

A Study on the Structural Relationship among Occupational Stress, Psychological Wellbeing, and Stress-Coping Resource of Firefighters

Hyo-Jin Shin¹ and Ha-Sung Kong²

¹*Department of Social Welfare, Kyungil University, 50 Gamasilgil
Haynagup Gyeongsan Gyeongbuk 38428, Korea*

²*Department of Fire Safety, Kyungil University, 50 Gamasilgil
Haynagup Gyeongsan Gyeongbuk 38428, Korea*

¹*hyos170@gmail.com, ²kiu119@naver.com*

Abstract

The mediating effects of stress-coping resources (social support and self-efficacy) were tested through the structural model in that occupational stress affects the Firefighter's psychological wellbeing. A self-reported questionnaire survey was done. A total of 225 copies were used for final analysis using AMOS 20.0 Statistical Program. The study results revealed that occupational stress did not directly affect psychological wellbeing of firefighters, but social support and self-efficacy had complete mediating effect in the structural model. Additionally self-efficacy had stronger mediating effect than that of social support.

Keywords: *Firefighters, Occupational stress, Social support, Self-efficacy, Psychological wellbeing*

1. Introduction

According to the stress and coping theory of Lazarus & Folkman [1], stress means the imbalance between stimuli and coping resources. It is explained that adaptive resources and coping responses are required in order to overcome stress.

Self-efficacy is self-belief in regard to internal coping resources. With the internal coping resources, individuals believe that they can attain their goals. Self-efficacy is defined as belief of individuals about whether they can attain their goals [2][3]. It has been studied as an important factor which can mediate between stress and responses. The study about officers dealing civil complaints such as fire officers, police officers and social workers [4] also showed that self-efficacy has a negative effect on occupational burnout and occupational stress and that self-efficacy has mediating effects on the effects that internalized behavior such as introspection has on occupational burnout.

Social support is an interpersonal or environmental coping resource. It has positive effects on problems caused by stress. It is also known to play a role in moderating stress [4][5]. Social support's moderating effects on the influential relationships between posttraumatic stressors and posttraumatic stress was shown in both police officers and fire officers [6].

Social support and self-efficacy have also proved variables which have direct or indirect effects on psychological wellbeing. In this context, the purpose of this study is to examine the multiple mediating effects of social support and self-efficacy on the investigation of the

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effects that occupational stress has on psychological wellbeing based on the stress coping theory.

2. Method of study

2.1. Establishment of study hypotheses

This study verified the multiple mediating effects of social support and self-efficacy on the effects that fire officers' occupational stress has on their psychological wellbeing by means of structural equation models. For this, five study hypotheses were established as follows.

Hypothesis 1: occupational stress must have significant effects on psychological wellbeing.

Hypothesis 2: occupational stress must have significant effects on social support.

Hypothesis 3: social support must have significant effects on psychological wellbeing.

Hypothesis 4: Occupational stress must have significant effects on self-efficacy.

Hypothesis 5: Self-efficacy must have significant effects on psychological wellbeing.

2.2. Measurement tool

Korean Occupational Stress Scale (KOSS), a questionnaire developed at NIOSH adapted to Korean working environment, was modified and supplemented for measurement on stress at work to use in accordance with this study [7]. The social support scale developed by J. W. Park (1985) was modified and supplemented for measurement on function of social support to use appropriately to study subjects [8]

Self-efficacy scale developed by Yong-Min Choi (2005) was used for measurement on self-efficacy, which is composed of total 15 questions [9]. Each question is scaled in 5 points from 'Never (1)' to 'Very positive (5),' and it means self-efficacy is high if the score is high. Psychological sense of welfare scale by Ryff (1989) was used for measurement on psychological sense of welfare with modification and supplementation [10][11].

3. Collection of researches and method of analysis

For the collection of researches, surveys were conducted targeting 230 firefighting officers working at 5 fire stations located in Daegu and Gyeongbuk in a self-recording type after agreement on the study. Structure equation modeling composed in this study was analyzed by using Amos 21.0, and mediator effect of social support and self-efficacy factor was verified using Bootstrapping method. Difference verification on mediator effect in multi-parameter was conducted by applying phantom variable [12][13].

4. Analysis on research results

4.1. Frequency analysis of general characteristics of study subject

The characteristics of the subjects of this study are as shown in Table 1. To begin with, 31-50 years old was the largest group by 76.4% in case of age distribution, 2-4 million won held the most part by 83.5% in case of monthly income, and 4-11 years was the largest by 50.7% in case of work experience. Fire protection area appeared to be the largest by 46.7% in working area, followed by first-aid area by 27.1%, rescue area by 10.2%, and administration area by 16%.

Table 1. Frequency analysis of democratic characteristics (n=225)

Variables	Category	Frequency (n)	Percentage (%)
Age	30 and less years old	28	12.4
	31~50	172	76.4
	more than 50 years old	25	19.2
Monthly Income	less than 2,000,000 Won	10	4.4
	2,000,000~4,000,000 Won	188	83.5
	more than 4,000,000 Won	27	12
Years of working	3 and less years	27	12
	4~11 years	114	50.7
	more than 11 years	84	37.4
Working Departments	Fire-Fighting	105	46.7
	Rescue	23	10.2
	First-Aid	61	27.1
	Administration	36	16

4.2. Confirmatory factor analysis of study model

In case of fit index of confirmatory factor analysis model for validation of validity of sub factors in occupational stress and social support, every fit index appeared to be statistically significant compared to the standard by chi-square (p-value) = 47.069(.042), RMR = 0.018, GFI = 0.961, NFI = .976, TLI = .986, CFI = .992, and RMSEA = .046, therefore, it can be concluded that the results of measurement of the structural equation model can be trusted. The value of composite reliability and Average Variance Extracted(AVE) is presented in Table 2. Standardized regression weight of every observed variable which composes occupational stress factor, social support factor, and self-efficacy factor all appeared to be above the value of 0.5, securing contract validity. AVE appeared to be above 0.5 and composite reliability appeared to be above 0.7, securing convergent validity. Also, AVE value of occupational stress, social support, and self-efficacy appeared to be much more than the square value of correlation coefficient between two latent variables, securing discriminant validity.

Table 2. Construct reliability & average variance extracted

Latent Variable	Observed Variable	S.R.W	Variances	C.R	AVE
Occupational Stress	Work Requirements	.826	.118	.919	.793
	Work Autonomy	.766	.111		
	Work Compensation	.605	.198		
Social Support	Emotional Support	.968	.036	.984	.939
	Evaluative Support	.951	.053		
	Material Support	.910	.109		
	Informative Support	.972	.035		
Self-Efficacy	Task Efficacy	.823	.082	.955	.876
	Emotional Efficacy	.810	.073		
	Coping Efficacy	.847	.134		

S•R•W = Standardized Regression Weight, C•R = Construct Reliability, AVE = Average Variance Extracted

4.3. Verification of the structural equation model

4.3.1. Study result for the hypothesis of the structural equation model

The structural equation model fit is chi-square (p-value) = 69.466 (0.002). Null hypothesis of chi-square statistics was rejected, and it can be known that the model fit was well done by RMR = 0.081, GFI = 0.948, NFI = 0.966, TLI = 0.978, CFI = 0.985, RMSEA = 0.059.

According to the analysis result for the structural equation model, occupational stress did not influenced a statistically significant effect on psychological wellbeing (Standardized coefficient = 0.026, C.R. = 0.353, $p > 0.05$). Occupational stress influenced a statistically significant effect on social support in a negative direction (standardized coefficient = - 0.319, C.R. = - 4.062, $p < 0.001$), and social support influenced a statistically significant effect on psychological wellbeing (standardized coefficient = 0,201, C.R. = 3.036, $p < 0.01$). Also, occupational stress influenced a statistically significant effect on self-efficacy in a negative direction (standardized coefficient = - 0.395, C.R. = - 4.574, $P < 0.001$), and self-efficacy influenced a statistically significant effect on psychological wellbeing (standardized coefficient = 0.413, C.R. = 5.396, $p < 0.001$).

4.3.2. Direct effect, indirect effect and total effect of the hypothesis model

[Figure 1] is a study model attained by the study result for structural equation model. The result conducted difference verification on mediating effect in multi-parameter by verifying mediating effect using bootstrapping method and applying phantom variable. It appeared that total indirect effect of occupational stress factor influencing on psychological wellbeing in the study model is - 0.227. Partial indirect effect of occupational stress factor influencing on psychological wellbeing through social support is $(- 0.319) \times (0.201) = - 0.064$, and partial indirect effect of occupational stress factor influencing on psychological wellbeing through self-efficacy can be known to be $(- 0.395) \times (0.413) = - 0.163$.

In addition, social support and self-efficacy have a complete mediating effect². Total mediating effect of this study model appears to be - 0.227. Partial mediating effect of self-efficacy (- 0.163) can be known to have more influence than partial mediating effect of social support (- 0.064).

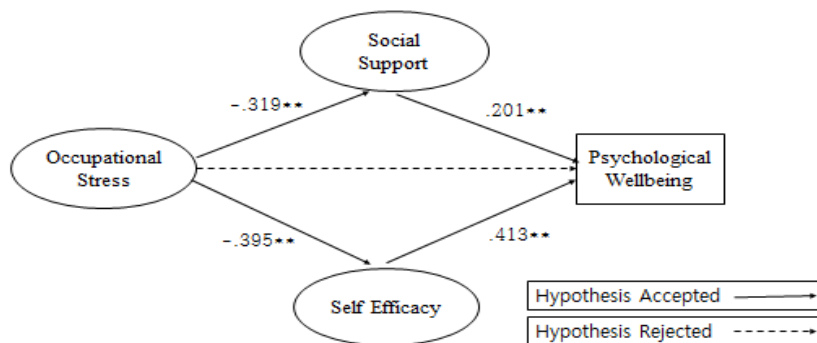


Figure 1. Study result for occupational stress, social support, self-efficacy and psychological wellbeing

² When parameter is more than 2, it is called "total mediating effect" when the effect of parameters are combined, and each mediating effect is called "individual mediating effect."

6. Conclusions and suggestions

This study tried to verify the process of occupational stress of a firefighting officer influencing on psychological wellbeing on a basis of stress displacement theory [2]. For this, it composed a study model where social support, which is an external displacement resource, and self-efficacy, which is an internal displacement, are mediating variables, respectively. Drawn study result is as the following. Firstly, occupational stress did not have a statistically significant effect directly on psychological wellbeing. However, occupational stress influenced a statistically significant effect on social support in a negative direction, and social support influenced a statistically significant effect on psychological wellbeing in a positive direction. It is interpreted that high occupational stress decreases social support of a firefighting officer, leading to a negative influence on psychological wellbeing.

Secondly, occupational stress influenced a statistically significant effect on self-efficacy in a negative direction, and self-efficacy influenced a statistically significant effect on psychological wellbeing in a positive direction. It is explained that high occupational stress lowers self-efficacy which is relevant to self confidence in accomplishment of work, leading to decrease in task efficiency and also psychological wellbeing of a firefighting officer.

Thirdly, at a state of the relationship between occupational stress and psychological wellbeing statistically not significant, self-efficacy and social support showed complete mediating effect in a relationship between occupational stress and psychological wellbeing. The result leads to a thought that increasing self-efficacy and social support even in a experience condition of unavoidably high occupational stress due to work characteristics of firefighting officer can be a method to prevent a decrease in psychological wellbeing which threatens mental health of a firefighting officer.

Studies targeting firefighting officers have mostly analyzed of occupational stress level and have been dealt with correlation between related factors such as occupational stress, depression, quality of life, and post-traumatic stressful barrier [14][15]. As a mediating factor of occupational stress, studies on mediating factors of occupational stress including social support and means to manage stress have mostly been dealt in a linear level, and studies which dealt with multi-parameter effect between coping resources are rarely found. Therefore, this study has a significance in that it further specifically verified the influence of occupational stress of a firefighting officer on psychological wellbeing, and prepared a basis for studies on occupational stress and coping resources to extend.

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