International Journal of Engineering & Technology, 8 (1.4) (2019) 90-97

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper



Effect of Alcohol-Patterns in the Resiliency of South Korean Firefighters from Job Stress and Incident Impact

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Abstract

In The purpose of this study is to improve the safety and work efficiency of firefighters by exploring how resilience contributes to the relationship and to provide basic data for the management program of traumatic stress. With the help of the fire department, we collected data through a self - report questionnaire consisting of self - report scale for 300 public officials. Data collection methods were based on e-mail sending and returning methods, There were 270 subjects in the analysis except for 30 subjects who were not or not reliable.
Normal drinking group showed mediating effect of resiliency($p < .001$). The higher the stress ($B = -0.700$, B is a regression coefficient), the lower the resilience($B = -12.338$) and the lower the event impact. The indirect effect of stress on event impact is 8.637.
The risk drinking group showed a mediating effect of resilience ($p < .001$). The higher the stress ($B = -0.729$), the lower the resilience ($B = -12.853$) and the lower the event impact.
The indirect effect of stress on event impact is 9.370. ($P > .05$). The estimated alcohol use disability group showed no mediating effect of resilience. This suggests that strengthening resilience may contribute to the management of post-traumatic stress. On the other hand, in the case of the alcohol-use disability, a therapeutic approach from the viewpoint of more fundamental substance addiction is necessary.

Keywords: *Firefighter, Patterns of alcohol use, Incident Impact, Job stress, Resilience*

1. Introduction

The work of firefighting officers generally experiences risks, urgency, importance, and uncertainty. In the case of stress and anxiety, the lack of sleep time, chronic fatigue, and family life are negatively affected and lead to job stress. These tasks are higher than other types of occupational mental stress, such as firefighting officers performing public affairs, threatening their lives or witnessing the death of their fellow workers (Ko, 2016). There is post traumatic stress disorder symptoms after a traumatic event (Corneil, et al., 1999; Haslam & Mallon, 2003) and experience severe pain and confusion (Lee, 2014). Alcohol use has been shown to have an effect on the severity of problem drinking (age, trauma experience, family conflict, job type) (Lee, 2014). In addition, a comparative study of post-traumatic stress disorder among fire-fighters and police officers, 51.1% of the subjects were found to have symptoms above partial PTSD (Lee, Hee-sun, 2012).
In order to investigate the degree of job stress, Yoon Myung Sook and Kim Sung Hye (2014) surveyed 1,300 firefighting officers. As a result, 43.7% of the firefighting officers experienced high level of job stress.
In the case of firefighting officers, it is necessary to improve the resilience needed to manage the job stress due to the stressful work. Song Yong Sun (2017).
In addition, firefighting officers are experiencing high physical and mental stresses despite the specificity of tasks that require dangers, urgency, activity environment, and strong physical strength in relation to work, and they choose to drink as a means to overcome them(Yu, 2012).
Job stresses were related conflicts, and drinking level.
According to the Alcohol Use Disorders Identification Test (AUDIT)(Korean Health Association, AUDIT-K Guidelines for screening for risk drinker, 2012) 21.08% of the respondents were diagnosed with problem drinking as a result of the psychological tests conducted on 37,093 nationwide firefighting officers. In the study report, factors related to the problem drinking problems of firefighters were reported to be influenced by gender, age, trauma experience, resilience, family conflict, job type, and workplace (Ewha Women University, 2014).
Drinking problems are also common Among the social problems caused by drinking alcohol, driving is a social problem that causes danger to drinkers, family members and others due to typical drinking problems (Lee Jae-kyung, 2014).
In order to clarify the relationship between job stress and incident impact of firefighters according to the aspect of drinking, which is a social problem.

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The purpose of this study is to improve the safety and work efficiency of firefighters by exploring how resilience contributes to the relationship and to provide basic data for the management program of traumatic stress. The results of this study are as follows. First, we examine the relationship between the degree of event impact, job stress, and resilience of firefighters. Based on the results, we intend to provide basic data for health promotion of firefighters' fraud.Method

2. Method

This study is an empirical research study to investigate the relationship between job stress, incident impact and resilience according to the use patterns of alcohol use by firefighters. With the help of the fire department, we collected data through a self - report questionnaire consisting of self - report scale for 300 public officials.
Data collection was conducted from July 1, to 20, 2017 at 119 safety centers and fire stations in Gyeonggi, Chungcheong and Gyeongsang provinces. Data collection methods were based on e-mail sending and returning methods, There were 270 subjects in the analysis except for 30 subjects who were not or not reliable.

According to the AU-DIT-K utilization guidelines provided by the Korean Health Association, the risk level of drinking behavior is classified into normal drinking group (moderate drinking behavior not reaching risk level), danger drinking group (risk of harm due to drinking, (High levels of alcohol abuse), and alcohol use impairment (alcohol abuse or alcohol abuse).

For the estimation of the number of samples, the sample size was 238 with α err probe of 0.05 and Power (1-β err probe) of 0.95 when calculating the number of samples by linear multiple regression in GPower 3.1 Version. However, Additional information was collected by 30%.

Data collection was done by judgemental sampling of 100 persons in each of the three local organizations that can cooperate with the fire department. After collecting data, 4 respondents avoided the response of the event impact scale, 26 did not participate in the questionnaire response and analyzed the final 270 data

The general characteristics of firefighters, 10 items of alcohol screening test(cronbach's coefficient alpha=0.923), 50 items of firefighting officer job stress(cronbach's coefficient alpha=0.979), 22 items of incident impact scale(cronbach's coefficient alpha=0.979), and 29 items of resilience(cronbach's coefficient alpha=0.945). Statistical analyses are conducted with SPSS Ver. 24. The frequency, mean and standard deviation of every variable are estimated, and the job stress, incident impact and resilience according to the use patterns of alcohol use by firefighters are conducted with descriptive statistics. To investigate mediating effect, median regression analysis was performed using spss ver. 24 and sobel test was performed using Excel. The z statistic was calculated using the non-standardized regression coefficient $b$and the standard error se_b for the effect of the parameters on the dependent variables.

$$z = \frac{a \times b}{\sqrt{a^2 \times se_b^2 + b^2 \times se_a^2}}$$

Fig. 1 : The formula of Sobel's median effect test

The above formula is a Sobel's median effect test, and since the z value follows the standard normal distribution, it can be said that the median effect is obtained when the absolute value is 1.96 or more.

Hypothesis 1 : Normal drinking group of firefighter will serve as a parameter for recovery flexibility between stress and event impact measures.
Hypothesis 2 : Risk drinking group of firefighter will serve as a parameter for recovery flexibility between stress and event impact measures.
Hypothesis 3 : Firefighting officer Achu Chung, the alcohol chief of the fire service, will play the role of parameters between stress and event impact measures.

3. Results

Frequency and descriptive statistics according to demographic characteristics were as follows. There were 229 males (84.8%) and 41 females (15.2%) and the mean age was 36.70 years (± 7.54). The marriage rate was 193 (71.7%) and 76 (28.3%) were married, and 182 (67.4%) were not religion and 88 (32.6%) were religion. The education level was 222 (82.2%) higher than college graduates and 48 (17.8%) lower than high school graduates. The number of working hours was 67 (24.9%) for 1 to 5 years, 65 (24.2%) for 5 to 10 years, 63 (23.4%) for 10 to 20 years, 40 (14.9% (12.6%), and the mean was 115.33 months (± 92.53). Currently, 93 people (34.6%) are in first aid, 68 people (58.3%) are others, and 54 people (20.1%) are building fire.
In Working style, 196 (72.9%) of shift work, 68 (25.3%) of regular weekly work, and 5 others (1.9%) were shown(Table 1).

Table 1 : Demographic characteristics

		N	%
Sex	male female	229 41	84.8 15.2
Years(M±SD)		36.70±7.54	
Marriage	single marry	76 193	28.3 71.7
religion	believe none	88 182	32.6 67.4
Academic	high school college	48 222	17.8 82.2

Employment period (year)	within 1	34	12.6
	1~5	67	24.9
	5~10	65	24.2
	10~20	63	23.4
	over 20	40	14.9
	(M±SD)	115.33±92.53(month)	
Current work	fire suppresssion	54	20.1
	rescue	54	20.1
	paramedic	93	34.6
	etc	68	58.3

The results of AUDIT according to general characteristics are as follows.
AUDIT showed no statistically significant difference in marital status, religion, education, and working period ($p \geqq .05$).
There was a statistically significant difference in AUDIT according to gender ($p = .022 < .05$). Men were more likely to drink alcohol than women (35.0%), women were more likely to drink alcohol(70.7%).
There was a statistically significant difference between the current work and the AUDIT ($p = .019 < .05$), but there was no statistical significance because more than 25% of the cells had an expected frequency of less than 5.

Table 2 : Alcohol use patterns according to general characteristics

Group		A	B	C	total	χ^2	p
Gender	Male	141 (62.4)	79 (35.0)	6 (2.7)	226 (100)	7.592	.022
	female	29 (70.7)	8 (19.5)	4 (9.8)	41 (100)		
	total	170 (63.7)	87 (32.6)	10 (3.7)	267 (100)		
Marriage	Single	47 (61.8)	27 (35.5)	2 (2.6)	76 (100)	.667	.717
	married	122 (64.2)	60 (31.6)	8 (4.2)	190 (100)		
	total	169 (63.5)	87 (32.7)	10 (3.8)	266 (100)		
Religion	Yes	59 (67.8)	24 (27.6)	4 (4.6)	87 (100)	1.588	.452
	No	111 (61.7)	63 (35.0)	6 (3.3)	180 (100)		
	total	170 (63.7)	87 (32.6)	10 (3.7)	267 (100)		
Education	High school	30 (62.5)	16 (33.3)	2 (4.2)	48 (100)	.050	.975
	college	140 (63.9)	71 (32.4)	8 (3.7)	219 (100)		
	total	170 (63.7)	87 (32.6)	10 (3.7)	267 (100)		
Work	1 year	19 (55.9)	14 (41.2)	1 (2.9)	34 (100)	9.817	.278
	1~5 Year	44 (65.7)	21 (31.3)	2 (3.0)	67 (100)		
	5~10 Year	37 (56.9)	25 (38.5)	3 (4.6)	65 (100)		
	10~20 Year	47 (77.0)	11 (18.0)	3 (4.9)	61 (100)		
	20 Year>	22 (56.4)	16 (41.0)	1 (2.6)	39 (100)		
	total	169 (63.5)	87 (32.7)	10 (3.8)	266 (100)		
Task	Fire suppression	31 (58.5)	22 (41.5)	0 (0.0)	53 (100)	15.140	.019
	rescue	34 (63.0)	15 (27.8)	5 (9.3)	54 (100)		
	firstaid	68 (73.9)	21 (22.8)	3 (3.3)	92 (100)		
	Administration	37 (55.2)	28 (41.8)	2 (3.0)	67 (100)		
	Total	170 (63.9)	86 (32.3)	10 (3.8)	266 (100)		

(A : Normal drinking group, B : The risk drinking group, C : The estimated alcohol use disability group)

The results of the analysis of event impact scale according to general characteristics were as follows. There was no statistically signifi-

cant difference in the event impact scale between marital status, religion, education, and current work (p ≧ .05).
There was a statistically significant difference in the event impact scale according to gender (p = .003 <.05). 74.2% of males and 51.2% of females were in the reference group, and 48.8% of females and 25.8% of males were high risk group(P = .001 <.05), while those in the reference group were 84.4% for less than 1 year, 77.6% for less than 1 to 5 years, and less than 5 to 10 years 78.1% and 66.1% in 10 ~ 20 years, respectively, and more than 55% in 20 years or more.

Table 3 : Incident impact scale according to general characteristics

Group		Reference	High risk	total	χ^2	p
Gender	Male	167 (74.2)	58 (25.8)	225 (100)	8.854	.003
	female	21 (51.2)	20 (48.8)	41 (100)		
Marriage	total	188 (70.7)	78 (29.3)	266 (100)		
	Single	54 (72.0)	21 (28.0)	75 (100)	.104	.748
	married	133 (70.0)	57 (30.0)	190 (100)		
	total	187 (70.6)	78 (29.4)	265 (100)		
Religion	Yes	62 (70.5)	26 (29.5)	88 (100)	.955	1.000
	No	126 (70.8)	52 (29.2)	178 (100)		
Education	total	188 (70.7)	78 (29.3)	266 (100)		
	High school	29 (61.7)	18 (38.3)	47 (100)	2.219	.136
	college	159 (72.6)	60 (27.4)	219 (100)		
	total	188 (70.7)	78 (29.3)	266 (100)		
Work	1 year	27 (84.4)	5 (15.6)	32 (100)	19.605	.001
	1~5 Year	52 (77.6)	15 (22.9)	67 (100)		
	5~10 Year	50 (78.1)	14 (21.9)	64 (100)		
	10~20 Year	41 (66.1)	21 (33.9)	62 (100)		
	20 Year>	18 (45.0)	22 (55.0)	40 (100)		
	total	188 (70.9)	77 (29.1)	265 (100)		
Task	Fire suppression	43 (79.6)	11 (20.4)	54 (100)	2.720	.437
	rescue	37 (68.5)	17 (31.5)	54 (100)		
	firstaid	62 (67.4)	30 (32.6)	92 (100)		
	Administration	46 (69.7)	20 (30.3)	66 (100)		
	Total	188 (70.7)	78 (29.3)	266 (100)		

The results of the analysis on the fire officer 's stress scale according to general characteristics were as follows. There were no statistically significant differences in the stressors of firefighting officers between marriage, religion, education, and current work (p ≧ .05).There was a statistically significant difference between the two groups (p = .023 <.05).
The female (M = 2.16) was higher than the male (M = 1.93). There was a statistically significant difference in the stress of the firefighting public servants according to the working period (p = .000 <.05).
The firefighters of more than 20 years (M = 2.21) were high stress.

Table 4 : Job stress by general characteristics

		M	SD	t	p
Gender	Male	1.93	0.57	-2.291	.023
	female	2.16	0.65		
Marriage	Single	1.88	0.55	-1.384	.168
	married	1.99	0.60		
Religion	Yes	2.01	0.58	.822	.412
	No	1.94	0.59		
Education	High school	2.04	0.66	.982	.327
	college	1.95	0.57		
		M	SD	F	p
Work	1 year	1.69	0.61	5.362	.000
	1~5 Year	1.83	0.56		
	5~10 Year	1.97	0.54		
	10~20 Year	2.09	0.54		
	20 Year>	2.21	0.63		
Task	Fire suppression	1.89	0.57	1.734	.160
	rescue	1.94	0.64		
	firstaid	2.07	0.52		
	Administration	1.89	0.63		

The resilience measure of firefighting officer according to general characteristics was as follows.
The resilience measure was not statistically significant ($p \geq .05$) for marital status, religion, education, and current work.
There was a statistically significant difference ($p = .006 < .05$) in the resilience measure of the firefighting public servants according to gender, and the resilience of the firefighting officer was higher than that of the female (M = 3.79).
There was a statistically significant difference in recovery resilience of firefighting officers according to the working period ($p = .002 < .05$). 1 year, 5-10 years and 1-5 years, respectively (Table 5).

Table 5. Resilience by general characteristics

		M	SD	*t*	*p*
Gender	Male	4.15	0.54	2.870	.006
	female	3.79	0.75		
Marriage	Single	4.18	0.54	1.515	.131
	married	4.06	0.61		
Religion	Yes	4.04	0.61	−.959	.339
	No	4.12	0.58		
Education	High school	4.06	0.60	−.442	.656
	college	4.10	0.59		
Work	1 year	4.35	0.48	4.266	.002
	1~5 Year	4.09	0.53		

	5~10 Year	4.12	0.49		
	10~20 Year	3.99	0.70		
	20 Year>	3.86	0.62		
	Fire suppression	4.18	0.53		
Task	rescue	4.20	0.52	1.682	.171
	First aid	4.03	0.62		
	Administration	4.02	0.64		

Normal drinking group showed mediating effect of resiliency(p <.001). The higher the stress (B = -0.700), the lower the resilience (B = -12.338) and the lower the event impact. The indirect effect of stress on event impact is 8.637.
The risk drinking group showed a mediating effect of resilience (p <.001). The higher the stress (B = -0.729), the lower the resilience (B = -12.853) and the lower the event impact.
The indirect effect of stress on event impact is 9.370. (P> .05). The estimated alcohol use disability group showed no mediating effect of resilience (Table 6).

Table 6 : The results of Sobel test

Group				B	SE	z	p
Normal drinking	stress	→	resilience	-.700	.055	5.907	<.001
	resilience	→	event impact	-12.338	1.850		
The risk drinking	stress	→	resilience	-.729	.089	4.418	<.001
	resilience	→	event impact	-12.853	2.450		
alcohol use disability	stress	→	resilience	-.699	.197	1.224	.221
	resilience	→	event impact	-11.927	9.148		

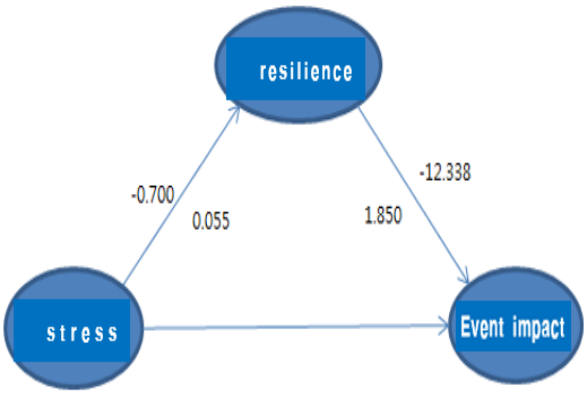


Fig. 2 : Sobel test results of Normal drinking group

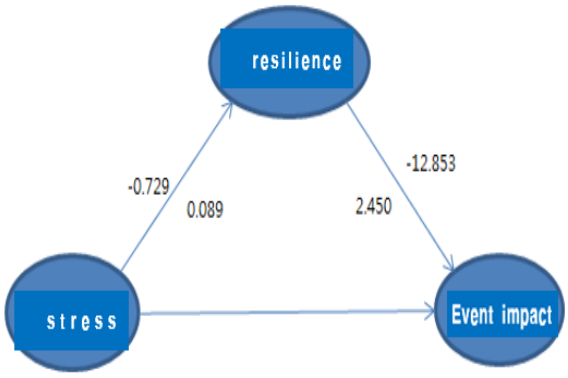


Fig. 3 : Sobel test results of the risk drinking group

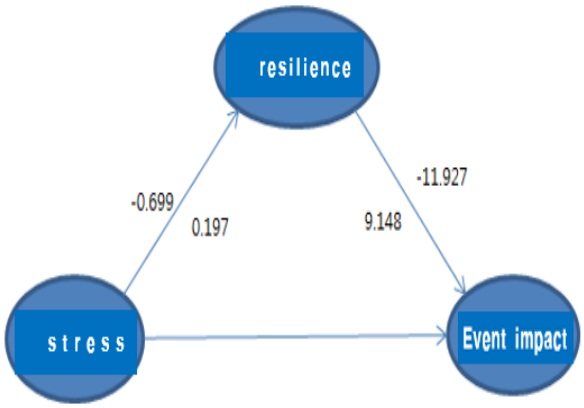


Fig .4 : Sobel test results of Alcohol use disability

4. Discussion

This study is an empirical research study to investigate the relationship between job stress, incident impact and resilience according to the use patterns of alcohol use by firefighters. The results of the present study showed that alcohol use patterns differed according to gender. In the AUDIT analysis, it was found that the risk drinking group had more alcohol use patterns in women. There were 9.8% for women and 2.7% for men. It predicted that women will have more difficulties when they are exposed to alcohol use than men.

However, recent data are incomparable and can not compared. However, in the study of Yoo et al. (2012), when 1,587 female firefighters in the nation enrolled, the rate of problem drinking was 12.5%. Based on these data, I think it is necessary to have a healthy, responsible drinking training in the workplace. As a result of the measurement of the event impact scale, women in the high risk group showed higher results than men.

The high risk group showed 48.8% of women and 25.8% of males. It can be seen that both men and women are higher than 21.5% of the results of the researches of Sin and Seong (2009), which is higher than 1~3% of the general population.

22.25% of American firefighters, 17.3% of Canadian firefighters (Corneil et al., 1999) and 18.2% of German firefighters (Wagner, et al., 1998).

This is somewhat higher than the high-risk group of post-traumatic stress disorder. In addition, the results of the incident impact scales of firefighters under 1 year were higher than those of other workers career. It is similar to the findings of Kwon Soonchun et al. (2008).

Through this, it is necessary to manage the trauma management of the fire service personnel within one year after entering the company.

The results of this study were as follows. First, the relationship between job stress and job stress examined. The results showed that job stress was higher in women with shorter working years.

The results of this study suggest that the shorter the number of years of work for women, the more difficulty they experience from their jobs.

I think that more health care services provided immediately after entering the company. It is also necessary to confirm the results of this study through subsequent studies.

In the trend of alcohol use among firefighters, the impact of resiliency on job stress was lower in normal drinking group and the risk drinking group. There was no effect of resiliency on the impact of job stress due to occupational stress in the alcohol-use disability. Based on the results of this study, it can be understood that participating in a program that can improve resilience of normal drinking group and the risk drinking group can mitigate job stress of firefighters and reduce incident impact.

Studies have shown that normal drinking groups and risk-drinking groups have a medium of resilience, and that the higher the stress, the lower the resilience, thereby lowering the impact of the incident. Therefore, hypotheses 1 and 2 carefully verified.

In this study, job stress is similar to that of Choi, Hee-cheol (2013), which suggests that job stress has a significant effect on depression and that the moderating effect of resilience is significant between job stress and depression.

The results of this study suggest that the higher the job stress, the lower the resilience. Yoo Seungwon et al. (2012) stated that the work of firefighters is experiencing physical and mental stress and chooses alcohol as a means to resolve them.

However, drinking should not be used as a way to cope with the stress of firefighters. In the future, there should be more policies and research results that can improve job stress, traumatic stress and resilience for firefighters. Also.This will lower the degree of accepting the same trauma as a shock through education and training that will increase the resilience of recovery for firefighters, and thus inform

the mental health management measures of firefighters.

5. Conclusion

As a result of the general characteristics of firefighting officers, we found that women are more vulnerable to shorter working career than men, and more active intervention is needed for them.

In order to verify the results of this research, it is necessary to improve the reliability of the research results through various follow - up studies. In the trend of alcohol use among firefighters, the impact of resiliency on job stress was lower in normal drinking group and the risk drinking group. There was no effect of resiliency on the impact of job stress due to occupational stress in the alcohol-use disability. Based on the results of this study, it can be understood that participating in a program that can improve resilience of normal drinking group and the risk drinking group can mitigate job stress of firefighters and reduce incident impact.

This suggests that strengthening resilience may contribute to the management of post-traumatic stress. On the other hand, in the case of the alcohol-use disability, a therapeutic approach from the viewpoint of more fundamental substance addiction is necessary.

Acknowledgement

This research was supported by the Research Fund of the Korea Research Foundation on 2017(research number – 2017R1A2B1003912)

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