

# Psychosocial factors and psychological well-being: a study from a nationally representative sample of Korean workers

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**Abstract:** This study was conducted to examine how each psychosocial factor on working conditions is related to a worker's well-being. Data from the 2011 Korean Working Conditions Survey were analyzed for 33,569 employed workers aged  $\geq 15$  years. Well-being was evaluated through the WHO-5 questionnaire and variables about occupational psychosocial factors were classified into eight categories. The prevalence ratios were estimated using Poisson regression model. Overall, 44.3% of men and 57.4% of women were in a low well-being group. In a univariate analysis, most of the psychosocial factors on working conditions are significantly related with a worker's low well-being, except for insufficient job autonomy in both genders and job insecurity for males only. After adjusting for sociodemographic and structural factors on working conditions, job dissatisfaction, lack of reward, lack of social support, violence and discrimination at work still showed a statistically significant association with a worker's low well-being for both genders. We found that psychosocial working conditions were associated with the workers' well-being.

**Key words:** Well-being, Psychosocial factor, Employed worker, Korean Working Condition Survey

## Introduction

There is a growing contribution of mental health problems to the global burden of disease<sup>1</sup>. The concept of psychological well-being is related to the positive dimensions of mental health, while the negative dimensions include psychological distress and psychiatric disorders<sup>2</sup>. Working conditions have been described as an essential determinant of well-being<sup>3</sup>. In a previous study in South Korea, there was a significant association between workers' well-being and general working conditions such as satisfaction with

working conditions, difference between the actual and desired working time, and employment stability<sup>4</sup>. In particular, the strongest association of a worker's well-being with satisfaction with working conditions, one of the psychosocial factors on working conditions, was observed.

The definition of health by the World Health Organization (WHO), a state of physical, mental, and social well-being, gives equal weight to the mental and physical aspects of health. The WHO-5 well-being index, which measures psychological well-being, is a subjective measurement of the positive dimensions of mental health, reflecting aspects other than just the absence of depressive symptoms<sup>5</sup>. Psychological well-being is predictive of job performance<sup>6</sup>, and a meta-analysis has revealed a positive relationship between job satisfaction and subjective well-being<sup>7</sup>. Many

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studies have examined job stress as the dimensions of job demand-control-support (JDCS) model identifying job demands, job control, and social supports as essential job characteristics influencing well-being<sup>8–10</sup>. In addition to the dimensions from the JDCS, other models include wide dimensions of a psychological environment such as effort-reward imbalance, insecurity at work, mental health, and other influences at work<sup>11, 12</sup>.

Psychological factors on working conditions are well known risk factors for many adverse health outcomes. Coronary heart diseases<sup>13</sup>, musculoskeletal diseases<sup>14, 15</sup>, depression<sup>16</sup>, even suicidal attempts<sup>17</sup> could be affected by psychosocial factors. However, these previous studies focused on specific diseases, not health status in daily life, or well-being. There is little research available about the wide range of psychosocial working conditions and the WHO well-being index (WHO-5) in a nationally representative sample of the working population<sup>18</sup>. The majority of studies have used a limited number of psychosocial work factors and employed different measures of well-being<sup>19, 20</sup>. Moreover, comparing with other etiologies, most of the previous studies dealt with psychosocial factors as one category or score of a test. Many aspects of psychosocial factors were merged together, so it is hard to interpret the results. The present study examines how each psychosocial factor on working conditions is related to workers' well-being, using a nationally representative sample of Korean workers.

## Subjects and Methods

### *Study participants*

This study used a sample from the third wave of the 2011 Korean Working Conditions Survey (KWCS) conducted by the Korea Occupational Safety and Health Agency. The methodology and survey questionnaire used for the third KWCS is similar to those used in the European Working Conditions Survey (EWCS), and the third survey built on investigations begun in the first and second survey (2006, 2011). The KWCS study has been described in detail previously<sup>21, 22</sup>. In both surveys, a nationally representative sample of the economically active population aged 15 to 65 years, persons who were either employees or self-employed at the time of the interview, was collected. The basic sample design for both surveys employed multi-stage random sampling based on the population and housing census<sup>23</sup>. In the EWCS 2010, psychosocial work factors were measured following a comprehensive instrument (Copenhagen Psychosocial Questionnaire, COPSQ): out of twenty-five psychosocial work factors, 16 were constructed according

to the second edition of the COPSQ<sup>24</sup>. The survey was carried out at a number of different sampling areas, determined using probability proportional to population size and to population density.

In this study, we defined the subjects as only 'employed workers', so we excluded 'a self-employed worker' or 'an unpaid worker for familial business. With these exclusion criteria, the data from 33,569 employed workers were used in this study. The quality of the KWCS was assured by its high external and content validity and reliability<sup>21</sup>. The KWCS used a seven-code recording method developed by the Standard Definitions (2011) of the American Association for Public Opinion Research (AAPOR)<sup>25</sup>, and a response rate of 35.4% was calculated. Trained interviewers were used to interview participants after getting written informed consent. The Institutional Review Board of Inha University Hospital approved the study protocol.

### *World Health Organization-5 Well-Being Index (WHO-5)*

Well-being was evaluated through the WHO-5 questionnaire (the 1998 version)<sup>26</sup>. Although the index was originally designed to measure well-being in diabetic patients<sup>27</sup>, its effectiveness has been supported in diagnostic depression screening<sup>28</sup> and evaluation of emotional well-being in patients with chronic diseases including cardiovascular diseases<sup>27</sup> and Parkinson's disease<sup>29</sup>, and in young children<sup>30</sup>, and elderly adults<sup>31</sup>.

The index consists of five positively worded items, each of which reflects the respondent's feelings during the preceding two-week period. The five items are as follows: I have felt cheerful and in good spirits; I have felt calm and relaxed; I have felt active and vigorous; I woke up feeling fresh and rested; My daily life has been filled with things that interest me. Subjects respond to each item rated on a 6-point Likert-type scale of 0–5, indicating 0 for the lack of positive feelings and 5 for consistent positive feelings during the past two weeks. A raw score lower than 13 implies a low well-being<sup>32</sup>, and a raw point score considerably below 13 may necessitate screening for depression with the Major Depression Inventory (under ICD-10)<sup>15</sup>. This study has evaluated the states of well-being of the subjects by classifying subjects with total scores below 13 into the "low well-being" group, and the scores  $\geq 13$  are indicative of the "high well-being" group<sup>32</sup>.

### *Workplace psychological factors*

Variables about occupational psychosocial factors were classified into eight categories: (i) job dissatisfaction, (ii) job insecurity, (iii) lack of social support, (iv) excessive

work intensity, (v) insufficient job autonomy, (vi) lack of rewards, (vii) discrimination, all aspects, and (viii) violence. Job dissatisfaction was evaluated using the following question: "I am satisfied with my occupational conditions." Job insecurity was evaluated using the following question: "I might lose my job within next 6 month." Lack of social support was evaluated using the following 2 questions: (1) "My colleagues help and support me." and (2) "My supervisor helps and supports me." Four items ("working pace" "presence of a deadline" "I know my appointed role in work" and "I am emotionally implicated in my job.") were used to evaluate excessive job intensity. Five items ("I can select or change my working orders." "I can select or change my working methods." "I can select or change my working pace." "When a person who is working with me will be selected, my opinion is reflected." and "I can take a break when I want to do.") were used to evaluate insufficient job autonomy. Three items ("I am receiving appropriate rewards from my job." "My job has a good prospect for career advancement." and "I feel comfort within my working organization") were used to evaluate lack of rewards. Participants who were discriminated against any aspect (age, educational level, region of birth, gender, and employment status) within last 12 months were classified to a group "with discrimination". Participants who experienced any violence (violent language, sexual harassment, threatening or humiliating behavior, physical violence, and bullying) within the last 12 months were classified to a group "with violence". Each factor was converted to a dichotomous variable (high, low).

#### *Potential confounding variables*

We used several other potential confounding variables that were likely to be associated with well-being globally and in Korea. Previously published studies that reported an association between workplace psychological factors and well-being or variables that could be potential confounders to well-being were also included in the analysis<sup>4, 18</sup>. The variables included those related to socio-economic and structural factors on work conditions such as age, educational level, monthly income, number of employees, employment contract types, working hours per week, occupation, shift work, and lifestyle factors. The lifestyle factors included daily alcohol consumption (number of glass of alcohol consumed a day) and smoking status.

#### *Statistical analysis*

All data were analyzed with the SPSS (version 14.0) after encoding was completed. All analysis was conducted after

stratifying by gender. A descriptive analysis was carried out on sociodemographic factors and structural and psychosocial factors on working conditions. Frequencies were compared on  $\chi^2$  tests. As the prevalence of outcomes in men and women was high, prevalence ratios (PRs) and 95% confidence intervals (CI) were estimated using Poisson regression model<sup>33</sup>. Two adjusted models were used for adjusting for the effect of confounding factors. Model 1 was adjusted for sociodemographic factors (age, education, monthly income, smoking status, and alcohol consumption); model 2 was adjusted for sociodemographic and structural factors (occupation, weekly working time, employment type, shift work, and number of employees). A Pearson correlation analysis was used to test for multicollinearity among individual factors. The significance threshold was 0.05.

## **Results**

Tables 1 and 2 compare sociodemographic and structural factors between high well-being and low well-being groups of male and female respondents. The descriptive analysis of the WHO Five Well-being Index in the 19,589 male participants revealed 8,681 (44.3%) were in the low well-being group, while 10,908 (55.7%) were in the high well-being group. Among the 13,980 female workers, 5,957 (42.6%) were in the low well-being and 8,023 (57.4%) were in the high well-being group.

#### *Sociodemographic factors and well-being*

In both genders, young workers showed a larger portion within the high well-being group than the portion for older workers. The workers with higher levels of education or monthly income showed a better well-being status than those at other levels of education. In male workers, well-being of the non-smoker group was the highest, while well-being of the currently smoking group was the lowest. However, no significant difference in well-being was observed in female workers according to smoking status. In both genders, the well-being of the moderate drinker group was the highest, while the well-being of the excessive drinker group was the lowest.

#### *Structural factors on working conditions and well-being*

A univariate analysis revealed that among 3 job types, blue-collar workers had the lowest well-being status. The portion of high well-being workers decreased along increasing weekly working hours in males, while the trend for female workers did not decrease. Temporary workers and shift workers showed a lower well-being status than the

**Table 1. Sociodemographic and structural factors and well-being of male respondents**

		Total	Well-being				<i>p</i> -value*	
			N	High		Low		
				N	%	N		%
Total		19,589	10,908	55.7	8,681	44.3		
Age (years)	≤29	2,646	1,602	60.5	1,044	39.5		
	30–39	6,173	3,607	58.4	2,566	41.6		
	40–49	5,626	3,051	54.2	2,575	45.8	<0.001	
	50–59	3,568	1,839	51.5	1,729	48.5		
	≥60	1,576	809	51.3	767	48.7		
Education	Middle school	1,858	756	40.7	1,102	59.3		
	High school	7,568	3,880	51.3	3,688	48.7	<0.001	
	Junior college	3,124	1,777	56.9	1,347	43.1		
	College or higher	7,039	4,495	63.9	2,544	36.1		
Monthly income (KRW)	<1 million	1,281	677	52.8	604	47.2		
	1–1.99 million	5,794	2,939	50.7	2,855	49.3	<0.001	
	2–2.99 million	6,791	3,826	56.3	2,965	43.7		
	≥3 million	5,723	3,466	60.6	2,257	39.4		
Smoking	Non-smoker	5,607	3,372	60.1	2,235	39.9		
	Current smoker	3,221	1,754	54.5	1,467	45.5	<0.001	
	Ex-smoker	10,761	5,782	53.7	4,979	46.3		
Alcohol consumption	Non-drinker	2,851	1,588	55.7	1,263	44.3		
	Moderate drinker	12,416	7,127	57.4	5,289	42.6	<0.001	
	Excessive drinker	4,322	2,193	50.7	2,129	49.3		
Occupation	White collar	7,876	4,974	63.2	2,902	36.8		
	Blue collar	8,913	4,220	47.3	4,693	52.7	<0.001	
	Pink collar	2,800	1,714	61.2	1,086	38.8		
Working time (hours)	<40	7,159	4,319	60.3	2,840	39.7		
	41–52	6,607	3,702	56.0	2,905	44.0	<0.001	
	53–60	3,822	1,911	50.0	1,911	50.0		
	≥61	2,001	976	48.8	1,025	51.2		
Employment contract	Standard	15,420	8,906	57.8	6,514	42.2	<0.001	
	Contingent	4,169	2,002	48.0	2,167	52.0		
Shift work	Absent	17,237	9,767	56.7	7,470	43.3	<0.001	
	Present	2,352	1,141	48.5	1,211	51.5		
Number of employees	≤4	3,695	2,068	56.0	1,627	44.0		
	5–49	10,071	5,545	55.1	4,526	44.9	0.100	
	50–299	3,808	2,184	57.4	1,624	42.6		
	≥300	2,015	1,111	55.1	904	44.9		
Job dissatisfaction	Low	14,244	8,895	62.4	5,349	37.6	<0.001	
	High	5,345	2,013	37.7	3,332	62.3		
Job insecurity	Low	18,572	10,365	55.8	8,207	44.2	0.131	
	High	1,017	543	53.4	474	46.6		
Lack of social support	Low	15,082	8,973	59.5	6,109	40.5	<0.001	
	High	4,507	1,935	42.9	2,572	57.1		
Work intensity	Low	11,578	6,629	57.3	4,949	42.7	<0.001	
	High	8,011	4,279	53.4	3,732	46.6		
Insufficient job autonomy	Low	9,995	5,585	55.9	4,410	44.1	0.578	
	High	9,594	5,323	55.5	4,271	44.5		
Lack of reward	Low	14,847	9,003	60.6	5,844	39.4	<0.001	
	High	4,742	1,905	40.2	2,837	59.8		
Discrimination	No	17,640	9,923	56.3	7,717	43.7	<0.001	
	Yes	1,949	985	50.5	964	49.5		
Violence at work	No	18,526	10,446	56.4	8,080	43.6	<0.001	
	Yes	1,063	462	43.5	601	56.5		

\*Chi-square test for comparison between high and low well-being.

**Table 2. Sociodemographic and structural factors and well-being of female respondents**

		Total	Well-being				<i>p</i> -value*
			High		Low		
			N	N	%	N	
Total		13,980	8,023	57.4	5,957	42.6	
Age (years)	≤29	2,871	1,766	61.5	1,105	38.5	
	30–39	3,995	2,445	61.2	1,550	38.8	
	40–49	4,191	2,373	56.6	1,818	43.4	<0.001
	50–59	1,992	1,019	51.2	973	48.8	
	≥60	931	420	45.1	511	54.9	
Education	Middle school	1,849	810	43.8	1,039	56.2	
	High school	5,714	3,196	55.9	2,518	44.1	<0.001
	Junior college	2,744	1,695	61.8	1,049	38.2	
	College or higher	3,673	2,322	63.2	1,351	36.8	
Monthly income (KRW)	<1 million	3,043	1,502	49.4	1,541	50.6	
	1–1.99 million	7,525	4,430	58.9	3,095	41.1	<0.001
	2–2.99 million	2,300	1,399	60.8	901	39.2	
	≥3 million	1,112	692	62.2	420	37.8	
Smoking	Non-smoker	12,793	7,321	57.2	5,472	42.8	
	Current smoker	393	244	62.1	149	37.9	0.156
	Ex-smoker	794	458	57.7	336	42.3	
Alcohol consumption	Non-drinker	5,008	2,700	53.9	2,308	46.1	
	Moderate drinker	7,647	4,665	61.0	2,982	39.0	<0.001
	Excessive drinker	1,325	658	49.7	667	50.3	
Occupation	White collar	5,995	3,779	63.0	2,216	37.0	
	Blue collar	3,161	1,494	47.3	1,667	52.7	<0.001
	Pink collar	4,824	2,750	57.0	2,074	43.0	
Working time	≤40	6,317	3,588	56.8	2,729	43.2	
	41–52	4,392	2,540	57.8	1,852	42.2	
	53–60	2,310	1,363	59.0	947	41.0	0.149
	≥61	961	532	55.4	429	44.6	
Employment contract	Standard	9,969	5,962	59.8	4,007	40.2	<0.001
	Contingent	4,011	2,061	51.4	1,950	48.6	
Shift work	Absent	13,073	7,547	57.7	5,526	42.3	
	Present	907	476	52.5	431	47.5	0.002
Number of employees	≤4	4,645	2,709	58.3	1,936	41.7	
	5–49	6,932	3,865	55.8	3,067	44.2	<0.001
	50–299	1,887	1,165	61.7	722	38.3	
	≥300	516	284	55.0	232	45.0	
Job dissatisfaction	Low	10,445	6,631	63.5	3,814	36.5	<0.001
	High	3,535	1,392	39.4	2,143	60.6	
Job insecurity	Low	13,134	7,580	57.7	5,554	42.3	
	High	846	443	52.4	403	47.6	0.002
Lack of social support	Low	10,492	6,422	61.2	4,070	38.8	<0.001
	High	3,488	1,601	45.9	1,887	54.1	
Work intensity	Low	8,691	5,085	58.5	3,606	41.5	
	High	5,289	2,938	55.5	2,351	44.5	0.001
Insufficient job autonomy	Low	6,673	3,876	58.1	2,797	41.9	
	High	7,307	4,147	56.8	3,160	43.2	0.112
Lack of reward	Low	10,425	6,510	62.4	3,915	37.6	<0.001
	High	3,555	1,513	42.6	2,042	57.4	
Discrimination	No	12,448	7,207	57.9	5,241	42.1	
	Yes	1,532	816	53.3	716	46.7	0.001
Violence at work	No	13,194	7,674	58.2	5,520	41.8	<0.001
	Yes	786	349	44.4	437	55.6	

\*Chi-square test for comparison between high and low well-being.

**Table 3. Associations between workplace psychosocial factors and well-being in the representative sample of Korean workers.**

		Unadjusted		Model 1 <sup>a</sup>		Model 2 <sup>b</sup>	
		PR	95% CI	PR	95% CI	PR	95% CI
<b>Male</b>							
Job dissatisfaction	Low	1.000		1.000		1.000	
	High	1.660	1.590–1.733	1.544	1.474–1.616	1.501	1.433–1.573
Job insecurity	Low	1.000		1.000		1.000	
	High	1.055	0.961–1.157	0.991	0.901–1.091	0.981	0.891–1.080
Lack of social support	Low	1.000		1.000		1.000	
	High	1.409	1.345–1.475	1.334	1.271–1.399	1.323	1.261–1.388
Work intensity	Low	1.000		1.000		1.000	
	High	1.090	1.045–1.137	1.055	1.011–1.102	1.022	0.978–1.067
Insufficient job autonomy	Low	1.000		1.000		1.000	
	High	1.009	0.967–1.052	0.986	0.944–1.029	0.969	0.928–1.012
Lack of reward	Low	1.000		1.000		1.000	
	High	1.520	1.453–1.590	1.411	1.345–1.479	1.382	1.318–1.450
Discrimination	No	1.000		1.000		1.000	
	Yes	1.131	1.057–1.209	1.104	1.033–1.181	1.072	1.002–1.147
Violence at work	No	1.000		1.000		1.000	
	Yes	1.296	1.193–1.408	1.217	1.119–1.322	1.163	1.069–1.266
<b>Female</b>							
Job dissatisfaction	Low	1.000		1.000		1.000	
	High	1.660	1.575–1.750	1.589	1.505–1.679	1.578	1.493–1.668
Job insecurity	Low	1.000		1.000		1.000	
	High	1.126	1.018–1.246	1.013	0.913–1.124	0.992	0.894–1.102
Lack of social support	Low	1.000		1.000		1.000	
	High	1.395	1.321–1.473	1.336	1.264–1.412	1.325	1.254–1.401
Work intensity	Low	1.000		1.000		1.000	
	High	1.071	1.017–1.128	1.063	1.009–1.120	1.043	0.988–1.100
Insufficient job autonomy	Low	1.000		1.000		1.000	
	High	1.032	0.981–1.086	1.029	0.978–1.083	1.028	0.976–1.082
Lack of reward	Low	1.000		1.000		1.000	
	High	1.530	1.450–1.614	1.444	1.365–1.527	1.431	1.353–1.514
Discrimination	No	1.000		1.000		1.000	
	Yes	1.110	1.027–1.200	1.125	1.040–1.217	1.107	1.023–1.198
Violence at work	No	1.000		1.000		1.000	
	Yes	1.329	1.206–1.465	1.370	1.241–1.511	1.350	1.222–1.491

<sup>a</sup> Adjusted for age, education, monthly income, smoking status, and alcohol consumption

<sup>b</sup> Additional adjustment for job type, weekly working time, employment type, work schedule, and company size.

other groups. The number of employees has no statistical significance for male workers.

#### *Psychosocial factors on working conditions and well-being*

Table 3 presents the gender-specific PRs (with 95% CI) of workplace psychosocial factors for low well-being. In a univariate analysis, most of the psychosocial factors on working conditions are significantly related with workers' low well-being, except for insufficient job autonomy in both genders and job insecurity in males only. After adjusting for sociodemographic and structural factors on working conditions, job dissatisfaction (PR=1.501, 95% CI: 1.433–1.573 in males; PR=1.578, 95% CI: 1.493–

1.668 in females), lack of reward (PR=1.382, 95% CI: 1.318–1.450 in males; PR=1.431, 95% CI: 1.353–1.514 in females), lack of social support (PR=1.323, 95% CI: 1.261–1.388 in males; PR=1.325, 95% CI: 1.254–1.401 in females), violence (PR=1.163, 95% CI: 1.069–1.266 in males; PR=1.350, 95% CI: 1.222–1.491 in females) and discrimination at work place (PR=1.072, 95% CI: 1.002–1.147 in males; PR=1.107, 95% CI: 1.023–1.198 in females) still showed statistically significant associations with workers' low well-being. Excessive work intensity (PR=1.055, 95% CI: 1.011–1.102 in males; PR=1.063, 95% CI: 1.009–1.120 in females) was significantly associated with workers' low well-being when adjusted for age,



education, income, smoking status and alcohol consumption. However, there were no significant PRs for job insecurity and job autonomy in both genders.

## Discussion

This study evaluated the association between psychosocial factors on working conditions and workers' well-being in a nationwide representative sample of Korea. After we adjusted for sociodemographic and structural factors on working conditions, job dissatisfaction showed the strongest association with workers' low well-being. Lack of reward and lack of social support also induce an important effect on workers' well-being. 'Reward' includes many values such as wage, salary, esteem, and chance of promotion, and is one of the most important psychosocial working conditional factors<sup>34</sup>). The 'Effort-Reward Imbalance Model' used in many studies revealed many association with workers' mental health outcome<sup>35</sup>) such as insomnia<sup>36</sup>), alcohol dependence<sup>37</sup>), and depression<sup>16</sup>). 'Social support' is also a very important factor for evaluating psychosocial burden at the workplace and is a crucial component of the 'Demand-Control-Support Model'<sup>8</sup>). In a previous study, social support showed significant association with coronary heart disease of workers<sup>38</sup>). We found that violence and discrimination at the work place, as well, were statistically significant factors for workers' well-being. As reported in previous studies, interpersonal violence<sup>26, 39</sup>) or discrimination by sex<sup>40</sup>) or race<sup>41</sup>) could affect the mental and physical health of workers.

In this study, the prevalence of poor psychological well-being in Korean workers was higher than that of European workers based on the European Working Conditions Survey (EWCS 2010); the rates were 44.3% of men and 42.6% of women in our study and 23.6% and 28.3%, respectively, in European countries<sup>18</sup>). This difference may be due to different definitions and classifications of outcome, different methodologies for collecting and processing information, culture differences in the experience of well-being, and different time frames analyzed, as well as of actual occurrence. However, in this study, the methodology and questionnaire used by the KWCS were very similar to those used by the EWCS; thus, the results of these two surveys are comparable. The difference in the prevalence of lower well-being between Korea and the European countries is not necessarily related to a lack of clarity in the definition, variation in the time frames or difference in methodologies. It may reflect cultural differences in various societies, meaning that the perceptions of psychological well-being can be different in different societies<sup>42</sup>). In countries with

more gender-neutral ideology, women may be treated more equally with men, may result in lower well-being. It is also reported that men in higher GDP countries have better psychological well-being related to work responsibility<sup>42</sup>). However, most studies on well-being and gender came from the United States and other Western nations; factors found to be important in these countries are not likely to have the same impact in non-Western nations. Therefore, further country-specific research in this context is needed.

The sociodemographic factors were drawn from a nationwide survey on working conditions and included age, educational level, monthly income, smoking, and drinking status. Our previous study concluded that workers' well-being resulted in no differences between the genders. However, there are still differences between genders on the way a worker adapts for or reacts to their psychosocial environment<sup>43</sup>). Therefore, we stratified the subjects by their gender. Age, educational level, monthly income, smoking and drinking status had the same trend with our previous study<sup>4</sup>).

This study, however, has several limitations. First, this is a cross-sectional study, and therefore, we cannot make conclusions regarding causality. Second, we did not take into account the "healthy worker effect" during our analysis, in which the influence of psychosocial working conditional factors could be underestimated. Third, we did not examine variations in individual personality traits. Every person employs different mechanisms of psychosocial adaptation. Moreover, an existing study explored the hypothesis that individuals' positive personalities are closely related to their well-being<sup>44</sup>). However, we were not able to investigate personality traits because the working conditions survey did not contain the necessary items.

Despite the limitations, to the best of our knowledge, this is the first study in Asia to use representative national data and to reveal that psychosocial factors on working conditions are associated with workers' well-being. We believe the use of the results of this study may contribute to better quality of a worker's daily life.

## Conclusions

We found that psychosocial working conditions were associated with the workers' well-being. Evidence from the study indicates that job dissatisfaction, lack of reward, lack of social support, violence and discrimination at work place, and excessive work intensity are key factors associated with workers' well-being. Workers' well-being is an important issue that merits continued attention and management. The above factors can deteriorate the quality of workers' lives

and may decrease overall labor productivity. Our results could be useful for guiding intervention programs related to the quality of workers' lives, in particular with the management of well-being in workers, addressing unfavorable psychosocial working conditions. We anticipate doing further research to determine causal relationships between psychosocial working conditions and workers' well-being.

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## Ethical Standards

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

## Conflict of Interest

The authors declare that they have no conflict of interest.

## References

- Whiteford HA, Ferrari AJ, Degenhardt L, Feigin V, Vos T (2015) The global burden of mental, neurological and substance use disorders: an analysis from the Global Burden of Disease Study 2010. *PLoS One* **10**, e0116820 (doi:10.1371/journal.pone.0116820).
- Headley B, Kelley J, Wearing A (1993) Dimensions of mental health: life satisfaction, positive affect, anxiety and depression. *Soc Indic Res* **29**, 63–82.
- Kopp MS, Stauder A, Purebl G, Janszky I, Skrabski A (2008) Work stress and mental health in a changing society. *Eur J Public Health* **18**, 238–44.
- Lee BJ, Park SG, Min KB, Min JY, Hwang SH, Leem JH, Kim HC, Jeon SH, Heo YS, Moon SH (2014) The relationship between working condition factors and well-being. *Ann Occup Environ Med* **26**, 34.
- Bech P, Olsen LR, Kjoller M, Rasmussen NK (2003) Measuring well-being rather than the absence of distress symptoms: a comparison of the SF-36 Mental Health subscale and the WHO-Five Well-Being Scale. *Int J Methods Psychiatr Res* **12**, 85–91.
- Wright TA, Cropanzano R (2000) Psychological well-being and job satisfaction as predictors of job performance. *J Occup Health Psychol* **5**, 84–94.
- Bowling NA, Eschleman KJ, Wang Q (2010) A meta-analytic examination of the relationship between job satisfaction and subjective well-being. *J Occup Organ Psychol* **83**, 915–34.
- Johnson JV, Hall EM (1988) Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population. *Am J Public Health* **78**, 1336–42.
- Johnson JV, Hall EM, Theorell T (1989) Combined effects of job strain and social isolation on cardiovascular disease morbidity and mortality in a random sample of the Swedish male working population. *Scand J Work Environ Health* **15**, 271–9.
- Karasek RA Jr (1979) Job demands, job decision latitude, and mental strain: Implications for job redesign. *Adm Sci Q* **24**, 285–308.
- Kristensen TS, Hannerz H, Høgh A, Borg V (2005) The Copenhagen Psychosocial Questionnaire—a tool for the assessment and improvement of the psychosocial work environment. *Scand J Work Environ Health* **31**, 438–49.
- Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, Peter R (2004) The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med* **58**, 1483–99.
- Kivimäki M, Kawachi I (2015) Work Stress as a Risk Factor for Cardiovascular Disease. *Curr Cardiol Rep* **17**, 630.
- Kraatz S, Lang J, Kraus T, Münster E, Ochsmann E (2013) The incremental effect of psychosocial workplace factors on the development of neck and shoulder disorders: a systematic review of longitudinal studies. *Int Arch Occup Environ Health* **86**, 375–95.
- Hoogendoorn WE, van Poppel MN, Bongers PM, Koes BW, Bouter LM (2000) Systematic review of psychosocial factors at work and private life as risk factors for back pain. *Spine* **25**, 2114–25.
- Theorell T, Hammarström A, Aronsson G, Träskman Bendz L, Grape T, Hogstedt C, Marteinsdottir I, Skoog I, Hall C (2015) A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health* **15**, 738.
- Woo JM, Postolache TT (2008) The impact of work environment on mood disorders and suicide: Evidence and implications. *Int J Disabil Hum Dev* **7**, 185–200.
- Schütte S, Chastang JF, Malard L, Parent-Thirion A, Vermeylen G, Niedhammer I (2014) Psychosocial working conditions and psychological well-being among employees in 34 European countries. *Int Arch Occup Environ Health* **87**, 897–907.
- Nieuwenhuijsen K, Bruinvels D, Frings-Dresen M (2010) Psychosocial work environment and stress-related disorders, a systematic review. *Occup Med (Lond)* **60**, 277–86.
- Tang K (2014) A reciprocal interplay between psychosocial job stressors and worker well-being? A systematic review of the “reversed” effect. *Scand J Work Environ Health* **40**, 441–56.
- Kim YS, Rhee KY, Oh MJ, Park J (2013) The validity and



- reliability of the second Korean working conditions survey. *Saf Health Work* **4**, 111–6.
- 22) European Foundation for the Improvement of Living and Working Conditions: Working conditions in Korea: Survey highlights. <http://www.eurofound.europa.eu/pubdocs/2012/19/en/1/EF1219EN.pdf>. Accessed July 1, 2015.
  - 23) Park J, Lee N (2009) First Korean Working Conditions Survey: a comparison between South Korea and EU countries. *Ind Health* **47**, 50–4.
  - 24) Slany C, Schütte S, Chastang JF, Parent-Thirion A, Vermeylen G, Niedhammer I (2014) Psychosocial work factors and long sickness absence in Europe. *Int J Occup Environ Health* **20**, 16–25.
  - 25) The American Association for Public Opinion Research. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys, 7th edition-2011. [https://www.esomar.org/uploads/public/knowledge-and-standards/codes-and-guidelines/ESOMAR\\_Standard-Definitions-Final-Dispositions-of-Case-Codes-and-Outcome-Rates-for-Surveys.pdf](https://www.esomar.org/uploads/public/knowledge-and-standards/codes-and-guidelines/ESOMAR_Standard-Definitions-Final-Dispositions-of-Case-Codes-and-Outcome-Rates-for-Surveys.pdf). Accessed July 2, 2015.
  - 26) Arnetz JE, Arnetz BB, Petterson IL (1996) Violence in the nursing profession: occupational and lifestyle risk factors in Swedish nurses. *Work Stress* **10**, 119–27.
  - 27) Birket-Smith M, Rasmussen A (2008) Screening for mental disorders in cardiology outpatients. *Nord J Psychiatry* **62**, 147–50.
  - 28) Awata S, Bech P, Koizumi Y, Seki T, Kuriyama S, Hozawa A, Ohmori K, Nakaya N, Matsuoka H, Tsuji I (2007) Validity and utility of the Japanese version of the WHO-Five Well-Being Index in the context of detecting suicidal ideation in elderly community residents. *Int Psychogeriatr* **19**, 77–88.
  - 29) Schneider CB, Pilhatsch M, Rifati M, Jost WH, Wodarz F, Ebersbach G, Djundja D, Fuchs G, Gies A, Odin P, Reifschneider G, Wolz M, Bottesi A, Bauer M, Reichmann H, Storch A (2010) Utility of the WHO-Five Well-being Index as a screening tool for depression in Parkinson's disease. *Mov Disord* **25**, 777–83.
  - 30) Allgaier AK, Pietsch K, Frühe B, Prast E, Sigl-Glöckner J, Schulte-Körne G (2012) Depression in pediatric care: is the WHO-Five Well-Being Index a valid screening instrument for children and adolescents? *Gen Hosp Psychiatry* **34**, 234–41.
  - 31) Allgaier AK, Kramer D, Saravo B, Mergl R, Fejtikova S, Hegerl U (2013) Beside the Geriatric Depression Scale: the WHO-Five Well-being Index as a valid screening tool for depression in nursing homes. *Int J Geriatr Psychiatry* **28**, 1197–204.
  - 32) Moon YS, Kim HJ, Kim DH (2014) The relationship of the Korean version of the WHO Five Well-Being Index with depressive symptoms and quality of life in the community-dwelling elderly. *Asian J Psychiatr* **9**, 26–30.
  - 33) McNutt LA, Wu C, Xue X, Hafner JP (2003) Estimating the relative risk in cohort studies and clinical trials of common outcomes. *Am J Epidemiol* **157**, 940–3.
  - 34) Siegrist J (1996) Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol* **1**, 27–41.
  - 35) Niedhammer I, Chastang JF, David S, Barouhuel L, Barrandon G (2006) Psychosocial work environment and mental health: Job-strain and effort-reward imbalance models in a context of major organizational changes. *Int J Occup Environ Health* **12**, 111–9.
  - 36) Ota A, Masue T, Yasuda N, Tsutsumi A, Mino Y, Ohara H (2005) Association between psychosocial job characteristics and insomnia: an investigation using two relevant job stress models—the demand-control-support (DCS) model and the effort-reward imbalance (ERI) model. *Sleep Med* **6**, 353–8.
  - 37) Head J, Stansfeld SA, Siegrist J (2004) The psychosocial work environment and alcohol dependence: a prospective study. *Occup Environ Med* **61**, 219–24.
  - 38) Kuper H, Marmot M, Hemingway H (2002) Systematic review of prospective cohort studies of psychosocial factors in the etiology and prognosis of coronary heart disease. *Semin Vasc Med* **2**, 267–314.
  - 39) Bourbonnais R, Jauvin N, Dussault J, Vézina M (2007) Psychosocial work environment, interpersonal violence at work and mental health among correctional officers. *Int J Law Psychiatry* **30**, 355–68.
  - 40) Pavalko EK, Mossakowski KN, Hamilton VJ (2003) Does perceived discrimination affect health? Longitudinal relationships between work discrimination and women's physical and emotional health. *J Health Soc Behav* **44**, 18–33.
  - 41) Agudelo-Suárez A, Gil-González D, Ronda-Pérez E, Porthé V, Paramio-Pérez G, García AM, Garí A (2009) Discrimination, work and health in immigrant populations in Spain. *Soc Sci Med* **68**, 1866–74.
  - 42) Hori M, Kamo Y (2014) A multi-level analysis of psychological well-being related to work and family in 33 countries. *Family and Health: Evolving Needs, Responsibilities, and Experiences* **8B**, 1–25.
  - 43) Denton M, Prus S, Walters V (2004) Gender differences in health: a Canadian study of the psychosocial, structural and behavioural determinants of health. *Soc Sci Med* **58**, 2585–600.
  - 44) Peterson C (2006) *A primer in positive psychology*. USA: Oxford University Press.