

Is Nonstandard Employment Hazardous to Workers' Health Status? A Focus on Special Employment in South Korea

Park, Bohyun¹ · Elizabeth Tarlov² · Park, Chang Gi³

¹Associate Professor, Department of Nursing, Changwon National University, Changwon, Korea

²Associate Professor, College of Nursing, University of Illinois at Chicago,

Center of Innovation for Complex Chronic Healthcare, Edward Hines, Jr. VA Hospital, Chicago

³Research Professor, College of Nursing, University of Illinois at Chicago, Chicago, USA

Purpose: Workers in special employment relationship (WSERs) are workers in nonstandard employment arrangements who lack worker protection accorded in standard employment arrangements. This study aimed to describe self-rated health (SRH) and depressive symptoms (DS) among Korean WSERs in comparison to regular wage workers (RWW) and identify associations between working conditions and those outcomes. **Methods:** In this study, secondary data analysis using the 5th Korean Working Conditions Survey was used. The sample totaled 29,120, including 1,538 WSERs and 27,564 RWWs. Sociodemographic and work-related characteristics were employed as explanatory variables and SRH and DS as dependent variables. Using multiple logistic regression, the determinants of fair/poor SRH and DS were identified. **Results:** The prevalence rates for fair/poor SRH and DS in WSERs were 25.2% and 28.3%, respectively, and 20.7% and 25.0% in RWWs, respectively. Compared to RWWs, WSERs had 31% (aOR=1.31, 95% CI=1.14~1.49) and 20% (aOR=1.20, 95% CI=1.06~1.36) higher odds of SRH and DS, respectively. Some factors, such as a lack of rest guarantee and sickness presenteeism, had a larger influence in the WSER than in the RWW group. **Conclusion:** Compared to RWWs, WSERs reported having poorer working conditions and were more likely to report poor general and mental health. Therefore, in Korea, public health policymakers should consider measures to protect the working conditions and health of WSERs, a growing segment of the working population. The study produced new epidemiological evidence regarding the relationships between employment arrangements and health.

Key Words: Health status disparities; Employment; Social determinants of health, Korea, Occupational health

INTRODUCTION

As the industrial structure of modern society evolved from its manufacturing origins, the service industry, employing a wide range of workers from highly skilled professionals to unskilled labor, is expanding rapidly. In the service sector, demand peaks are less predictable than in the manufacturing realm, and thus, staffing flexibility is a high organizational priority [1]. This required flexibility threatens standard employment relationships that guarantee full-time work with a fixed schedule and continued employment. Nonstandard employment arrangements,

which include temporary employment, part-time work, temporary agency work and other forms of employment involving multiple parties, and disguised employment relationships and dependent self-employment, provide the staffing flexibility required to meet employers' needs [2]. Therefore, the use of nonstandard employment workers has steadily increased in recent years. This phenomenon is common in many developed countries, including South Korea [3]. In recent years, the number of nonstandard employment workers in that country has risen steeply, accounting for about 36.4% of all workers in August 2019[4].

An accumulating literature suggests that workers in in-

Corresponding author: Park, Bohyun

Department of Nursing, Changwon National University, 20 Changwondaehak-ro, Uichang-gu, Changwon 51140, Korea.
Tel: +82-55-213-3575, Fax: +82-55-213-3579, E-mail: bhpark@changwon.ac.kr

- This paper was supported by the Changwon National University Research Fund in 2019.

Received: Apr 17, 2020 / Revised: Sep 14, 2020 / Accepted: Oct 5, 2020

This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

secure employment relationships, such as part-time and temporary workers, tend to have worse health status, including higher rates of mortality and mental health morbidity, and are at a higher risk of occupational injuries than that of workers in secure relationships, such as full-time and permanent workers [5-7]. However, most previous studies have not focused on workers in types of non-standard employment other than part-time or temporary arrangements. Thus, there is a gap in knowledge about the health status of many nonstandard employment workers, including Korean workers in special employment relationship (WSER), the target population of this study, and whose employment quality differs in some important respects from those of part-time and temporary workers.

In Korea, WSERs are legally self-employed workers who contract with the employer individually and supply their labor in a subordinate status to the employer [8]. Therefore, their employment status is like the International Labour Organization dependent self-employed category of nonstandard employment. WSERs are not designated as or provided the protection of regular employees under the Korean Labor Standards Act [8], have few legal protections, and have substandard working arrangements in several respects. For example, although Korea's Labor Standards Act stipulates that regular wage workers (RWW) could work for 40 hours a week, the standard does not apply to WSERs. WSERs have no guarantee of break time and place and no unemployment benefit. Most WSERs are paid according to their productivity and have no guaranteed income [9]. Thus, WSERs may be exposed to long working hours because they work without breaks to maintain a certain income. Further, because much of their customer interaction takes place at customers' homes, dealing with customer problems and complaints independently, without institutional support, is an added stressor [9,10]. Finally, few WSERs have workers' compensation insurance coverage [3] because only workers in nine of the many WSER occupations-home-visit tutor, insurance salesperson, credit card recruiter, golf game assistant, truck driver, loan collector, proxy driver, delivery person with motorcycle, and package delivery person-are legally designated as WSERs under Korea's Industrial Accident Compensation Insurance Act [11]. Thus, in multiple aspects and given evidence relating working conditions to health, WSERs may be at greater risk of poor physical and mental health outcomes than their standard employee counterparts.

Little is known about the health of WSERs, including their work-related health status, because reliable statistical data, including data on industrial accidents involving WSERs, are lacking [10,12]. To help fill this research gap,

we conducted a secondary data analysis using the 5th Korean Working Conditions Survey (KWCS) to explore the health status and determinants of health of WSERs in comparison to workers with more standard employment. We selected self-rated health (SRH) and depressive symptoms (DS) as our two dependent variables. SRH is a well-established valid indicator of overall health status [13,14] and an excellent predictor of health decline and mortality [15,16]. Workers under beneficial employment conditions and relationships, such as stable employment, regular working time, and not long working hours, have been found to have better SRH than those who do not [14,17,18]. Employment quality, including job insecurity and long working hours, can not only cause physical health problems but also mental health problems, including depression [19,20].

This study aimed to compare the health status of WSERs and RWWs to examine the association between workers' employment relationships (WSER versus RWW) and self-rated health and depressive symptoms and identify factors associated with those outcomes by each group.

METHODS

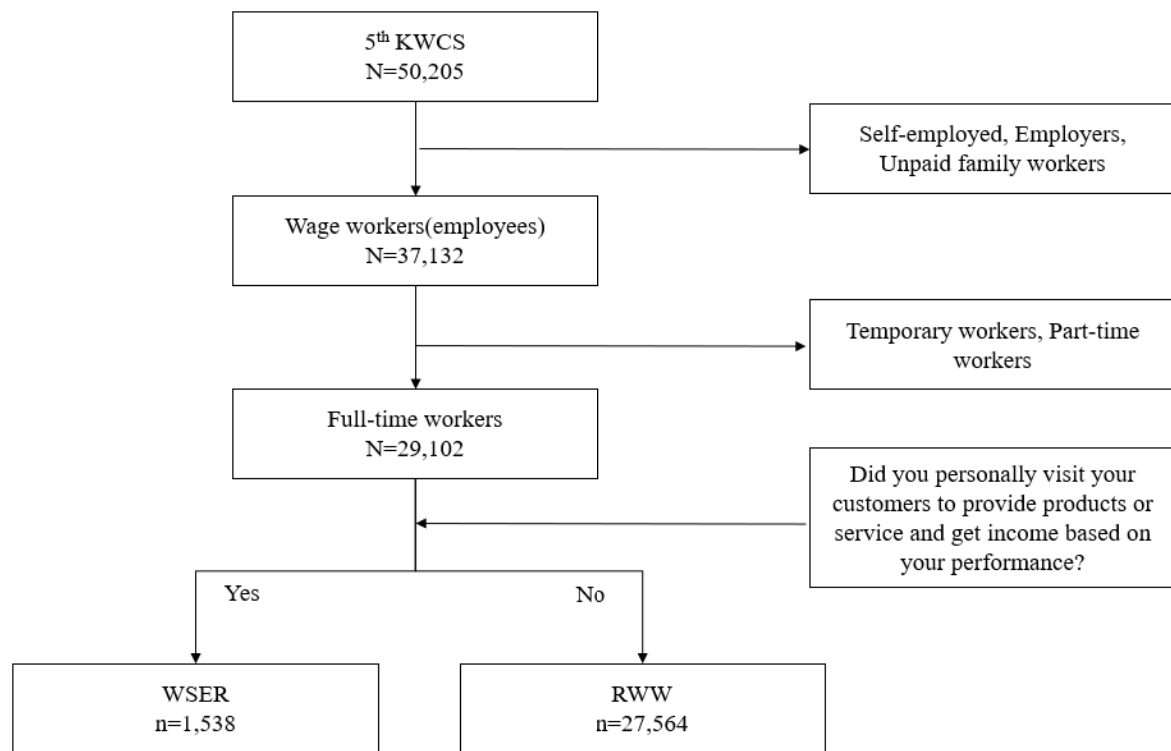
1. Study Design

A cross-sectional study was conducted with secondary data analysis using the 5th KWCS.

2. Data Source and Study Participants

This study used data from the 5th KWCS, which was conducted by the Occupational Safety and Health Research Institute (OSHRI) of Korea in 2017. Every 3 to 4 years, OSHRI conducts the survey nationwide by means of door-to-door interviews. This survey was developed based on the European Working Condition Survey (EWCS) conducted by Eurofound. The KWCS target population was workers aged 15 years or more living in households. The KWCS employed multistage, clustered, and probability sampling methods. The survey sample was selected using the sampling frame of the Korean Population and Household Census of 2015. Among the 50,205 respondents of the 5th KWCS, our study was limited to 29,102 employees after excluding 13,073 respondents who were students, housewives, unemployed, retired, or self-employed and 8,030 employees in temporary or part-time jobs (Figure 1).

The KWCS contains one specific question-last week, did you personally visit your customers to provide products



KWCS=Korea Working Conditions Survey; RWW=Regular wage workers; WSER=Special employment relationships workers.

Figure 1. Selection of study subjects from the 5th Korea Working Conditions Survey.

or services and earn income based on your performance? -that allows WSERs to be identified among participants. Therefore, the sample was divided into two groups using the responses to that specific question. Those who responded yes to the question were classified as WSERs, and those who responded no were classified as RWWs, who served as a reference group for the purpose of health outcome comparison. Thus, the sample subjected to analysis totaled 29,102, including 1,538 WSERs and 27,564 RWWs.

3. Study Variables

Of the two dependent variables, SRH and DS, SRH was measured using the question, How is your health status in general? Those who responded fair, poor, or very poor were considered to have fair/poor SRH, and those who responded good or very good were considered to have good SRH. DS was measured using the World Health Organization (WHO) Five Well-Being Index (WHO-5), which is a self-report measure of well-being. This tool consists of five items that are rated on a 6-point Likert scale ranging from 0=never experienced to 5=all the time; the items were, in the last two weeks (1) I felt cheerful and in good spirits, (2)

I felt calm and relaxed, (3) I felt active and vigorous, (4) I woke up feeling fresh and rested, and (5) daily life is filled with things that interest you. If the total score is lower than 13 points, depressive symptoms are suspected [21]. WHO-5 has been shown to have a strong positive correlation with the Beck's Depression Inventory, the tool most used for depression screening [21]. In Krieger et al.'s validation study, the Cronbach's α was .95 [22], and in our study, it was .92.

The explanatory variables of our study were divided into two categories: sociodemographic and work-related factors. The sociodemographic factors included gender, age, education level, relationship to householder, and monthly household income. Gender was classified as male or female, and age was classified as <30 years old, 30~39 years old, 40~49 years old, 50~59 years old, or 60 years or older. Education level was classified as middle school or less, high school, or college or more. Relationship to householder was classified as either a householder or a member of the household. Finally, monthly household income was classified as <2,000,000; 2,000,000~2,999,999; 3,000,000~3,999,999; and 4,000,000 or more Korean Won. The work-related factors included occupation, average working hours per week, existence of a union, lack of a rest guarantee, work-life balance, and sickness presenteeism (SP).

WSERs are often engaged in long working hours due to irregular working hours and are not guaranteed break time during their work, and they cannot make a collective organization like a labor union that represents them because they are not legally recognized as workers in Korea [9]. Kim et al.[23] reported that most nonstandard employment may increase the risk of SP. Job-related explanatory variables were selected based on previous study results. Occupation was categorized into four groups: professional/clerical, service/sales, skilled manual, and non-skilled manual. Categories of weekly average working hours were 40 hours or less, 41~52 hours, and 53 hours or more. The existence of a union was measured by the question, Do you have any trade unions, workers' councils, or similar committees representing employees in your company or organization? to which subjects answered yes or no. Regarding the lack of a rest guarantee, subjects answered yes or no to the question, At least once last month, did you have less than 11 hours between ending work and starting the next day's work? Work-life balance was measured using the question, Are your work hours suitable for your family and social life? Those who responded very suitable or suitable were considered to have a suitable work-life balance. Finally, SP was measured using the question, During the last 12 months, have you ever worked even though you were sick or hurt? The answers were categorized as yes, no, or not ever sick or hurt.

4. Data Analysis

Differences in the distributions of sociodemographic and work-related variables (all categorical) between the two groups, RWWs and WSERs, were tested using χ^2 tests. Differences in the unadjusted prevalence of fair/poor SRH and DS among WSER compared to RWW were tested using the χ^2 test. The factors influencing fair/poor SRH and DS were analyzed using multivariate logistic regression conducted in two steps: the first included the full sample, and the second was individually performed with WSER and RWW groups in separate models. The results were presented as estimated adjusted odds ratios (aOR) with 95% confidence intervals (CI95). Data were weighted using the probability weight provided by the KWCS, and all analyses were performed using SPSS 24.0.

5. Ethical Approval

All procedures involving human participants were in accordance with the ethical standards of the institutional and/or national research committee. The data of the 5th

KWCS, which are publicly available with the permission of the KOSHA at <http://www.kosha.or.kr/>, were accessed with the approval of KOSHA. In addition, this study was granted an exemption by the Institutional Review Board of Changwon National University (No: 1040271-201905-HR-012)

RESULTS

Table 1 shows the distributions of sociodemographic and work-related characteristics in the WSER and RWW groups. Overall, the WSERs were more likely to be female, 40 or more years old, and service and sales occupation was the most common in this group. Among the WSERs, the percentages of subjects working 53 hours or more per week, lacking a rest guarantee, having an unsuitable work-life balance, and reporting SP were higher than those of the RWWs. The unadjusted prevalence rates for fair/poor SRH were higher for WSERs at 25.2% than that for RWWs at 20.7%. DS prevalence was higher among WSERs at 28.3% than among RWWs at 25.0% (Table 1).

Logistic regression analysis was performed to explore factors influencing fair/poor SRH and DS. Table 2 shows the results for the model pooling data for WSERs and RWWs, including all covariates. WSER individuals had 31% greater odds of fair/poor SRH (aOR=1.31, 95% CI=1.14~1.49) and 20% greater odds of having DS (aOR=1.20, 95% CI=1.06~1.36).

Factors associated with SRH and DS among WSERs and RWWs were examined in separate models and are shown in Table 3. For fair/poor SRH, significant factors in the WSER model included age, education level, lack of a rest guarantee, and SP; these were also significant in the RWW model. The point estimates in the WSER model tended to be larger than those in the RWW model, although the wide confidence intervals for the WSER model (likely owing to the small sample size) frequently included the RWW point estimate. WSERs with low education had 4.5 times higher odds (aOR=4.53, 95% CI=2.19~9.38) of fair/poor SRH, while low-educated RWWs had just 1.5 times higher odds (aOR=1.46, 95% CI=1.22~1.73) of fair/poor SRH. In the subgroup analyses for DS, significant factors in the WSER model included occupation, enterprise size, existence of a union, average weekly work hours, lack of a rest guarantee, and SP; in the RWW model, the same factors were significant. The largest same-direction effects in the WSER and RWW models were observed for enterprise size, existence of a union, lack of a rest guarantee, and SP. However, service or sales occupation and average weekly working hours of 41~52 hours showed opposite directional

Table 1. Sociodemographic, Work-related Characteristics, and Health Status

Variables	Characteristics	Categories	WSERs	RWWs	<i>p</i>
			% (weighted)	% (weighted)	
Sociodemographic characteristics	Gender	Male	52.8	61.2	< .001
		Female	47.2	38.8	
	Age (year)	< 40	37.6	45.8	< .001
		40~49	30.6	28.0	
		50~59	25.7	19.6	
		≥ 60	6.1	6.7	
	Education	Middle school or less	3.3	4.1	< .001
		High school	36.5	26.7	
		College	60.2	69.2	
	Monthly income (10,000 won)	< 200	15.8	22.1	< .001
200~299		37.6	31.8		
300~399		28.2	25.3		
≥ 400		18.3	20.8		
Relationships with householder	Householder	56.0	59.0	.021	
	Household member	44.0	41.0		
Work-related characteristics	Occupation	Manager/clerical	32.6	57.5	< .001
		Sales/service	44.0	14.8	
		Skilled manual	13.7	21.4	
		Non-skilled manual	9.8	6.3	
	Enterprise location	Metropolitan	53.2	46.7	< .001
		Small-medium city	46.8	53.3	
	Enterprise size	Small	29.5	33.4	< .001
		Medium	64.2	54.9	
		Large	6.3	11.6	
	Years of employment	≤ 2	19.8	22.6	< .001
		3~5	36.7	30.5	
		6~8	15.2	12.4	
		≥ 9	28.3	34.4	
	Average work hours per week (hour)	≤ 40	50.1	57.3	< .001
		41~52	30.7	29.7	
		≥ 53	19.1	12.9	
	Existence of union	Yes	17.6	19.8	.031
		No	82.4	80.2	
	Lack of a rest guarantee	No	89.1	91.7	< .001
Yes		10.9	8.3		
Work life balance	Bad	27.3	24.1	.004	
	Good	72.7	75.9		
Sickness presenteeism	Not hurt or sick	79.7	84.3	< .001	
	Yes	20.3	15.7		
Health status	Self-rated health	Fair or poor	25.2	20.7	< .001
		Good	74.8	79.3	
	Depressive symptoms	Yes	28.3	25.0	.004
		No	71.7	75.0	

WSERs=special employment relationships workers; RWWs=regular wage workers.

Table 2. The Difference of Adjusted Odds Ratio for Fair/poor Self-rated Health and Depressive Symptoms between WSERs and RWWs

Variables	Fair/poor self-rated health		Depressive symptoms	
	aOR	95% CI	aOR	95% CI
Group				
RWWs	1.00		1.00	
WSERs	1.31	1.14~1.49	1.20	1.06~1.36

Adjusted by gender, age, education, monthly income, relationships with householder, occupation, enterprise location, enterprise size, years of employment, average working hours per week, union, lack of a rest guarantee, work-life balance, and sickness presenteeism; RWWs=regular wage workers; WSERs=special employment relationships workers; CI=95% confidence interval; aOR=adjusted odds ratio.

Table 3. The results of Logistic Regression on Fair/poor Self-rated Health and Depressive Symptoms

Variables	Categories	Fair/poor self-rated health				Depressive symptoms			
		WSERs		RWWs		WSERs		RWWs	
		aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Gender (ref. female)	Male	1.39	0.92~2.09	0.83	0.75~0.92	0.86	0.58~1.27	0.99	0.91~1.09
Age (ref. ≤40)	41~50	1.87	1.33~2.63	1.56	1.42~1.70	1.34	0.98~1.83	1.18	1.09~1.27
	51~60	1.90	1.31~2.75	1.96	1.78~2.17	1.01	0.71~1.44	1.10	1.00~1.21
	>60	0.99	0.53~1.85	2.26	1.95~2.61	0.88	0.49~1.60	1.08	0.94~1.25
Education (ref. college)	Middle school or less	4.53	2.19~9.38	1.46	1.22~1.73	1.98	0.98~4.01	1.53	1.29~1.82
	High school	1.46	1.06~2.00	1.16	1.06~1.27	0.98	0.72~1.32	1.27	1.17~1.38
Monthly income (ref. ≥400)	<200	1.63	0.98~2.70	1.99	1.74~2.28	0.94	0.58~1.54	1.30	1.15~1.47
	200~299	1.48	0.97~2.25	1.51	1.35~1.69	1.11	0.74~1.66	1.09	0.99~1.21
	300~399	1.02	0.68~1.53	1.17	1.05~1.30	1.30	0.89~1.90	1.02	0.93~1.12
Relationships with householder (ref. household member)	Householder	1.21	0.82~1.78	1.32	1.20~1.45	1.02	0.71~1.47	1.12	1.03~1.22
Occupation (ref. profession/clerical)	Service or sales	1.10	0.79~1.52	1.01	0.91~1.12	1.45	1.06~1.98	0.86	0.78~0.94
	Skilled manual	1.29	0.79~2.10	1.41	1.28~1.55	2.38	1.48~3.81	1.12	1.03~1.23
	Non-skilled manual	0.90	0.53~1.52	1.21	1.04~1.40	2.44	1.48~4.02	1.06	0.92~1.22
Enterprise location (ref. metropolitan)	Medium and small city	1.03	0.79~1.33	1.25	1.17~1.33	1.14	0.89~1.46	1.12	1.05~1.19
Enterprise size (ref. small)	Medium	1.29	0.95~1.75	0.99	0.92~1.07	1.30	0.97~1.74	1.09	1.02~1.17
	Large	1.57	0.90~2.74	0.82	0.72~0.94	1.76	1.04~2.97	1.17	1.04~1.31
Years of employment (ref. 2 or less)	3~5	0.87	0.60~1.26	1.23	1.12~1.35	1.19	0.83~1.70	0.92	0.85~1.00
	6~8	0.74	0.47~1.17	1.11	0.98~1.25	1.30	0.84~2.00	0.90	0.81~1.00
	≥9	0.87	0.57~1.32	1.29	1.16~1.44	1.14	0.75~1.72	0.92	0.83~1.01
Average working hour per week (ref. 40 or less)	41~52	0.84	0.62~1.16	1.16	1.08~1.26	0.61	0.45~0.83	1.13	1.05~1.21
	≥53	1.03	0.69~1.52	1.09	0.98~1.21	0.94	0.64~1.36	1.41	1.28~1.55
Existence of union (ref. no)	Yes	0.84	0.59~1.20	0.92	0.84~1.01	0.63	0.44~0.89	0.90	0.83~0.98
Lack of a rest guarantee (ref. no)	Yes	1.75	1.17~2.62	1.35	1.20~1.51	1.58	1.07~2.34	1.30	1.17~1.44
Work-life balance (ref. bad)	Good	0.77	0.57~1.04	0.65	0.60~0.70	0.81	0.61~1.08	0.77	0.72~0.82
Sickness presenteeism (ref. not hurt or sick)	Yes	2.83	2.09~3.82	2.29	2.11~2.48	1.66	1.23~2.23	1.76	1.63~1.90

WSERs=special employment relationships workers; RWWs=regular wage workers; CI=confidence interval; aOR=adjusted odds ratio.

effects in the two models. Specifically, among WSERs, workers with a service or sales occupation showed greater odds of DS than those having a clerical or professional occupation (aOR=1.45, 95% CI=1.06~1.98). However, among RWWs, lower odds of DS (aOR=0.86, 95% CI=0.78~0.94) were observed. In contrast, in the WSER model, workers with weekly working hours of 41~52 hours had lower odds of DS than those working 40 hours or less (aOR=0.61, 95% CI=0.45~0.83), but in the RWW model, higher odds (aOR=1.13, 95% CI=1.05~1.21) were observed.

DISCUSSION

This study aimed to examine the health status of WSERs and RWWs and identify the factors influencing health status in each group. We found that the WSERs reported higher poor/fair SRH (25.2%) and greater DS (28.3%) than (poor/fair SRH 20.7%, DS 25.0%) the RWWs. Despite the growing number of WSERs, their health status has received less attention in health research. Therefore, the results of this study were compared with those of previous studies that examined the associations between health status among permanent and temporary workers. For example, in analyzing KWCS data collected in 2011, Kwon et al. reported that the prevalence of poor SRH among permanent workers was 10 percentage points lower than among temporary workers, who showed an OR of 1.2 for poor SRH [24]. In addition, based on British cohort data, Emerson et al. reported the risk of fair/poor SRH among non-standard workers to be 1.66 compared to standard workers [25]. Like our results for SRH, the mental health status of temporary/part-time workers was generally worse than that of permanent/full-time workers [6,20,26]. Although the temporary/part-time workers included in previous studies were not identical to WSERs in terms of work relationships, this study's results for WSERs corresponded with those of earlier studies for temporary or part-time workers.

Unlike previous studies, Julià et al. [27]'s study, which analyzed the difference in SRH and mental well-being between informal workers (similar to the WSERs of this study) and permanent workers in 27 European countries, showed no statistically significant difference in SRH or mental well-being between informal and permanent workers. Some of our study's significant results differed from those of Julià et al. [27]. In Julià et al. [27]'s study, the prevalence of poor SRH was lower, but the unadjusted prevalence of poor mental well-being was higher among informal workers than among permanent workers. In adjusted models, the authors found no statistically signifi-

cant differences in SRH or mental well-being between informal and permanent workers. The authors postulated that this seemingly contradictory result may have been due to a "healthy workers bias." Furthermore, it is possible that Korean working conditions and employment quality among WSERs may differ from those among informal workers in Europe in ways that affect health. Further research examining the influence of working environment on the health of WSERs is needed to explore this possibility.

Our study expands the knowledge of the determinants of WSERs' health. For example, we found that the likelihood of DS was very high for skilled and non-skilled manual occupations compared to other WSER occupations. Most skilled manual workers were taxi, bus, and truck drivers, and most non-skilled manual workers were package and food delivery persons (not reported in Results). Our study cannot shed light on the reasons for higher rates of DS in those occupations; task-related stress and unstable employment conditions may contribute. Working hours per week had effects on DS in opposite directions in the WSER and RWW models. Unlike RWWs, DS among WSERs were less likely if individuals worked 41~52 hours per week than 40 hours or less per week. Since WSER has no fixed income and is paid based on their productivity [9], DS among those working less than 40 hours per week may reflect income-related distress. Further research is needed to understand the relationships among specific jobs, employment stability, working hours, and DS.

Finally, workers lacking a rest guarantee or exhibiting SP were more likely to have fair/poor SRH and higher DS, with the effects being greater in WSERs than in RWWs. Skagen and Collin [28] reported that SP was associated with poor health status among workers, and Jeon et al. [29] reported that long working hours among Korean workers were significantly related to SP. Korean workers average 2,069 working hours annually, the second highest among Organization for Economic Co-operation and Development countries [30]. In a working environment where long working hours are prevalent, workers are forced to do their work even when they feel sick or are not guaranteed an adequate rest period between shifts, thus exposing them to health risks. According to the study results, these situations have greater effects on WSERs, who are more vulnerable in their employment relationships. The Labor Standards Act of Korea allows only 12 extended hours within a 40-hour work week. However, businesses that require 24-hour work (e.g., hospitals and transportation facilities) are permitted to guarantee an 11-hour break between shifts as a substitute for compliance with the

12-hour overtime rule. However, since WSERs are not legally designated employees, neither regulation governing employees applies to them. The results of this study suggest that the lack of an 11-hour rest period between shifts has a significant deleterious effect on the health of WSERs. Policy revision extending the 11-hour rest period to all workers may be a necessary and effective means to protect the health of WSERs and other nonstandard workers.

Some limitations of this study should be acknowledged. First, WSERs exhibit the characteristics of both employees and the self-employed. However, the subjects of this study were selected from among employees in the KWCS data; self-employed WSERs were not included because the specific question pertaining to WSER status was asked of employees only. Second, the RWW sample size was approximately 18 times larger than that of the WSER group, making it difficult to directly compare the results tested statistically. Last, this study was not able to consider the specific employment-related characteristics of WSER, such as employment stability, wage system, and absence of social security, that contribute to their vulnerable status. In the future, to uncover the pathway that explains the low health status of such workers, researchers should focus on potential associations between those specific characteristics of WSERs' employment and their health status.

Nonstandard employment is prevalent in Korea and worldwide, but research on their health has not been commensurate. This is one of the first studies to examine the health status and determinants of health of WSERs and RWWs. We reported that WSERs have poorer SRH and higher DS than RWWs and suggested several factors affecting their health status, such as a lack of rest guarantee and SP. In addition, the results of this study are reliable as they were analyzed using data representing Korean workers.

CONCLUSION

As the industrial structure in developed countries changed from manufacturing-oriented to service-oriented, various forms of nonstandard employment proliferated. Despite the increasing number of unusual and diverse forms of nonstandard employment in real life, previous research has mainly targeted part-time and temporary workers. Focusing on an important group of nonstandard employment workers, WSERs, the authors studied their health status and how different factors affected their health compared to RWWs. The results showed that WSERs, compared to RWWs, had poorer health and suggest that WSER work arrangements may confer health risks. Fur-

ther investigation is needed to determine how best the demands of industry can be met while protecting worker health. Korean public health policymakers should consider measures to protect the working conditions and health of WSERs, a growing segment of the working population. This study is meaningful as it is the first report comparing the health status and health determinants of WSERs and RWWs using KWCS, a data that represents the working population in Korea.

REFERENCES

1. Euwals R, Hogerbrugge M. Explaining the growth of part-time employment: Factors of supply and demand. In *Labour*. 2006;20(3):533-557. <https://doi.org/10.1111/j.1467-9914.2006.00352.x>
2. International Labour Organization. Non-standard employment around the world. Understanding challenges, shaping prospects [Internet]. Geneva, Swiss: International Labor Office; 2016 November. [Cited 2019 December 1]. Available from: http://www.ilo.org/global/publications/books/WCMS_534326/lang--en/index.htm Accessed 31 July 2019
3. Yoon A. A critical review on the application of the industrial accident compensation insurance act for independent workers. *Labor Law Review*. 2012;33:47-91.
4. Korean Statistical Information System. Number and percentage of wage workers by gender/employment type [Internet]. Daejeon: Korean Statistical Information System. 2019 [cited 2020 January 04]. Available from: http://kosis.kr/statisticsList/statisticsListIndex.do?menuId=M_01_01&vwcd=MT_ZTITLE&parmTabId=M_01_01#SelectStatsBoxDiv
5. Kivimäki M, Vahtera J, Virtanen M, Elovainio M, Pentti J, Ferrie JE. Temporary employment and risk of overall and cause-specific mortality. *American Journal of Epidemiology*. 2003;158(7):663-668. <https://doi.org/10.1093/aje/kwg185>
6. Rönblad T, Grönholm E, Jonsson J, Koranyi I, Orellana C, Kreshpaj B, et al. Precarious employment and mental health: A systematic review and meta-analysis of longitudinal studies. *Scandinavian Journal of Work, Environment & Health*. 2019;45(5):429-443 <https://doi.org/10.5271/sjweh.3797>
7. Virtanen M, Kivimäki M, Joensuu M, Virtanen P, Elovainio M, Vahtera J. Temporary employment and health: A review. *International Journal of Epidemiology*. 2005;34(3):610-622. <https://doi.org/10.1093/ije/dyi024>
8. Lee H. The industrial accident compensation insurance act - Focusing on the improvement of law & institutions on "Economically Dependent Worker". *Korean Journal of Labor Studies*. 2015;21(1):257-303.
9. Park B, Jo Y, Oh S. Health problems and coping of workers under special employment relationships: Home-visit tutors, in-

- urance salespersons, and credit card recruiters. *Korean Journal of Occupational Health Nursing*. 2019;28(4):208-220. <https://doi.org/10.5807/kjohn.2019.28.4.208>
10. Shin S, Byeon SH. The analysis of risk exposure and ill health symptom by difference depending on the special type of employment. *Journal of Korean Society of Occupational and Environmental Hygiene*. 2018;28(3):319-329. <https://doi.org/10.15269/JKSOEH.2018.28.3.319>
 11. Cho Y. A review on article 125 of the industrial accident compensation insurance act - Focusing on precedents and legislation bills. *Social Security Law Review*. 2016;5(2):237-278.
 12. Park C, Whang D, Kim K. Job types diversification trend and Industrial Insurance, Policy Report. Sejong: Korea Labor Institute; 2016 December. Report No.: 2016-04.
 13. Bailis DS, Segall A, Chipperfield JG. Two views of self-rated general health status. *Social Science of Medicine*. 2003;56(2):203-217. [https://doi.org/10.1016/s0277-9536\(02\)00020-5](https://doi.org/10.1016/s0277-9536(02)00020-5)
 14. Van Aerden K, Gadeyne S, Vanroelen C. Is any job better than no job at all? Studying the relations between employment types, unemployment and subjective health in Belgium. *Archives of Public Health*. 2017;75(1):55. <https://doi.org/10.1186/s13690-017-0225-5>
 15. Jylhä M. What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Social Science of Medicine*. 2009;69(3):307-316. <https://doi.org/10.1016/j.socscimed.2009.05.013>
 16. DeSalvo KB, Bloser N, Reynolds K, He J, Muntner P. Mortality prediction with a single general self-rated health question. A meta-analysis. *Journal of General Internal Medicine*. 2006;21(3):267-275. <https://doi.org/10.1111/j.1525-1497.2005.00291.x>
 17. Van Aerden K, Puig-Barrachina V, Bosmans K, Vanroelen C. How does employment quality relate to health and job satisfaction in Europe? A typological approach. *Social Science & Medicine*. 2016;158:132-140. <https://doi.org/10.1016/j.socscimed.2016.04.017>
 18. Cho SS, Paek D, Kang MY. Influence of combined exposure to perceived risk at work and unstable employment on self-rated health: A comparison of two cross-sectional surveys in Europe and Korea. *BMJ Open*. 2020;10(1):e032380. <https://doi.org/10.1136/bmjopen-2019-032380>
 19. Kim T, von dem Knesebeck O. Perceived job insecurity, unemployment and depressive symptoms: a systematic review and meta-analysis of prospective observational studies. *International Archives of Occupational Environmental Health*. 2016;89:561-573. <https://doi.org/10.1007/s00420-015-1107-1>
 20. Virtanen M, Jokela M, Madsen IE, Magnusson Hanson LL, Lallukka T, Nyberg ST, et al. Long working hours and depressive symptoms: systematic review and meta-analysis of published studies and unpublished individual participant data. *Scandinavian Journal of Work, Environment & Health*. 2018; 44(3):239-250. <https://doi.org/10.5271/sjweh.3712>
 21. WHO. Mastering depression in primary care / the deprecare project [Internet]. Stockholm, Sweden: World Health Organization regional office for Europe; 1998. [cited 2019 July 31] Available from: http://www.euro.who.int/__data/assets/pdf_file/0016/130750/E60246.pdf
 22. Krieger T, Zimmermann J, Huffziger S, Uhl B, Diener C, Kuehner C, et al. Measuring depression with a well-being index: Further evidence for the validity of the WHO Well-Being Index (WHO-5) as a measure of the severity of depression. *Journal of Affective Disorders*. 2014;156(1):240-244. <https://doi.org/10.1016/j.jad.2013.12.015>
 23. Kim JY, Lee J, Muntaner C, Kim SS. Who is working while sick? Nonstandard employment and its association with absenteeism and presenteeism in South Korea. *International Archives of Occupational and Environmental Health*. 2016;89(7):1095-1101. <https://doi.org/10.1007/s00420-016-1146-2>
 24. Kwon K, Park J, Lee K, Cho Y. Association between employment status and self-rated health: Korean working conditions survey. *Annals of Occupational and Environmental Medicine*. 2016;28(1):43. <https://doi.org/10.1186/s40557-016-0126-z>
 25. Emerson E, Hattona C, Robertson J, Baines S. The association between non-standard employment, job insecurity and health among British adults with and without intellectual impairments: Cohort study. *SSM - Population Health*. 2018;4:197-205. <https://doi.org/10.1016/j.ssmph.2018.02.003>
 26. Canivet C, Bodin T, Emmelin M, Toivanen S, Moghaddassi M, Östergren PO. Precarious employment is a risk factor for poor mental health in young individuals in Sweden: A cohort study with multiple follow-ups. *BMC Public Health*. 2016;16:687. <https://doi.org/10.1186/s12889-016-3358-5>
 27. Julià M, Belvis F, Vives A, Tarafa G, Benach J. Informal employees in the European Union: Working conditions, employment precariousness and health. *Journal of Public Health (Oxf)*. 2018;41(2):e141-e151. <https://doi.org/10.1093/pubmed/fdy111>
 28. Skagen K, Collin AM. Consequences of sickness presenteeism on health and wellbeing over time: A systematic review. *Social Science & Medicine*. 2016;161:169-177. <https://doi.org/10.1016/j.socscimed.2016.06.005>
 29. Jeon SH, Leem JH, Park SG, Heo YS, Lee BJ, Moon SH, et al. Association among working hours, occupational stress, and presenteeism among wage workers: Results from the second Korean Working Conditions Survey. *Annals of Occupational and Environmental Medicine*. 2014;26(1):6. <https://doi.org/10.1186/2052-4374-26-6>
 30. Bak S. South Koreans work second-longest hours in OECD for below average pay. *The Korea Herald*. 2017 Aug 17.