

소방공무원의 근무형태에 따른 수면의 질, 직무스트레스, 피로도, 직무만족 및 외상 후 스트레스장애 차이

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Differences in quality of sleep, job stress, fatigue, job satisfaction, and posttraumatic stress disorder according to the type of work in fire-fighting officers

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연구 목적: 본 연구는 소방공무원의 근무형태에 따라 수면의 질, 직무스트레스, 피로도, 직무만족 및 외상 후 스트레스 장애 차이를 알아보고, 근무형태에 맞는 심리치료의 기초자료를 제공하고자 하였다.
연구 방법: 본 연구는 온라인 설문지를 이용하였다. 소방공무원 322명을 대상으로 하였으며, 자료수집기간은 2018년 5월 2일부터 5월 20일까지였다. 수집된 자료는 SPSS 22.0을 이용하여 분석하였다.
연구 결과: 소방공무원의 근무형태에 따라 직무스트레스, 직무만족, 외상 후 스트레스 장애는 유의미한 차이를 보였으나, 수면의 질, 피로도 차이는 없었다. 직무스트레스, 직무만족, 외상 후 스트레스 장애의 유의미한 차이를 나타낸 것은 화재진압과 구조·구급근무형태였다. 또한 외상 후 스트레스 장애는 수면의 질, 직무스트레스, 직무만족, 피로도와 유의미한 차이를 보였다. 이는 외상 후 스트레스 장애를 겪고 있는 소방공무원들은 수면의 질, 직무스트레스, 직무만족, 피로도의 어려움을 함께 경험하고 있으므로 이를 개선할 수 있는 방안을 제안하였다.

결론: 본 연구의 결과를 토대로 소방공무원 근무형태에 따라 수면의 질, 직무스트레스, 피로도, 직무만족 및 외상 후 스트레스 장애를 극복할 수 있는 심리치료 기초 자료를 제공할 때 소방공무원의 정신건강이 좋아질 것이다.

국문중심단어: 수면의 질, 직무 스트레스, 피로도, 직무만족, 외상 후 스트레스 장애

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=Abstract =

Purpose: The purpose of the study was to investigate the differences in quality of sleep, job stress, fatigue, job satisfaction, and posttraumatic stress disorder (PTSD) according to the type of work in fire-fighting officers.

Methods: This study used an online questionnaire. The participants were 322 fire-fighting officers. The data were collected from May 2 to 20, 2018. Data were analyzed using SPSS 22.0.

Results: According to the work styles of fire fighting officers, job stress, job satisfaction, and PTSD showed significant differences. However, There were no differences in sleep quality and fatigue. There were significant differences in job stress, job satisfaction, and PTSD in those in roles of fire suppression and rescue emergency medical technicians and this result suggests a way to improve the quality of sleep, job stress, job satisfaction and fatigue for fire-fighting officers who suffer from PTSD.

Conclusion: Based on the results of this study, mental health of fire-fighting officers will be improved through basic data for psychotherapy which can overcome the quality of sleep, job stress, fatigue, job satisfaction and PTSD according to the work style of fire-fighting officers.

Keywords: Type of work, Quality of sleep, Job stress, Fatigue, Job satisfaction, Posttraumatic stress disorder (PTSD)

I . Introduction

In Korea, the role of fire-fighting officers is becoming more important as a result of large-scale casualties such as the sinking of Sewolho in 2014, Fire accident in Uijeongbu apartment in 2015, Jecheon Sports Center fire in 2017 and Milyang Sejong hospital fire in 2018. A fire fighting officer is a special-purpose civil servant who suppresses a fire and performs rescue·emergency medical technician(EMT) in a fire, disaster and other emergency situations. In the past, if the main tasks of fire fighting officers were limited to passive fire suppression [1], Currently, the work of fire fighting officers is expanding to include fire protection and evolving, fire protection measures for rescue emergency medical technicians and fire safety training for life safety education. This means that the

area is expanding from the traditional fire-fighting work to the settlement of various disaster accidents, support for the people who was suffered from accident. The responsibilities of fire suppressions are increasing rescue and rescue activities and the role [2].

While the roles of fire fighting officers are becoming more and more burdensome, the treatment of fire fighting officers is lacking. For example, In spite of the implementation of the five day work week, fire-fighting officers are not subject to the 52-hour work week under the current law and appear to be working in two shifts of 84 hours a week, nearly twice than legal working hours. Even if they are injured at various accident scenes, they are not able to receive financial support and have the difficulties caused by the lack of old equipments and fire-fighting officers. In addition, there is a conflict in comparison with other organizations in unequal and

inferior work environments such as the elimination of opportunities for education and training in overseas and employee education of local governments [3]. The disastrous experience shows that the mental health of fire fighting officers is very serious. They are complaining about recurrent events, dreams, sleep disturbances and emotional disturbances at the same time, as well as being more sensitive and impotent than before [4]. Particularly, one third of the Korean fire fighting officers were judged as posttraumatic stress disorder(PTSD). In the report, They are experiencing symptoms of ptsd but there is no intervention or treatment plan. In addition, They must rescue and transport victims of accidents while maintaining their equilibrium in a devastating accident scene, also, the high level of emotional labor is required to provide relief and comfort for victims' families around the accident [5]. In a situation in which public services provide policy for providing citizen satisfaction service, they are experiencing many difficulties such as responding to unreasonable requests and abuse of non-emergency patients, spoilers, etc., while adjusting their emotions [6].

Fire fighting officers are known to have a lot of sleep disturbances due to shift work or night shift. Sleep is an essential element in human health and life, supplementing energy to overcome physical and mental fatigue [7]. To ensure the quality of sleep, you should sleep at night to fit your biorhythm. However, They who work on shifts often work at night and work on-site and this causes the lack of sleep and the quality of sleep of them to be reduced, and serious obstacles to the physical and mental

health of fire fighting officers [8].

According to a survey result submitted to the National Assembly for National fire agency, National fire fighting officers of 36.4% were found to have sleep disorders. This can be seen as a very high level compared to people of 15% with sleep disorders. In addition, the Anti corruption & Civil Right Commission in 2015 directly surveyed them into the rescue site. As a result, insomnia and sleep disorders accounted for all fire fighting officers of 43.2%, 19.6 times more than ordinary people.

Due to the nature of fire fighting officers work, job stress is increasing [9]. Job stress is also known to cause psychological, behavioral, and physical health problems [10]. Job stress is harmful physical and emotional responses that occur when the requirements of the work do not match workers' abilities or resources [11]. According to the data on the job stressors of fire fighting officers, 16.8% of them was under job stress and 79.2% were exposed to potential stress [12]. This can be regarded as a stress to them due to the tension and psychological burden of performing work in the work environment of 24 hours shift work and in the scene of various accidents. They were found to be stressed by irregularity, risk, and urgency scene. As a result, it can be seen that mental and physical work is required in high risk situations. For example, it is fire suppression and lifesaving and serious injured treatment scene. As a result, they have experiences high stress [13].

Shift workers often lose their vital rhythmic cycles during frequent day and night changes. As a result, fatigue accumulates and causes various

side effects. The mental and physical dysfunction of the individual due to fatigue accumulation may interfere with the performance of the work. This can lead to mental and physical illnesses, especially in workers who work at night, showing high fatigue [14]. According to Kim et al. [15], That fire fighting officers have a high level of danger and high tension, and fatigue in various work environments is relatively high compared to other occupations. In these studies, the level of fatigue of them was higher than the level of fatigue of police officers. The result was reported as job stress.

Job satisfaction refers to the emotional aspect of a worker's job, which is a positive or negative evaluation of his or her work or work situation. According to a study of fire fighting officers, their job satisfaction was higher than those of other shift workers (hospital nurses), which showed that they were more satisfied with their work. There were differences in job satisfaction according to the type of work of them. Fire fighting officers who were in charge of fire suppression and rescue·EMT showed higher job satisfaction than desk duty job, and rescue·emt were more satisfied with job than fire suppression [16]. It was found that, while rescuing those who were in an emergency and treating first aid, they perceived themselves to be necessary for others and thought that their work form was more rewarding than other forms of work.

Fire fighting officers often witness the death or injury of their colleagues in unforeseen circumstances or at the scene of the accident and they often hear about the accident through the media. When the number of repetitive exposures

to such a horrible event increases, they have a high risk of experiencing posttraumatic stress disorder(PTSD) [17]. According to a study by Lee [18], The 30.6% of the 100 fire fighting officers working in Seoul and Gyeonggi-do were classified as PTSD and 20.5% were classified as partial PTSD. According to the results of the fire fighting officer's health check-up in 2015, in the case of field fire fighting officers, ptsd was 6% of all fire fighting officers, 10 times that of ordinary people. The prevalence of ptsd among the fire fighting officers increased as the age and grade increased, the most in the 40s, which is more vulnerable to repeated PTSD experiences. Posttraumatic stress disorder is known to be the most serious of all work stresses, and special care is required for ptsd of them [18].

As a result, the various roles of fire-fighters and the work environment factors in which they are put, lowers their quality of sleep and high job stress and increases fatigue and hampers job satisfaction. Ultimately, they also experience ptsd. Thus, although previous studies have provided empirical data on the difficulties of them, they did not distinguish these characteristics according to the type of work of fire fighting officers. As described above, there are various types of work in terms of the work characteristics of fire fighting officers. Generally speaking, fire fighting officers are often considered to be responsible for fire suppression, rescue·EMT. However, fire fighting officers are working in various forms such as fire suppression, driving, desk duty, rescue·EMT, communications, and fire investigations.

Fire fighting officers differ in the environ-

ment in which they have to deal with emergency situations and the tasks they are dealing with according to these various forms of work. Fire suppression works on the whole thing that goes to the fire scene and directly turns off the fire, and supplies the water source and removes the risk of the fire scene and life serving, desk duty are responsible for complaints handling, handling of dangerous goods and building permits, personnel and welfare of fire fighting officers, purchasing of equipment and measures for the prevention of accidents. rescue·EMT cover the most urgent tasks in life, such as transporting emergency patients, animal structures and life-saving caused by various accidents. Telecommunication services 119 telephone reception and management of various communication equipment. Finally, the fire investigator will identify the cause of the fire and estimate the damage. In other words, the quality of sleep, job stress, fatigue, job satisfaction, and ptsd may be different for each type of work, so differentiated intervention needs to be provided according to this situation. Therefore, it is meaningful to examine the difference between the various difficulties experienced according to their working styles. Therefore, the purpose of this study is to investigate the differences of sleep disturbance, job stress, fatigue, job satisfaction, and PTSD according to the work style of the fire fighting officer that was overlooked in the previous study.

In this study, fire fighting officer's working style is divided into fire suppression, rescue·EMT and desk duty. This took into account the nature of the work of the fire station. The fire department is divided into the field department

and the internal department. The internal department works as a communication officer, a fire investigator, and others in charge of administrative affairs but the field department performs fire suppression, rescue·EMT. If there is a difference in the difficulties experienced by these types of work of fire fighting officers, it may be possible to provide a basis for differentiated measures to improve these factors according to the type of work. We hope that this study will provide basic data for the preparation of the psychological counseling intervention plan according to the work style of fire fighting officers. To this end, the research problems set by this study are as follows.

1. Are there differences in sleep quality, job stress, fatigue, job satisfaction, and posttraumatic stress disorder by each type of work?
2. Are there differences in sleep quality, job stress, fatigue, and job satisfaction due to posttraumatic stress disorder?

II. Research method

1. Research participants

This study was conducted on 322 fire fighting officers in Gwangju and Jeonnam. A total of 322 fire-fighting officers were selected for the final research, except for 20 of the respondents who responded unfairly to the questionnaire through the online questionnaire. Participants were 289 males and 33 females and the researcher explained the purpose of the study to the fire department in charge and

measured the sleep quality, job stress, fatigue, job satisfaction and post traumatic stress disorder through the online questionnaire. A frequency analysis was conducted to investigate the demographic characteristics of 322 respondents. The results are shown in <Table 1>.

The participants of the study were 289 males (89.8%) and 33 females (10.2%) and the age group was 28 (8.7%) in their 20s, 107 (33.2%) in their 30s, 91 (28.2%) in their 40s and 97 (29.8%) in their 50s or older. In the rank, 65 (20.1%) were fire suppressions, 61 (19%) were senior fire sergeant, 75 (23.3%) were fire sergeant, 87 (27%) were fire lieutenant and 34 (11.3%) were fire captain. In the working period, It was 85 (26.4%) for 1 to 5 years, 55 (17.1%) for 6 to 10 years, 39 (12.1%) for 11 to 15 years and 22 (6.8%) for 16 to 20 years And 121 (37.6%) over 21 years. According to the type of

work of fire suppressions classified in this study, fire suppression was 126 (39.1%), rescue·EMT 128 (39.8%) and 68 (21.1%) desk duty.

The crossover analysis was conducted to examine sex, age, class, and years of work according to work type variables. The results are shown in Table 2. As a result of the analysis, fire suppression occupied the majority of 125 males (1 female). The age of the patients was the highest with 52 patients in their 50s and over but the least in the 20s with 10 patients and followed by 39 patients in their 40s and 25 patients in their 30s. For the rank, there were 25 fire suppression, 15 senior fire sergeant, 24 fire sergeant, 59 fire lieutenant and 10 fire captain. In the working period, there was more than 21 years with 62 persons. Followed by 1 to 5 years with 28 persons, 6–10 years with 17 persons,

Table 1. Demographic characteristics of study subjects

	Variable	N	%
Sex	Male	289	89.8
	Female	33	10.2
Age	20–29	28	8.7
	30–39	107	33.2
	40–49	91	28.2
	≥ 50	96	29.8
Work types	Fire suppression	126	39.1
	Rescue EMT*	128	39.8
	Desk duty	68	21.1
Rank	Fire suppression	65	20.1
	Senior fire sergeant	61	19.0
	Fire sergeant	75	23.3
	Fire lieutenant	87	27.0
	≥ Fire captain	34	11.5
Work period	1 year ≤ 5 years	85	26.4
	6 years ≤ 10 years	55	17.1
	11 years ≤ 15 years	39	12.1
	16 years ≤ 20 years	22	6.8
	≥ 21 years	121	37.6
	Total	322	100.0

Table 2. Demographic comparison of work types

Variable	Work Types			χ^2	p	
	Fire suppression (n=126)	Rescue, EMT (n=128)	Desk duty (n=68)			
Sex	Male(n=289)	125(99.2%)	103(80.5%)	61(89.7%)	24.24	.000
	Female(n=33)	1(0.8%)	25(19.5%)	7(10.3%)		
Total	322	126(100%)	128(100%)	68(100%)		
Age	≥20(n=28)	10(35.7%)	16(57.1%)	2(7.1%)	49.61	.000
	≥30(n=107)	25(23.4%)	66(61.7%)	16(15.0%)		
	≥40(n=91)	39(42.9%)	30(33.0%)	22(24.2%)		
	≥50(=96)	52(54.2%)	16(16.7%)	28(29.2%)		
Total	322	126(100%)	128(100%)	68(100%)		
Rank	Fire suppression(n=65)	25(38.5%)	34(52.3%)	6(9.2%)	62.44	.000
	Senior fire sergeant (n=61)	15(24.6%)	31(50.8%)	15(24.6%)		
	Fire sergeant(n=75)	24(32%)	38(50.7%)	13(17.3%)		
	Fire lieutenant(n=87)	52(59.8%)	21(24.1%)	14(16.1%)		
	≥ Fire captain(n=34)	10(29.4%)	4(11.8%)	20(58.8%)		
Total	322	126(100%)	128(100%)	68(100%)		
Work Period	1 year ≤ 5 years(n=85)	28(32.9%)	44(51.8%)	13(15.3%)	33.36	.000
	6 years ≤ 10 years(n=55)	17(30.9%)	29(52.7%)	9(16.4%)		
	11 years ≤ 15 years(n=39)	8(20.5%)	22(56.4%)	9(23.1%)		
	16 years ≤ 20 years(n=22)	11(50%)	7(31.8%)	4(18.2%)		
	≥ 21 years(n=121)	62(51.2%)	26(21.5%)	33(27.3%)		
Total	322	126(100%)	128(100%)	68(100%)		

*p<.05, **p<.01

16–20 years with 11 persons, and 11–15 years with 8 persons. rescue·EMT were 103 males (25 females) with a relatively high percentage of males and in the age group, it is the largest at 30 to 66 persons and followed by 40s to 30 persons, 20s to 16 persons, and 50s to 16 persons. In the rank, there were 38 fire sergeant, 34 fire suppression, 31 senior fire sergeant, 21 fire lieutenant, and 4 fire captain. In the working period, was 44 in 1–5 years, 29 in 6–10 years, 26 in 21 years, 22 in 11–15, and 7 in 16–20 years. The desk duty is 61 males (7 females), mostly male. The most common age group was 28 in the fifties and followed by 22 in the 40s to the next 16 in the 30s and 2 in the 20s. In the rank, There were 20 fire captain, 15

senior fire sergeant, 14 fire lieutenant, 13 fire sergeant and 6 fire suppression. In the working period, 33 persons were the most in 21 years, to the next 13 in 1–5 years, 9 in 6–10 years, 9 in 11–15 years, 4 in 16–20 years.

2. Research Tools

1) PSQI-K

In this study, Pittsburgh sleep quality index developed by Buysse et al. [19] is translated into Korean (PSQI-K) used the published version of the online version in 2011. This scale is based on subjective quality of sleep (1 question), sleep latency (2 questions), sleep duration (1 question), habitual sleep effect (3 questions), sleep dis-

turbance (9 questions) And daytime dysfunction (2 questions). It consists of 19 items. The items in the 19 items are combined to form seven composition points, and each item is rated on a 4 point Likert scale from 0 points (no difficulty) to 3 points (very difficult). These seven composition scores are added to create a single "overall" score, with a score range of 0–21. The higher the score, the greater the difficulty in sleeping. In the study of Sohn et al. [20], the internal consistency (Cronbach's alpha) of .84 was .76 in this study.

2) Korean Occupational Stress Scale Short Form: KOSS-SF

In this study, the Korean Occupational Stress Scale Short Form (KOSS-SF) developed by Chang et al. [21] was used. This scale is composed of 4 items of job demands (4 items), duty rate (4 items), relationship conflict (3 items), job instability (2 items), organizational system (4 items), inadequate compensation (3 items) And a total of 24 items. Each item responds to a 4-point Likert scale of 0 (very low) to 4 (very high), and the higher the score, the higher the job stress. In the study of Chang et al. [21], the internal consistency (Cronbach's alpha) was .83 and in this study was .89.

3) Multidimensional Fatigue Scale: MFS

The multidimensional Fatigue Scale (MFS) developed by Chang [22] was used to measure fatigue level in this study. This scale consists of 19 items, consisting of three sub-domains: general fatigue (8 items), daily living dysfunction (6 items), and situational fatigue (5 items) due

to certain environmental factors. Each item was answered with a 7 point Likert scale from 1 point (not at all) to 7 points (very much), and the higher the score, the higher the degree of fatigue. In the study of Chang [22], the internal consistency (Cronbach's alpha) was .85 and in this study was .96.

4) Job Satisfaction Scale

In this study, we used the Job Satisfaction Scale developed to examine the employee job satisfaction in Korea National Health Examination Institute [23]. This scale is a total of 35 items. In detail, the characteristics (4 items), the prospect (5 items), the reward (5 items), the promotion (4 items), the relationship with the peer (5 items) And relationship with senior (6 questions). It consists of seven sub-factors. Each item responds to a 4-point Likert scale from 0 (not at all) to 4 (very agree). The higher the score, the higher the job satisfaction is. In research of Korea National Health Examination Institute, The internal consistency (Cronbach's alpha) was .78 in this study and .96 in this study.

5) PTSD Checklist

In this study, we used a 20-item self-report questionnaire and a post traumatic stress disorder checklist. This scale measures how painful the past stressful experiences have been in the past month. Each item is rated on a 5 point Likert scale of 0 (not at all) to 4 (very similar). The range of the total score is from 0 to 80, with a PTSD of more than 38 points. In the study of Jang et al. [24], the internal consistency (Cronbach's alpha) was .92 and .96 in this study.

III. Results

1. According to the type of work, sleep quality, job stress, fatigue, job satisfaction, Posttraumatic stress disorder analysis

Table 3 shows descriptive statistics to determine the mean, standard deviation and group differences of sleep quality, job stress, fatigue, job satisfaction, and PTSD according to working style. Statistical analysis results showed that, in case of sleep quality by work type, fire suppression was 6.48, rescue·emt to be 6.34 and desk duty to be 6.35. The sleep quality score is calculated by adding all seven constituent scales (0 to 3 on the Likert scale) to 0 to 21 points. An average of 5 or more sleep quality indicates poor sleep quality [19]. The average sleep quality of the fire fighting officer was between 6.10 and 6.70, suggesting that the quality of sleep of them was not good. The level of sleep quality according to work

type sleep quality was analyzed through analysis of variance(ANOVA) and results (.F=.093, $p=.911$,) was higher than .05 in significance thus, there was no significant difference among the groups.

In the case of job stress according to working style, fire suppression was 2.36, rescue·EMT, 2.21, and desk duty, 2.29. The results of this study are as follows. First, the job stress of the participants is somewhat higher than the middle level. In the present study, the stress scores were slightly above 2.0. Thus, it indicated that they were under stress by Park [25]. This shows that all fire fighting officers are under job stress regardless of the type of work. Job stress was analyzed through analysis of variance(ANOVA) and results (F=5.58 $p=.004$) was lower than .05 in significance thus, there was significant difference among the groups.

In the case of fatigue by work type, the average of fire suppression was 4.12, rescue·EMT, 4.17, and desk duty 4.55. In this study, 7 points were scored from 1 point to 7 points for fatigue. The

Table 3. Sleep quality, job stress, fatigue, job satisfaction, and PTSD of mean difference

Variable	Work Types			Total	F	p	Scheffé
	1=Fire suppression (n=126)	2=Rescue, Emt (n=128)	3=Desk duty (n=68)				
Sleep quality M(SD)	6.48(2.75)	6.34(2.70)	6.35(2.99)	6.40(2.77)	.093	.911	-
Job stress M(SD)	2.36(0.35)	2.21(0.39)	2.29(0.34)	2.29(0.37)	5.58	.004	1>2
Fatigue M(SD)	4.12(1.28)	4.17(1.33)	4.55(1.34)	4.23(1.32)	2.59	.077	-
Job satisfaction M(SD)	2.79(0.42)	2.99(0.48)	2.84(0.41)	2.28(0.45)	6.68	.001	2>1
PTSD M(SD)	15.30(14.1)	11.05(11.86)	13.50(15.68)	13.26(13.72)	3.24	.041	1>2

* $p<.05$

fatigue of the participants is somewhat higher than a median of 3.5 by Jang [29]. Fatigue was analyzed through analysis of variance(ANOVA) and results ($F=2.59, p=.077$). Thus, there was no significant difference among the groups in the fatigue.

In the case of job satisfaction by type of work, the average of fire suppression was 2.79, rescue·emt to be 2.99 and desk duty to be 2.84. The results of this study are as follows. It is found that the job satisfaction of the participants is somewhat higher than that of the job. (Korea Health Research Institute) [23]. Job satisfaction was analyzed through analysis of variance(ANOVA) and Results ($F=6.68, p=.001$). thus, there was a significant difference among the group.

In the case of ptsd, the total of 20 items are 0–4 points for each item. The total score ranges from 0 to 80, and PTSD can be suspected if the score is 38 or more. fire suppression was 38 points or more in 55 people (43.7%), rescue·EMT in 35 people (27.3%) and desk duty in 19 people (27.9%). In this study, fire suppression is suffering from PTSD rather than rescue·EMT and administrative work types. Posttraumatic stress disorder was analyzed through analysis of variance(ANOVA) and results ($F=3.24, p=.041$) showed significant differences among groups. One-way ANOVA was used to examine the differences in sleep quality, job stress, fatigue, job satisfaction, and posttraumatic stress according to the type of work. The results showed that job stress, job satisfaction, and posttraumatic stress were significantly different. On the other hand, there was no significant difference in sleep quality and

fatigue. The job stress, job satisfaction, and ptsd were found to be significantly different according to the type of work. therefore, In order to see if there are any specific differences, we conducted a post test using Scheffé.

As a result of the post test, there was a significant difference in job stress, job satisfaction, and ptsd in fire suppression and rescue·emt types. In the case of job stress, the fire suppression was 2.36, which was higher than the rescue·EMT 2.21. however, in the case of job satisfaction, rescue·EMT was 2.99 higher than fire suppression 2.79. Also, fire suppression was found to be more dangerous at PTSD than rescue·EMT. On the other hand, fire suppression and rescue·EMT did not show significant difference from desk duty.

2. Analysis of differences in sleep quality, job stress, job satisfaction, and fatigue according to posttraumatic stress disorder

Posttraumatic stress disorder is classified as follows before analyzing the difference of sleep quality, job stress, job satisfaction, fatigue according to post traumatic stress disorder. The PTSD scores above 38 indicate suspicion of PTSD [26]. In this study, we classified the group with more than 38 scores and the subgroup. Of the 126 fire suppression victims, 55 (43.7%), 35 (27.3%) of the rescue·EMT workers, and 19 (27.9%) were classified as PTSD suspects. Of the total 322 participants, 109 (33.9%) were included. The results are shown in Table 4.

Table 4. Difference of PTSD by work types

Variable	Work Types			χ^2	<i>p</i>	
	Fire suppression (n=126)	Rescue, Emt (n=128)	Desk duty (n=68)			
PTSD	Low(n=213)	71 (56.3%)	93(72.7%)	49(72.1%)	8.89	.012
	High(n=109)	55(43.7%)	35(27.3%)	19(27.9%)		
Total	322	126(39.1%)	128(39.8%)	68(21.1%)		

p*<.05, *p*<.01

To investigate the effects of sleep quality, job stress, fatigue, and job satisfaction on ptsd, crossover analysis and t-test were used. According to ptsd, it was analyzed that sleep quality, job stress, job satisfaction, and fatigue differences.

The results showed that ptsd, job stress, fatigue and job satisfaction were significantly different. This means that the fire fighting officers with experience of ptsd are more likely to experience sleep quality, job stress, job satisfaction and fatigue than those who are not. In light of these results, it is necessary to manage the PTSD of fire fighting officers

more thoroughly and develop diverse treatment programs and provide adequate rest by Moon [27]. The results of the analysis are shown in Table 5.

IV. Discussion and Conclusion

The purpose of this study was to investigate the difference of sleep disability, job stress, fatigue, job satisfaction and PTSD according to working style of fire fighting officers. fire fighting officers(N=322) in K and J area were

Table 5. T-test means in compared groups by PTSD

PTSD Variable	M	SD	t	<i>p</i>	
Jop satisfaction	Low(n=213)	2.98	.45	5.52	.000
	High(n=109)	2.69	.38		
Job stress	Low(n=213)	2.20	.36	-6.11	.000
	High(n=109)	2.45	.33		
Fatigue	Low(n=213)	3.95	1.37	-5.51	.000
	High(n=109)	4.74	1.01		
Sleep quality	Low(n=213)	.85	.40	-5.31	.000
	High(n=109)	1.12	.43		

**p*<.05

participant to use basic data and to improve that. The results of the research hypotheses presented in this study are as follows.

First, the quality of sleep did not show a significant difference according to the type of work. However, the quality of sleep quality by type of work was 6.48 for fire suppression average, 6.34 for rescue·EMT average, 6.35 for desk duty average, and 6.40 for overall average. This indicated that the overall quality of sleep was not good. The reason is that the low sleep quality is due to the irregular sleep pattern. This is because of shift work and the tension for 24 hour emergency waiting time.

Second, there is a significant difference in job stress by working style. This shows a significant difference between fire suppression and rescue·emt. This shows that job stress in fire suppression and rescue·EMT workers differ. It is found that the fire suppression are more job stressed than the rescue·EMT.

Third, fatigue did not show significant difference according to the type of work. This proves that you are feeling fatigue regardless of the type of work. In this study, the Likert scale is 7 and the fatigue is 3.5, which is 1 to 7 middle. The fatigue of the participants was slightly higher(4.23) than that of Chang [22].

Fourth, job satisfaction showed a significant difference in working style. There was a significant difference between fire suppression and rescue·EMT. It is found that the rescue·EMT work types are more job satisfaction than the fire suppression type.

Fifth, ptsd showed a significant difference. There was a difference between fire

suppression and rescue·EMT. It is found that the fire suppression have more ptsd than rescue·emt. This reason is that there are many dangerous factor in the fire scene than other works type.

In addition, PTSD showed significant difference in job satisfaction, job stress, fatigue and sleep quality.

The limitations of this study and suggestions for future research are as follows.

First, it is a matter of research generalization. This study is limited to the generalization of the results of the study because it is aimed at the fire fighting officers in K and J area. Therefore, further research is needed to expand the sample size in future studies.

Second, there were no scales appropriate to the special occupational environment of fire fighting officers. Therefore, it was not able to capture the problems felt by the fire fighting officers in the actual field.

Third, further study is needed to improve the adaptation by studying detailed measures to reduce sleep disturbance, fatigue, job stress, PTSD, and improving and supporting shift work system.

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