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The effect of stress coping on resilience of firefighters.

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Abstract

This study was attempted to provide basic data on mental health by identifying factors affecting the resilience of firefighting officers. The data collection was conducted from May 1st, 2018 to May 31st, 2018, with the consent of the target person and the questionnaire was conducted. The number of participants used in the final analysis was 147. The questionnaire consisted of demographic characteristics, stress coping, and resilience. The collected data were analysed using SPSS 21.0 statistical program using descriptive statistics, t-test, ANOVA, Pearson's correlation, and Multiplier regression. The results of this study showed that the difference in resilience according to general characteristics was the result of subjective health condition, stress relief method, and subjective health condition in stress coping. Resilience showed a static correlation with stress coping, and stress coping showed a positive correlation between active coping and passive coping. In addition, active coping showed a positive correlation with passive coping. Based on the above results, regression analysis showed that factors affecting resilience were stress coping and subjective health status, and the factors used in the analysis explained 49.2% of resilience.

Keywords: Firefighters, Resilience, Stress, Coping behaviour.

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Introduction

Firefighters are special civil servants who are responsible for emergency rescue functions at all disaster sites, including fire and human disasters [1]. Regarding the duties of the Ministry of Fire, the Basic Law of Fire Service "protects people's life, body and property through fire prevention, vigilance, suppression, fire, disaster, disaster and other emergency situations, And to contribute to the promotion of welfare" [2].

As a result of various risk factors such as fire, disaster, disaster, rescue and emergency, firefighters are easily fatigued due to psychological and physical stresses arising from special work environment and work besides physical diseases, and stress was felt to be serious, such as excitement or anger at minor things [3].

Lazarus and Falkman defined stress coping as "cognitive and behavioral efforts to reduce or persevere stress and tension", "Cognitive and behavioral efforts to reduce and resolve to understand the inner desire to be an individual assessment that has exceeded the resources or too much emphasis" [4]. Coping is also an all-inclusive response to an individual's stress situation, which includes learned or instinctive responses to inappropriate stimuli. In other words, how individuals cope with stress is influenced by both positive and negative effects on individual growth [5]. The impact of stress on individuals varies depending on personality, personal characteristics, and social support, and if you cope with stress properly, you will learn how to overcome it when stress occurs again [6]. Proper coping with stress is an important factor in improving the quality of life, so it is important to find a stress coping method for each individual [7].

A prior study on the coping of stress by firefighters, firefighters have found that they use a lot of passive coping methods when solving sudden and difficult cases [8]. In addition, in a study of firefighting officers on mental health, it was said that people who use passive coping need mediation to improve active coping because they are unhealthy in terms of mental health rather than those who use active coping [9]. Therefore, firefighters who are in a high stress situation compared to other occupational groups need to know what coping methods are mainly used.

Resilience is the ability to recover from crisis and adversity, to live a more resilient life after overcoming crisis, and it is important to protect the negative effects of stress in the daily life of firefighters with various stresses and to tolerate and respond to persistent stress [10].

Resilience was found to be different among individuals, and it was found that people with high resilience showed less post-traumatic symptoms in relation to major events than those with low resilience [11]. In addition to disasters, it was found that people with high resilience also had a high recovery in relation to stress [12].

The Goyumi saw resilience as a function that allows the lost level of adaptation to return and recover due to the stress environment [13], it as a positive force to adapt and overcome adversity and stress environment [14]. Resilience as social psychological ability to cope with personal adversity, adapt to environment, and mental growth ability [15].

It is considered necessary to confirm the important resilience to cope with the stress to the firefighting officers exposed to many stress situations, but there is a lack of prior research on this.

This study confirms the degree of stress coping and resilience of firefighters and confirms the relationship between stress coping style and resilience. In addition, we conducted this study to identify the factors affecting resilience and to use it as basic data to improve the mental health of firefighting officers and to help them find ways to cope with stress.

Research Methodology

Research design

This study is a descriptive research using structured questionnaires to investigate the effect of stress coping on the resilience of fire fighter.

Research subjects

This study was conducted for firefighting officers in G city and Y city in Gangwondo Province. The purpose of this research was understood and it was conveniently extracted to those who voluntarily agreed to participate in the research.

The number of samples was calculated by using G*Power 3.1.5 program for multiple regression analysis, the significance level was calculated as .05, the power was 0.95, the effect size was 0.15, and the final sample the size was 146 people. A total of 160 copies were distributed in consideration of the number of dropouts, and 150 copies were collected. Among them, 147 data were used for the final analysis except for 3 cases where the response was insufficient.

Research tools

Stress coping: Stress coping implies a constantly changing cognitive and behavioral effort to control the external and internal demands that are burdened by the individual or that he or she is considered to transcend resources [4]. It was developed by Lazarus and Falkman [4], and translated by Kim et al. [16] and used by the Bang [17]. This tool consists of active coping (coping with problems and coping with social support) and passive coping (coping with emotions and coping with desires). It was composed of a 5-point Likert scale with totally 24 items. In the study of Bang [17], Cronbach's α value of the active coping style was .82 and the Cronbach's α value of the passive coping style was 0.72. In this study, the Cronbach's α value of the active coping style was 0.89 and the Cronbach's α value of the passive coping style was 0.83.

Resilience: Resilience means a combination of capabilities and characteristics that include a process of dynamic interaction, allowing individuals to recover from their original state, adapt successfully, and adapt to their physical condition despite stress or to interact dynamically [18]. It was used what Bae [19] translated the resiliency measurement tool developed by Connor [20] (K-CD-RISC: Korean Connor Da vidson Resilience Scale). The tool consists of five sub-factors: robustness, persistence, optimism, support, and spirituality. It was composed of a 5-point Likert scale with totally 25 items. Cronbach's α value stood at 0.93. Cronbach's α value in this study came to 0.94.

Data collection method

Data collection was made through the one-to-one interview by each individual with a researcher and 3 research assistants, who were trained in advance, from May 1st, 2018, to May 31st. A structured questionnaire was used in subjects with a written consent of participating in the research. A total of 160 copies were distributed in consideration of the number of dropouts, and 150 copies were collected. Among them, 146 data were used for the final analysis except for 3 cases where the response was insufficient.

Data analysis method

The collected data are analysed using the SPSS 21.0 program as follows. Resilience and stress coping level, according to the demographic characteristics of the subjects was analysed with descriptive statistics, t-test, ANOVA, and post-test were used for Scheff'e test. The correlations between resilience and stress coping were analysed using Pearson's correlation. The effects of the resilience were analysed by multiple regression.

Results

Difference in resilience, stress coping of according to general characteristics

Resilience differences in general characteristics was statistically significant with subjective health state ($F=7.38$, $p<0.001$), stress relief ($F=3.77$, $p<0.05$). Stress coping differences in general characteristics was statistically significant with stress relief ($F=3.16$, $p<0.05$) (Table 1).

Level of resilience and stress coping

The resilience was 92.35 ± 13.82 on the scale of 125 points. The level of Stress coping was 79.20 ± 12.01 on the scale of 120, in the sub domain, aggressive coping was 41.34 ± 7.04 on the scale of 60, passive coping was 43.60 ± 5.86 on the scale of 60 points (Table 2).

Correlation between resilience and stress coping

The resilience was positively correlated with stress coping (r=0.666, p<0.001), Stress coping sub-domain of aggressive coping (r=0.774, p<0.001), and passive coping (r=0.429, p<0.001). Stress coping showed a significant positive correlation in the aggressive coping (r=903, p<0.001), and passive coping (r=899, p<0.001). Aggressive coping showed a significant positive correlation in the passive coping (r=0.631, p<0.001) (Table 3).

Factors affecting resilience

Before the regression analysis, tolerance and variance inflation factor (VIF) values were examined to see whether multicollinearity occurred between the variables, as a result, the dispersion limit value is greater than 0.1 in both 0.86 to 0.93, and the dispersion expansion value is 1.07 to 1.17, there is no problem of multicollinearity. As a result of the multiple regression of the gender, position, subjective health state, stress relief and stress copping, factors affecting resilience the stress relief (β=0.606, p<0.001), Subjective health state (β=-0.217, p<0.05) were statistically significant. In particular, the subjective health status was analysed as having a negative effect on the resilience, and the resilience explanatory power of the factors used in the analysis was 49.2% (Table 4).

Table 1. Difference in resilience, stress coping of according to general characteristics (N=147).

Characteristics	Categories	n (%)	Resilience		Stress coping	
			M ± SD	t/F (p), Scheffe	M ± SD	t/F (p), Scheffe
Gender	Male	134 (91.2)	93.01 ± 13.92	1.87 (0.063)	79.56 ± 11.64	1.17 (0.241)
	Female	13 (8.8)	85.53 ± 11.08		75.46 ± 15.36	
Age (year)	20~29	20 (13.4)	90.90 ± 16.03	0.46 (0.711)	78.85 ± 13.70	0.29 (0.826)
	30~39	54 (36.6)	92.11 ± 14.06		79.57 ± 12.17	
	40~49	60 (40.7)	92.16 ± 12.47		78.43 ± 10.77	
	50~59	13 (9.2)	96.46 ± 16.09		81.76 ± 14.86	
Education	High school	35 (23.8)	93.00 ± 15.75	0.47 (0.700)	79.60 ± 13.63	1.00 (0.391)
	College	33 (22.4)	90.96 ± 13.97		77.09 ± 12.99	
	University	77 (52.4)	92.89 ± 12.95		80.19 ± 10.80	
	Graduate school	2 (1.4)	83.00 ± 14.14		69.00 ± 5.65	
Religion	Yes	43 (29.3)	92.88 ± 15.58	0.29 (0.765)	80.20 ± 14.07	0.65 (0.516)
	No	104 (70.7)	92.13 ± 13.10		78.78 ± 11.09	
Position	Fireman[a]	24 (16.3)	86.37 ± 12.37	2.05 (0.109)	76.62 ± 12.16	1.25 (0.292)
	Semi firefighter[b]	35 (24)	95.17 ± 16.02		82.40 ± 13.91	
	Fire sergeant[c]	42 (28.8)	92.38 ± 12.84		78.95 ± 10.96	
	Above fire lieutenant[d]	46 (30.9)	93.04 ± 13.12		78.48 ± 11.22	
Subjective health state	Very healthy[a]	21 (14.3)	101.42 ± 10.32	7.38 (<.001)a, b>c, d>e	84.86 ± 17.57	1.51 (0.205)
	General health[b]	69 (46.9)	94.92 ± 13.17		80.20 ± 17.02	
	Usually[c]	36 (24.5)	87.00 ± 14.07		78.02 ± 10.24	
	Slight disease[d]	19 (12.9)	84.78 ± 11.40		77.49 ± 9.96	
	Serious disease[e]	2 (1.4)	76.50 ± 4.94		81.88 ± 10.75	
Stress relief	Talk with colleagues[a]	51 (34.7)	91.31 ± 12.56	3.77 (0.002)	79.78 ± 10.26	3.16 (0.006)
	Hobby[b]	53 (36.1)	96.86 ± 13.14	e>a, b, d>c, f, g	82.41 ± 11.39	e>a, b, c, d, f>g
	Alcohol[c]	23 (15.6)	87.26 ± 14.94		75.26 ± 13.44	
	Talk to family[d]	7 (4.8)	91.00 ± 14.13		77.14 ± 6.46	

	Religious activities[e]	2 (1.4)	115.00 ± 11.31		87.50 ± 2.12	
	Keep in mind[f]	5 (3.4)	86.40 ± 8.17		74.80 ± 7.88	
	No solution[g]	6 (4.1)	79.83 ± 11.37		64.33 ± 20.20	
Consider counseling, treatment help	Yes	23 (15.6)	88.65 ± 12.98	-1.40 (0.163)	75.91 ± 9.91	-1.43 (0.153)
	No	124 (84.4)	93.04 ± 13.92		79.81 ± 12.29	

Table 2. *Level of resilience and stress coping (n=147).*

Variables	Range	M ± SD
Resilience	25~125	92.35 ± 13.82
Stress coping	24~120	79.20 ± 12.01
Aggressive coping	12~60	41.34 ± 7.04
Passive coping	12~60	43.60 ± 5.86

Table 3. *Correlation between resilience and stress coping (n=147).*

Variables	Resilience	Stress coping	Aggressive coping	Passive coping
Resilience	1			
Stress coping	0.666**	1		
Aggressive coping	0.774**	0.903**	1	
Passive coping	0.429**	0.899**	0.631**	1

*p<0.05, **p<0.001

Table 4. *Factors affecting resilience (N=147).*

Variables	B	SE	β	t	p
(Constant)	42.792	8.179		5.23	0
Stress coping	0.696	0.073	0.606	9.491	0
Subjective health state	-3.228	0.954	-0.217	-3.384	0.001
Stress relief	0.452	0.46	0.061	0.983	0.327
Gender	-3.116	2.977	-0.064	-1.047	0.297
Position	1.509	0.793	0.117	1.903	0.059
	Adj R^2=0.492	R^2=0.510,	F=29.09,	P<0.001	

Discussion

This study was conducted to identify the effects of stress coping on resilience in G-si, C-si and Y-gun firefighting officers in Gangwon Province.

The results of the study showed that the resilience of firefighters and the coping with stress were positively correlated, and the same results were reported in the study of the effects of resilience on post-traumatic stress symptoms in domestic firefighters [21]. In addition, firefighters reported that mental stress was higher than physical stress [22], and firefighters with severe post-traumatic stress symptoms reported depression and alcohol problems and low resilience [23].

The study found that the methods of relieving stress were in the order of colleagues and stories (34.7%), hobbies (36.1%), alcohol (15.6%), family stories (4.8%), religious activities (1.4%), and no solution (4.1%). They use relatively positive and positive methods such as talking with colleagues and family, and hobbies, however, 20% of respondents said that they do not have a solution or solution for drinking, therefore it is necessary to pay attention to the method of relieving the stress of the fire service personnel.

The stress coping methods used to overcome stress situations are problem-based coping, social support seeking, emotional relaxation coping, and hopeful thinking coping. Problem-solving and social support seeking coping are classified as active coping, emotional-oriented coping and hopeful thinking coping as passive coping.

As a result of this study, firefighters were more likely to use passive coping (43.60 ± 5.86) than active coping (41.34 ± 7.04), which is a result of previous research studying coping methods of firefighters in Korea [8]. In this study, Korean people traditionally use the method of adjusting their minds, but firefighters seem to be making passive coping with the difficulty of constantly fixing and solving sudden events in a difficult work environment. In another study, firefighting officers used active coping and passive coping together, but it is reported that the subjects who use passive coping methods such as emotional-centered coping style have negative effects on mental health such as post-traumatic stress disorder [9].

The resilience of firefighting officers was not statistically significant in general characteristics such as sex, age, educational background, religion, etc, except subjective health status. A previous study found that resilience has the effect of controlling job stress and depression showed that the resilience of firefighters was not significant in gender, religion, or marriage, but the results showed that the resilience of those who graduated from college or higher was higher than that of those who graduated from high school or below [24]. A study of the relationship between resilience and post-traumatic stress disorder in firefighters found that resilience significantly affected PTSD (post-traumatic stress disorder) and that resilience was not affected by demographic variables, which means that the resilience level of firefighters was low [25].

84.4% of the respondents said they did not feel that they needed help in counselling and treatment. However, the actual experience of counselling by firefighters is noted for resilience and reports that counselling experience helps improve resilience [25]. In the present study, the resilience of the subjects was positively correlated with stress coping ($r=0.666$, $p<0.001$) and the subcategories of stress coping ($r=0.774$, $p<0.001$), passive coping ($r=0.429$, $p<0.001$). The factors affecting resilience were stress coping and subjective health status. It is urgent to find ways to improve the resilience of firefighting officers because the decrease of resilience may lead to mental health problems.

Conclusion

This study has tried to identify the relationship between stress coping and resilience of firefighters, to identify factors affecting resilience and to cope with stress, and to make a basic data to improve the mental health of firefighters.

Based on the results of this study, the following suggestions are made. First, it is necessary to study stress management programs, including counselling, for firefighters who have to face sudden and difficult situations continuously. Second, research on the development and application of arbitration programs that increase the active coping method is needed to improve the mental health of firefighting officers. Third, research is needed to develop and apply programs that can improve the resilience of firefighters.

Conflict of Interest

The authors report no conflicts of interest related to this study. The author does not have any financial interest in the companies whose materials are included in the article.

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