I agree the research data collected for this study may be published provided my name and any other identifying information is not used. Y ☐ ☐ N
5. I agree that the data collected as part of this study can be used in future research projects provided that the appropriate ethics approval (Edith Cowan University Human Research Ethics Committee) is obtained and that all personal information is deidentified. Y ☐ ☐ N
6. I confirm that I do not suffer from any comorbid conditions that may influence the results of this study. Y ☐ ☐ N
7. In the event that concerning results regarding my mental wellbeing is found, I provide consent for study researchers to:
    a. Contact me personally? Y ☐ ☐ N
    b. Contact my general practitioner? Y ☐ ☐ N
    c. I do not wish for study researchers to contact anyone Y ☐ ☐ N
8. If you want study researchers to contact you personally, what is your contact number?

    _____
9. If you want study researchers to contact your general practitioner:
    a. What is the name of your doctor? _____
    b. What is the name of your doctor's surgery? _____

Name of Participant (please print) _____

Signed _____Date _____Phone _____

Approval to conduct this research has been provided by the Edith Cowan University Human Research Ethics Committee. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time.

Any questions concerning the project entitled entitled "Factors associated with anxiety, depression and PTSD Symptomatology in Australian Paramedics" can be directed to:

Mr Tim Rankin, Ph: 08 6304 3453 Email: trankin@our.ecu.edu.au

Prof Russell Jones, Ph: 08 6304 2043 Email: russell.jones@ecu.edu.au

Dr Travis Cruickshank, Ph 08 6304 3416 Email: t.cruickshank@ecu.edu.au

In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting either the Human Research Ethics Office at ECU on (08) 6304 2170 or research.ethics@ecu.edu.au.

Appendix D – Demographics Questionnaire

Demographics Questionnaire

Gender:

☐ M ☐ F

Age: _____

Marital status:

☐ Single, never married
☐ Married or domestic partnership
☐ Divorced
Previously married: Y ☐ N ☐
☐ Separated
☐ Widowed

State you are currently working in: _____

Your highest level of education achieved:

☐ Year 10
☐ High School Graduate
☐ Tafe/VET
☐ Undergraduate (Bachelor's)
☐ Postgraduate (Master's/Ph.D)
☐ Other: _____

Years worked in the current ambulance service: _____

Age started as a paramedic: _____

What are your working hours during the average week? Please indicate your standard roster in terms of days on, nights on, and then days off shift. For example, the rotating roster would be 2 days, 2 nights and four days off. Permanent nightshift may be 0 days, 4 nights, 4 days off (etc.):

_____
_____
_____

Are you a: ☐ Full time employee ☐ Part time employee

Hours expected to work per week/rostered swing: _____

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MEDICATION

Are you currently on any medication(s) that you may wish to disclose? ☐ NO

Please note this question does not relate to inclusion/exclusion criteria. The purpose of this question is to determine if the population at study is receiving treatment that may influence anxiety, depression or PTSD symptomatology (positive or negative).

If yes, please list (generic or brand names):

_____

_____

_____

ALCOHOL CONSUMPTION

Question 1: During the last 12 months, how often did you usually have any kind of drink containing alcohol? By a drink we mean half an ounce of absolute alcohol (350mL can of alcohol or glass of beer, a standard glass of wine, or a drink containing 1 shot or more shots of liquor). Choose only one.

☐ Once a week **Go question 2**
☐ Twice a week **Go question 2**
☐ 2 to 3 times a month **Go question 2**
☐ Once a month **Go question 2**
☐ 3 to 11 times in the past year **Go question 2**
☐ 1 or 2 times in the past year **Go question 2**
☐ I did not drink any alcohol in the past year, but I did drink in the past **(go to question 1A)**
☐ I never drank any alcohol in my life **(go to question 1B)**

Question 1A: During your lifetime, how many alcoholic drinks did you have on a typical day when you drank alcohol?

☐ Every day
☐ 5 to 6 days a week
☐ 3 to 4 days a week
☐ Two days a week
☐ One day a week
☐ 2 to 3 days a month
☐ One day a month
☐ 3 to 11 days in the year
☐ 1 to 2 days in the year

Question 1B: So you have never had a drink containing alcohol in your entire life

☐ Yes, I never drank **(Done with alcohol questions)** ☐ No, I did drink **(Go back to question 1)**

Question 2: During the last 12 months, how many alcoholic drinks did you have on a typical day when you drank alcohol?

- ☐ Every day
- ☐ 5 to 6 days a week
- ☐ 3 to 4 days a week
- ☐ Two days a week
- ☐ One day a week
- ☐ 2 to 3 days a month
- ☐ One day a month
- ☐ 3 to 11 days in the year
- ☐ 1 to 2 days in the year

Question 3: During the last 12 months, how often did you have 5 or more (males) or 4 or more (females) drinks containing any kind of alcohol within a two-hour period?

- ☐ Every day
- ☐ 5 to 6 days a week
- ☐ 3 to 4 days a week
- ☐ Two days a week
- ☐ One day a week
- ☐ 2 to 3 days a month
- ☐ One day a month
- ☐ 3 to 11 days in the year
- ☐ 1 to 2 days in the year

SMOKING

Question 1: Do you currently smoke tobacco on a daily basis, less than daily, or not at all?

- ☐ Daily
- ☐ Less than daily
- ☐ Not at all
- ☐ Don't know

Question 2: Have you smoked tobacco in the past?

- ☐ Daily
- ☐ Less than daily
- ☐ Not at all
- ☐ Don't know

CHILDREN

Do you have children? ☐ 0 ☐ 1 ☐ 2 ☐ 3 or more

Appendix E – Emergency Medical Services Chronic Stress Questionnaire

The Emergency Medical Services Chronic Stress Questionnaire

Instructions: Below is a list of items that describe different aspects of being an EMT or paramedic. Please indicate how much stress each of these has caused you over the past six months.

	No Stress at all			Moderate stress			A lot of stress
Organizational Stressors							
Feeling like different rules apply to different people (e.g. favoritism)	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Feeling like you always have to prove yourself to the organization	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Constant changes in policy/legislation	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Staff shortages	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Bureaucratic red tape	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Lack of training on new equipment	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Dealing with supervisors	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Lack of resources	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Unequal sharing of work responsibilities	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Leaders over-emphasize the negatives (e.g. supervisor evaluations, public complaints)	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Operational Stressors							
Shift work	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Risk of being injured on the job	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Managing your social life outside of work	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Friends/family feel the effects of the stigma associated with your job	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Eating healthy at work	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Fatigue	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Lack of understanding from your friends and family about your work	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Making friends outside of the job	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Negative comments from the public	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)
Feeling like you are always on the job	o(1)	o(2)	o(3)	o(4)	o(5)	o(6)	o(7)

Donnelly, E. A., Chonody, J., & Campbell, D. (2014). Measuring chronic stress in the emergency medical services. *Journal of Workplace Behavioral Health*, *29*(4), 333-353. doi: 10.1080/15555240.2014.965824

Appendix F – Maslach Burnout Inventory

NOTE: The Maslach Burnout Inventory was omitted from this thesis because it is copyrighted material.

MBI-Human Services Survey

Christina Maslach & Susan E. Jackson

The purpose of this survey is to discover how various persons In the human services, or helping professionals view their job and the people with whom they work closely.

Appendix G – Beck Anxiety Inventory

NOTE: The Beck Anxiety Inventory was omitted from this thesis because it is copyrighted material.

Appendix H – Beck Depression Inventory-II

NOTE: The Beck Depression Inventory-II was omitted from this thesis because it is copyrighted material.

Appendix I – PTSD CheckList

PTSD CheckList – Civilian Version (PCL-C)

Instructions: Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, put an "X" in the box to indicate how much you have been bothered by that problem *in the past month.*

No.	Response:	Not at all (1)	A little bit (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
1.	Repeated, disturbing *memories, thoughts,* or *images* of a stressful experience from the past?					
2.	Repeated, disturbing *dreams* of a stressful experience from the past?					
3.	Suddenly *acting* or *feeling* as if a stressful experience *were happening again* (as if you were reliving it)?					
4.	Feeling *very upset* when *something reminded* you of a stressful experience from the past?					
5.	Having *physical reactions* (e.g., heart pounding, trouble breathing, or sweating) when *something reminded* you of a stressful experience from the past?					
6.	Avoid *thinking about* or *talking about* a stressful experience from the past or avoid *having feelings* related to it?					
7.	Avoid *activities* or *situations* because *they remind you* of a stressful experience from the past?					
8.	Trouble *remembering important parts* of a stressful experience from the past?					
9.	Loss of interest in things that you used to enjoy?					
10.	Feeling *distant* or *cut off* from other people?					
11.	Feeling *emotionally numb* or being unable to have loving feelings for those close to you?					
12.	Feeling as if your *future* will somehow be *cut short*?					
13.	Trouble falling or staying asleep?					
14.	Feeling irritable or having angry outbursts?					
15.	Having difficulty concentrating?					
16.	Being *"super alert"* or watchful on guard?					
17.	Feeling *jumpy* or easily startled?					

Weathers, F.W., Huska, J.A., Keane, T.M. *PCL-C for DSM-IV.* Boston: National Center for PTSD – Behavioral Science Division, 1991.

Appendix J – Chalder Fatigue Scale

chalder fatigue scale

We would like to know more about any problems you have had with feeling tired, weak or lacking in energy in the last month. Please answer ALL the questions by ticking the answer which applies to you most closely. If you have been feeling tired for a long while, then compare yourself to how you felt when you were last well. Please tick only one box per line.

	less than usual	no more than usual	more than usual	much more than usual
do you have problems with tiredness?				
do you need to rest more?				
do you feel sleepy or drowsy?				
do you have problems starting things?				
do you lack energy?				
do you have less strength in your muscles?				
do you feel weak?				
do you have difficulties concentrating?				
do you make slips of the tongue when speaking?				
do you find it more difficult to find the right word?				
	better than usual	no worse than usual	worse than usual	much worse than usual
how is your memory?				

This scale can be scored "bimodally" with columns representing 0, 0, 1 & 1 and a range from 0 to 11 with a total of 4 or more qualifying for "caseness". Alternatively it can be scored in "Likert" style 0, 1, 2 & 3 with a range from 0 to 33. Mean "bimodal" score for CFS sufferers was 9.14 (SD 2.73) and for a community sample 3.27 (SD 3.21). Mean "Likert" score was 24.4 (SD 5.8) and 14.2 (SD 4.6).

total (0-33) =

Cella, M. and T. Chalder (2010). *"Measuring fatigue in clinical and community settings."* J Psychosom Res 69(1): 17-22. This study involved 361 CFS sufferers and 1615 individuals from the community. Average age was in the 30's. Fatigue levels were similar for males and females. A score of 29 discriminated between CFS sufferers and the community sample in 96% of cases and a score in the 30's discriminated in 100% of cases. The CFS sufferers also scored a mean of 26.99 on the Work & Social Adjustment Scale (W&SAS) with a SD of 8.6 (i.e. about 70% scoring between 18.4 and 35.6).

Appendix K – Pittsburgh Sleep Quality Index

PITTSBURGH SLEEP QUALITY INDEX (PSQI)

INSTRUCTIONS: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, when have you usually gone to bed at night?

   USUAL BED TIME _____

2. During the past month, how long (in minutes) has it usually take you to fall asleep each night?

   NUMBER OF MINUTES _____

3. During the past month, when have you usually gotten up in the morning?

   USUAL GETTING UP TIME _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed.)

   HOURS OF SLEEP PER NIGHT _____

INSTRUCTIONS: For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
(a) ...cannot get to sleep within 30 minutes	☐	☐	☐	☐
(b) ...wake up in the middle of the night or early morning	☐	☐	☐	☐
(c) ...have to get up to use the bathroom	☐	☐	☐	☐
(d ...cannot breathe comfortably	☐	☐	☐	☐
(e) ...cough or snore loudly	☐	☐	☐	☐
(f) ...feel too cold	☐	☐	☐	☐
(g) ...feel too hot	☐	☐	☐	☐
(h) ...had bad dreams	☐	☐	☐	☐
(i) ...have pain	☐	☐	☐	☐
(j) Other reason(s), please describe _____ _____				
How often during the past month have you had trouble sleeping because of this?	☐	☐	☐	☐

PSQI Page 1

	Very good	Fairly good	Fairly bad	very bad
6. During the past month, how would you rate your sleep quality overall?	☐	☐	☐	☐

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
7. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?	☐	☐	☐	☐
8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	☐	☐	☐	☐

	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	☐	☐	☐	☐

	No bed partner or roommate	Partner/ roommate in other room	Partner in same room, but not same bed	Partner in same bed
10. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	☐	☐	☐	☐

If you have a roommate or bed partner, ask him/her how often in the past month you have had...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
(a) ...loud snoring	☐	☐	☐	☐
(b) ...long pauses between breaths while asleep	☐	☐	☐	☐
(c) ...legs twitching or jerking while you sleep	☐	☐	☐	☐
(d) ...episodes of disorientation or confusion during sleep	☐	☐	☐	☐
(e) Other restlessness while you sleep; please describe	☐	☐	☐	☐

_____

_____

Appendix L – Orebro Musculoskeletal Pain Questionnaire

Örebro Musculoskeletal Pain Questionnaire (ÖMPQ) Linton and Boersma 2003[1]

Have you had any experience with pain or chronic pain within the last month?

___ Yes
___ No (Please skip to physical activity questionnaire)

These questions and statements apply if you have aches or pains, such as back, shoulder or neck pain. Please read and answer questions carefully. Do not take long to answer the questions, however it is important that you answer every question. There is **always** a response for your particular situation.

	2x (max 10)
5. Where do you have pain? Place a tick (✓) for all appropriate sites. ☐ Neck ☐ Shoulder ☐ Arm ☐ Upper Back ☐ Lower Back ☐ Leg ☐ Other (state)	
6. How many days of work have you missed because of pain during the past 18 months? Tick (✓) one. ☐ 0 days (1) ☐ 1-2 days (2) ☐ 3-7 days (3) ☐ 8-14 days (4) ☐ 15-30 days (5) ☐ 1 month (6) ☐ 2 months (7) ☐ 3-6 months (8) ☐ 6-12 months (9) ☐ over 1 year (10)	
7. How long have you had your current pain problem? Tick (✓) one. ☐ 0-1 week (1) ☐ 1-2 weeks (2) ☐ 3-4 weeks (3) ☐ 4-5 weeks (4) ☐ 6-8 weeks (5) ☐ 9-11 weeks (6) ☐ 3-6 months (7) ☐ 6-9 months (8) ☐ 9-12 months (9) ☐ over 1 year (10)	
8. Is your work heavy or monotonous? Circle the best alternative. 0 1 2 3 4 5 6 7 8 9 10 Not at all Extremely	
9. How would you rate the pain that you have had during the past week? Circle one. 0 1 2 3 4 5 6 7 8 9 10 No pain Pain as bad as it could be	

1 Linton SJ, Boersma K. Early identification of patients at risk of developing a persistent back problem: the predictive validity of the Orebro Musculoskeletal Pain Questionnaire. Clin J Pain 2003;19: 80-86.

1

10. In the past three months, on average, how bad was your pain on a 0-10 scale? Circle one. 0 1 2 3 4 5 6 7 8 9 10 No pain — Pain as bad as it could be	
11. How often would you say that you have experience pain episodes, on average, during the past three months? Circle one. 0 1 2 3 4 5 6 7 8 9 10 Never — Always	
12. Based on all things you do to cope, or deal with your pain, on an average day, how much are you able to decrease it? Circle the appropriate number. 0 1 2 3 4 5 6 7 8 9 10 Can't decrease it at all — Can decrease it completely	10 - x
13. How tense or anxious have you felt in the past week? Circle one. 0 1 2 3 4 5 6 7 8 9 10 Absolutely clam and relaxed — As tense and anxious as I've ever felt	
14. How much have you been bothered by feeling depressed in the past week? Circle one. 0 1 2 3 4 5 6 7 8 9 10 Not at all — Extremely	
15. In your view, how large is the risk that your current pain may become persistent? Circle one. 0 1 2 3 4 5 6 7 8 9 10 No risk — Very large risk	
16. In your estimation, what are the chances that you will be able to work in six months? Circle one. 0 1 2 3 4 5 6 7 8 9 10 No chance — Very large chance	10 - x
17. If you take into consideration your work routines, management, salary, promotion possibilities and work mates, how satisfied are you with your job? Circle one. 0 1 2 3 4 5 6 7 8 9 10 Not satisfied at all — Completely satisfied	10 - x

2

Here are some of the things that other people have told us about their pain. For each statement, circle one number from 0 to 10 to say how much physical activities, such as bending, lifting, walking or driving, would affect your pain.

18. Physical activity makes my pain worse.

0 1 2 3 4 5 6 7 8 9 10

Completely disagree — Completely agree

19. An increase in pain is an indication that I should stop what I'm doing until the pain decreases.

0 1 2 3 4 5 6 7 8 9 10

Completely disagree — Completely agree

20. I should not do my normal work with my present pain.

0 1 2 3 4 5 6 7 8 9 10

Completely disagree — Completely agree

Here is a list of five activities. Circle the one number that best describes your current ability to participate in each of these activities.

21. I can do light work for an hour. 10 - x

0 1 2 3 4 5 6 7 8 9 10

Can't do it because of pain problem — Can do it without pain being a problem

22. I can walk for an hour. 10 - x

0 1 2 3 4 5 6 7 8 9 10

Can't do it because of pain problem — Can do it without pain being a problem

23. I can do ordinary household chores. 10 - x

0 1 2 3 4 5 6 7 8 9 10

Can't do it because of pain problem — Can do it without pain being a problem

24. I can do the weekly shopping. 10 - x

0 1 2 3 4 5 6 7 8 9 10

Can't do it because of pain problem — Can do it without pain being a problem

25. I can sleep at night. 10 - x

0 1 2 3 4 5 6 7 8 9 10

Can't do it because of pain problem — Can do it without pain being a problem

Appendix M – Compendium of Physical Activity

Compendium Of Physical Activity

Instructions: This questionnaire will assess your level of physical activity. It is important that you only consider the activities that are outside of your working duties. For example, if you are a brick layer, do not include the walking you do on site during work time. However, please do include activities such as walking to/from work or during your lunch break. It is important that you only include activities within the last two months that you do regularly (habitually). If you have recently changed sports/activities (due to change in season), please only include the sport/activities you have done the most in the last two months. If there is an activity that is not included in this form, you may select an activity that you feel is similar. You may also write your own activity on the last page should there be no subtitute. You may either select activities based on day of week (middle) OR select average amount of sessions per week (right).

To be completed by participant ACTIVITY (1)	Do you perform this	Day of activity							Average time per session		OR	Average sessions per week	Average time per session	
		Mon	Tues	Weds	Thurs	Fri	Sat	Sun	Hrs.	Mins.			Hrs.	Mins.
Section A Walking	Yes													
Walking for pleasure														
Walking the dog														
Walking to work or class														
Section B Running														
Jogging														
Running														
Runnning on a treadmill														
Section C Cycling														
Bicycling to/from work														
Bicycling for pleasure/in general														
Bicycling - stationary														
Bicycling RPM/Spin class														
Section D Conditioning exercise														
Boot camp training														
Calisthenics (pushups, sit ups)														
Circuit training moderate														
Swimming laps														
Circuit training vigorous														
Weight (resistance) training/lifting														
Health club/gym exercise (general exercise + weight training)														
Pilates														
Yoga														
Section E Sports														
Basketball														
Bowling (indoor)														
Boxing														
Coaching (football, soccer, basketball etc.)														
Cricket (batting, bowling, fielding, training)														
Football (AFL)														
Golf														
Gymnastics														
Hockey														
Horse riding														
Motocross														
Rock or mountain climbing														
Rugby (union/league)														
Rollerblading														
Soccer														
Softball/baseball														
Squash														
Tennis														
Volleyball														
Netball														

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To be completed by participant ACTIVITY (1)	Do you perform this	Day of activity							Average time per session		OR	Average sessions per week	Average time per session	
		Mon	Tues	Weds	Thurs	Fri	Sat	Sun	Hrs.	Mins.			Hrs.	Mins.
Section F Dancing	Yes													
Ballet, modern, jazz, general														
Ballroom dancing														
Ethnic or cultural dancing														
General dancing (disco, folk, country)														
Zumba														
Section G Fishing and hunting														
Fishing														
Hunting														
Pistol shooting														
Section H Household activities														
Cleaning/sweeping carpet or floors/general tidy-up														
Cleaning (heavy or major) ie. house/garage														
Cleaning windows														
Cooking (cooking food, washing dishes, cleaning)														
Food shopping														
Non-food shopping														
Laundry (washing, hanging, folding clothes)														
Section I Home repair														
Auto repair														
Carpentry (general/workshop)														
General home repair														
Mowing lawn														
Planting, potting plants														
Gardening in general														
Watering lawn or garden														
Section K Leisure at home														
Drawing, writing, painting														
Playing drums														
Playing piano														
Playing guitar														
Playing other instrument														
Singing														
Playing videogames (playstation, PC etc.)														
Sitting and reading (newspaper, book, etc.)														
Sitting listening to music														
Sitting and studying														
Watching television														
Family activities (sitting, relaxing, talking, eating)														
Sitting at a sports event, spectating														
Section L Water activities														
Boating														
Canoeing, rowing														
Sailing (Boat or board)														
Water skiing or wakeboarding														
Jet skiing														
Scuba diving														

To be completed by participant ACTIVITY (1)	Do you perform this	Day of activity							Average time per session		OR	Average sessions per week	Average time per session	
		Mon	Tues	Weds	Thurs	Fri	Sat	Sun						
	Yes								Hrs.	Mins.			Hrs.	Mins.
Snorkeling														
Surfing or bodyboarding														
Swimming (general, leisure)														
Section M Volunteering														
Volunteering with sitting, general talking involved														
Volunteering , standing (with light work/duties)														
Volunteering with walking and standing involved														
Section N Religious														
Attending church service														

Section O Please add any activity that you do regularly for which no adequate substitute could be made

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Appendix N – Multidimensional Scale of Perceived Social Support

Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
Circle the "2" if you **Strongly Disagree**
Circle the "3" if you **Mildly Disagree**
Circle the "4" if you are **Neutral**
Circle the "5" if you **Mildly Agree**
Circle the "6" if you **Strongly Agree**
Circle the "7" if you **Very Strongly Agree**

1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7	SO
2.	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	SO
3.	My family really tries to help me.	1	2	3	4	5	6	7	Fam
4.	I get the emotional help and support I need from my family.	1	2	3	4	5	6	7	Fam
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7	SO
6.	My friends really try to help me.	1	2	3	4	5	6	7	Fri
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7	Fri
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7	Fam
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	Fri
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7	SO
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7	Fam
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7	Fri

The items tended to divide into factor groups relating to the source of the social support, namely family (Fam), friends (Fri) or significant other (SO).

Appendix O – Quality of Life Index

Ferrans and Powers
QUALITY OF LIFE INDEX®
GENERIC VERSION - III

PART 1. For each of the following, please choose the answer that best describes how ***satisfied*** you are with that area of your life. Please mark your answer by circling the number. There are no right or wrong answers.

HOW *SATISFIED* ARE YOU WITH:	Very Dissatisfied	Moderately Dissatisfied	Slightly Dissatisfied	Slightly Satisfied	Moderately Satisfied	Very Satisfied
1. Your health?	1	2	3	4	5	6
2. Your health care?	1	2	3	4	5	6
3. The amount of pain that you have?	1	2	3	4	5	6
4. The amount of energy you have for everyday activities?	1	2	3	4	5	6
5. Your ability to take care of yourself without help?	1	2	3	4	5	6
6. The amount of control you have over your life?	1	2	3	4	5	6
7. Your chances of living as long as you would like?	1	2	3	4	5	6
8. Your family's health?	1	2	3	4	5	6
9. Your children?	1	2	3	4	5	6
10. Your family's happiness?	1	2	3	4	5	6
11. Your sex life?	1	2	3	4	5	6
12. Your spouse, lover, or partner?	1	2	3	4	5	6
13. Your friends?	1	2	3	4	5	6
14. The emotional support you get from your family?	1	2	3	4	5	6
15. The emotional support you get from people other than your family?	1	2	3	4	5	6

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HOW *SATISFIED* ARE YOU WITH:	Very Dissatisfied	Moderately Dissatisfied	Slightly Dissatisfied	Slightly Satisfied	Moderately Satisfied	Very Satisfied
16. Your ability to take care of family responsibilities?	1	2	3	4	5	6
17. How useful you are to others?	1	2	3	4	5	6
18. The amount of worries in your life?	1	2	3	4	5	6
19. Your neighborhood?	1	2	3	4	5	6
20. Your home, apartment, or place where you live?	1	2	3	4	5	6
21. Your job (if employed)?	1	2	3	4	5	6
22. Not having a job (if unemployed, retired, or disabled)?	1	2	3	4	5	6
23. Your education?	1	2	3	4	5	6
24. How well you can take care of your financial needs?	1	2	3	4	5	6
25. The things you do for fun?	1	2	3	4	5	6
26. Your chances for a happy future?	1	2	3	4	5	6
27. Your peace of mind?	1	2	3	4	5	6
28. Your faith in God?	1	2	3	4	5	6
29. Your achievement of personal goals?	1	2	3	4	5	6
30. Your happiness in general?	1	2	3	4	5	6
31. Your life in general?	1	2	3	4	5	6
32. Your personal appearance?	1	2	3	4	5	6
33. Yourself in general?	1	2	3	4	5	6

(Please Go To Next Page)

PART 2. For each of the following, please choose the answer that best describes how ***important*** that area of your life is to you. Please mark your answer by circling the number. There are no right or wrong answers.

HOW *IMPORTANT* TO YOU IS:	Very Unimportant	Moderately Unimportant	Slightly Unimportant	Slightly Important	Moderately Important	Very Important
1. Your health?	1	2	3	4	5	6
2. Your health care?	1	2	3	4	5	6
3. Having no pain?	1	2	3	4	5	6
4. Having enough energy for everyday activities?	1	2	3	4	5	6
5. Taking care of yourself without help?	1	2	3	4	5	6
6. Having control over your life?	1	2	3	4	5	6
7. Living as long as you would like?	1	2	3	4	5	6
8. Your family's health?	1	2	3	4	5	6
9. Your children?	1	2	3	4	5	6
10. Your family's happiness?	1	2	3	4	5	6
11. Your sex life?	1	2	3	4	5	6
12. Your spouse, lover, or partner?	1	2	3	4	5	6
13. Your friends?	1	2	3	4	5	6
14. The emotional support you get from your family?	1	2	3	4	5	6
15. The emotional support you get from people other than your family?	1	2	3	4	5	6

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HOW *IMPORTANT* TO YOU IS:	Very Unimportant	Moderately Unimportant	Slightly Unimportant	Slightly Important	Moderately Important	Very Important
16. Taking care of family responsibilities?	1	2	3	4	5	6
17. Being useful to others?	1	2	3	4	5	6
18. Having no worries?	1	2	3	4	5	6
19. Your neighborhood?	1	2	3	4	5	6
20. Your home, apartment, or place where you live?	1	2	3	4	5	6
21. Your job (if employed)?	1	2	3	4	5	6
22. Having a job (if unemployed, retired, or disabled)?	1	2	3	4	5	6
23. Your education?	1	2	3	4	5	6
24. Being able to take care of your financial needs?	1	2	3	4	5	6
25. Doing things for fun?	1	2	3	4	5	6
26. Having a happy future?	1	2	3	4	5	6
27. Peace of mind?	1	2	3	4	5	6
28. Your faith in God?	1	2	3	4	5	6
29. Achieving your personal goals?	1	2	3	4	5	6
30. Your happiness in general?	1	2	3	4	5	6
31. Being satisfied with life?	1	2	3	4	5	6
32. Your personal appearance?	1	2	3	4	5	6
33. Are you to yourself?	1	2	3	4	5	6

Appendix P – Thank you!

Thank you for your participation in this study. We greatly appreciate your contributions and service to the community.