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The Mediating Effect of Social Support in the Relationship Between Job Stress and Stress Coping Strategies of Male Workers on a Three-Shift System

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Abstract

The purpose of this study is to identify the mediating effect of social support in the relationship between job stress and stress coping strategies among male workers on a three-shift system. The subjects of the study were 146 male workers working in manufacturing companies with more than 500 employees located in C City, Chungbuk Province, who understood the purpose of the study and agreed to participate. The collected data were analyzed using frequency and percentage, descriptive statistics, Pearson Correlation Coefficient, and multiple regression analysis. Job stress had a significant effect on the mediating variable, social support ($\beta=.34, p<.001$), and job stress had a significant effect on the dependent variable, stress coping strategies ($\beta=.41, p<.001$). When examining the effect of social support on stress coping strategies ($\beta=.35, p<.001$), social support was found to be a significant predictor of stress coping strategies. Therefore, social support plays a mediating role in the relationship between job stress and stress coping strategies among male workers on a three-shift system, and job stress and social support explained 27.4% of the variance in stress coping strategies. Thus, it is necessary to establish a psychological support system that can reduce job stress through active stress coping measures that consider the social support of male workers on a three-shift system.

Keywords: Job Stress, Stress Coping, Male Worker, Social Support, Three-Shift

1. INTRODUCTION

The shift work system is a form of working hours system that is implemented to increase labor intensity and secure time for education and training to produce products or services that respond immediately to customer demand[1]. The proportion of companies implementing the shift work system decreased from 29.7% in 2015 to 26.4% in 2017, but increased again to 29.7% in 2019[1]. However, while shift work brings continuity, efficiency, and economic benefits to the work process, workers experience health problems due to working at times that do not align with their physical and daily rhythms[2].

Shift work is classified as a Group 2A carcinogen by the International Agency for Research on Cancer, an affiliate of the World Health Organization. It also deteriorates workers' health, accelerates the accumulation of fatigue, and decreases the quality and efficiency of work[3]. Additionally, excessive stress makes it difficult to get sufficient rest and sleep, leading to diseases such as diabetes, hypertension, ischemic heart disease, and depression, which can result in occupational burnout[4-5].

Studies comparing stress perception levels have shown that shift workers have higher stress perception

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levels and greater exposure to stress than daytime workers[6]. Job stress negatively affects physical and mental health and reduces job satisfaction[7], and in particular, shift workers have been shown to have an increased risk of depression due to the synergistic interaction of long shifts and short rest periods[8].

Since individuals subjectively evaluate stressful situations according to their level of stress acceptance[9], strengthening stress coping abilities can help them perceive stressful situations more positively[10]. Therefore, studying the stress coping strategies of shift workers is significant as it provides positive perspectives on the health problems and negative outcomes associated with shift work stress.

Psychological adaptation to stress depends not only on individual coping strategies but also on social support[11]. From the perspective of stress adaptation, social support is defined as the resources received from significant others to help adapt to stressful situations[12]. Studies on the relationship between job stress and social support have shown that job stress was reduced by social support in firefighters[13], job stress was reduced by support from supervisors in office workers[14], and there was no relationship between job stress and social support among clinical nurses[15]. However, in another study of clinical nurses, novice nurses reported feelings of disconnection from social support, while experienced nurses identified social support from senior nurses and management at work and from family as important factors in reducing stress[16]. These studies indicate varying results on the relationship between job stress and social support depending on the subject. Although social support is reported as an important factor in alleviating stress, research on the relationship between job stress and social support among shift workers is limited. Particularly, male workers are known to have less stress management compared to female workers[17], so it is necessary to understand the level of job stress among male workers and explore ways to improve health by identifying their stress coping strategies.

Stress coping strategies are efforts made by individuals to minimize the damage caused by stress and overcome it by directly changing the stress-inducing factors[18]. The level of stress varies depending on how individuals cope with stress-inducing factors, so it is important to not only assess the level of stress but also how to properly cope with it[19]. Lazarus et al.[18] emphasized that how individuals cope with stress has a significant impact on their physical, psychological, and social stability and that the differences in adaptation outcomes are more related to stress coping strategies than the concept of stress itself. Therefore, if an individual does not cope healthily with stress, it can negatively affect job performance even in the same work situation[20]. Thus, it is important to identify stress coping strategies when exposed to job stress. Job stress can be alleviated depending on the coping strategies employed by individuals exposed to it. This involves behavioral and cognitive strategies that go beyond simple responses to stress to alleviate it[21]. Hence, exploring the relationship between personal stress coping strategies and job stress is crucial. Therefore, the purpose of this study is to investigate the relationship between the level of job stress and stress coping strategies among workers, and to identify the mediating effect of social support in the relationship between job stress and stress coping strategies, to provide a basis for developing programs to promote the health of workers on a three-shift system.

2. METHODS

2-1. Research Design

This study is a descriptive correlational study aimed at identifying the mediating effect of social support in the relationship between job stress and stress coping strategies among male workers on a three-shift system.

2-2. Subjects and Data Collection Methods

The subjects of this study were male workers on a three-shift system, including night shifts, working at three manufacturing companies with more than 500 employees located in C City, Chungbuk Province. The purpose and methods of the study were explained to the personnel managers of each company, and permission for data collection was obtained. Then, the purpose and methods of the study were explained to the heads of each department, and workers who agreed to participate in the study by signing the questionnaire were included.

The completed questionnaires were placed in individual envelopes, sealed by the participants, and collected as a group, after which the researcher visited the companies to collect them. The number of subjects was calculated based on a significance level of .05, an effect size of .15, a power of .80, and nine predictor variables, resulting in 114 subjects. Considering a dropout rate, 160 questionnaires were distributed, and a total of 146 were used for analysis after excluding 14 incomplete or insincere responses.

2-3 Research Tools

2.3.1 Job stress

The tool used to measure job stress was the Korean Occupational Stress Scale-Short Form (KOSS-SF) developed by Jang et al.[22]. It consists of 24 items divided into seven subdomains: job demand (4 items), job autonomy (4 items), relationship conflict (3 items), job insecurity (2 items), organizational system (4 items), inappropriate compensation (3 items), and workplace culture (4 items). Each item is scored on a 4-point scale from "Not at all" (1 point) to "Very much" (4 points), with higher scores indicating higher job stress. Fifteen reverse-scored items were reverse-coded. The overall Cronbach's α in Jang et al.'s[22] study was .79, and the overall Cronbach's α in this study was .81.

2.3.2 Stress Coping Strategies

The tool used to measure stress coping strategies was the Way of Coping tool developed by Lazarus & Folkman[18], modified and supplemented by Kim[23]. It consists of 24 items divided into active coping (12 items) and passive coping (12 items). Each item is scored on a 4-point scale from "Not at all" (1 point) to "Very much" (4 points), with higher scores indicating more frequent use of stress coping strategies. In Kim's[23] study, problem-focused coping and social support-seeking coping were classified as active coping, while emotional coping and wishful thinking were classified as passive coping. The overall Cronbach's α in Kim's[23] study was .79, and the overall Cronbach's α in this study was .85.

2.3.3 Social Support

The tool used to measure social support was based on the tool developed by Park[24] and modified and supplemented by Jeong[25]. It consists of 25 items divided into four subdomains: emotional support (7 items), informational support (6 items), material support (6 items), and evaluative support (6 items). Each item is scored on a 5-point scale from "Not at all" (1 point) to "Very much" (5 points), with higher scores indicating higher social support. The overall Cronbach's α in Jeong's[25] study was .96, and the overall Cronbach's α in this study was .95.

2-4 Data Analysis Methods

The data were analyzed using SPSS Statistics 21.0 program. The general characteristics of the subjects were analyzed using frequency and percentage, and the job stress, stress coping strategies, and social support were analyzed using descriptive statistics. The correlation between job stress, stress coping strategies, and social support was calculated using the Pearson Correlation Coefficient. The mediating effect of social support in the relationship between job stress and stress coping strategies was analyzed using multiple regression analysis.

2-4 Ethical Considerations

The purpose, methods, and process of the study were explained in detail to the subjects who agreed to participate in the study after obtaining permission from the companies. They were informed that they could withdraw from the study at any time if they did not wish to continue participating, and they were asked to sign the consent form voluntarily. The collected data would not be used for any purpose other than the study, and they would be safely disposed of after the study was completed. The researcher's personal contact information

was provided so that participants could ask questions and receive answers at any time. Participants were given a small token of appreciation for their participation.

3. Results

3-1. General Characteristics

The general characteristics of the subjects were as follows: 47.9% were in their 20s, 41.8% were in their 30s, and 10.3% were in their 40s. Regarding marital status, 71.9% were single. In terms of education level, 65.8% were college graduates, and 34.2% were high school graduates. The perceived economic level was 0% for high, 72.6% for medium, and 27.4% for low. The average duration of current employment was 4.96 years, with 58.2% having worked for 5 to 10 years, 17.8% for 3 to 5 years, 12.3% for less than 1 year, and 11.6% for 1 to 3 years. Regarding perceived health status, 63.7% reported being in average health, 27.4% in good health, and 8.9% in poor health (Table 1).

Table 1. General Characteristics

Characteristics	Categories	N(%)	M±SD
Age(year)	20~29	70(47.9)	30.67±4.66
	30~39	61(41.8)	
	40~49	15(10.3)	
Marital Status	Single	105(71.9)	
	Married	41(28.1)	
Education	High School	50(34.2)	
	College	96(65.8)	
Perceived Economic Level	Top	0(0.0%)	
	Middle	106(72.6)	
	Bottom	40(27.4)	
Current employment Period(year)	<1	18(12.3)	4.96±28.52
	1≤3	17(11.6)	
	3≤5	26(17.8)	
	5≤10	85(58.2)	
Perceived Health Status	Healthy	40(27.4)	
	Normal	93(63.7)	
	Not Healthy	13(8.9)	

3-2. Levels of Job Stress, Stress Coping Strategies, and Social Support

The levels of job stress, stress coping strategies, and social support among the subjects are shown in (Table 2). Job stress averaged 2.48 points (1–4 points), with relationship conflict scoring the highest at 3.19 points, followed by organizational system (2.86 points), inappropriate compensation (2.82 points), lack of job autonomy (2.41 points), job demand (2.33 points), and job insecurity (1.86 points). Stress coping strategies averaged 2.63 points (1–4 points), with active coping scoring 2.79 points and passive coping scoring 2.47 points. Social support averaged 3.59 points (1–5 points), with emotional support scoring the highest at 3.63 points (1–5 points), followed by evaluative support (3.57 points), material support (3.53 points), and informational support (3.11 points).

Table 2. Levels of Job Stress, Stress Coping Strategies, and Social Support

Variable	M±SD	Range
Job Stress	2.48±.18	1~4
Job requirement	2.33±.42	
Job autonomy lack	2.41±.47	
Relationship conflict	3.19±.45	
Job instability	1.86±.52	
Organization system	2.86±.43	
Inadequate compensation	2.82±.45	
Work culture	1.85±.48	
Stress Coping	2.63±.24	1~4
Active coping	2.79±.34	
Passive coping	2.47±.28	
Social Support	3.59±.56	1~5
Emotional support	3.63±.64	
Informational support	3.11±.56	
Material support	3.53±.64	
Evaluational support	3.57±.50	

3-3. Correlation Between Job Stress, Stress Coping Strategies, and Social Support

The correlation between job stress, stress coping strategies, and social support showed a positive correlation between job stress and stress coping strategies ($r=.416$, $P<.001$), and a positive correlation between job stress and social support ($r=.340$, $P<.001$). Stress coping strategies also showed a positive correlation with social support ($r=.455$, $P<.001$).

Table 3. Correlation between Job Stress, Stress Coping and Social Support

Variable	Job Stress	Stress Coping	Social Support
	$r(\rho)$	$r(\rho)$	$r(\rho)$
Job Stress	1		
Stress Coping	.416 ($<.001$)	1	
Social Support	.340 ($<.001$)	.455 ($<.001$)	1

3-4. Mediating Effect of Social Support in the Relationship Between Job Stress and Stress Coping Strategies

The Before testing the mediating effect, the autocorrelation of the dependent variable and the multicollinearity between the independent variables were examined. The Durbin-Watson index for autocorrelation was 1.721, close to 2, indicating independence. The VIF (Variance Inflation Factor) index for multicollinearity among the independent variables was 1.131, indicating that there was no multicollinearity, making the data suitable for regression analysis.

The results of Baron & Kenny's[27] three-step test to verify the mediating effect of social support in the relationship between job stress and stress coping strategies among three-shift workers are as follows. In the first step of regression analysis, the independent variable, job stress, had a significant effect on the mediating variable, social support ($p<.001$). Therefore, this study presented the mediating effect of social support in the relationship between job stress and stress coping strategies. In the first step of regression analysis, the independent variable, job stress, had a significant effect on the mediating variable, social support ($\beta=.34$, $p<.001$), with an explanatory power of 10.9% for social support. In the second step of regression analysis, the independent variable, job stress, had a significant effect on the dependent variable, stress coping strategies ($\beta=.41$, $p<.001$), with an explanatory power of 16%. In the third step, to verify the effect of the mediating variable, social support, on the dependent variable, stress coping strategies, regression analysis was conducted with job stress and social support as predictors and stress coping strategies as the dependent variable. The results showed that job stress ($\beta=.29$, $p<.001$) and social support ($\beta=.35$, $p<.001$) were significant predictors of stress coping strategies. In other words, the direct effect of job stress on stress coping strategies among male workers on a three-shift system was $\beta=.29$, and the effect of job stress on social support was $\beta=.34$, and the effect of social support on stress coping strategies was $\beta=.35$, indicating that the product of the indirect effect of job stress on stress coping strategies through social support was 0.12. The β value of the direct effect of the independent variable, job stress, was .29, which was smaller than the total effect β value of .41 in the first step, indicating that the mediating effect of social support existed. Therefore, social support played a mediating role in the relationship between job stress and stress coping strategies among male workers on a three-shift system, and these variables explained 27.4% of the variance in stress coping strategies (Table 4). The significance of the size of the mediating effect of social support was verified using the Sobel test, which confirmed that social support was a significant mediator in the relationship between job stress and stress coping strategies ($Z=3.185$, $p=.001$) (Figure 1).

Table 4. Mediating effects of Social Support in the relation between Job Stress and Stress Coping

	B	β	t	p	R ²	Adj R ²	Additional R ²	F	p
step1. Job Stress	1.029	.340	4.33	<.001	.115	.109		18.79	<.001
-Social Support									
step2. Job Stress	.534	.416	5.49	<.001	.173	.167		30.14	<.001
-Stress Coping									
step3. Job Stress, Social Support -Stress Coping					.284	.274	.111	28.37	<.001
1) Job Stress	.379	.296	3.93	<.001					
-Stress Coping									
2) Social Support	.150	.354	4.70	<.001					
-Stress Coping									
Sobel test: Z=3.185, p=.001									

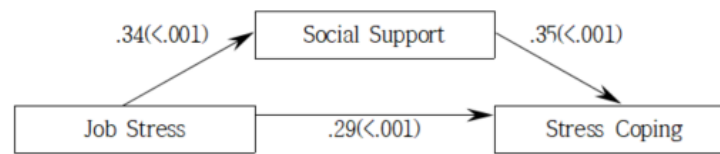


Figure 1. Mediating Effect of Social Support

4. DISCUSSION AND CONCLUSION

This study aimed to identify the mediating effect of social support in the relationship between job stress and stress coping strategies among male workers on a three-shift system. The level of job stress among the subjects was 2.48 points (1–4 points), with relationship conflict scoring the highest at 3.19 points, followed by organizational system (2.86 points), and inappropriate compensation (2.82 points). In a study of shift workers by Kim & Oh[26], the level of stress was 2.46 points, similar to the results of this study. The subdomains showed that job autonomy was the highest at 2.84 points, followed by job demand (2.54 points) and inappropriate compensation (2.53 points). In a study by Lee[27] on shift workers, the level of stress was 2.50 points, similar to the results of this study. The subdomains showed that inappropriate compensation was the highest at 2.53 points, followed by organizational system (2.65 points) and job autonomy (2.29 points). However, in a study by Kim[28] on male office workers, job stress was 2.41 points, lower than the stress levels of shift workers[26-27]. This is likely due to the fact that production workers work in environments that are less favorable in terms of job autonomy and decision-making authority compared to office workers[29]. Previous studies[30] have also shown that production workers are more likely to be in passive groups with both low workload and low job autonomy. While subdomain-specific job stress was high among production workers, mainly due to lack of job autonomy, inappropriate compensation, and organizational system, relationship conflict was identified as the highest job stress factor in this study, differing from previous studies. These results highlight the importance of an organizational management system that ensures job autonomy, an appropriate compensation system, and reasonable job demands to improve relationships between workers and appropriately manage job stress. Furthermore, it suggests that the diverse reasons, such as individual characteristics and environmental factors, should be explored in follow-up studies involving various subjects and work patterns.

The stress coping strategies of the study subjects averaged 2.63 points (1–4 points), with active coping strategies averaging 2.79 points and passive coping strategies averaging 2.47 points. In a study on middle-aged married workers[30], active coping strategies were more commonly used than passive ones, similar to the results of this study. However, in a study of male production workers[31], passive coping strategies were more commonly used, differing from the results of this study. This difference is likely due to the fact that shift work reduces workers' confidence in their work, self-regulation efficacy, and ability to actively cope with challenging tasks[31]. However, as previous studies and the results of this study differ, repeated studies considering individual characteristics and occupational characteristics of the subjects are necessary.

Social support in this study averaged 3.59 points (1–5 points), with emotional support

scoring the highest at 3.63 points, followed by evaluative support (3.57 points), material support (3.53 points), and informational support (3.11 points). In a study of novice nurses[32], social support averaged 3.59 points, similar to the results of this study, with informational support scoring the highest at 3.83 points, followed by emotional support (3.62 points), evaluative support (3.61 points), and material support (3.30 points), differing from the results of this study. The higher score for evaluative support suggests that fair performance evaluations are well established within the company, and the material support score suggests that reasonable compensation is provided following performance evaluations. However, novice nurses scored highest in informational support, likely due to their need to enhance their competence in performing clinical tasks in various clinical situations. Social support has been identified as an external protective factor received

from others and as an important factor in alleviating stress[33]. Therefore, social support is necessary for male workers on a three-shift system to alleviate stress and adapt well to the organization, and repeated studies involving a broader range of workers are needed to achieve this.

The job stress and stress coping strategies of the study subjects showed a positive correlation. Previous studies[31] have also shown that stress coping strategies, particularly active coping strategies, are used in stressful situations. In addition, job stress and social support showed a positive correlation, and previous studies on office and production workers[33] have also confirmed a significant relationship between job stress and social support, indicating a significant correlation between job stress and stress reduction. Therefore, recognizing and respecting the work abilities of superiors and colleagues within the workplace to reduce job stress and improve productivity can lead to the reduction of job stress and the improvement of work productivity among male workers on a three-shift system.

Examining the significant effects of job stress on stress coping strategies among male workers on a three-shift system revealed that job stress is a significant factor affecting stress coping strategies. Particularly, the more active stress coping strategies were used, the lower the level of stress, while passive stress coping strategies did not affect stress reduction[30]. There are various reasons why active stress coping strategies have a positive effect on stress reduction, but they help reduce stress by directly changing stress-inducing factors[34]. Therefore, if stress coping strategies are identified and active stress coping strategies are developed for male workers on a three-shift system, company-level stress management can reduce workers' stress levels.

Social support was confirmed to be a significant mediator in the relationship between job stress and stress coping strategies. As there are few previous studies on the mediating effect of social support in the relationship between job stress and stress coping strategies, it is difficult to make direct comparisons. However, a study on office workers[35] found that social support was a factor influencing depression and job burnout, showing similar results to this study. In other previous studies, job stress was reduced by social support[13-14], showing similar results to this study. How individuals psychologically adapt to stressful situations depends on social support[11], so it is necessary to establish a psychological support system that actively considers the social support of male workers on a three-shift system. Only then will job stress be reduced through active stress coping strategies.

This study provides basic data for the development of programs to promote the health of male workers on a three-shift system, which could positively impact the working environment through effective job stress management. The contribution of this study was used as basic data to lay the groundwork for the development of programs for the health promotion of male workers in three shifts, and it was found that social support has a mediating effect in effective stress management. Additionally, there was a limitation in comparing and discussing the results due to the lack of previous studies on the mediating effect of social support in the relationship between job stress and stress coping strategies.

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