

## JOB STRESS ASSESSMENT FACTORS AMONG MALAYSIAN FIREFIGHTERS AT HIGH RESPONSE RATE STATIONS

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### ABSTRACT

*Depression, anxiety and stress among emergency responders are emerging issues as they can affect psychological well-being. Firefighting is a highly stressful occupation and highly demanding in terms of physical and psychological capacities. As the studies on job stress factors and mental health among firefighters are significantly low in Malaysia, understanding the job stress factors among Malaysian firefighters has become substantially important. Such studies can create a scientific novelty and contribute to suitable intervention processes by the Malaysian government and Fire and Rescue Department Malaysia in ensuring the high efficiency of emergency responders at all times. Hence, this study aimed to determine the factors contributing to depression, anxiety and stress among firefighters in Malaysia. A cross-sectional study involving 82 firefighters from Grade A and Grade B stations in Kota Bharu, Kelantan was conducted, and a validated National Institute for Occupational Safety and Health Generic Job Stress Questionnaire (NIOSH GJSQ) was used. The results indicated that physical environment, job future, job requirement, mental demand, workload and responsibility, as well as problem at work, conflict at work and self-esteem have a high possibility to be attributed as stress factors for firefighters. Additionally, the physical environment has the highest contribution as a stressor for firefighters at 79.8%. The findings also found that self-esteem is correlated to problem at work ( $r = 0.305$ ) and job requirement ( $r = 0.276$ ). In conclusion, this study has identified the contributing factors that influence the psychological well-being of firefighters in Malaysia. Therefore, it is suggested that further research should be conducted to prevent the arising of mental health problems among firefighters in Malaysia.*

**Keywords:** Workload, psychological well-being, firefighter, job stress, self-esteem, NIOSH GJSQ

### INTRODUCTION

Depression, anxiety and stress are categorized as psychological and mental health problems that can lead to adverse health effects<sup>1</sup>. In the occupational field, depression, anxiety and stress can cause negative impacts on both the employee and the organization, which is supported by the latest studies on psychological health among emergency responders in Malaysia<sup>1,2</sup>. The job stress experienced by employees is highly noteworthy because it may affect the performance of the workers, especially for a firefighter<sup>1,2</sup>. Stress is considered a non-communicable disease but with an appearance as if it is an infectious disease<sup>3</sup>. Generally, prolonged negative stress is considered harmful to the physical, mental and emotional health of professionals<sup>4</sup>.

In Great Britain, occupational stress is "contiguous", with nearly half a million employees currently suffering from it. Adding to its "infectivity", work stress also happens to be "virulence" towards workers, which could affect their productivity<sup>3</sup>. A stress condition should be prevented due to its ability to be a major drain on work production; a past study showed that about

40% of work-related illness cases were due to work stress, which had an impact on the organization in terms of sickness absence, lost production and increased accidents<sup>3</sup>.

Job stress also creates many problems at the individual level and the organizational level, which eventually create a deep impact on organizational commitment and performance<sup>5,6</sup>. This condition commonly occurs in every person but the level differs based on their sociological and environmental conditions. For emergency responders, firefighters particularly, conditions triggering depression, anxiety and stress are usually due to their work environment and several factors themselves<sup>7,8</sup>. Firefighters need to contribute their time, energy and effort to assist in emergencies and play a vital role in responding to the impact of the occurring disaster or incident. Inevitably, striving during disasters to save the life of victims and prevent further damage to properties exposes firefighters to dangerous circumstances or traumatic situations.

Firefighters are often exposed to highly stressed situations, which are extremely demanding both physically and psychologically<sup>1,2</sup>. Most emergency responders at some point will be subjected to

particularly traumatic and often tragic events; evidence suggests that most mortality and morbidity of firefighters are related either directly or indirectly to the stressful nature of their work<sup>9,10</sup>.

Firefighters perform their typical occupational activities in very intense, unpredictable emergency circumstances, thus, exposing them to severe stress. They can be exposed to several physical, chemical and biological hazards<sup>9</sup>. Disasters can cause both physical and psychological impacts<sup>11</sup>. While the physical impact of the disaster is usually obvious, the psychological impact, however, may cause long-lasting suffering or disability.

Unfortunately, studies on job stress factors and mental health among firefighters are significantly scarce in Malaysia<sup>1</sup>. As the previous study has recorded that firefighting is a highly stressful occupation<sup>12</sup>, the authors believed that understanding factors that contribute to stress can assist in developing an intervention programme to reduce normal job stress<sup>1,2</sup> of firefighters and prevent them from having mental health issues<sup>13,14</sup>. Hence, merely discussing stress is not enough in describing the psychological problem among firefighters, it is also important to understand the factors that contribute to stress. The factors that occur may be influenced by many aspects, either from the work area or the organization itself. Therefore, the objectives of this study were to interpret the level of each of the stress factors, determine the factors that contribute to stress, identify the highest contributing factor, and finally, establish the correlation between each occupational stress factor among firefighters in Malaysia.

## METHODS

A cross-sectional study involving 82 personnel was conducted at Grade A and Grade B stations in Kota Bharu, Kelantan, through a purposive sampling method with ethical approval. Respondents were classified into two groups, namely the control group and the non-control group. Firefighters working in the administration department were labelled as the control group, while firefighters working in rescue operations were the non-control group.

The National Institute for Occupational Safety and Health Generic Job Stress Questionnaire (NIOSH GJSQ) was used in this study to measure the job stressors among the respondents. The NIOSH GJSQ questionnaire has been validated and widely used in much research, including job stress research conducted in Malaysia<sup>15</sup>. This questionnaire consists of several elements, with each element comprising several related questions. The elements act as a contributing factor to occupational stress. Nevertheless, not all factors mentioned necessarily lead to stress, it will

depend on the work status of the respondent itself. The NIOSH GJSQ uses a Likert scale in interpreting data. A higher score indicates more stress. It is also to be noted that some items need to be reversely coded, in which a higher score will signify lower job stress.

The factors and the highest contributing cause to depression, anxiety and stress among the respondents were determined by descriptive statistical analysis. All results were expressed as mean and standard deviation (SD). The Pearson's Correlation test was used to determine the relationships between occupational stress factors among firefighters in Kota Bharu. A p-value of 0.05 was considered a significant level.

This study was conducted with the approval of the ethics committee (USM/JEPeM/19110739) from the Human Research Ethics Committee of Universiti Sains Malaysia (USM).

## RESULTS

A total of 82 firefighters completed the NIOSH GJSQ (response rate = 88.2%). All respondents were Malay, where the male respondents outnumbered the female respondents at 97.6% and 2.4%, respectively. The majority of the respondents were from the age group of 41-50 years (50%) and the fewest were from the group of 21-30 years (4.9%). Another 28.0% were from the age group of 31-40 years and 17.1% were from the age group of 51-60 years. The majority of respondents were married (95.1%) and only 1 person was divorced (1.2%). The remaining respondents were unmarried (3.7%). All respondents were working a 12-hour shift with no set pattern and shift changes more than twice weekly.

### Factors of Job Stress

Table 1 shows the summary of the computed means of all items according to corresponding variables. Maximum Score in the table indicates that the factors are at a maximum level. In other words, the higher the ratio, the higher the possibility of that item being the stress factor. Among all the stress factors, social support and job satisfaction were considered positively oriented factors, in which the ratio indicates the presence of job stressors among the responder, either resulting in high or low stress. As per past research, the stress factors that arise may be due to individual or organizational factors<sup>16</sup>. Ratio calculated by dividing mean with maximum score.

The physical environment (0.798) showed the highest ratio, indicating this element might highly influence job stress. Other elements with high ratios included job future (0.775); job requirement (0.771); mental demand (0.752); workload and responsibility (0.702); problem at work (0.693); conflict at work (0.642); and how do you feel about yourself (self-esteem) (0.629).

For elements that were positively oriented, social support (0.316) showed a high contribution to job stress among the respondents. A high level of social support lowers stress levels. This argument is supported by studies on improving employee performance, where instrumentality which is a part of social support, can improve employee satisfaction<sup>17</sup>. Social support acts as a buffer to enhance the mental health of employees. On the

other hand, job satisfaction (0.379) showed a low contribution to job stress among the respondents. Low job satisfaction translates to high stress among the firefighters. It is deduced that when the respondents feel comfortable and satisfied with their job, the stress they feel will be reduced. This is in agreement with past studies that had identified job satisfaction as one of the ways to improve employee performance<sup>6,18</sup>.

**Table. 1. Total mean score, maximum score and standard deviation for respondent stress factors.**

	Mean	Maximum score	Standard Deviation
General health	26.59	85	7.752
How do you feel about yourself (self-esteem)	31.45	50	5.297
Physical environment	15.96	20	1.271
Job requirement	38.57	50	7.478
Mental demands	15.04	20	2.009
Problem at work	20.79	30	3.770
Conflict at work	51.35	80	7.818
Work hazards	10.41	22	3.189
Workload and responsibility	38.62	55	5.751
Social support	18.96	60	6.717
Job satisfaction	4.93	13	1.163
Job future (job future ambiguity)	19.37	25	2.760

#### Simple Regression Analysis of Job Stress

A simple regression was also used to predict the stress of the respondents from all outlined stress factors. It was found that the majority of the stress factors contributed significantly to stress but in a minimal score (regression coefficient). The general health factor explained a significant amount of the variance in stress factor, with  $F(1,80) = 19.76$ ,  $p = 0.00$ ,  $R^2 = 0.19$ ,  $R^2_{adjusted} = 0.19$ . The regression coefficient of  $B = 1.44$  indicated that on average, an increase in one general health factor corresponds to an increase of 1.44 in the stress factor score. Self-esteem factor also explained a significant amount of the variance in stress factor, with  $F(1,80) = 14.69$ ,  $p = 0.00$ ,  $R^2 = 0.16$ ,  $R^2_{adjusted} = 0.14$ . The regression coefficient of  $B = 1.86$  indicated that on average, an increase in one self-esteem factor corresponds to an increase of 1.86 in the stress factor score. This is also true for work hazard factor, where it explained a significant amount of the variance in stress factor, with  $F(1,80) = 20.21$ ,  $p = 0.00$ ,  $R^2 = 0.20$ ,  $R^2_{adjusted} = 0.19$ . The regression coefficient of  $B = 3.53$  indicated that on average, an increase in one work hazard factor corresponds to an increase of 3.53 in the stress factor score.

The mental demands factor, problem at work factor and conflict at work factor also showed significance to stress with a minimal score (regression coefficient). The mental demands factor explained a significant amount of the variance in stress factor, with  $F(1,80) = 7.54$ ,  $p = 0.00$ ,  $R^2 = 0.09$ ,  $R^2_{adjusted} = 0.07$ . The regression coefficient of  $B = 3.66$  indicated that on average, an increase in one mental demands factor corresponds to an increase of 3.66 in the stress factor score. Likewise, the problem at work factor explained a significant amount of the variance in stress factor, with  $F(1,80) = 38.13$ ,  $p = 0.00$ ,  $R^2 = 0.33$ ,  $R^2_{adjusted} = 0.31$ . The regression coefficient of  $B = 3.78$  indicated that on average, an increase in one problem at work factor corresponds to an increase of 3.78 in the stress factor score. Also, the conflict at work factor explained a significant amount of the variance in stress factor, with  $F(1,80) = 44.42$ ,  $p = 0.00$ ,  $R^2 = 0.36$ ,  $R^2_{adjusted} = 0.35$ . The regression coefficient of  $B = 1.92$  indicated that on average, an increase in one conflict at work factor corresponds to an increase of 1.92 in the stress factor score.

The workload and responsibilities factor, social support factor and job future factor were among other factors discussed earlier that showed

significance to stress with a minimal score (regression coefficient). The workload and responsibilities factor explained a significant amount of the variance in stress factor, with  $F(1,80) = 69.95$ ,  $p = 0.00$ ,  $R^2 = 0.47$ ,  $R^2_{adjusted} = 0.46$ . The regression coefficient of  $B = 2.98$  indicated that on average, an increase in one workload and responsibilities corresponds to an increase of 2.98 in the stress factor score. The same goes for the social support factor, where it explained a significant amount of the variance in stress factor, with  $F(1,80) = 4.12$ ,  $p = 0.04$ ,  $R^2 = 0.05$ ,  $R^2_{adjusted} = 0.04$ . The regression coefficient of  $B = 0.83$  indicated that on average, an increase in one social support factor corresponds to an increase of 0.83 in the stress factor score. Also, the job future explained a significant amount of the variance in stress factor, with  $F(1,80) = 11.56$ ,  $p = 0.001$ ,  $R^2 = 0.13$ ,  $R^2_{adjusted} = 0.12$ . The regression coefficient of  $B = 3.23$  indicated that on average, an increase in one job future corresponds to an increase of 3.23 in the stress factor score.

The simple regression was also conducted on the physical environment factor and job satisfaction factor, nevertheless, they did not explain a

significant amount of the variance in stress factor. Interestingly, it was found that the job requirement factor contributed significantly to stress with a high score (regression coefficient). The job requirement factor explained a significant amount of the variance in stress factor, with  $F(1,80) = 36.50$ ,  $p = 0.00$ ,  $R^2 = 0.31$ ,  $R^2_{adjusted} = 0.30$ . The regression coefficient of  $B = 74$  indicated that on average, an increase in one job requirement factor corresponds to an increase of 74 in the stress factor score, which is multiple times higher compared to other significant stress factors.

**Correlation Between Job Stress Factors**

As shown in Table 2, job requirement and self-esteem showed a low positive correlation ( $r = 0.276$ ,  $p = 0.012$ ). This finding showed that high job requirements among the respondents were associated with high self-esteem. Meanwhile, problem at work and self-esteem showed a medium positive correlation ( $r = 0.305$ ,  $p = 0.005$ ). Increasing problems at work can influence the emotions of the respondents, causing them to feel useless and unworthy, i.e., having low self-esteem, which can eventually lead to stress.

**Table. 2. Correlation of stress factors among respondents.**

	1	2	3	4	5	6	7	8	9	10	11	12
<b>1. General health</b>	1											
<b>2. Self-esteem</b>	-	1										
	.022											
<b>3. Physical environment</b>	-	.024	1									
	.027											
<b>4. Job requirement</b>	-	.276*	.175	1								
	.067											
<b>5. Mental demands</b>	.060	.089	.083	.034	1							
<b>6. Problem at work</b>	.165	.305**	.034	.476**	.192	1						
<b>7. Conflict at work</b>	.133	.175	.134	.075	.167	.207	1					
<b>8. Work hazards</b>	.103	.032	.004	.255*	.055	.136	.171	1				
<b>9. Workload and responsibility</b>	.216	.101	.182	.432**	.049	.406**	.250*	.406**	1			
<b>10. Social support</b>	.171	-.159	-.015	-.224*	.204	-.200	.189	.023	-.062	1		
<b>11. Job satisfaction</b>	-	-.151	-.027	-.112	.070	-.254*	-.151	-.002	.035	.087	1	
	.066											
<b>12. Job future (job future ambiguity)</b>	-	.188	.011	.457**	.038	.300**	.097	.266*	.432**	-	-.272*	1
	.136									.330**		

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

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

The next correlation is between problem at work and job requirement ( $r = 0.476$ ,  $p = 0.000$ ). This medium positive correlation showed that problems at work will increase when there is a high demanding job scope. For workload and responsibility and job requirement ( $r = 0.432$ ,  $p = 0.000$ ), a medium correlation was shown,

indicating that increasing job requirement among the respondents increases their workload and responsibilities.

The other positive correlation was found between workload and responsibility and problem at work ( $r = 0.406$ ,  $p = 0.000$ ). The medium positive

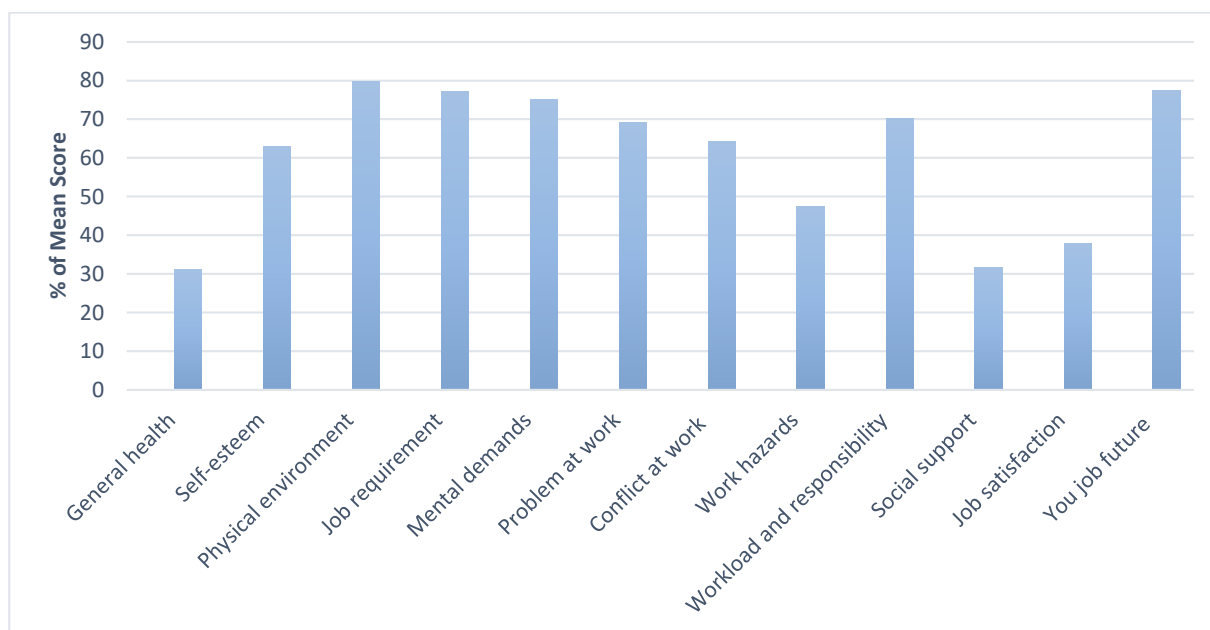
correlation indicates that high workload and responsibility at work cause more problems to arise. The job of firefighters to protect the public is considered crucial as any wrong action will lead to severe problems. When firefighters feel burdened with their workload and responsibility, it may affect their performance and effectiveness during work. Meanwhile, workload and responsibility and work hazards ( $r = 0.406, p = 0.000$ ) showed a medium positive correlation, in which the workload of the firefighters relates to the work hazards they are exposed to.

The elements of job future (job future ambiguity) and job requirement also showed a medium positive correlation ( $r = 0.457, p = 0.000$ ). In other words, high job requirements among the respondents signify a better job future. The next element pair that showed a medium positive correlation was job future (job future ambiguity) and workload and responsibility ( $r = 0.432, p = 0.000$ ). Quite similar to the job requirement factor, workload and responsibilities during work will influence the job future ambiguity of firefighters, in which high workload translates to more certainty about their future.

Lastly, job future (job future ambiguity) and problem at work ( $r = 0.300, p = 0.006$ ) also showed a positive correlation but at a low level. This is because managing the problems that arise better will lead to a better job future for the firefighters.

**DISCUSSION**

In Understanding the Factors of Job Stress Among Firefighters, figure 1 indicates the percentage of mean scores for every element in the NIOSH GJSQ. A high percentage indicates that a high number of respondents attribute that element as a factor of job stress. The physical environment had the highest percentage of 79.8% as it comprises potential stressors, such as noise, lighting, temperature and humidity, for the firefighters at their workplace. This finding is supported by previous studies, which had shown that exposure to an uncomfortable environment leads to stress in the workers<sup>16,19</sup>. In addition, it was also suggested that control over the environment allows workers to cope with workplace stress efficiently<sup>20</sup>.



**Figure 1: Percentage of mean scores for job stress factors among respondents.**

Besides, job future ambiguity also showed a high percentage. The job future ambiguity is essentially about the certainty of the respondents about their future career, opportunities for promotion, the use of job skills and work responsibilities. Even though the respondents were certain about their job future as firefighters as they were in the government sector, they felt the burden of getting promotion opportunities. This study believes that the reason may be because of the age or physical stamina requirements for promotion consideration. Based on the demographic data, most respondents were from the age groups of 41-50 years (50.0%) and 51-60 years (17.1%), which were senior firefighters

with relatively lower stamina. As a result, it is likely that they perceive job future ambiguity as a job stress factor.

The job requirement section in the NIOSH GJSQ demands the respondents to reveal the learned skills and knowledge they are often required to use during their job to get the finest outcome. This includes skills from previous experience and training as well. As per Figure 1, this study discovered that job requirement exhibited a significant relationship with job stress among the respondents (77.1%).

Self-esteem was also been identified as a contributing factor to job stress in this study. Often related to depression in cases of low self-esteem<sup>21</sup>, this element can act as an influential factor in both physical and mental health. Self-esteem is an important psychological factor contributing to health and quality of life<sup>22</sup>. Several studies had shown that subjective well-being significantly correlates with high self-esteem, and that self-esteem shares significant variance and becomes the most dominant predictor of both mental well-being and happiness<sup>22</sup>. People tend to be stressed and depressed when they are not living up to standards. In organizational situations, they may be stressed when not achieving the expectation of the superior or team members. End of the day, they might feel insecure or unsatisfied with their capability in doing the task given.

For a positive orientation scale, social support showed a high contribution in reducing stress among the respondents. The ratio for social support is low by means the respondents felt burdened when experiencing those factors (31.6%). Previous findings had shown that employees with a higher level of social support had lower stress<sup>23-25</sup>. A lack of social support is a determinant of mental health problems like depressive symptoms, and it can harm the quality of life. In addition, another study has also shown that firefighters prefer to seek support from colleagues because they spend most of their time at the working place and with their colleagues<sup>26</sup>.

### Firefighter Challenges

From the Simple Regression Analysis of Job Stress in results it can be understood that firefighters are required to maintain their fitness for fire and rescue operations, the fitness of a firefighter is always in optimum condition<sup>2</sup>, hence, the general health factor contributed to stress minimally. The self-esteem factor also contributed to stress minimally, which this study believes is due to the high regard and respect the public has for firefighters<sup>2</sup>. Interestingly, the work hazards factor also contributed significantly to stress but in a minimal score (regression coefficient). This indicates that even though firefighters are concerned about their safety during work<sup>27</sup>, it only contributed to their stress score minimally.

In term of education, firefighters mostly undergo a diploma-level education during their training, hence, indicating the significance of the mental demands factor towards stress score. Even though it is minimal, previous research found that elite team firefighters show a higher level of stress compared to regular operational firefighters<sup>2</sup>. The problem at work factor and conflict at work factor also contributed to stress, and these findings are supported by a previous study<sup>28</sup>, however, their significance on the increase in stress score is minimal as well.

Comparing to normal operational teams, the elite teams, have higher demands on themselves due to the additional workload they undertake as a part of the elite team<sup>2</sup>. This study believes that even though it may not be as substantial, the workload and responsibilities of elite teams contribute to the stress score. As this country does not have specific requirements for trained emergency personnel in relevant industries, it may create issues of job future gaps for current firefighters. Hence, the significant but minimal contribution to the stress score. Moreover, even though firefighters Malaysia have a retirement scheme, the current remuneration received, unfortunately, may cause some discomfort among them when compared to working in the private sector or other industries<sup>13,28,29</sup>.

Finally this study believes that the current COVID-19 pandemic has led to a significant increase in the stress factor scores. The reason is that since the onset of the pandemic in Malaysia, firefighters play an important role in the disinfection of several affected governmental and public areas, as well as the management (burial) of the deceased, which at one time, accounted for thousands of casualties<sup>30,31</sup>.

### Overcoming Job Stress Factor

Results indicated in Table 2 shows the correlation between different job stress factors. A previous study indicated that self-esteem is a predictor of an employee's attitude and its relationship with other variables, such as work engagement<sup>18</sup>. Self-esteem is important for every person because it dictates the ability to face life's challenges and manage them properly. High self-esteem is eventually good for employees' performance, in which they can perform even when under pressure like time pressure or excessive workload. Good self-esteem also allows employees to be in control and able to deal with high job challenges. On the other hand, poor self-esteem can cause negative effects on the mental health of a person and affect the actions taken to solve problems<sup>6</sup>. Therefore, it is fair to state that self-esteem is important to overcoming job stress.

The problems at work of the respondents arise when their job requires them to work under pressure, such as in cases of a limited time frame, increasing workload and demanding fast thinking and high concentration<sup>1,2</sup>. While these elements do not directly lead to job stress, they can reduce the performance of the firefighters. In this part, the respondents were asked how often their job requires them to work hard, work fast, work under time pressure, work with increased concentration and work with an increased workload<sup>6,17</sup>.

Work hazards can be categorized as chemical, biological, physical and psychological. A previous study showed that work hazards had a strong association with depression<sup>32</sup>. Therefore, this study concludes that a workload increase will

increase the exposure to hazards and affect the mental health of the firefighters. However the authors believe that the motivations of firefighters relates towards the satisfaction of overcoming the work hazards<sup>2</sup>.

Results section also mentioned the job future ambiguity is about how certain respondents feel their responsibilities or job skills will remain relevant in the future<sup>6</sup>. As for job requirement, it relates to the need for firefighting roles. Hence, it can be concluded that as long as such roles of a firefighter are still needed, the respondents will be more confident about their job future. In this part, there was a question that discussed the responsibilities of firefighters towards the future, job security, morale and welfare of others. As long as that those responsibilities remain relevant, it can be concluded that firefighters are more than needed in the future.

## CONCLUSION

This study concluded that the job requirement is the highest factor that contributes to job stress among Malaysian firefighters. In addition, other elements that contribute to higher job stress are physical environment, problem at work, job future and self-esteem. Even though other elements did not directly correlate to job stress, these factors, however, were correlated with each other, which can affect the work performance and psychological state of the respondents, and may eventually lead to job stress. Through this study, the authors deduce that every individual will experience conditions such as job stress, job dissatisfaction and burnout, however, the level of severity may differ depending on their coping abilities. Hence, ensuring a good coping mechanism helps in overcoming the mental health problems experienced by firefighters in Malaysia. It is suggested that further research could be conducted towards understanding good coping mechanisms for depression, anxiety and stress so that the psychological health problems of firefighters can be managed or even prevented.

Some limitations in this study that are worth mentioning include the respondents coming from a high incident rate firestations only, to ensure different availability of elite teams from the same pool of respondents. Other limitations include the COVID-19 pandemic outbreak. Since the start of the pandemic outbreak in Malaysia in early 2020, the roles of firefighters have increased to include fully supporting the government on the ground process for decontamination and sanitizations of facilities, as well as several other operational supports. Hence, such additional roles likely increased the factors of stress among the respondents.

Throughout this study, the authors discern that efforts in providing good social support, general

healthcare concerns and job satisfaction can contribute to reducing job stress. Firefighters' job requirements and capabilities in solving problems should always be acknowledged and publicized to ensure a healthy level of self-esteem among firefighters. Nevertheless, stress is also caused by job future ambiguity and problems at work. Hence, the government of Malaysia needs to acknowledge its firefighters further with better benefits. Other takeaways from this study include social support can reduce stress caused by job requirement and job satisfaction can reduce stress caused by problem at work.

The authors believe that the novelty of this research consists of:

- Social support, general health and job satisfaction are factors to be considered to reduce the job stress of firefighters
- Job requirement and problem-solving at work (during operations) provide additional self-esteem to firefighters
- Job future ambiguity, workload and problem at work contribute to job requirement-induced stress among firefighters
- Firefighters' current workload is causing problems at work and additional hazards for them
- Firefighters tend to be unsure of their job future because of the workload and responsibility received
- Social support can reduce the job requirement stress factor
- Job satisfaction can reduce the problem at work stress factor.

## Conflict of interest

The authors declare no potential conflict of interest.

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## REFERENCES

1. Ainul Husna K, Khairilmizal S, Najaatun Nisa AR. A Preliminary Study of Depression, Anxiety, Stress and Its Factors among Firefighters in Malaysia. In: Abdullah H, Suppian R (eds) *The Influence Of Ecosystem Services Towards Human*

- Wellbeing*. New York: Nova Science Publisher, p. 133.
2. Samsudin K, Mohamad Fahmi Hussin, Nur Fatin Najihah Ghazali, et al. Association Between Workload And Psychological Well-Being In Malaysia Elite Firefighter. *Malaysian Journal of Public Health Medicine* 2021; 21: 374–381.
  3. Shaiful M, Bin A, Ismail A, et al. Original Article a Review of Occupational Stress Prevalence and Its Predictors. 2018; 18: 1–6.
  4. De Silva N, Samanmali R, De Silva HL. Managing occupational stress of professionals in large construction projects. *Journal of Engineering, Design and Technology* 2017; 15: 488–504.
  5. Bhatti MH, Bhatti MH, Akram MU, et al. Relationship between job stress and organizational commitment: An empirical study of banking sector. *E3 Journal of Business Management and Economics* 2016; 7: 029–037.
  6. Jimoh, Lukman A, Kee DMH, et al. Does Talent Management Practices Impact Service Quality in Nigeria? *Journal of Southwest Jiaotong University*; 55. Epub ahead of print 2020. DOI: 10.35741/issn.0258-2724.55.5.8.
  7. Rodrigues S, Paiva JS, Dias D, et al. Stress among on-duty firefighters: An ambulatory assessment study. *PeerJ* 2018; 2018: 1–19.
  8. Klimley KE, Van Hasselt VB, Stripling AM. Posttraumatic stress disorder in police, firefighters, and emergency dispatchers. *Aggress Violent Behav* 2018; 43: 33–44.
  9. Klimley KE, van Hasselt VB, Stripling AM. Posttraumatic stress disorder in police, firefighters, and emergency dispatchers. *Aggress Violent Behav* 2018; 43: 33–44.
  10. Haynes H. U.S. Firefighter Injuries in 2016. *NFPA Journal*, 2017.
  11. Ahmad FBIN. Psychological distress and its relation to coping strategies among firefighters and civil defense force involved in the massive flood disaster in Kelantan.
  12. Dahlan M, Malek HA. The Sources of Occupational Stress and Coping Strategies among Emergency Workers in Sabah , Malaysia The Sources of Occupational Stress and Coping Strategies among Emergency Workers in Sabah , Malaysia Faculty of Psychology and Education. 2016; 6: 155–162.
  13. Park H, Kim JI, Oh S, et al. The impact of emotional labor on the severity of PTSD symptoms in firefighters. *Compr Psychiatry* 2018; 83: 53–58.
  14. Kim JIJHJI, Park H, Kim JIJHJI. The mediation effect of PTSD, perceived job stress and resilience on the relationship between trauma exposure and the development of depression and alcohol use problems in Korean firefighters: A cross-sectional study. *J Affect Disord* 2018; 229: 450–455.
  15. Kazronian S, Zakerian SA, N. SJ, et al. Reliability and Validity study of the NIOSH Generic Job Stress Questionnaire (GJSQ) among Firefighters in Tehran city. *Journal of Health and Safety at Work* 2013; 3: 25–34.
  16. Purwalaksana IB, Sumartono, Haryono BS, et al. Implications of Social Inequality for Soldiers in Health Services of the Indonesian National Armed Forces Managed by the Social Security Agency. *Journal of Southwest Jiaotong University* 2021; 56: 307–317.
  17. Almaskari MSNS, Marni N bin. Human Resource Management Role in Improving Employees' Performance in the United Arab Emirates' Health Sector. *Journal of Southwest Jiaotong University* 2020; 55: 326–344.



18. Pathardikar A, Sahu S, Srivastava A. Self-esteem and Work Engagement influencing Job Satisfaction. *the Indian journal of commerce*; 72.
19. McCormack N, Cotter C. Factors contributing to burnout. 2013; 27–56.
20. McCormack N, Cotter C. Factors contributing to burnout. 2013; 27–56.
21. Saijo Y, Ueno T, Hashimoto Y. Job stress and depressive symptoms among Japanese fire fighters. *Am J Ind Med* 2007; 50: 470–480.
22. Mann M, Hosman CMH, Schaalma HP, et al. Self-esteem in a broad-spectrum approach for mental health promotion. *Health Educ Res* 2004; 19: 357–372.
23. Alsubaie MM, Stain HJ, Webster LAD, et al. The role of sources of social support on depression and quality of life for university students. *Int J Adolesc Youth* 2019; 24: 484–496.
24. Dafaalla M, Farah A, Bashir S, et al. Depression , Anxiety , and Stress in Sudanese Medical Students : A Cross Sectional Study on Role of Quality of Life and Social Support. Epub ahead of print 2016. DOI: 10.12691/education-4-13-4.
25. Duran F, Woodhams J, Bishopp D. An Interview Study of the Experiences of Firefighters in Regard to Psychological Contract and Stressors. *Employee Responsibilities and Rights Journal* 2018; 30: 203–226.
26. Duran F, Woodhams J, Bishopp D. An Interview Study of the Experiences of Firefighters in Regard to Psychological Contract and Stressors. *Employee Responsibilities and Rights Journal* 2018; 30: 203–226.
27. Dowdall-Thomae C, Gilkey J, Larson W, et al. Elite firefighter/first responder mindsets and outcome coping efficacy. *Int J Emerg Ment Health* 2012; 14: 269–281.
28. Smith TD, Hughes K, DeJoy DM, et al. Assessment of relationships between work stress, work-family conflict, burnout and firefighter safety behavior outcomes. *Saf Sci* 2018; 103: 287–292.
29. Kennedy BK. *The Psychological and Physiological Effects of Stress on Firefighters*. 2018.
30. MOH. COVID-19 (Maklumat Terkini).
31. Harian B. Kronologi COVID-19 di Malaysia.
32. Hsu SHJ, Chen DR, Cheng Y, et al. Association of psychosocial work hazards with depression and suboptimal health in executive employees. *J Occup Environ Med* 2016; 58: 728–736.