

Impacts of Smoking and Alcohol Consumption on Workplace Presenteeism: A Cross-Sectional Study

So Young Lee

Kyungbuk University

Jinhwa Lee

University of Ulsan

Min Kwon (✉ mink@suwon.ac.kr)

University of Suwon <https://orcid.org/0000-0003-0947-5830>

Research

Keywords: alcohol drinking, absenteeism, non-smokers, occupational health, presenteeism, smoking, work performance, workplace

Posted Date: June 15th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-34300/v1>

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Abstract

Background: Presenteeism refers to the practice of going to work despite poor health, resulting in subpar performance. The problems caused by smoking and drinking alcohol while on company premises have received limited attention despite their health hazards, which are linked to sick leave, occupational injuries, and reduced productivity. This study aimed to investigate the effects of smoking and alcohol drinking on presenteeism.

Methods: The study participants were 60,051 wage workers from the database of the second and third Korean Working Conditions Surveys (KWCS) in 2010 and 2011, respectively. A total of 41,672 workers aged 19 and over who had worked for at least one hour in the previous week answered the survey questions. Chi-squared tests and multiple logistic regression analyses were conducted using SPSS 18.0 to determine the impacts of smoking and drinking alcohol on presenteeism.

Results: Of the 41,672 Korean workers, 8565 (20.6%) had experienced presenteeism in the past 12 months. Presenteeism was higher among women; the elderly; people with low educational status; people with low income; people with 5-11 days absenteeism; people with more working time; people with health problems; heavy smokers; and high-risk alcohol drinkers than other participants. Based on the results of multiple regression analysis, heavy smoking (AOR = 2.10, 95% CI [1.56, 2.82]) and high-risk drinking of alcohol (AOR = 1.20, 95% CI [1.10, 1.31]) were significantly related to presenteeism among workers.

Conclusions: Smoking and alcohol drinking are associated with and potentially influence presenteeism; therefore, interventions for employees, and for the general public, may improve workplace productivity and reduce accidents. Companies that encourage employees to receive treatments for reduction of smoking or alcohol consumption may benefit from greater productivity. Hence, we should consider the impact of smoking and alcohol in the workplace and build appropriate strategies and implementation programs to help reduce heavy smoking and high-risk alcohol drinking behaviors.

Background

Nicotine and alcohol are the most socially acceptable approved substances used worldwide. In South Korea, however, substance abuse is a serious matter, rated at the top of the OECD (Organization for Economic Cooperation and Development) member countries [1]. Reports indicate that South Korea's smoking rate among men has reached 43.1%, over twofold higher than the global average of 22.7%, as determined by a WHO survey [2]. Additionally, recent high-risk drinking rates were 20.8% for males and 8.4% for females [3], and the per capita annual alcohol consumption of 11.9L, approximately twice the global average of 6.4L, is the highest among Western Pacific countries [4].

In considering the cost of substance abuse, the nicotine/alcohol dependence of workers, who play the largest role in the growth of the national economy, has become a matter of concern, especially in terms of productivity [5]. Smoking and alcohol use are not only significant factors in mental and physical health but also have socioeconomic costs. Workplaces that allow smoking make it more difficult for workers to

quit and easier for them to become nicotine-dependent [6], adding the burden of poor health to company costs. One study suggested workers' poor health can lead to workplace accidents and lower work efficiency, reducing companies' overall productivity [5]. An employee's mental and physical health has a critical influence on their ability to perform their job effectively [7], and health risks such as hypertension, diabetes, hyperlipidemia, poor nutrition, obesity, lack of exercise, and depression are related to productivity losses when employees continue to work while sick [8, 9]. Nicotine and alcohol, the most used and misused psychoactive substances in the workplace, affect work productivity [10–12], and employees' impaired work performance may lead to both absenteeism and presenteeism [13].

The WHO suggests that job stress increases workers' alcohol consumption, thereby causing alcohol dependency, and heavy drinking increases absenteeism, reduced productivity, and workplace accidents equating to social costs [14]. According to U.S. data, when a heavy alcohol user goes to work while sick, their job performance decreases by approximately 25% [15]. Further, the annual per-smoker cost of lost productivity due to unsanctioned smoking breaks ranges from \$3,077 to \$4,102, even assuming a smoker consumes only two cigarettes each day for 15 minutes each outside of sanctioned break times [16]. One study reported that a current smoker's productivity loss is approximately 1.7-fold higher than that of a non-smoker [17]. Smoking and alcohol drinking are major health determinants; accordingly, uncontrollable alcohol use and heavy smoking must be addressed by implementing preventive policies and workplace health management.

According to previous studies, workers' absenteeism and presenteeism can explain loss of productivity [13]. Presenteeism accounts for 77% of total lost productivity in the workplace, while absenteeism is only responsible for 23% of that loss [8], yet presenteeism has been overlooked because it is not as obvious as absenteeism [10]. Previous studies regarded presenteeism primarily as a corporate issue; however, emerging discussions treat it as a social matter to be managed by clinicians and specialists [18]. Little research has been published on the effects of smoking and alcohol on presenteeism beyond a few reports that alcohol consumption is associated with presenteeism [19] and smoking is related to work impairment including absenteeism and presenteeism [20]. Indeed, previous studies have viewed health conditions and depression as major factors of presenteeism [21], but it is hard to find analyses confirming factors directly related to workers' addictions.

Methods

Aim

This study aimed to examine the association between presenteeism and nicotine/alcohol use by addressing the following questions:

1. Are there any differences in presenteeism according to general characteristics, smoking, and alcohol drinking?

2. Are smoking and drinking significant predictors of presenteeism, after adjusting for potentially confounding variables?

Design

This study used a cross-sectional survey research design to conduct a secondary analysis of screening survey data from the second and third KWCS databases. We investigated the effects of smoking and alcohol drinking on presenteeism among wage workers.

Setting and sample subjects

The original KWCS surveys were approved by the Korea Occupational Safety and Health Agency. The SPSS data files classified by year were merged by cases (Approval No. 38002).

KWCS is a state-recognized statistical survey that has been conducted since 2006 to identify risk factors by working type and conditions—including mechanical, physical, and chemical hazards in the workplace—and psychosocial factors that influence working conditions. The population represented by the KWCS are economically active people 15 years and older residing in Korea. A two-step stratified cluster sampling method was used for the first and second sampling units. In contrast, sampling frameworks were stratified according to the criteria city-province, neighborhood/township/town, and housing type (single houses/apartment homes).

The second and third KWCS enrolled a combined 60,051 participants, from which we selected the 41,703 wage workers who were over 19 years old. After excluding surveys with insufficient or incomplete data, completed surveys from 41,672 workers were included in the present analysis.

Instruments

Presenteeism

Presenteeism needed to be identified. “Yes” responses to the question “Have you ever come to work while sick in the past 12 months?” were considered to indicate presenteeism in this research.

Smoking and drinking alcohol

We defined smokers as people who had smoked five packs of cigarettes or more (100 cigarettes or more) to date in their lifetime. “Non-smokers” were those who had never smoked; those who were smokers at the time of the survey were classified as “current smokers”; those who no longer smoked but had in the past were classified as “ex-smokers.” Based on preceding studies [22, 23], those who smoked 40 cigarettes or more a day were referred to as “heavy smokers.”

Drinkers were defined as those who drank at least once a month regardless of the type of liquor. High-risk drinkers were defined as those who drank more than twice a week, seven glasses of alcohol or more for

men and five glasses of alcohol or more for women at a time, following the standard suggested by the Korea National Health and Nutrition Examination Survey [3].

General characteristics and health problems

Based on previous studies, general characteristics of the subjects included gender, age, educational status, income, absenteeism, and smoke exposure as factors potentially associated with presenteeism [16, 24].

To examine the health problems that affect presenteeism, we included “Yes” responses to the question “Have you ever had health problems over the past 12 months, such as a hearing problem, a dermatologic problem, musculoskeletal pain (back pain, shoulder/neck/arm muscular pain, or lower extremities muscular pain), headache/asthenopia, abdominal pain, respiratory distress, cardiovascular disease, injury, depression/anxiety disorder, fatigue, or insomnia/sleep disorder?”

Data analysis

Survey data obtained in this study were analyzed using SPSS 18.0, and workers’ presenteeism rate was calculated in terms of frequency and percentage. Chi-square tests were used to determine differences in presenteeism according to the subjects’ general characteristics, smoking, drinking, and health problems. Multiple logistic regression analysis was used to evaluate the associations among smoking, drinking, and presenteeism. Adjusted odds ratio (AOR) and 95% confidence intervals (CI) were calculated, and the level of statistical significance was set at $p < .05$.

Results

General characteristics of participants

Participants’ average age was 40.7 years; 58.8% were male and 42.2% female. There was a high proportion of college graduates, and for most participants, household income was less than 3 million Korean won per month. Of all respondents, 90.7% had no absences while 4.1% reported missing 1–4 days within the previous 12 months. Musculoskeletal pain was the most common symptom of health problems, and 1.9% had been exposed to tobacco smoke for over three-fourths of their working hours (Table 1).

Characteristics	Classification	n (%)
Gender	Male	24,486 (58.8)
	Female	17,186 (41.2)
Age (Mean±SD: 40.73±12.01)	19-29	8,640 (20.7)
	30-39	11,897 (28.5)
	40-49	11,163 (26.8)
	50-59	7,079 (17.0)
	≥ 60	2,893 (7.0)
Educational status	≤Middle school	4,558 (10.9)
	≤High school	15,648 (37.6)
	≥College	21,466 (51.5)
Income (KRW10,000*)	<100	5,572 (13.4)
	100-299	27,709 (66.5)
	≥300	8,391 (20.1)
Absenteeism (Days)	0	37,802 (90.7)
	1-4	2,369 (5.7)
	5-11	1,000 (2.4)
	≥12	501 (1.2)
Smoke exposure	Less than half of work time	40,871 (98.1)

		3/4 or more of working hours	801 (1.9)
Health problems	Hearing	Does not have	40,905 (98.2)
		Has	767 (1.8)
	Dermatologic	Does not have	40,642 (97.5)
		Has	1,030 (2.5)
	Musculoskeletal pain	Does not have	26,022 (62.4)
		Has	15,650 (37.6)
	Headache/asthenopia	Does not have	34,163 (82.0)
		Has	7,509 (18.0)
	Abdominal pain	Does not have	41,082 (98.6)
		Has	590 (1.4)
	Respiratory distress	Does not have	41,382 (99.3)
		Has	290 (0.7)
	Cardiovascular disease	Does not have	41,201 (98.9)
		Has	471 (1.1)
	Injury	Does not have	40,823 (98.0)
		Has	849 (2.0)
	Depression/anxiety	Does not have	41,066

disorder		(98.5)
	Has	606 (1.5)
Fatigue	Does not have	32,325 (77.6)
	Has	9,347 (22.4)
Insomnia/sleep disorder	Does not have	40,590 (97.4)
	Has	1,082 (2.6)

Table 1. General characteristics and health problems (N=41,672)

[1] KRW 10,000 = USD 8.20 = EUR 7.56 (2020.4.9 exchange rate)

Prevalence of smoking, drinking, and presenteeism

Of all respondents, 20.6% had experienced presenteeism. Approximately one third (33.8%) of participants were current smokers, 0.6% being heavy smokers. Most reported drinking alcohol (63.6%) and 12.4% were high-risk drinkers (Table 2).

Characteristics	Classification	n (%)
Smoking	Non-smoker	22,960 (55.1)
	Ex-smoker	4,376 (10.5)
	Current smoker	14,085 (33.8)
	Heavy smoker	251 (0.6)
Alcohol Drinking	Non-drinker	9,998 (24.0)
	Current drinker	26,513 (63.6)
	High-risk drinker	5,161 (12.4)
Presenteeism	No	33,107 (79.4)
	Yes	8,565 (20.6)

Table 2. Smoking, drinking, and presenteeism (N=41,672)

Presenteeism and general characteristics

Table 3 shows the relationships among smoking, drinking, general characteristics, and presenteeism. Heavy smokers had more presenteeism than non-smokers, ex-smokers, or current smokers ($p < .001$). High-risk drinkers had more experience of presenteeism than non-drinkers or current drinkers ($p < .001$). Females had more experience of presenteeism than males ($p < .001$). Presenteeism was also more common among the elderly ($p < .001$), workers who had lower educational status ($p < .001$), and workers who had lower income ($p < .001$). Workers who were absent from 5 to 11 days had more presenteeism than those who were never absent, were absent from 1 to 4 days, or were absent more than 12 days ($p < .001$). Workers who were exposed to tobacco smoke for at least three-quarters of their work time had more presenteeism than those exposed to tobacco smoke less than half of their work time ($p < .001$). Presenteeism was higher among subjects with health problems than subjects without.

Characteristics	Classification	Presenteeism	χ^2 (<i>p</i>)
Smoking	Non-smoker	4,741 (20.6)	21.36
	Ex-smoker	945 (21.6)	(<.001)
	Current smoker	2,802 (19.9)	
	Heavy smoker	76 (30.3)	
Alcohol Drinking	Non-drinker	1,908 (19.1)	20.54
	Current drinker	5,524 (20.8)	(<.001)
	High-risk drinker	1,132 (21.9)	
Gender	Male	4,638 (18.9)	94.42
	Female	3,927 (22.8)	(<.001)
Age (Years)	19-29	1,448 (16.8)	108.59
	30-39	2,491 (20.9)	(<.001)
	40-49	2,430 (21.8)	
	50-59	1,611 (22.8)	
	≥60	585 (20.2)	
Educational status	≤Middle school	1,119 (24.6)	51.50
	≤High school	3,184 (20.3)	(<.001)
	≥College	4,261 (19.8)	
Income (KRW10,000)	<100	1,008 (18.1)	24.10
	100-299	5,816 (21.0)	(<.001)
	≥300	1,740 (20.7)	
Absenteeism (Days)	0	6,429 (17.0)	3254.51
	1-4	1,273 (53.7)	(<.001)
	5-11	654 (65.4)	
	≥12	41.4 (20.8)	
Smoke exposure	Less than half of work time	8,318 (20.4)	51.96

		3/4 or more work time	246 (30.8)	(<.001)
Health problem	Hearing	Does not have	8,280 (20.2)	131.94
		Has	285 (37.2)	(<.001)
	Dermatologic	Does not have	8,128 (20.0)	306.79
		Has	436 (42.3)	(<.001)
	Musculoskeletal pain	Does not have	3,710 (14.3)	1681.33
		Has	4,854 (31.0)	(<.001)
	Headache/asthenopia	Does not have	6,048 (17.7)	941.50
		Has	2,516 (33.5)	(<.001)
	Abdominal pain	Does not have	8,291 (20.2)	242.78
		Has	273 (46.3)	(<.001)
	Respiratory distress	Does not have	8,428 (20.4)	125.24
		Has	136 (47.1)	(<.001)
	Cardiovascular disease	Does not have	8,346 (20.3)	195.30
		Has	219 (46.4)	(<.001)
	Injury	Does not have	8,211 (20.1)	234.68
		Has	353 (41.6)	(<.001)
	Depression/anxiety disorder	Does not have	8,266 (20.1)	308.57
		Has	298 (49.2)	(<.001)
	Fatigue	Does not have	5,450 (16.9)	1202.45
		Has	3,114 (33.3)	(<.001)
	Insomnia/sleep disorder	Does not have	8,058 (19.9)	470.70
		Has	507 (46.9)	(<.001)

Table 3. Presenteeism and smoking, drinking, and general characteristics

Associations among smoking, drinking, and presenteeism

Table 4 shows how smoking and drinking affect presenteeism when the all characteristics were added as confounding variables. Compared to non-smokers, heavy smokers (AOR = 2.10, 95% CI = [1.56, 2.82]) were more likely to experience presenteeism. Compared to non-drinkers, high-risk drinkers (AOR = 1.20, 95% CI = [1.10, 1.31]) were more likely to experience presenteeism.

Characteristics	Classification	AOR (95% CI)	<i>P</i>
Smoking	Non-smoker	1	
	Ex-smoker	1.25(1.14-1.38)	<.001
	Current smoker	1.13(1.05-1.22)	<.01
	Heavy smoker	2.10(1.56-2.82)	<.001
Alcohol Drinking	Non-drinker	1	
	Current drinker	1.09(1.02-1.16)	<.01
	High-risk drinker	1.20(1.10-1.31)	<.001
Gender	Male	1	
	Female	1.48(1.38-1.59)	<.001
Age (Years)	19-29	1	
	30-39	1.26(1.17-1.36)	<.001
	40-49	1.25(1.15-1.35)	<.001
	50-59	1.21(1.10-1.33)	<.001
	≥ 60	1.07(0.94-1.23)	.309
Educational status	≤Middle school	1	
	≤High school	0.85(0.77-0.94)	<.01

		≥College	0.91(0.82-1.02)	.097
Income		<100	1	
(KRW10,000)		100-299	1.31(1.20-1.43)	<.001
		≥300	1.43(1.28-1.60)	<.001
Absenteeism		0	1	
(Days)		1-4	4.92(4.50-5.37)	<.001
		5-11	7.18(6.25-8.24)	<.001
		≥12	2.65(2.19-3.19)	<.001
Smoke exposure		Less than half of work time	1	
		3/4 or more of work hours	1.27(1.07-1.51)	<.01
Health problems	Hearing	Does not have	1	.265
		Has	1.10(0.93-1.31)	
	Dermatologic	Does not have	1	<.001
		Has	1.38(1.19-1.59)	
	Musculoskeletal pain	Does not have	1	<.001
		Has	1.87(1.77-1.98)	
	Headache/asthenopia	Does not have	1	<.001

	Has	1.29(1.21-1.37)	
Abdominal pain	Does not have	1	<.05
	Has	1.28(1.06-1.55)	
Respiratory distress	Does not have	1	<.05
	Has	1.32(1.01-1.73)	
Cardiovascular disease	Does not have	1	<.001
	Has	1.79(1.45-2.21)	
Injury	Does not have	1	<.01
	Has	1.24(1.06-1.45)	
Depression/anxiety disorder	Does not have	1	<.001
	Has	1.58(1.31-1.91)	
Fatigue	Does not have	1	<.001
	Has	1.59(1.50-1.69)	
Insomnia /sleep disorder	Does not have	1	<.001
	Has	1.53(1.33-1.77)	

Table 4. Results from a multiple logistic regression analysis

Note: AOR = adjusted odds ratio, CI = confidence interval

The other factors significantly related to presenteeism in this study were gender, income, absenteeism, smoke exposure, and health problems. Specifically, those more likely to experience presenteeism included

females (AOR = 1.48, 95% CI = [1.38, 1.59]), people older than 29 (AORs = 1.26, 95% CI = [1.17, 1.36]), people with higher income levels (AORs = 1.43, 95% CI = [1.28, 1.60]), those with 5-11 days absenteeism as compared to no absenteeism (AORs = 7.18, 95% CI = [6.25, 8.24]), those whose workplace smoke exposure was high rather than low (AORs = 1.27, 95% CI = [1.07, 1.51]), and those who had health problems (dermatologic; musculoskeletal pain; headache/asthenopia; abdominal pain; respiratory distress; cardiovascular disease; injury; depression/anxiety disorder; fatigue; insomnia/sleep disorder) (AORs = 1.38, 95% CI = [1.19, 1.59]; AORs = 1.87, 95% CI = [1.77, 1.98]; AORs = 1.29, 95% CI = [1.21, 1.37], AORs = 1.28, 95% CI = [1.06, 1.55], AORs = 1.32, 95% CI = [1.01, 1.73], AORs = 1.79, 95% CI = [1.45, 2.21]; AORs = 1.24, 95% CI = [1.06, 1.45]; AORs = 1.58, 95% CI = [1.31, 1.91]; AORs = 1.59, 95% CI = [1.50, 1.69]; AORs = 1.53, 95% CI = [1.33, 1.77]).

Discussion

Our results indicate differences in presenteeism according to general characteristics and health problems, including smoking and drinking. Several other studies have also shown female workers to have more presenteeism than male workers [8, 10]. Many employees had health issues that significantly affected presenteeism [10–12, 25], including psychological distress and emotional ill-health [8, 11, 12, 25] and, in recent studies, drug and alcohol problems [10, 12, 25] and smoking [10, 25]. The results of our study support these findings of earlier studies.

Businesses and governments are concerned about employee health because it affects employers' medical costs and productivity. Hence, recent studies have investigated relations between workers' health problems and presenteeism as related to productivity. Zakrzewska [26] reported that presenteeism costs more than absenteeism and disability, so it is reasonable to link workers' health problems to presenteeism. However, most studies only link presenteeism to physical health problems [8, 25, 27], mental stress [8, 10, 11, 12], and work environment stressors [28]. Some have addressed links with health behaviors such as smoking [12, 16], alcohol use [12], obesity, and physical activity [10, 16, 21].

Though all employees can occasionally be unproductive, research suggests that smoking status alone negatively impacts productivity beyond the work time lost due to smoking breaks [16]. Some people might work intensely despite poor health conditions; however, previous studies have demonstrated smoking and drinking among workers affects their productivity [10, 11, 12], and loss of productivity may lead to absenteeism and presenteeism [13]. In recent studies, binge drinking was associated with presenteeism [29], and higher levels of alcohol consumption were associated with higher levels of impaired work performance (i.e., presenteeism) [19]. It is reasonable to assume that presenteeism might occur when people work through a hangover or smoke at work and, therefore, excessive drinking and heavy smoking can impact presenteeism.

In this study, alcohol drinking and smoking were found to be related to presenteeism. These findings are consistent with previous studies [14, 16, 19, 30]. The multiple logistic regression analysis from our study revealed that heavy smoking and high-risk alcohol drinking significantly affected presenteeism. After

adjusting for general characteristics and the variable “health problems,” we found that the influence of heavy smoking on presenteeism increased. The longer employees were exposed to tobacco smoking in the workplace, or the more health problems they had, the greater the odds of presenteeism. There are several possible explanations for such results. Health status has a critical influence on work ability [7], and health risks are related to reduced productivity [8, 9]. Furthermore, smoking among workers affects productivity [10-12], may lead to presenteeism [13], and causes health problems related to presenteeism such as cancer [31] and cardiovascular diseases [32–35]. Similarly, alcohol drinking causes chronic liver diseases and cancer [36].

This study’s results have several implications. Smoking or drinking increases presenteeism, even after adjusting for physical illnesses, which implies costs to employers. Other recent studies have also found that presenteeism was associated with alcohol consumption [19, 29] and smoking [20], and several studies suggest that heavy drinking increases absenteeism and leads to declines in productivity, which can be more harmful to productivity than absenteeism [14]. Further, research suggests that high costs are incurred due to smokers’ absenteeism, presenteeism, smoking breaks, healthcare costs, and pension benefits [16].

Changes are needed to improve the health of workers who smoke and drink. The WHO states that one of the most effective ways to reduce tobacco consumption is to raise tobacco prices, but South Korea has the highest smoking rate and the lowest tobacco prices among the 41 OECD countries [3, 37]. Our society should pay more attention to heavy smoking and anti-smoking intervention programs, and based on our study, it would be wise to target heavy smokers in the workplace. Smoke-free workplace programs encourage smokers to quit and improve their overall health and productivity [24]. A recent study showed that when heavy smokers were part of a smoking cessation program, their success rates became higher than non-heavy smokers [30]. There is little information on whether changes in work structure can reduce the harmful effects of alcohol in the workplace [38]; however, mandatory screening programs are effective for industries such as transportation. Furthermore, investments in social welfare policies outside the workplace can decrease alcohol-related absences and increase productivity [14].

Though our study yielded important results, it had some limitations. First, this cross-sectional study could only confirm the associations between factors; in other words, it could not prove that smoking and drinking are direct causes of presenteeism. Second, errors regarding health problems may have occurred from using participants’ responses instead of doctors’ diagnoses. Nonetheless, this research is significant in being the first to investigate the effects of both smoking and drinking on presenteeism. The results of this study suggest that smoking and drinking, which have mainly been treated as health risk factors, may also be related to national productivity. In addition, this research, based on a national survey, can serve as a basic guide for future researchers about the impacts of heavy smoking and high-risk alcohol use in the workplace and the necessity of implementing relevant programs.

Conclusions

Smoking and alcohol consumption are associated with chronic health diseases and high socio-economic costs worldwide. The present findings further highlight the economic costs of smoking and drinking, as these are associated with greater odds of presenteeism among Korean workers. These findings demonstrate a critical need for social and behavioral interventions to alter employees' smoking and drinking habits. Further research is needed to identify efficacious treatments as well as the impacts of reduced smoking and drinking on presenteeism.

Abbreviations

KWCS: Korean Working Conditions Surveys

Declarations

Ethics approval and consent to participate: This study, a secondary analysis of existing data, was exempt from ethics approval of the Institutional Review Board of the University of Ulsan (IRB No.1040968-E-2019-005).

Consent for publication: Not applicable.

Availability of data and materials: All data generated or analyzed during this study are included in this published article.

Competing interests: The authors declare that they have no competing interests.

Funding: This study was supported by research grant of the University of Suwon.

Author's contributions: Conceptualization, S.Y.L, J.L. and M.K.; methodology, J.L. and M.K.; data analysis, J.L.; writing—original draft, S.Y.L, J.L. and M.K.; writing—review and editing, S.Y.L, J.L. and M.K.; supervision, M.K.; reading and approving the final manuscript, S.Y.L, J.L. and M.K.

Acknowledgments: We thank the Occupational Safety and Health Research Institute (OSHRI) for providing the Korean Working Conditions Survey (KWCS). The paper's contents are solely the responsibility of the author and do not necessarily represent the official views of the OSHRI.

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