# RISK, RESILIENCE AND CULTURE :
# EVALUATING FIREFIGHTER STRESSORS, NEGATIVE
# EMOTIONS, AND COPING CAPACITY IN SRI LANKA

### Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c], AVM Leonard Rodrigo RSP [d], Dr. Xiangyu (Dale) Li [a]

[a] Assistant Professor, Oklahoma State University, United States of America

[b] Post-Doctoral Researcher, The University at Albany, United States of America

[c] Senior Research Fellow, Institute of National Security Studies, Sri Lanka

[d] Deputy Chief of Staff (Retd), Sri Lanka Air Force

## Abstract

War, disaster, and domestic terrorism have shaped Sri Lanka's military and emergency services which have evolved, over time, as a reaction to these threats. As a result, the men and women of the country's eight fire brigades and the Air Force Fire and Rescue Unit stand ready, 24-hours-a-day, to respond whenever disaster occurs. Lessons learned from 9/11, the London, Paris and Manchester Arena bombings indicates that a nation's preparedness, readiness, and operational capacity are dependent on the wellbeing of these personnel which are vital to the nation's security and resilience.

The community expects its military and civilian firefighters to be brave, strong, and ready for anything. However, a high operational tempo exacts a heavy toll on the nation. Research indicates that an increasing operational tempo and regular exposure to trauma can result in chronic physical and psychological health problems. This results in higher work-related injury and absence rates, the breakdown of professional and personal relationships, self-medication with alcohol and/or drugs, depression, withdrawal, post-traumatic stress disorder, suicidal ideation, suicide and more. Beyond these often-devastating individual consequences, this hidden disaster within a disaster- which consists of stressors, negative emotions, and coping capacity - can significantly reduce operational capacity and undermine the nation's resilience building efforts. Similar to their military counterparts, civilian emergency services require appropriate consideration of their psychological health.

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

Organizational and managerial environments can either help or hinder coping capacity. Environmental stressors such as task overload, personnel shortages, ineffective communication, and perceived lack of managerial support dramatically increase levels of stress. The ongoing pandemic with the constant fear of exposure, dynamic shifts in operating picture, and protests and riots add further COVID-19-related stressors which are exacerbated by unbalanced demands for increased service capacity. This inhibits, already strained, emotional resources meaning well-developed coping behaviors are required. Existing research points to several approaches. Exercise and social relationships are considered effective, whereas drug and alcohol use and avoidance are not. Ineffective coping behaviors can lead to harmful physical and psychological outcomes that significantly reduce organizational performance. However, little is understood about how firefighters cope with these stressors. Recent multi-agency incidents such as the Easter Bombings, COVID-19, and the Xpress Pearl, have drawn global media scrutiny toward Sri Lanka. Thus, the psychological wellbeing of firefighters is a very real and significant national security concern. Accordingly, this paper outlines a theoretical model for evaluating stressors, negative emotions, and coping capacity within Sri Lankan Fire Brigades.

*Keywords : firefighters, stress, negative emotions, coping capacity,*
        *Sri Lanka*

## Introduction

The 20th anniversary of the September 11, 2001 (9/11), terrorist attacks on the World Trade Center, the Pentagon, and Pennsylvania in the United States of America (US) provides a visceral reminder of the bravery, dedication to duty and sacrifice of first responders the world over. Of the 2,996 killed on that fateful day, 414 were first responders (9/11 Commission 2004). Their sacrifice is a constant reminder of the toll response operations place upon those who serve, their colleagues, friends, and families. Indeed, 20 years on, many of these brave men and women are still suffering asapproximately 91,000 first responders were exposed to a myriad of physical and psychological hazards linked to 9/11 operations. The death toll stands at 3,429 with aerodigestive illness, cancer and psychological issues accounting for 34%, 30%, and 15%respectively of the post-9/11 deaths (Smith 2021).Moreover, 15% to 20% of 9/11 first responders suffer with Post-Traumatic Stress Disorder (PTSD)- despite a noted decline within the general population- while instances of early-stage dementia are rising (Smith 2021). Nearby communities - such as Chinatown and lower Manhattan – are also presented with physiological and psychological symptoms demonstrating

wider community impacts as the collective trauma has scarred the US and, indeed, global, psyches (Antao et al. 2019; Kung et al. 2019; North Atlantic Treaty Organization 2008). The extensive global media coverage triggered extreme stress and PTSD reactions within geographically distant communities; notably, amongst children and their parents (Otto et al. 2007). An enduring legacy of 9/11 is a visceral reminder of the critical need for governments, emergency services and the wider community to proactively address the psychological toll that high operational tempo and exposure to trauma imparts upon the brave men and women that protect the nation.

Sri Lanka has a long and storied history; from the Sitawaka and Kandyan kingdoms to colonialism and independence. Today, it is known as both the Pearl of the Indian Ocean and the Tear Drop of India due to its rich biodiversity and highly-sought after cinnamon and tea exports. The nations beauty and rich cultural and religious diversity defies its significant experience of trauma. The nation has suffered through political unrest, civil war and terrorism, droughts, floods, landslides, cyclones, health epidemics and transportation accidents. Consequently, the military and civilian emergency services are highly capable and experienced. However, the long-term consequences of this high operational tempo and frequent exposure to trauma are currently unknown. Indeed, the hidden disaster of chronic physical and psychological health problems can be devastating to individuals, their colleagues, friends, and family while reducing operational capability which compromises national security.

Post 9/11, larger US professional fire departments initiated a cultural change relating to psychological wellbeing and support which is now reflected in training and organizational attitudes; however, smaller rural and volunteer departments have yet to change (Testa 2021). Given the high operational tempo and exposure to trauma currently being experienced by firefighters in Sri Lanka, there is a clear need to better understand stressors, negative emotions, and coping capacity to maintain operational capability. Accordingly, this study aims to "measure the causes, implications, and management of stress in firefighters". Atheoretical model - based on correlation analysis of the collated qualitative and quantitative data corpora - to predict the likelihood of ineffective coping behaviors linked to organizational culture, social connectedness and family support is posited to assist fire brigades in maintaining the psychological wellbeing of their firefighters.

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

## Literature Review

## Suicide Risk Amongst Firefighters

Firefighters are at increased risk of suicide (Stanley, Hom, and Joiner 2016). A study of 1,027 US firefighters determined that 46.8% experienced suicidal ideations and 19.2% had actively developed a suicide plan, while 16.4% engaged in non-suicidal self-harm and 15.5% attempted suicide (Stanley et al. 2015). Worryingly, the US Firefighter Behavioral Health Alliance estimates that less than 40% of US firefighter suicides are reported due to a lack of a national tracking mechanism. It is, therefore, likely that more firefighters are dying by suicide rather than in the line-of-duty (Heyman, Dill, and Douglas 2018). PTSD symptoms - flashbacks, nightmares, and severe anxiety - are increasingly recognized as a precursor to suicidal ideation and behaviors amongst firefighters (Boffa et al. 2018; Stanley et al. 2019). Firefighters experience significantly higher PTSD rates than the general population with estimates ranging between 5% and 37% (Del Ben et al. 2006; Alghamdi, Hunt, and Thomas 2016). Current research provides much-needed insights: however, there are no empirical models that adequately explain the latent conditions for when and, more generally, why firefighters are at heightened risk of PTSD, suicidal ideation, and suicide. The US Federal Emergency Management Agency (2019) cites the role of severe job-related stressors and a cultural stigma to showing weakness within fire departments as significant causal factors in firefighter depression, PTSD, suicidal ideation, and suicide: however, these factors have yet to be adequately tested within a comprehensive empirical model.

## Job-Related Stressors

Monnier et al (2002) defines, and measures, two job-related stressor categories. Operational stressors include exposure to trauma such as visceral trauma calls, suicide attempts and calls involving children, family members and downed firefighters, and being assaulted by the public (Monnier et al. 2002). In 2018, 64% of fire emergencies involved medical crises marked by serious injuries and death on arrival (Bendersky 2018). Moreover, 60% to 90% of firefighters responded to multi-casualty incidents, while 61% to 84% witnessed the death of a child (Regambal et al. 2015a). Repeated exposure to trauma significantly increases the risk of negative psychological outcomes (Jahnke et al. 2016) and is a key predictor of depression and PTSD disorders (Marmar et al. 2006). Organizational stressors include work overload, unbalanced overtime demands, lack of autonomy, lack of participation in decision-making, poor communication, personnel

shortages, improper or lack of equipment (Violanti et al. 2017).  Operational stressors are linked to burnout and turnover intentions; notably, when employees feel unappreciated, inadequate, or incompetent as their work and efforts are not considered enough, and job-related demands are perceived to be unreasonable.  Interestingly, organizational stressors are rarely considered alongside operational stressors particularly in the context of firefighters.  Moreover, other key stressors - such as sleep disturbances, leadership and staffing issues, marital, and family stress and, more recently, the demands of COVID-19 are also not considered (Sanford, Suchecki, and Meerlo 2015).Consequently, the relationship between operational and organizational stressors, specific coping behaviors and psychological outcomes is not clearly determined which inhibits efforts to maintain operational capacity and tempo.


## Coping-Capacity

Exposure to trauma and associated stressors results in both positive and negative emotional experiences (Beehr, Johnson, and Nieva 1995).  Aldwin and Revenson (1987) argue that the actual experience of stress is less important than the ways in which an individual chooses to cope with it (Aldwin & Revenson, 1987). A firefighter's coping capacity is, therefore, based on the cognitive and behavioral efforts they apply to manage taxing internal or external demands that exceed the available individual resources (Lazarus and Folkman 1984).  Effective coping strategies allow individual firefighters to protect themselves from psychological harm (Beehr, Johnson, and Nieva 1995).  Stress-induced negative emotions inhibit a firefighter's ability to pursue goals and complete tasks meaning that effective coping behaviors are necessary to maintain operational capacity (Brown, Westbrook, and Challagalla 2005).  Carver et al (1989) defines effective - exercise, social relationships, positive humor, and stress-related talks- and ineffective - drug and alcohol use, avoidance, withdrawal, self-blame, and negative humor - coping behaviors.  Ineffective coping leads to negative physical and psychological outcomes that increase occurrences of anger, anxiety, depression, addiction, heart disease, PTSD, suicidal ideation and suicide (Ménard and Arter 2013).  Firefighters predominantly engage in ineffective coping behaviors (Cicognani et al. 2009): binge drinking, alcohol and substance abuse - which correlate to PTSD onset - are substantially higher amongst firefighters (Jahnke et al. 2016).  The literature clearly defines various stressors and coping behaviors; however, the connections between specific stressors and coping behaviors remain unclear.  This is especially true of ineffective coping behaviors as the reasons why firefighters engage in negative behaviors are unknown (Cicognani

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

et al. 2009). At present, there are a lack of empirical studies and inadequate attention is paid to the multiple stressors and contextual factors that influence firefighter decision-making following exposure to trauma.

Job-related stressors have a profound negative influence on coping behaviors and emotions; notably, when combined with family stressors such as marital dysfunction, divorce and child-related problems (Beaton, Murphy, and Pike 1996). Family support can reduce stress by providing a buffer between operational and organizational stressors (Cullen et al. 1985). However, it can also exacerbate job-related stressors triggering overwhelming emotions (Oosthuizen and Koortzen 2007). A combination of stressors are, therefore, more likely to lead to ineffective coping behaviors (Violanti et al. 2017). Indeed, job-related stressors alone are linked to suicidal ideation amongst firefighters with low social support (Carpenter et al. 2015). To date, Sri Lankan research has focused on work life balance (Weerasignhe and Abeykoon 2015), burnout (Wickramasinghe and Wijesinghe 2018), and depression (Wickramasinghe et al. 2018) within the police, rural first responder stressors (Regambal et al. 2015b), psychological complacency within the military (Monaragala 2014) and, daily stressors amongst war survivors (Jayawickreme et al. 2017). However, no studies have examined the relationships between operational, organizational, family and COVID-19-related stressors, coping capacity, and psychological outcomes amongst firefighters in Sri Lanka. This hidden disaster of ineffective coping behaviors can be individually and organizationally devastating while also compromising operational capacity, resilience, and national security.

## Methodology

A pilot study consisting of 16 semi-structured qualitative interviews and two rounds of quantitative surveys were completed to develop an initial model - see Figure 1 - and refine the survey tool(Bell, Bryman, and Harley 2019). The study posed three questions, which forms of stressors are the most impactful?, how do firefighters normally cope with these stressors?, and what outcomes are these stressors and coping mechanisms associated with? The two quantitative surveys - informed by the interview data - were applied nine weeks apart via a hyperlink distributed anonymously to firefighters by the departmental headquarters. The sample-frame consisted of 370of 1,008 firefighters - a response rate of 36.7% -drawn from a large metropolitan fire department in the eastern United States. The corpus of data was subjected to correlation analysis which determined three key stressors (Martin and Bridgmon 2012). Namely, job outcomes(withdrawal and performance),well-being (burnout, social withdrawal, and PTSD) and, be-

haviors and intentions(suicidal ideation, intentions to quit the department and career field).

## Results and Discussion

The three aforementioned key stressors - job outcomes, well-being and behaviors and intentions were grouped into four categories that contain numerous sub dimensions:
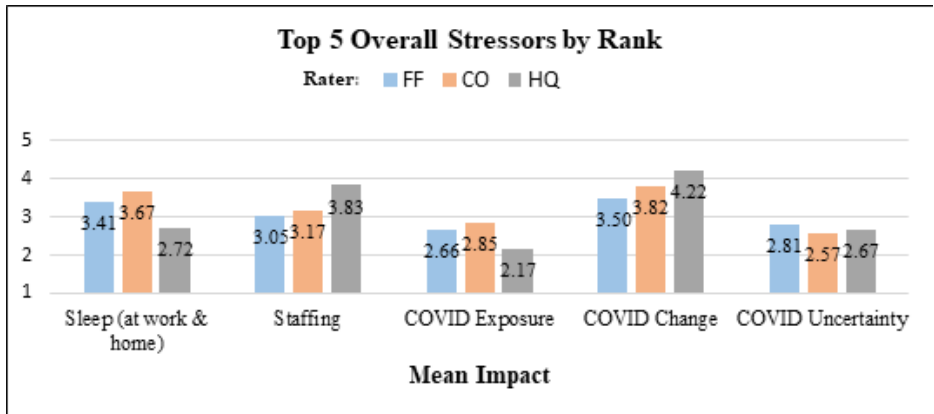
1.  Operational stressors: sleep disturbance at work, job skill concerns, critical incidents, apprehensions regarding personal safety, and substandard equipment

2.  Managerial stressors: management and/or labor conflict, co-worker conflict, reduction in force/wage/benefit worries/staffing, and discrimination

3.  Family stressors: family and financial strain, second job stress, and sleep disturbance at home

4.  COVID-19 stressors: COVID-19exposure and constantly changing Incident Action Plans, COVID-19change planned, and COVID Change uncertainty.

Across all categories, the five stressors that are most impactful for firefighters from the pilot study sample included :

1.  Disrupted sleep

2.  Staffing issues

3.  COVID-19 exposure

4.  COVID-19 planned change

5.  COVID-19 uncertainty

These stressors are likely to be experienced differently based on rank. Consequently, the mean impact of each stressor was determined by firefighter (FF), company officer (CO) and headquarters (HQ) ranks as shown in figure 1 below:

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

## Figure 1: Top Stressors Identified in Pilot Study



Figure 1: Top Stressors Identified in Pilot Study

Unsurprisingly, sleep issues were considered a more impactful stressor by fire-fighter and company officer ranks. However, sleep disturbance of headquarters ranks is not negligible. Consequently, the long-term cumulative effects of stress and sleep disruption is impactful across the organization. As the most commonly reported stressor, displayed in the correlation analysis below, sleep disturbance at work is related to a variety of negative outcomes. This includes withdrawal at work and higher levels of burnout and PTSD. Moreover, as also the most commonly reported family stressor, sleep disturbance at home is related to a variety of negative work outcomes, including lower job performance, negative well-being, and suicide ideation.

## Figure 2 : Correlation Analysis of Sleep Disturbances
         (significant correlations in red)



Figure 2 : Correlation Analysis of Sleep Disturbances (significant correlations in red)
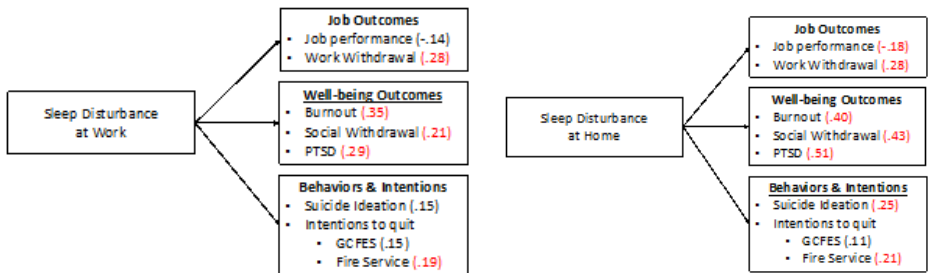
In contrast to sleep issues, staffing issues, while stressful to all ranks, appear to be the most stressful to those at headquarters rank. This is, arguably, to be expected

given that headquarters ranks are required to manage staff shortages and implement mandatory overtime policies. As the second most commonly reported stressor, staffing issues are related to a variety of negative outcomes including negative well-being and intentions to quit.
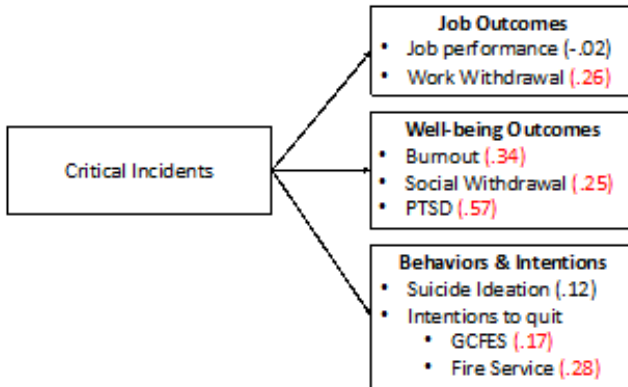
**Figure 3 : Correlation Analysis of Staffing Stressors**
**(significant correlations in red)**
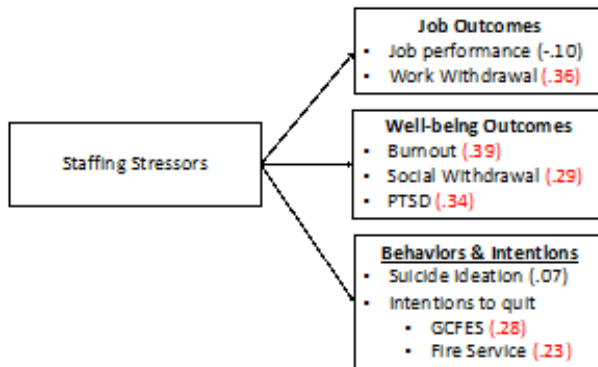


COVID-19 related issues comprise the other stressors. The findings suggest that all ranks experienced similar levels of stress related to COVID-19 uncertainty, policies, and fear of exposure. Indeed, while that impactful COVID-19-realted issue related was the frequent change. Headquarters ranks responsible for creating and implementing plans during the pandemic, experienced high levels of stress. Exposure to COVID-19 and dynamic incident action planning were associated with negative outcomes such as withdrawal, burnout, PTSD), COVID-19 change related stress which was the most impactful form of COVID-19 related stress was not associated with poor outcomes. Interestingly, despite firefighters reporting this as a significant source of stress, it does not appear to have had a significant impact on work performance or well-being outcomes.

Although critical incident stressors were not reported as being as stressful as other events, the traumatic and lasting effects of these stressors, as noted in the literature, warrants further investigation. While critical incident stress did not relate to lower job performance, it moderately to strongly related to negative well-being and intentions to quit both the organization and the fire service as a whole: see figure four below:

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

**Figure 4 : Correlation Analysis of Critical Incidents**
**(significant correlations in red)**



## Firefighter Coping

To deal with the emotional impact of stressors, firefighters engage in various coping strategies. Respondents asked about how they cope with two separate sources of stressors: operational stressors (e.g., critical incidents involving children, severe trauma, COVID etc.) and organizational stressors (e.g., frustration with leaders, scheduling and staffing issues). Respondents selected how they coped with these stressors separately along a number of effective and ineffective coping mechanisms, listed below.

- Effective coping: Problem-focused, self-distraction, humor, social support (work), social support (non-work/home), Critical Incident Stress Management (Formal Program), problem-focused coping

- Ineffective coping: Self-blame, mental disengagement/detachment, substance use, venting (not always negative)

The figure 5 below indicates which strategies firefighters typically use to cope with each category of stressor; blues lines indicate coping strategies used for managerial stressors, whereas orange lines indicate coping strategies for operational stressors. The graph is sorted from most commonly used strategies (left) to least used strategies (right). Overall, firefighters reported that they relied on effective coping strategies more often than negative coping strategies for dealing with both managerial and operational stressors. Notably, the sampled firefighters reported using problem focused coping - a stress-management strategy in which a person directly confronts a stressor in an attempt to decrease or eliminate it – which is an important strength (Penley, Tomaka, & Weibe, 2012).

**Figure 5 : Coping Preferences**
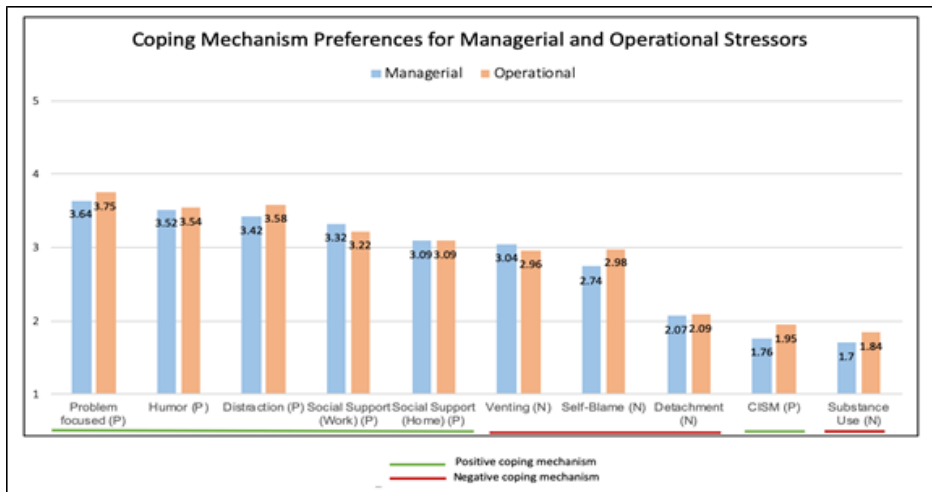


The most regularly used negative coping strategies were venting and self-blame. Venting is a coping strategy that involves expressing negative emotions to others. Disclosing stressors through venting is done to reduce stress levels - which it can do effectively under the proper circumstances (i.e., when used sparingly and when the person who is hearing the venting is able to empathize and manage the venter's emotions). However, venting is not just about the person venting, but also about the person hearing the venting. Constant venting or venting as a result of common stressors can actually heighten negative emotional states. That is, someone who regularly complains about mundane tasks may do so as a way to stoke their own anger or frustration rather than dealing with those emotions. Venting also takes a toll on the listener as prolonged venting from colleagues can create a culture of negativity that can unduly influence morale.

As an example of how coping strategies relate to outcomes the most frequently reported effective coping strategy were correlated; namely; problem-focused coping and the most commonly reported negative coping strategy - venting. As the figures six and seven below show, problem-focused coping is related to higher levels of job performance and lower levels of work withdrawal. Interestingly, problem focused coping was not related to well-being outcomes, in contrast to research in other organizations. Venting is related to a number of negative job outcomes, specifically work withdrawal behaviors and negative well-being.

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

**Figure 6 : Correlation Analysis of Problem Focused Coping**
        **(significant correlations in blue)**

**Figure 7 : Correlation Analysis Venting**
        **(significant and negative oriented correlations in red)**
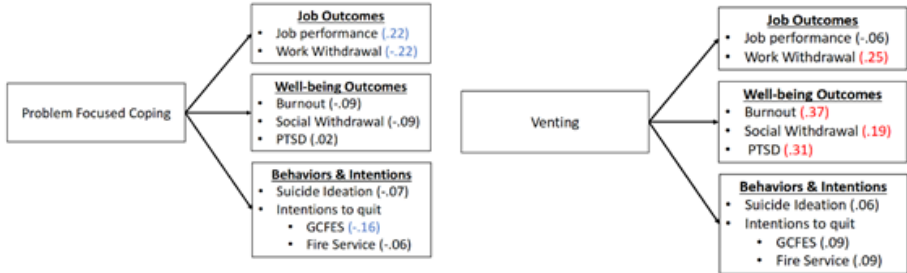


## PTSD and Suicide

The findings indicate a significant interaction effect between stress and coping variables as they relate to outcomes such as PTSD, suicidalideation, and suicide. For example, Figure eight below shows the results for interactive effect between stressors and coping styles on PTSD. The red line represents department employees who report using more negative coping strategies (i.e., venting, self-blame, detachment, substance use). Moving from the left side of the line, when stress is low, to the right side of the line, when stress is high, the line has a positive slope. This means that as stress increases, those who utilize negative coping strategies are reporting higher levels of PTSD. In contrast, the blue line represents firefighters who report using low levels of ineffective coping strategies. Moving from left to right on the line it is almost flat. This means that regardless of whether stress is low or high, firefighters who do not use ineffective coping strategies are reporting lower levels of PTSD overall (i.e., the line is lower than the red line).

**Figure 8 : Interaction Effects on PTSD**



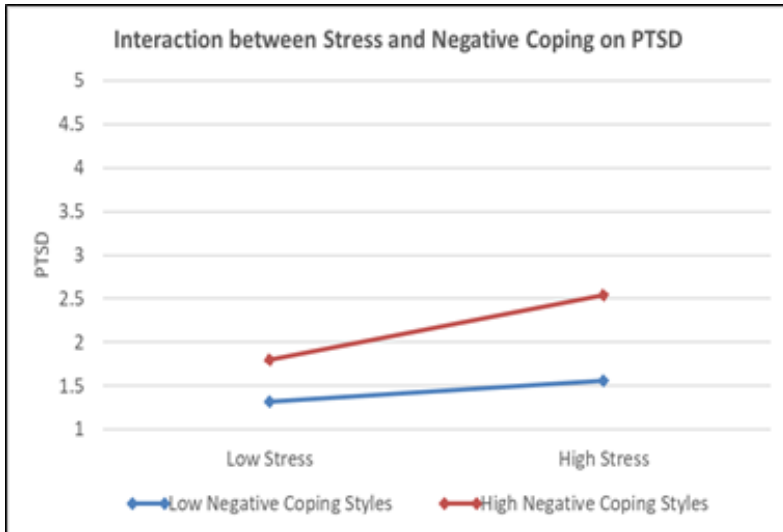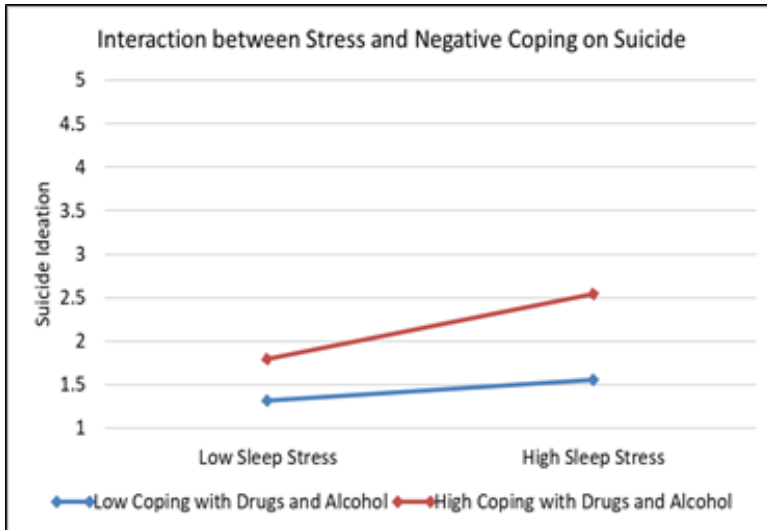Interaction between Stress and Negative Coping on PTSD

Figure nine shows the results for interactive effect between stressors and coping styles on suicidal ideation. The red line represents department employees who report using the drugs and alcohol as a coping strategy. Similar to figure eight, the graph shows that as stress increases, those who utilize drugs and alcohol as a coping strategy report higher levels of suicide ideation. In contrast, the blue line represents department employees who do not use drugs and alcohol as a coping strategy. Moving from left to right on the line it is also almost flat. This means that regardless of whether stress is low or high, firefighters who do not use negative coping strategies are reporting lower levels of suicide ideation overall (i.e., the line is lower than the red line). The main takeaways are that using ineffective coping strategies increases PTSD and suicidal ideation, especially when the firefighter is experiencing higher levels of stress.

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

**Figure 9 : Interaction Effects on Suicide**



Interaction between Stress and Negative Coping on Suicide

The findings reported herein are a much-needed first-step in understanding the causes, management, and implications of stress on firefighters. Accordingly, a theoretical model was hypothesized and is outlined below.

## Theoretical Model

Figure ten below illustrates the posited theoretical model which predicts that operational, organizational, family, and COVID-19 stressors will lead to ineffective firefighter coping strategies where there is a toxic (overly) masculine culture which limits emotional expression, low social connectedness and organizational support, and high family-related stress such as divorce and parental challenges. The resultant ineffective emotional and behavioral responses - such as poor performance, withdrawal, PTSD, and suicidal ideation – will, therefore, be stronger. Conversely, when work and home environments are more positive, supportive, and connected, firefighters are more likely to be receptive to, and engage in effective coping strategies that can lead to better mental well-being and performance.

**Figure 10: Hypothesized Model**
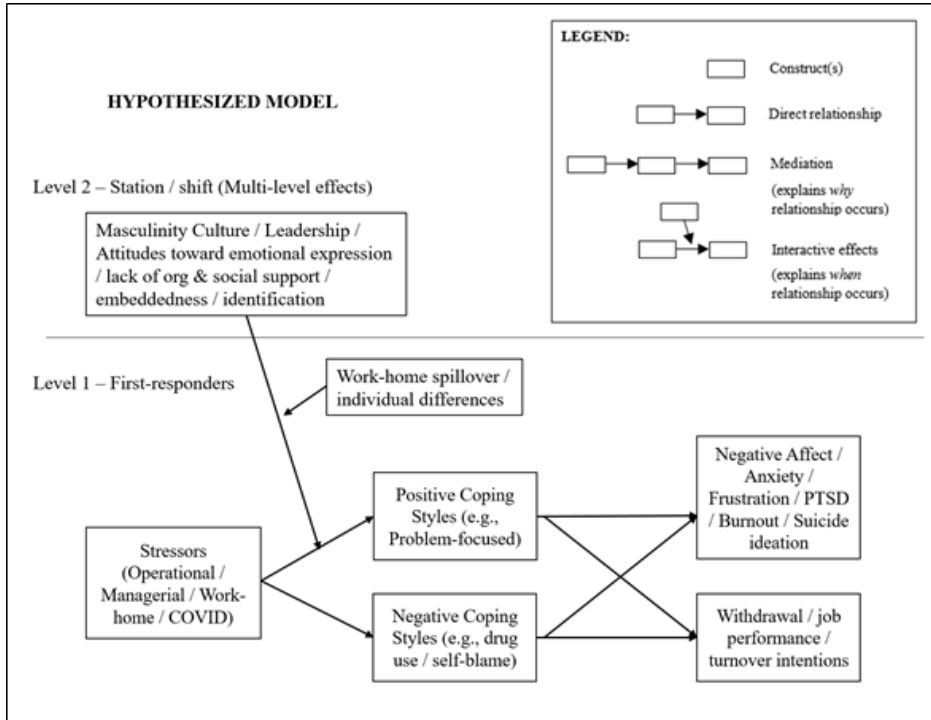


The findings and posited theoretical model offer a validated framework to assess firefighter stressors, negative emotions, and coping capacity. However, given the relatively small sample-frame within this study further research, to secure size large enough for complex analytical procedures (i.e. structural equation modeling that include multi-level effects) which has never been done in a firefighter setting to explore stress, coping, and well-being outcomes, assess the generalizability of the findings and posited model, and develop refined measurement tools.

The noted stressors consisted of operational, organizational, family and COVID-19 related stressors. The most frequent and impactful stressor was sleep disturbance at work and at home. Additionally, staffing issues, COVID-19 exposure, and uncertainty, and repeated policy changes were frequently cited. Higher levels of stress were related to negative job and well-being outcomes such as withdrawal, burnout, reduced performance, turnover intentions, PTSD, and suicidal ideation. The sampled firefighters primarily relied upon positive cop-

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

ing behaviors; however, utilization of negative coping behaviors - venting, substance abuse and self-blame - was reported to increase the negative impacts of the noted stressors. These stressors coupled with negative coping behaviors are related to higher levels of burnout, reduced performance, PTSD, and suicidal ideation. Moreover, firefighters articulated that they were more likely to engage in negative coping behaviors when their organization, and associated culture, limited emotional expression and provided little support. This led to poorer job and well-being outcomes. Interestingly, operational stressors and exposure to trauma were considered less stressful than job or family stressors. However, they were related to ineffective coping behaviors and subsequent withdrawal, PTSD, and suicidal ideation. Thus, operational stressors and exposure to trauma warrant further investigation.

## Conclusions

A lack of empirical research on the psychological wellbeing of firefighters, combined with a cultural stigma surrounding mental and behavioral health issues (Federal Emergency Management Agency 2019) limits our ability to address the ineffective firefighter coping behaviors that lead to negative psychological outcomes (Henderson et al. 2016). We must, therefore, determine when and why different stressors trigger negative emotional responses and ineffective coping behaviors amongst firefighters to reduce the devastating individual, family, and organizational consequences while maintaining organizational capacity and national security. Heyman et al (2018) found that more US firefighters (and police officers) died by suicide than all line-of-duty deaths combined. Given, the heightened operational tempo and exposure to trauma related to the recent Easter Sunday bombings, COVID-19, and the Xpress Pearl maritime accident there is a demonstrable need to better understand firefighter stressors, negative emotions, and coping capacity in Sri Lanka.

## Recommendations

Contemporary fire brigades must develop organizational connectedness to build a sense of togetherness. Moreover, leadership and the organizational culture must emphasize support, openness and promote employee empowerment and decisiveness whilst also combating toxic masculinity and destigmatizing mental health. This is critical as firefighters are regularly exposed to severe operational, organizational, and family stressors which are currently exacerbated by COVID-19. Firefighters must, therefore, utilize effective coping behaviors to

reduce the risk of withdrawal, depression, PTSD, suicidal ideation, and suicide which requires a conducive culture and leadership.  Without this, the resultant poor performance will exacerbate stress through higher personnel turnover which, in turn, reduces organizational capability and resilience. Little is understood about how firefighters in Sri Lanka cope with job-related stressors, even less is known about the factors that influence firefighter's decision-making and selection of ineffective coping behaviors following exposure to trauma. The impact of individual stressors and the effectiveness of specific firefighter coping behaviors in mitigating differing operational, organizational, family, and COVID-19-relatedstressors are also unknown.  Thus, failure to maintain the psychological wellbeing of firefighters in Sri Lanka represents a clear risk to national security.

# References

9/11 Commission. 2004. The 9/11 Commission Report: Final Report of the National Commission on the Terrorist Attacks upon the United States. National Commission on Terrorist Attacks Upon the United States (Washington D.C. USA). http://govinfo.library.unt.edu/911/report/911Report.pdf.

Aldwin, Carolyn M., and Tracey A. Revenson. 1987. "Does Coping Help? A Reexamination of the Relation Between Coping and Mental Health." Journal of Personality and Social Psychology 53 (2): 337-348. https://doi.org/10.1037/0022-3514.53.2.337.

Alghamdi, Mohammed, Nigel Hunt, and Shirley Thomas. 2016. "Prevalence rate of PTSD, Depression and Anxiety symptoms among Saudi Firefighters." Journal of Traumatic Stress Disorders adn Treatment 5 (3): 1-6. https://doi.org/10.4172/2324-8947.1000164.    https://core.ac.uk/download/pdf/76974799.pdf.

Antao, Vinicius C., L. L. Pallos, Shannon L. Graham, Youn K. Shim, James H. Sapp, Brian Lewis, Steven Bullard, Howard E. Alper, James E. Cone, Mark R. Farfel, and Robert M. Brackbill. 2019. "9/11 Residential Exposures: The Impact of World Trade Center Dust on Respiratory Outcomes of Lower Manhattan Residents." International Journal of Environmental Research and Public Health 16 (5): 798. https://doi.org/10.3390/ijerph16050798.

Beaton, Randal, Shirley Murphy, and Kenneth Pike. 1996. "Work and Nonwork Stressors, Negative Affective States, and Pain Complaints Among Firefighters and Paramedics." International Journal of Stress Management 3 (4): 223-237. https://doi.org/10.1007/BF01857685. https://doi.org/10.1007/BF01857685.

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

Beehr, Terry A., Leanor B. Johnson, and Ronie Nieva. 1995. "Occupational Stress: Coping of Police and their Spouses." Journal of Organizational Behavior 16 (1): 3-25. https://doi.org/https://doi.org/10.1002/job.4030160104. https://onlinelibrary.wiley.com/doi/abs/10.1002/job.4030160104.

Bell, Emma, Alan Bryman, and Bill Harley. 2019. Business Research Methods. 5th ed. Oxford, UK: Oxford University Press.

Bendersky, Corinne. 2018. "Making U.S. Fire Departments More Diverse and Inclusive." Harvard Business Review. Accessed 12th September https://hbr.org/2018/12/making-u-s-fire-departments-more-diverse-and-inclusive.

Boffa, Joseph W., Ian H. Stanley, Lia J. Smith, Brittany M. Mathes, Jana K. Tran, Sam J. Buser, Norman B. Schmidt, and Anka A. Vujanovic. 2018. "Posttraumatic Stress Disorder Symptoms and Suicide Risk in Male Firefighters: The Mediating Role of Anxiety Sensitivity." The Journal of Nervous and Mental Disease 206 (3): 179-186. https://doi.org/10.1097/NMD.0000000000000779. https://pubmed.ncbi.nlm.nih.gov/29309295

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5825264/.

Brown, Steven P., Robert A. Westbrook, and Goutam Challagalla. 2005. "Good Cope, Bad Cope: Adaptive and Maladaptive Coping Strategies Following a Critical Negative Work Event." Journal of Applied Psychology 90 (4): 792-798. https://doi.org/10.1037/0021-9010.90.4.792.

Carpenter, G. S., T. P. Carpenter, N. A. Kimbrel, E. J. Flynn, M. L. Pennington, C. Cammarata, R. T. Zimering, B. W. Kamholz, and S. B. Gulliver. 2015. "Social Support, Stress, and Suicidal Ideation in Professional Firefighters." American Journal of Health Behaviors 39 (2): 191-6. https://doi.org/10.5993/ajhb.39.2.5.

Carver, Charles S., Michael F. Scheier, and Jagdish K. Weintraub. 1989. "Assessing Coping Strategies: A Theoretically Based Approach." Journal of Personality and Social Psychology 56 (2): 267-283. https://doi.org/10.1037/0022-3514.56.2.267.

Cicognani, Elvira, Luca Pietrantoni, Luigi Palestini, and Gabriele Prati. 2009. "Emergency Workers' Quality of Life: The Protective role of Sense of Community, Efficacy beliefs and Coping Strategies." Social Indicators Research 94 (3): 449-463. https://doi.org/10.1007/s11205-009-9441-x.

Cullen, Francis T., Bruce G. Link, Nancy T. Wolfe, and James Frank. 1985. "The Social Dimensions of Correctional Officer Stress." Justice Quarter-

ly 2 (4): 505-533. https://doi.org/10.1080/07418828500088711. https://doi.org/10.1080/07418828500088711.

Del Ben, Kevin S., Joseph R. Scotti, Yi-Chuen Chen, and Beverly L. Fortson. 2006. "Prevalence of posttraumatic stress disorder symptoms in firefighters." Work & Stress 20 (1): 37-48. https://doi.org/10.1080/02678370600679512.

Federal Emergency Management Agency. 2019. "Firefighter Fatalities in the United States in 2019." U.S. Fire Administration. Accessed 12th September. https://www.usfa.fema.gov/downloads/pdf/publications/firefighter-fatalities-2019.pdf.

Henderson, Sarah, Vincent Hasselt, Todd LeDuc, and Judy Couwels. 2016. "Firefighter Suicide: Understanding Cultural Challenges for Mental Health Professionals." Professional Psychology: Research and Practice 47 (3): 224-230. https://doi.org/10.1037/pro0000072.

Heyman, Miriam, Jeff Dill, and Robert Douglas. 2018. "The Ruderman White Paper on Mental Health and Suicide of First Responders

." Rudermann Family Foundation. Accessed 11th September. https://dir.nv.gov/uploadedFiles/dirnvgov/content/WCS/TrainingDocs/First%20Responder%20White%20Paper_Final%20(2).pdf.

Jahnke, S. A., W. S. Poston, C. K. Haddock, and B. Murphy. 2016. "Firefighting and Mental Health: Experiences of Repeated Exposure to Trauma." Work 53 (4): 737-44. https://doi.org/10.3233/wor-162255.

Jayawickreme, N., C. Mootoo, C. Fountain, A. Rasmussen, E. Jayawickreme, and R. F. Bertuccio. 2017. "Post-Conflict Struggles as Networks of Problems: A Network Analysis of Trauma, Daily Stressors and Psychological Distress Among Sri Lankan War Survivors." Social Science and Medicine 190 (October): 119-132. https://doi.org/10.1016/j.socscimed.2017.08.027.

Kung, Winnie W., Xiaoran Wang, Xinhua Liu, Emily Goldmann, and Debbie Huang. 2019. "Unmet Mental Health Care Needs among Asian Americans 10–11 Years After Exposure to the World Trade Center Attack." International Journal of Environmental Research and Public Health 16 (7): 1302. https://doi.org/10.3390/ijerph16071302.

Lazarus, Richard S., and Susan Folkman. 1984. Stress, Appraisal, and Coping. New York, USA: Springer.

Marmar, C. R., S. E. McCaslin, T. J. Metzler, S. Best, D. S. Weiss, J. Fagan, A.

Dr.Tony McAleavy [a], Dr. David Huntsman [b], Dr. Michelle Brooks [c],
AVM Leonard Rodrigo RSP [d], Dr.Xiangyu (Dale) Li [a]

Liberman, N. Pole, C. Otte, R. Yehuda, D. Mohr, and T. Neylan. 2006. "Predictors of Posttraumatic Stress in Police and Other First Responders." Annals of the New York Academy of Science 1071 (July): 1-18. https://doi.org/10.1196/annals.1364.001.

Martin, William E., and Krista D. Bridgmon. 2012. Research Methods for the Social Sciences - Quantitative and Statistical Research Methods: From Hypothesis to Results. Vol. 42. Vol. Book, Whole. Somerset, NJ, USA: John Wiley & Sons.

Ménard, Kim S., and Michael L. Arter. 2013. "Police Officer Alcohol Use and Trauma Symptoms: Associations with Critical incidents, coping, and Social Stressors." International Journal of Stress Management 20 (1): 37-56. https://doi.org/10.1037/a0031434.

Monaragala, R.M.M. 2014. "Are We Complacent About Mental Health Issues of the Military in Sri Lanka?" Sri Lanka Journal of Psychiatry 5 (2): 5-8.

Monnier, Jeannine, Rebecca Cameron, Stevan Hobfoll, and J. Gribble. 2002. "The Impact of Resource Loss and Critical Incidents on Psychological Functioning in Fire-Emergency Workers: A Pilot Study." International Journal of Stress Management 9 (1): 11-29. https://doi.org/10.1023/A:1013062900308.

North Atlantic Treaty Organization. 2008. "Psychological Care for People Affected by Disasters & Major Incident." Joint Medical Committee. Accessed 11th Spetember. https://www.coe.int/t/dg4/majorhazards/ressources/virtuallibrary/materials/Others/NATO_Guidance_Psychosocial_Care_for_People_Affected_by_Disasters_and_Major_Incidents.pdf.

Oosthuizen, R M, and P Koortzen. 2007. "An Empirical Investigation of Job and Family Stressors Amongst Firefighters in the South African Context." 2007 33 (1). https://doi.org/10.4102/sajip.v33i1.252. https://sajip.co.za/index.php/sajip/article/view/252.

Otto, Michael W., Aude Henin, Dina R. Hirshfeld-Becker, Mark H. Pollack, and Joseph Biederman. 2007. "Post-traumatic Stress Disorder Symptoms Following Media Exposure to Tragic Events: Impact of 9/11 on Children at Risk for Anxiety Disorders." Journal of Anxiey Disorder 21 (7): 888-902.

Regambal, Marci, Shannon Wagner, Henry Harder, William Koch, Klint Fung, and Carly Parsons. 2015a. "Characteristics of the Traumatic Stressors Experienced by Rural First Responders." Journal of Anxiety Disorders 34 (August 2015): 86-93. https://doi.org/10.1016/j.janxdis.2015.06.006.

---. 2015b. "Characteristics of the Traumatic Stressors Experienced by Rural First Responders." Journal of Anxiety Disorders 34. https://doi.org/10.1016/j.janxdis.2015.06.006.

Sanford, Larry, Deborah Suchecki, and Peter Meerlo. 2015. "Stress, Arousal, and Sleep." In Sleep, Neuronal Plasticity and Brain Function, edited by Peter Meerlo, Benca Ruth and Abel Ted, 379-410. Berlin, Germany: Springer.

Smith, Erin. 2021. "9/11: Twenty Years On, Responders Still Paying a Heavy Price." Edith Cowan University,. Accessed 11th September. https://www.ecu.edu.au/features/postgraduate/911-twenty-years-on-responders-still-paying-a-heavy-price?utm_source=salesforce&utm_medium=email&utm_campaign=sf-staff-service_ecu-matters_bam_03092021_email&utm_content=.

Stanley, Ian H., Joseph W. Boffa, Jana K. Tran, Norman Brad Schmidt, Thomas E. Joiner, and Anka A. Vujanovic. 2019. "Posttraumatic Stress Disorder Symptoms and Mindfulness Facets in Relation to Suicide Risk Among Firefighters." Journal of clinical psychology 75 (4): 696-709. https://doi.org/10.1002/jclp.22748. https://pubmed.ncbi.nlm.nih.gov/30672591

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6434694/.

Stanley, Ian H., Melanie A. Hom, Christopher R. Hagan, and Thomas E. Joiner. 2015. "Career Prevalence and Correlates of Suicidal Thoughts and Behaviors." Journal of Affective Disorders 187 (November): 163-171.

Stanley, Ian H., Melanie A. Hom, and Thomas E. Joiner. 2016. "A Systematic Review of Suicidal Thoughts and Behaviors Among Police Officers, Firefighters, EMTs, and Paramedics." Clinical Psychology Review 44 (March): 25-44. https://doi.org/10.1016/j.cpr.2015.12.002.

Testa, Diana. 2021. "The Pandemic Is Fading. But for First Responders, a Longer Struggle Begins." The River Valley Newsroom. Accessed 11th September.

Violanti, John M., Luenda E. Charles, Erin McCanlies, Tara A. Hartley, Penelope Baughman, Michael E. Andrew, Desta Fekedulegn, Claudia C. Ma, Anna Mnatsakanova, and Cecil M. Burchfiel. 2017. "Police Stressors and Health: A State-of-the-Art Review." Policing 40 (4): 642-656. https://doi.org/10.1108/PIJPSM-06-2016-0097. https://pubmed.ncbi.nlm.nih.gov/30846905

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6400077/.

Weerasignhe, I.M.S., and A.B.M.M.M. Abeykoon. 2015. "Impact of Work Life

Balance on Job Satisfaction of Non-Gazette Officers in Sri Lanka Police "With Special Reference to Badulla District"." International Research Symposium, Rajarata University, 26th February.

Wickramasinghe, N. D., and P. R. Wijesinghe. 2018. "Burnout Subtypes and Associated Factors Among Police Officers in Sri Lanka: A Cross-Sectional Study." Journal of Forensic and Legal Medicine 58 (August): 192-198.

Wickramasinghe, N. D., P.R. Wijesinghe, S. Dharmaratne, and S. Agampodi. 2018. "The Prevalence and Associated Factors of Depression in Policing: A cross sectional Study in Sri Lanka." SpringerPlus 5 (2016): 1776.