

Correlations among occupational stress, fatigue, and depression in call center employees in Seoul

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Abstract. [Purpose] This study identified correlations among occupational stress, fatigue, and depression in call center employees in South Korea. [Subjects and Methods] This study consisted of 150 call center workers. A cross-sectional design was adopted. Tools including the Effort-Reward Imbalance, Checklist Individual Strength, and Depression scales were used to measure levels of stress, fatigue, and depression. [Results] There were statistically significant differences between fatigue and depression. We found that fatigue significantly predicted the level of depression among Korean call center employees (adjusted $R^2=0.227$). [Conclusion] Call center employees who experienced great emotional stress appeared to have high levels of depression, and fatigue was a powerful factor influencing their depression.

Key words: Emotional stress, Occupational health, Depression

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INTRODUCTION

Dasan Call Center is a 24-hour information hotline launched by the Seoul Metropolitan Government in 2007 that responds to inquiries on a variety of topics, including public transportation, water supply, tourism services for foreigners, cultural events, and any other travel-related and everyday living topics in Seoul and other regions. It is available in five foreign languages, including English. The call center also provides consultations via mobile phone text messages and social network service (SNS), and receives public complaints from callers. As the primary functions of Dasan Call Center, including providing callers with information and receiving and handling public complaints, do not require high-level job qualifications, most of the employees are low-paid part-time women¹⁾. As customer satisfaction is heavily affected by the extent to which the employees control their emotions in situations where they have constant interaction with the public, the employees are required to always maintain emotional control with a good tone of voice²⁾. Furthermore, because the employees' job performance is evaluated on whether they provide satisfactory services to callers and if they provide complete answers to the callers' questions directly, immediately, and with complete details, the psychological pressure experienced by these employees is high. The employees receive an average

of 20 vicious phone calls and civil complaints daily, with verbally abusive and sexually provocative language from callers. Thus, many employees experience depression and emotional insensitivity, as well as anger, loss of self-esteem, insomnia, and stress³⁾.

Likewise, call center employees required to control their emotions without treating their psychological stress may develop various symptoms of depression caused by the high level of occupational or work-related stress combined with a low level of social support associated with a low-paying part-time job⁴⁾, which may lead to physical and psychological health problems. The constant suppression of stress and anger by people in emotionally charged work environments could lead to psychological disorders such as anxiety, depression, low self-esteem, and neurosis as well as physical diseases such as hypertension, heart disease, coronary arterial disease, and cancer.

This study was conducted to identify call center employees' subjectively perceived levels of occupational stress and fatigue, and to determine the effects of occupational stress and fatigue on depression in these employees. Therefore, the primary purpose of this study was to identify the relationships among occupational stress, fatigue, and depression based on the demographic characteristics of call center employees. The secondary purposes were (1) to identify the differences in occupational stress, fatigue, and depression based on demographic characteristics of call center employees; (2) to evaluate the correlations among occupational stress, fatigue, and depression in call center employees; and (3) to determine the effects of occupational stress and fatigue on depression in call center employees.

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SUBJECTS AND METHODS

This study was a cross-sectional design. The study sample was recruited from a Korean call center in Seoul. Subjects were selected using the convenience sampling method. For ethical considerations, the purpose of the study was clearly explained to all participants. Only those who agreed to participate in the study were enrolled. In addition, the participants were informed that the study data would not be used for any purpose other than for this study, which they could withdraw from at any time if they so wished, and that the study data would be treated anonymously to avoid dissemination of their personal information. The signed consent forms were collected before the survey was performed. The minimum number of participants required for multiple regression analysis was estimated to be 107 participants based on Cohen's power analysis formula (0.05 significance level, 0.80 test power (1- β), and 0.15 effect size). In this study, data obtained from a total of 150 participants were included in the final analysis.

Occupational stress are those aspects of a job perceived as falling within a spectrum of discomfort ranging from mildly disturbing to painful suffering⁵). To assess occupational or work-related stress in this study, the Korean version of the Effort-Reward Imbalance (ERI) tool originally developed by Siegrist⁶) and translated into Korean by Yun, Lee, Lim⁷) and revised by Kim⁸) was used. The 17-item Korean version of the ERI is based on a 5-point Likert scale, with 0 meaning no stress at all and 4 the worst stress the participant had ever felt; in other words, higher scores, indicate higher stress level. The scores on seven items for positive cognition with negatively worded statements were converted when calculated into total scores. The Cronbach's α of the internal consistency of the tool in Kim's study⁸) and this study were 0.702 and 0.614, respectively.

The Checklist Individual Strength (CIS) tool originally developed by Vercoulen et al.⁹) was used to measure fatigue. It employs a 20-item 7-point Likert scale, with 1 meaning no fatigue at all and 7, a very high level of fatigue, indicating that higher scores correspond to higher levels of fatigue. The questionnaire consists of four subscales: fatigue severity (CIS-fatigue, 8 items), concentration (5 items), motivation (4 items), and activity level (3 items), each scored based on a 7 point Likert scale. Cronbach's α of the internal consistency of the tool reported by Vercoulen et al.⁹) and this study were 0.90 and 0.819, respectively.

To measure depression, the Center for Epidemiologic Studies Depression (CES-D) Scale, a self-report measure of depression severity developed by the U.S. National Institute of Mental Health in 1971 and translated into Korean by Cho and Kim¹⁰), was used. This questionnaire consists of four subscales: somatic and retarded activity (3 items: possible range 0–21), depressed affect (3 items: possible range 0–21), positive affect (4 items: possible range 0–12), and interpersonal relations (2 items: possible range 0–6), each scored based on a 4-point Likert scale. The higher scores indicate higher levels of depressive symptoms. A person with a total score 16 or above is considered to have a clinically significant depressive tendency. Unlike the CES-D Scale, which has a borderline of 16 points for distinguishing between

non-depression and possible depression in this study, the 21-point borderline proposed by Cho and Kim¹⁰) was used as the criterion for diagnosing depression in the current study. Scores for the three items were converted into total scores. Cronbach's α of the internal reliability of the tool in the study conducted by Cho and Kim¹⁰) and the current study were 0.772–0.823 and 0.908, respectively.

The collected data were analyzed using SPSS version 15.0. The demographic characteristics and differences in the major study variables were tested using descriptive statistics, t-test, Pearson correlation coefficients, and multiple regression analysis.

RESULTS

The demographic characteristics of the participants are shown in Table 1.

Differences in occupational stress, fatigue, and depression according to demographic characteristics are shown in Table 1. There was no statistical difference between occupational stress and the demographic characteristics of the study participants, but there were statistical differences between fatigue and age group ($p < 0.05$) and between fatigue and depression, with the latter's score exceeding the borderline of 21 points on the scale ($p < 0.05$) (Table 1).

Correlations among occupational stress, fatigue and depression are shown in Table 2. While occupational stress was shown not to have statistically significant correlation between fatigue and depression, there was a strong positive correlation between fatigue and depression ($p < 0.001$) (Table 2).

The factors influencing depression revealed by multiple regression analysis are shown in Table 3. This analysis showed that the prediction model for depression among Korean call center employees was significant ($p < 0.001$). The adjusted R^2 was 0.227, which corresponds to an explanatory power of 22.7%. Fatigue was found to have the most influence on depression among Korean call center employees (Table 3).

DISCUSSION

This study was conducted to identify the effects of occupational stress and fatigue on depression in employees of the Dasan Call Center.

The occupational stress among call center employees in this study was mainly caused by their unfavorable job outlook, low income, lack of prestige, and underprivileged position. Considering that the average income level of most of the study participants (78.9%) ranged from 1,410,000 to 2 million Korean won per month, and that 90.8% of the participants were phone counselors, there should be greater environmental and social support for efforts to inform the general public of the importance of understanding the hardships of people doing emotionally challenging work, and to encourage appreciation of the services that these workers provide. The average break time for rest and relaxation for these call center employees was 1.23 hours, and their average daily sleeping time was 6.4 hours, revealing a lack of sleep and rest. Irregular sleeping habits and excessive stress are

Table 1. Differences in occupational stress, fatigue, and depression based on participant demographic characteristics (N=150)

Characteristics	Subcategory	F (%)	Occupational stress	Fatigue	Depression
			M±SD	M±SD	M±SD
Gender	M	16 (10.5)	30.6±4.9	92.7±11.5	19.9±7.3
	F	134 (89.5)	32.0±6.9	82.0±15.1	16.2±10.4
Age (years)	21–29	11 (7.4)	31.5±5.4	92.5±18.5*	20.6±13.7
	30–39	92 (61.1)	31.5±7.4	86.9±13.7*	17.1±8.8
	40–49	39 (25.9)	32.3±5.4	75.3±14.5*	14.4±11.3
	50–59	8 (5.6)	35.0±4.5	72.4±14.1*	12.4±10.1
Position	Phone counselor	136 (90.8)	31.3±6.6	82.8±15.3	16.9±10.5
	Team leader	14 (9.2)	34.0±11.2	79.6±8.0	7.6±4.5
	Contract-based (full-time)	16 (10.5)	31.2±3.7	87.7±5.8	20.0±5.5
Employment	Full-time	126 (84.2)	31.7±7.2	82.1±15.9	15.4±10.9
	Others	8 (5.3)	36.0±2.6	101.5±2.1	23.6±8.5
	Monthly income (10,000 won)				
Monthly income (10,000 won)	121–140	20 (13.2)	33.6±5.7	92.6±13.5	18.7±7.1
	141–200	118 (78.9)	31.3±6.8	82.2±15.1	16.4±11.1
	201–250	8 (5.3)	35.5±6.3	70.7±7.1	13.0±5.6
	≥ 301	4 (2.6)	34.0±6.3	82.5±14.8	17.5±4.9
Length of employment (months)	≤ 12	20 (13.5)	28.8±10.4	78.0±20.0	12.5±8.2
	13–36	63 (42.3)	30.5±5.1	83.3±16.2	17.5±11.6
	37–60	58 (38.5)	33.6±6.6	82.9±14.1	15.4±9.7
	≥ 61	9 (5.7)	34.0±4.2	87.0±18.3	15.5±6.3
Average daily working hour (hours)	≤ 8	117 (78.2)	31.5±5.5	83.6±14.9*	17.5±10.8
	9	22 (14.5)	29.8±11.0	84.3±15.8*	13.4±7.9
	≥ 10	11 (7.3)	38.0±4.7	83.2±12.4*	15.6±5.9
Average break time (min)	≤ 59	58 (38.5)	31.7±8.0	76.8±15.2	15.5±10.0
	60–119	65 (43.5)	30.5±6.7	84.2±13.4	15.5±11.8
	≥120	27 (18.0)	34.2±6.8	86.6±15.0	15.9±8.8
Daily sleeping hours	≤ 7	128 (85.2)	31.6±6.6	83.6±15.7	16.5±9.1
	8–9	22 (14.8)	32.5±7.4	82.3±12.1	18.6±15.6
Disease	None	86 (56.9)	31.3±5.8	81.9±17.3	15.7±9.9
	Back pain, disc	29 (19.4)	33.2±5.3	85.5±12.4	17.2±9.8
	GI disease	12 (8.3)	34.3±5.0	79.5±7.5	16.5±7.3
	Diabetes	4 (2.8)	39.0±5.2	84.0±10.4	22.5±10.6
	Hypertension	4 (2.8)	32.0±1.4	87.5±10.6	38.5±14.8
	Others	15 (9.7)	30.2±18.7	89.4±18.9	15.6±8.5
Depression	Yes	46 (30.3)	32.2±6.4	88.1±11.2*	27.8±6.8*
	No	104 (69.7)	31.2±6.9	79.8±15.7*	10.6±5.4*

*p<0.05

Table 2. Correlations among occupational stress, fatigue, and depression

Variable	Occupational stress	Fatigue	Depression
Occupational stress	1		
Fatigue	0.154	1	
Depression	0.161	0.540***	1

***p<0.001

Table 3. Factors influencing depression by multiple regression analysis

Variables	B	S.E	β	Adj R ²
(Constant)	-20.406	10.540		
Occupational stress	0.137	0.219	0.084	0.227**
Fatigue	0.396	0.109	0.490**	

**p<0.01

risk factors for fatigue¹¹). Therefore, exercise and relaxation programs that encourage workers to exercise on a regular

basis should be offered to help workers effectively and positively reduce their fatigue¹²) and depression¹³). In addition to an exercise facility, a staff lounge or therapy room should

be available for workers to rest during their breaks, undergo physical therapy, or replenish their sleeping hours in order to increase their productivity and reduce their fatigue.

Analysis of findings of this study with Turkey's post hoc test showed that younger participants had higher levels of both depression and fatigue, a result consistent with those reported by other studies¹⁴). This may be because younger participants, who were relatively inexperienced, were less likely to have emotional stability and the ability to control and manage their work performance than older and more experienced employees. Furthermore, there was no statistical difference between part-time workers and fatigue in this study, contrary to a previous report that full-time workers were more likely to have higher levels of fatigue than part-time workers¹⁴), likely because 84.2% of the participants of the current study were full-time workers.

Although occupational stress was statistically significantly correlated to fatigue or depression in this study, a strong positive correlation was found between depression and fatigue ($p < 0.001$), unlike the results of a previous study on the relationship between occupational stress and fatigue¹⁴⁻¹⁶), but consistent with the results of a study conducted by Lee, Lee, Kwon, and Cho¹⁷) on the relationship between depression and fatigue. In other words, the participants in this study appeared to have very intensive workloads that easily exhausted them physically; due to the positive correlations with whole body musculoskeletal symptoms¹⁸) and psychological effects, some of the call center workers developed depression. This result demands establishment of measures to alleviate worker fatigue and prevent workers from developing more severe depression. Likewise, there should be a supportive environment that provides call center employees with sufficient rest and relaxation, as well as provisions for work schedule rearrangement, which can reduce the work intensity and the negative effects of their long working hours.

Multiple regression analysis showed that fatigue is the most influential factor for depression, with an explanatory power of 22.7%. The majority of the participants in this study were female employees, who were relatively physically weaker than their male counterparts. Considering as well the results of another study pointing to an inseparable relationship between sleep quality and depression¹⁵), an ongoing follow-up program that monitors fatigue and depression levels in call center employees must be established.

The call center employees who participated in this study appeared to have high levels of depression, and fatigue was found to be a powerful factor influencing their depression. Thus, cognitive behavioral approaches¹⁹), considered some of the most efficient methods for changing cognitive thinking, should be employed to alleviate worker depression and improve their health behavior and health management skills by helping them recognize, take responsibility for, and show interest in solving their own health problems. In addition, environmental policies and facilities should be established to reduce fatigue in people with emotionally charged jobs, such as call center employees.

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