The Relationship of Shift Worker and Depression using Big Data

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Abstract. The purpose of this study was to investigate the effects of shift work on depression. Data from the study were analyzed using the The sixth Korea National Health and Nutrition examination survey VI-2. The results showed that the shift worker had 1.459 times more depressed than the non-shift worker. The quality of life and perception of subjective health status of shift workers were found to be related to depression. The quality of life of these shift workers and the policy approach to improve industrial safety are considered to be a way to improve the mental health of shift workers.

Keywords: Shift work, depression, Occupation, Quality of life

1   Introduction

Currently, Korea is in a serious state of mental health problems such as suicide, anxiety, and depression, despite the improvement of medical technology and living standard, which is in serious danger due to social problems. In response to these mental health problems, countermeasures have been established in various and systematic ways at the national level. In particular, various studies have been conducted to prevent suicide in the face of the disgrace of OECD suicide rate (1).

In 2011, the prevalence of major depressive disorder lifetime prevalence was 4.0% in 2001, 5.6% in 2006, and 6.7% in 2011 in the mental health state epidemiology survey of the Ministry of Health and Welfare. In addition, there is a significant increase in depression among mental health problems (2).

Modern society has changed the working hours in order to meet various demand factors of the people through changes in industrial environment and cultural life. Therefore, workers are often required to work not only during the day when humans are awake, but also at night when they must rest physiologically and psychologically. Shifts in the number of shift workers are increasing due to changes in the industrial environment. In Europe and the United States in 2000, it is estimated that about 20%

of the total worker is in shift work (3-4). In the case of a shift worker, daily rhythm incongruity is disrupted by the daily cycle rhythm, which reduces the efficiency of work and negatively affects the interpersonal relationship in social relations. In addition, shift workers may experience insomnia, lack of sleep, and poor quality of sleep, resulting in loss of work efficiency and loss of the company (5). However, the more serious side effects are that they can lead to metabolic disorders, emotional problems, somatization disorders and psychiatric disorders on a personal level due to shift work stress (6).

The purpose of this study is to evaluate the health and nutrition level of the people and to calculate the statistics necessary for establishing and evaluating the health policy in the Ministry of Health and Welfare. By using statistical data of the National Health and Nutrition Survey, And to provide basic data for establishing effective working conditions to reduce the depression of workers by confirming the relationship with depression.

2　Study Method

2.1　Subjective

The data used to carry out this study were from The sixth Korea National Health and Nutrition examination survey VI-2. In order to improve the accuracy of the representative and estimation of the sample, we used stratified, clustered, and weighted (health Questionnaires, and screening weights). The estimation of the population mean ($\overline{Y}$) and variance ($V^{\cdot}(\overline{Y})$) in the complex sample is as follows (Figure 1).

$$\overline{Y}^\wedge = \frac{\sum_{h=1}^{H}\sum_{i=1}^{m}\sum_{i=1}^{a}\omega_{hii}\times y_{hii}}{\sum_{h=1}^{H}\sum_{i=1}^{m}\sum_{i=1}^{a}\omega_{hii}} \qquad V^{\wedge}(\overline{Y}^{\wedge})=\sum_{h=1}^{H}\frac{m}{m-1}\sum_{i=1}^{m}(\varepsilon_{hi}-\overline{\varepsilon_{h}})^{2}$$

(h : layer, i: research, : household, ω_{hii}: weight, y_{hii}: value, $\varepsilon_{hi}=[\sum_{i=1}^{a}\omega_{hi}/(\omega_{hi}-\overline{Y})]/\omega\cdots$: residual(research), $\overline{\varepsilon_{h}}=\sum_{i=1}^{m}(\varepsilon_{hi})/m$: residual(layer))

Fig. 1. Estimated Mean and Variance

2.2　Measurement of Depression

The sixth Korea National Health and Nutrition examination survey VI-2 used a depression module consisting of the self-report questionnaire. PHQ-9 was developed to meet DSM-IV(Diagnostic and statistical manual of mental disorder) diagnostic criteria for depressive episodes. No, not at all, from 0 to nearly every day, according to the severity of the symptoms, ranging from 5 to 9 points, 10 to 14 points, moderate to 15 to 19 points, severe to 20 points or more, Was used (7). In this study, more than 5 mild depressive disorder was used as the cut point of depression.

2.3 Analysis Method

The sixth Korea National Health and Nutrition examination survey VI-2 was revised to fit the purpose of the study. The relationship between these characteristics and depression was presented using the χ2 test. Multivariate logistic regression analysis was performed to determine the relationship between the presence of shift work and depression in the univariate control of variables with significant relationship to depression.

3 Results

3.1 Multiple logistic regression analysis between general, occupation, health characteristic and depression

The logistic regression analysis was conducted to examine the effect of shift work on depression in the univariate control of variables affecting depression(table 1).

Depression was found to be 1.459 times higher in the shift work group than in the non-shift work group (95% CI: 1.008-2.110). A significant variables were controlled and analysis.

Table 1. Multiple logistic regression analysis between General, Occupation, Health characteristic and Depression

Independent variables		Odds ratio	95%CI*	
			Lowest	highest
Gender(female)	male	0.733	0.556	0.966
Age(66 and over)	19-35	1.590	0.866	2.920
	36-50	1.166	0.646	2.105
	51-65	0.995	0.598	1.656
Education (collage and above)	elementary and below	1.016	0.567	1.822
	middle	0.849	0.495	1.457
	high	1.156	0.783	1.705
house Income(high)	low	1.643	0.847	3.187
	middle low	1.372	0.939	2.006
	middle high	0.958	0.694	1.322
medical insurance (medical care)	Health insurance	0.645	0.251	1.654
private insurance(no)	Yes	0.976	0.627	1.517
Employment type(other*)	Non-precarious	0.775	0.390	1.540
	precarious	0.800	0.451	1.419
Regular working(other*)	Regular	1.188	0.691	2.042
	Temporary	1.241	0.711	2.165
	Daily	1.000	.	.
Occupation group(labor)	Office	0.651	0.450	0.942
	Service	0.826	0.580	1.177
Form of working hours (part time)	Full time	1.151	0.730	1.817
Chronic disease(yes)	None	1.043	0.694	1.567
Cerebro-cardiovascular disease(yes)	None	1.189	0.569	2.483
Stress state(often)	Sometimes	0.255	0.193	0.336
Body mass index(obesity)	Underweight	2.214	1.143	4.289
	Normal weight	1.243	0.911	1.697

Sleeping time(9 and over)	4≥	2.107	0.850	5.222
	5-8	0.659	0.367	1.15
Quality of life(problem)	No problem	2.353	1.771	3.128
subjective health state (poor)	Good	0.290	0.188	0.448
	Fair	0.597	0.431	0.826
Shift worker(no)	Yes	1.459	1.008	2.110

Other*:self-employment and unpaid family
CI*:confidence interval

4 Discussion

This study was conducted to investigate General, Job and Health characteristics that affect depression on shift workers and to find ways to improve their work efficiency by solving their depression.

The shift worker showed 1.459 times higher depression level than the comparison worker. This study was conducted by Park (8) who studied the relationship between shift work and depression, Kim(9) who studied nurses, Bae(10) investigated the relationship between police officers' of depression, And Elisabeth Flo (11) on the health problems of nurse shift workers.

The results of Costa's study(12) suggest that shift workers who have not had constant working hours show mental changes as well as physical changes as well as differences in lifestyle, group personality, family relationship, and social status. Most of these mental changes have negative consequences and cannot be reversed.

5 Conclusion

The results showed that the shift worker had 1.459 times more depression than the non-shift worker. In particular, there was a significant difference in quality of life (OR: 2.353) and subjective health status (OR: 0.290). Quality of life and perception of health status were found to be related to depression. The quality of life of these shift workers and the policy approach to improve industrial safety are considered to be a way to improve the mental health of shift workers.

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