

# Analyzing Psychological Burnout Among Firefighters Involved in Fire Suppression

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## 〈Abstract〉

This study analyzed psychological burnout among firefighters in fire suppression units and identified factors that influence it. Fire suppression work involves high levels of stress and repeated exposure to traumatic events, making psychological burnout particularly severe in this field. This burnout negatively impacts job performance and organizational efficiency. This study conducted an online survey of firefighters across South Korea, with 120 respondents, and analyzed the level of psychological burnout based on factors such as age, years of service, and rank. The results showed that the mean score for overall psychological burnout was 2.8 out of 5, indicating a moderate level of burnout among firefighters. Furthermore, personnel in lower ranks (firefighters, senior firefighters, fire sergeants, and fire lieutenants) experienced higher levels of psychological burnout compared to those in higher ranks (fire captains, deputy fire chiefs, etc.). These findings suggest the need for rank-specific burnout management strategies. Overall, the results of this study contribute to alleviating psychological burnout among firefighters, enhancing organizational efficiency, and strengthening public safety.

*Keywords : Fire service personnel, Psychological Burnout, Mental health*

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## 1. Introduction

The primary duty of firefighters is suppressing fire, during which they experience extreme physical and mental stress. The occurrence of a fire creates a dangerous environment with continuous life-threatening risks, and firefighters must rescue lives and protect property with swift and accurate judgment. Owing to societal changes such as rapid industrialization, accelerated urbanization, and population aging have expanded the scope of work for firefighters, resulting in excessive workload [1]. This can cause severe stress, affect firefighters' mental health, and increase their likelihood of burnout [2].

Burnout is a state of mental and physical fatigue stemming from job stress [3]. It hampers job satisfaction, quality of life, and overall mental health [4, 5]. Firefighters, particularly those in fire suppression units, are frequently exposed to fire suppression tasks. This exposure can cause trauma and repetitive tension and make them more vulnerable to burnout than other professionals [6]. Studies have shown that more than 80% of firefighters experience traumatic stress, and many are expected to have such experiences [7]. Such burnout can affect the operational efficiency of the entire firefighting organization and, ultimately, hamper public safety. Moreover, it can have a detrimental effect on one's own health. Repeated traumatic experiences can impair one's mental health and result in stress, anxiety, and depression [8]. This may lead to chronic burnout and adversely affect not only one's own quality of

life but also that of their family and friends [9].

This study aimed to explore the burnout experienced by firefighters in fire suppression units, identify the factors contributing to such burnout, and seek effective strategies to address this issue. With this aim, the study seeks to help firefighters perform their duties in a healthier state, enhance the efficiency of firefighting organizations, and improve public safety.

## 2. Methods

### 2.1 Participants and data collection

This study analyzed the burnout experienced by firefighters involved in fire suppression. A survey was administered to firefighters nationwide between March 28 and June 10, 2024. The survey was conducted using the On-nara Administrative Management System 2.0, and 120 individuals completed the survey.

### 2.2 Measurements

A questionnaire measuring psychological burnout was developed by revising and reconstructing the questionnaire developed by Ji-eun Kim [10]. The resulting questionnaire comprised 10 items that were rated on a 5-point Likert scale ranging from "Not at all" (1 point) to "Very much" (5 points). The reliability analysis yielded a Cronbach's alpha coefficient of .891, which exceeded the standard value of 0.6 and demonstrated the internal consistency of the measurement tool.

## 2.3 Data analysis

The collected data were analyzed in the following manner. First, a frequency analysis was conducted to identify the general characteristics of the participants and obtain descriptive statistics (frequencies and percentages).

Second, the Cronbach's alpha coefficient was calculated to determine the reliability of the tool used to measure psychological burnout.

Third, a descriptive statistical analysis was conducted to determine the level of psychological burnout.

Fourth, independent t-tests and one-way ANOVA were conducted to determine differences in the level of psychological burnout based on participants' general characteristics. Duncan's test was used for post-hoc analysis.

Fifth, a multiple regression analysis was conducted to identify the factors affecting psychological burnout among firefighters involved with fire suppression skills.

All statistical analyses were performed using the SPSS 28.0 software.

## 3. Results

### 3.1 General characteristics of the participants

Table 1 presents the general characteristics of the participants. The total number of respondents was 120. Most of them were male (99.2%), and many were aged between 51 and 60 (44.2%). Regarding years of service,

Table 1. General characteristics of the participants

Characteristic		N	%
Sex	male	119	99.2
	Female	1	0.8
Age	21-30	9	7.5
	31-40	23	19.2
	41-50	35	29.2
	51-60	53	44.2
Years of service (in years)	≤ 5	26	21.7
	6-10	12	10.0
	11-15	13	10.8
	16-20	14	11.7
	21-25	5	4.2
	26-30	28	23.3
	≥ 31	22	18.3
Rank	Firefighter	19	15.8
	Senior Firefighter	11	9.2
	Fire Sergeant	20	16.7
	Fire Lieutenant	39	32.5
	Fire Captain	26	21.7
	Deputy fire chief higher	5	4.2
Total		120	100.0

those who had served for 26 to 30 years were the highest in number (23.3%). Regarding rank, most participants were fire lieutenants (32.5%).

### 3.2 Level of Psychological Burnout

Table 2 presents data on the levels of psychological burnout experienced by the participants. The mean score for overall psychological burnout was slightly below the midpoint (3 points) at 2.80 points. The mean scores for the items were as follows: 2.78 points for "I am emotionally tired from my job," 2.89 points for "I get exhausted at the end of working hours," 2.93 points for "I feel tired when I wake up in the morning and think about going to work," 2.79 points

for “I feel exhausted from work,” 3.08 points for “Working with people is stressful,” 2.94

**Table 2. Level of Psychological Burnout**

category	N	M	SD
I am emotionally drained due to my duties.	120	2.78	1.13
I am exhausted by the end of my shift.	120	2.89	1.08
In the morning, the thought of going to work makes me feel tired.	120	2.93	1.14
I feel utterly drained due to my work.	120	2.79	1.07
Working with people is stressful for me.	120	3.08	1.07
The horrific conditions at the scene make me emotionally numb.	120	2.94	1.03
I have developed a fear of responding to disaster scenes.	120	2.53	1.02
I dislike handling administrative tasks during work.	120	3.01	1.13
I dislike doing training during work.	120	2.42	0.98
I find it difficult to create a relaxed atmosphere with my colleagues.	120	2.60	1.08
Overall	120	2.80	0.76

M = Mean, SD = Standard Deviation

points for “The disastrous situations at the site make me emotionally numb,” 2.53 points for “I am afraid of being dispatched to disaster sites,” 3.01 points for “I don't want to do administrative work during my shift,” 2.42 points for “I don't want to participate in training during work hours,” and 2.60 points for “I find it difficult to create a comfortable atmosphere with my colleagues.”

### 3.3 Differences in the Level of Psychological Burnout Based on Participants' General Characteristics

Table 3 presents the results of investigating differences in the level of psychological burnout based on age, years of service, and rank. No statistically significant differences

**Table 3. Differences in the Level of Psychological Burnout Based on Age, Years of Service, and Rank**

Characteristic	Classification	M	SD	t/F	p	Duncan test
Age	21-30	2.94	0.81	1.905	.133	
	31-40	3.07	0.85			
	41-50	2.83	0.78			
	51-60	2.64	0.69			
Years of Service (in years)	≤ 5	2.93	0.88	2.716*	.017	c, f, g<e
	6-10	3.13	0.75			
	11-15	2.42	0.66			
	16-20	3.09	0.74			
	21-25	3.44	0.77			
	26-30	2.62	0.68			
	≥ 31	2.58	0.60			
Rank	Firefighter	3.19	0.83	3.824**	.003	e, f<a
	Senior firefighter	2.61	0.91			
	Fire sergeant	2.72	0.63			
	Fire lieutenant	3.01	0.68			
	Fire captain	2.40	0.66			
	Deputy fire chief higher	2.44	0.84			

M = Mean, SD = Standard Deviation

were found in psychological burnout based on age. However, the level of psychological burnout differed significantly based on the years of service ( $p < .05$ ). Duncan's test revealed that the level of psychological burnout was higher among those who had served for 21-25 years than for those who had served for 11-15 years, 26-30 years, and 31 years or more. Furthermore, the level of swere levels psychological burnout showed statistically significant differences based on rank ( $p < .01$ ). Duncan's test revealed that firefighters had experienced a higher level of psychological burnout awareness than fire captains and deputy fire chiefs or those with a higher rank.

### 3.4 Factors Influencing Psychological Burnout

Table 4 shows the results of determining

**Table 4. Factors Influencing Psychological Burnout Among Firefighters Involved in Fire Suppression**

Factor	B	SE	$\beta$	t	p	VIF
Cnnstat	4.115	.391	.	10.523	.000	.
Age	-.465	.244	-.270	-1.901	.060	2.650
Years of Service (in years)	.095	.057	.283	1.663	.099	3.785
Position	-.126	.203	-.067	-.622	.535	1.535
Rank	-.597	.228	-.344	-2.614*	.010	2.265
R=.122, AdjR <sup>2</sup> =.092, F=4.004**, D/W=1.938, p=.004						

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$   
 \*Dummy: D1 (Age): 21-40 = 0, 41-60 = 1; D2 (Position): Paramedic/Rescuer/Firefighter = 0; Administrative staff = 1; D3 (Rank): Firefighter/Senior firefighter/Fire sergeant/Fire lieutenant = 0; Fire captain/Deputy fire chief or higher = 1

the factors influencing the psychological burnout among firefighters involved within fire suppression. The Variance Inflation Factor (VIF) was between 1.535 and 3.785, which is below the threshold of 10, indicating no multicollinearity among the independent variables. The Durbin-Watson (D/W) value was 1.938, which is close to 2, indicating no autocorrelation among the residuals. The R<sup>2</sup> value was .122, suggesting an explanatory power of 12.2%. The regression model was found to be suitable at a significance level of  $p = .01$ , with  $F = 4.004$ . Among the general characteristics of the participants, rank ( $\beta = -0.344$ ,  $p < .05$ ) had a significantly negative effect on psychological burnout. Specifically, firefighters, senior firefighters, fire sergeants, and fire lieutenants experienced greater psychological burnout than fire captains and deputy fire chiefs or those with a higher rank.

## 4. Discussion and Conclusion

An analysis of the level of psychological burnout revealed a moderate level of psychological burnout, with the mean score for overall psychological burnout being 2.8 out of 5 points. This result is similar to the findings of other studies involving firefighters, as they reported an average score of 60 out of 100 points [6]. Studies involving dedicated nurses have shown that work overload [11] and fear of infection among paramedics [9] are factors that increased psychological burnout.

Previous studies have shown that psychological burnout is significantly higher when the number of dispatches is high, the years of service are low, or there is anxiety about infection during work. Sex, average number of dispatches per day, and wearing protective gear were not found to be significant factors [9]. Aligning with these findings, this study found that psychological burnout is higher among fire service personnel with fewer years of experience (i.e., firefighters) than among fire captains and deputy fire chiefs or those with a higher rank which is consistent. It also found a higher level of psychological burnout among firefighters with 21–25 years of experience than among those with 11–15 years, 26–30 years, and 31 years or more of experience.

The multiple regression analysis showed that firefighters, senior firefighters, fire sergeants, and fire lieutenants experience higher levels of psychological burnout than fire captains and deputy fire chiefs or those with a higher rank. This finding suggests that the intensity of fieldwork and fewer years of experience contribute to increased levels of psychological burnout. In a previous study, A stepwise regression analysis of psychological burnout among firefighters showed that paperwork burden, health status, and workload account for 20.99% of the burnout level [12]. These findings suggest that frequent exposure to unpredictable situations, stress from direct contact with patients, repeated traumatic events [13], and the burden of performing administrative

tasks after field activities contribute to psychological burnout among firefighters involved in fire suppression.

To ensure emotional stability and create a healthy work environment for firefighters involved in fire suppression, psychological burnout must be prevented and managed using a multifaceted approach is necessary. Developing and implementing mental health programs tailored to each rank and job characteristic is crucial. For instance, regular psychological counseling and stress management training may alleviate the psychological burden experienced by firefighters involved in fire suppression. It is also essential to enhance psychological resilience by strengthening peer support networks and fostering a positive workplace culture. Such efforts can improve firefighters' mental health and, ultimately, the efficiency of their tasks.

The findings of this study can serve as foundational data in improving the psychological well-being of firefighters involved in fire suppression and creating a safe and healthy work environment.

Continued research and program development may reduce psychological burnout among firefighters involved in fire suppression and help them manage work-related stresses. This will ultimately enhance the job satisfaction of firefighters, who are responsible for public safety, and contribute to the provision of better services. This study was conducted with 120 firefighters, which presents a limitation in representing the entire population

of firefighters. Additionally, the study focused solely on firefighters involved in fire suppression, making it difficult to reflect the psychological burnout levels of firefighters in other roles. Future research should involve a larger sample size, including various job roles, and conduct in-depth analyses that take into account regional characteristics and work environments.

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