

# Overwork-related disorders and recent improvement of national policy in South Korea

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## Abstract

**Objectives:** Recently, overwork-related disorders have become a major public health concern in Korea. This study investigated the current trends of working hours, causes of death in the working population, and compensation rates.

**Methods:** We reviewed the current trends of working hours, cause of death statistics in the working population, industrial accident compensation insurance (IACI) statistics, issues of compensation and prevention of work-related cerebro-cardio vascular diseases (CCVDs), mental disorders, and suicide.

**Results:** Although weekly working hours and the proportion of long working days have decreased, workers in small companies with fewer than five employees and those in the service sector continue to work long hours. The age standardized mortality due to CCVD and suicide was highest among those with managerial roles. In total, 589 CCVD cases and 104 mental disorder or suicide cases were compensated as occupational diseases in 2017. Between 2016 and 2017, 61% of 59 compensated suicides were related to overwork, specifically: long working hours, increased responsibility, or increased workload. The Korean government has introduced various policies to reduce working hours and to increase compensation approval rate for overwork-related CCVDs. Stakeholders have called for the introduction of independent laws to prevent overwork-related disorders, change organizational culture, and address the blind spots of the IACI Act and Labor Standard Act.

**Conclusions:** Prevention and compensation policies have improved working conditions in Korea, but there remains much to be done. This review significantly contributes to the understanding of the overall policies and research to prevent overwork-related disorders in Korea.

## KEYWORDS

overwork, working hours, cerebro-cardiovascular disease, mental disorder, suicide

## 1 | INTRODUCTION

Long working hours and a high suicide mortality rate are important issues in South Korea (hereafter, Korea). According to statistics released by the Organization for Economic

Co-operation and Development, annual working hours in Korea were ranked third internationally in 2016, behind Mexico and Costa Rica.<sup>1</sup> Since 2007, Korea's suicide rate has been consistently ranked first or second globally.<sup>2</sup> Several Korean researchers have studied the relationship between

working hours and cerebro-cardio vascular disease (CCVD), mental illness, and suicide. Some case-control and case-cross-over studies in Korea have found that long working hours and work intensity could be risk factors of CCVDs.<sup>3-6</sup> A few studies on the relationship between suicide and overwork using representative national data showed an association between working hours and depressive symptoms or suicide ideation in Korea.<sup>7-9</sup> Korea is also one of just a few countries that provide compensation for CCVDs and mental disorders related to long working hours, a heavy workload, or stressful events.

This study aimed to investigate the current situation and trends of working hours, causes of death in the working population, and compensation provided by Industrial Accident Compensation Insurance (IACI). Additionally, this study proposes changes in national policy to prevent or compensate for overwork-related disorders in Korea.

## 2 | TRENDS OF WORKING HOURS

We analyzed the first through the fifth Korean Working Condition Surveys, which were introduced in 2006 to monitor working conditions and are based on the European Working Condition Survey.<sup>10</sup> Average weekly working hours (AWWH) decreased from 50.7 hours in 2006 to 44.4 hours in 2017; however, the AWWH of self-employed workers (50.1 hours in 2017) and employers (51.5 hours in 2017) were still higher than employees (42.7 hours in 2017).<sup>11</sup>

We analyzed employees' AWWH by industry, occupation, and company size. The AWWH of "equipment, machine operators and assemblers," "craft and related trades workers," and "sales workers" were longest. The AWWH of "service workers" decrease from 2006 to 2017. We found that "personal services" was the industry with the longest AWWH (51.4 hours), followed by "accommodation and food service activities" (49.4 hours, Table 1). More than 20% of employees in the "equipment, machine operators and assemblers," "craft and related trades workers," "sales workers," and "service workers" occupations worked over 52 hours per week in 2017 (Figure S1). Generally, more than 20% of employees worked over 52 hours per week in the "accommodation and food service activities," "membership organizations, repair and other personal services", "transportation and storage", "agriculture, forestry and fishing", "wholesale and retail trade", and "real estate activities" industries (Figure S2).

## 3 | CAUSE OF DEATH STATISTICS IN KOREA'S WORKING POPULATION

According to cause of death statistics in 2017, suicide was the most common cause of death among employees age

20-30 years, while cancer was the second most common cause of death among employees aged 40-50 years. CCVD was also ranked in five main causes of death.<sup>12</sup> We measured the direct age-standardized mortality rate of CCVD from 2011 to 2016 and that of suicide from 2014 to 2016 by occupation, using the raw cause of death statistics data of the economically-active population from Statistics Korea from 2011 to 2016. We found that both male and female managers showed the highest mortality rate due to cardiovascular disease (28.2/100 000 in men and 18.7/100 000 in women), cerebrovascular disease (50.6/100 000 in men and 55.7/100 000 in women), and suicide (241.2/100 000 in men and 133.1/100 000 in women). Cardiovascular disease mortality was higher among male service workers (13.9/100 000) and among skilled agricultural, forestry and fishery workers (14.5/100 000). Cerebrovascular disease mortality rate was high among skilled agricultural, forestry and fishery workers (18.0/100 000 in men and 17.9/100 000 in women). The suicide mortality rate was high among male elementary workers (40.2/100 000) and skilled agricultural, forestry and fishery workers (44.4/100 000 in men and 15.9/100 000 in women) (Table 2). Thus, death due to suicide and CCVD was identified as a major problem among the working-age population, and those in managerial roles have a high risk of suicide and CCVD mortality.

## 4 | INDUSTRIAL ACCIDENT COMPENSATION INSURANCE STATISTICS

Compensation for occupational diseases such as CCVD, mental disorders, or suicide is determined according to the specific criteria for the recognition of occupational diseases in Schedule 3 of the Enforcement Decree of the IACI Act in Korea. The Korea Workers' Compensation & Welfare Service (COMWEL) conducts investigations for occupational diseases. Compensation determinations are made in the decision meetings of the Committee of Occupational Disease Judgment (CODJ) of COMWEL, where agreement of the chairperson of the committee and a majority of the seven committee members is required.<sup>13</sup> When a denial decision has been made by the CODJ, the worker may request a reexamination within 90 days, which will be approved or disapproved by the Industrial Accident Reexamination Committee. Although CCVDs and mental illness are not the most frequently approved cases of occupational disease (accounting for 10% of all work-related illness),<sup>14,15</sup> discussions related to policies to improve the long working hours problems in Korea are presently concentrated on diseases related to overwork.

Mental illness was first recognized as an occupational disease in 2005, when several subway drivers made claims

**TABLE 1** Average weekly working hours among all type of employment from 2006 to 2017

	2006	2010	2011	2014	2017
Total	50.7	47.8	49.2	46.2	44.4
Sex					
Men	51.4	49.5	50.5	47.9	46.2
Women	49.6	45.5	47.3	43.5	41.9
Employment status					
Self-employed	47.7	55.8	55.2	52.3	50.1
Employer	58.8	55.5	57.0	54.6	51.5
Employee	56.8	45.0	47.1	44.1	42.7
Occupation					
Managers	48.8	48.2	48.2	45.0	42.9
Professionals	45.5	43.1	45.0	42.8	41.8
Office workers	46.5	43.4	44.6	43.0	42.0
Service workers	57.7	53.8	56.0	50.3	47.3
Sales workers	57.3	54.6	54.7	51.3	48.7
Skilled agricultural, forestry and fishery workers	50.7	46.3	44.2	41.5	39.7
Craft and related trades workers	50.0	51.2	52.2	49.7	47.7
Equipment and machine operators and assemblers	52.6	50.8	52.8	50.0	47.6
Elementary occupations	48.3	44.0	46.3	43.2	40.9
Industry					
Agriculture, forestry and fishing	50.5	45.5	44.2	41.4	39.7
Mining and quarrying	52.4	43.5	43.0	47.8	38.7
Manufacturing	49.9	47.7	49.1	46.3	44.4
Electricity, gas, steam, and air conditioning supply	43.9	44.2	43.0	44.1	42.7
Water supply, waste management	—	42.9	48.3	42.6	45.4
Construction	47.6	47.7	48.5	46.1	45.3
Wholesale and retail trade	57.4	55.0	54.5	50.9	49.0
Transportation and storage	53.6	51.7	53.2	50.9	48.3
Accommodation and food service activities	62.0	55.9	57.5	51.5	49.4
Information and communication	—	44.0	45.0	43.8	42.7
Financial and insurance activities	43.1	43.6	43.7	42.7	41.6
Real estate activities	49.7	48.7	51.8	50.9	47.7
Professional, scientific, and technical activities	—	44.5	45.4	43.3	42.4
Business services	45.8	47.7	48.7	46.1	43.6
Public administration and defense	44.5	36.8	39.5	36.1	36.5
Education	42.6	38.7	40.9	36.9	36.9
Human health and social work activities	48.6	41.6	44.4	41.7	39.2
Arts, sports, and recreation related services	51.2	43.0	51.6	44.9	43.6
Personal services	54.7	54.0	55.9	52.5	51.4
Households as employer	35.9	36.7	37.1	37.1	37.5

(Continues)

**TABLE 1** (Continued)

	2006	2010	2011	2014	2017
Extraterritorial organizations and bodies	40.0	—	38.0	42.3	40.0
Company size (no. of employees)					
<5	—	52.0	52.8	49.3	47.0
5-9	—	46.4	48.5	44.9	43.5
10-29	—	44.9	46.6	44.3	42.6
30-99	—	44.0	46.3	43.9	43.2
100-299	—	45.3	46.7	44.5	42.9
300-499	—	46.4	45.5	44.3	42.7
≥500	—	43.6	44.3	43.1	42.0

—; not classified or surveyed in Korean Working Condition Survey.

to COMWEL for recognition of work-related mental disorders due to experiencing a passengers' accident. It was the first social movement to promote the compensation of mental disorders as an occupational disease. The number of mental illnesses and suicides recognized as work-related in Korea between 2014 and 2018 are shown in Table 3. In 2012, the number of recognized cases rapidly increased (0 cases in 2000, 27 cases in 2005, 47 cases in 2012), which resulted from the addition of post-traumatic stress disorder (PTSD) to the legal list of occupational diseases. Further, in 2015, the guidelines for the investigation and determination of the work-relatedness of mental illness were revised, and violence by customers was a main issue to add to the legal list.

Table 3 shows all of CODJ's decisions regarding CCVD and mental disorders, including suicide, to date. The final approval rate has slightly increased, if the court has decided to recognize work-related disease for the cases not to agree with the CODJ's decision. The number of CCVDs cases claimed is decreasing in Korea, but the approval rate is increasing. However, both the number of claimed mental illness cases and suicide cases and the approval rate for compensation of these cases are increasing.

#### 4.1 | Mental disorder and suicide

In our previous study, analyzing 516 claimed cases from 2010 to 2014, the most frequent reason of approval of compensation for mental disorder and suicide (142 cases, 29.4%) was the experience of an acute stress event, and the second most common cause of work-related mental illness and suicide was long working hours. The most common acute stressful events were work-related legal problems, workplace violence or harassment, and issues related to employment status. Of the 516 claimed cases in 2010-2014, 109 cases were managers.<sup>16</sup> We also analyzed the main work-related stresses that resulted in suicide from 2016-2017 after revision of investigation guideline in 2015. Of the 103 suicide cases, 24 cases claimed that "conflict with a supervisor" was

the main stressful event related with suicide, while 14 cases reported that job insecurity or readjustment related to relocation were the main stressful events, and 13 cases focused on changes in pace productivity. Conflict with a supervisor, including harassment, was the most common cause claimed for approval of compensation for suicide (Table 4).<sup>17</sup> There were few suicides related to the extremely long working hours in 2016-2017, as this was not yet included as a main stressful event in the CODJ work-related illness investigation guide.

#### 4.2 | Cerebro-cardio vascular disease

COMWEL provided for us a database of the initial applications for recognition of work-related CCVD cases, which also included investigations of average working hours during the 1-week, 4-weeks, and 12-week periods prior to diagnosis. A total of 4,898 cases from January 2013 to June 2016 were included in this dataset. Cerebrovascular disease was defined using ICD-10 codes of I60-63 (subarachnoid hemorrhage, intracerebral hemorrhage, other nontraumatic intracranial hemorrhage, cerebral infarction) and cardiovascular disease was defined using ICD-10 codes of I21-25 (ischemic heart disease), I46 (cardiac arrest), or I71 (aortic aneurysm and dissection). Cardiovascular disease had a higher approval rate (28.2%) than cerebrovascular disease (25.9%). Subarachnoid hemorrhage received the highest approval rate (30.0%, 253/845 cases). Acute myocardial infarction had the second-highest approval rate (29.5%, Table 5). However, the approval rate in 2018 increased rapidly, as shown in Table 3. This increase is related to the changes in recognition criteria.

Table 5 also shows the relationship between approval rate and weekly working hours during the 12-week period prior to diagnosis. In 2013, the quantitative criteria for recognition of CCVD were introduced for the first time. According to these criteria, if workers worked for over 60 hours per week then their CCVDs usually approved as work-related. The approval rate was the highest at about 67% for CCVD cases made by workers who worked more than 60 hours per week

**TABLE 2** Age standardized mortality (per 100 000 people) of 20–64 years old workers from 2011 to 2016 using cause of death statistics in Korea

Occupation	Cardiovascular disease				Cerebrovascular disease				Suicide (2014–2016)			
	Men		Women		Men		Women		Men		Women	
	ASM	95% CI	ASM	95% CI	ASM	95% CI	ASM	95% CI	ASM	95% CI	ASM	95% CI
Managers	28.2	28.1–28.2	18.7	17.4–20.2	50.6	50.5–50.8	55.7	54.5–56.9	241.2	240.7–241.6	133.1	130.7–135.6
Professionals and related	8.1	8.1–8.2	1.1	1.0–1.1	7.7	7.7–7.7	2.9	2.8–2.9	15.3	15.3–15.3	4.7	4.7–4.7
Clerks	8.9	8.9–9.0	1.2	1.2–1.3	9.1	9.0–9.1	3.2	3.2–3.2	16.8	16.8–16.8	4.9	4.9–4.9
Service and sales	13.9	13.9–13.9	0.8	0.8–0.8	13.7	13.7–13.7	3.3	3.3–3.3	33.2	33.2–33.3	9.9	9.9–9.9
Skilled agricultural, forestry and fishery	14.5	14.4–14.5	2.4	2.4–2.5	18.0	17.9–18.0	17.9	17.8–18.1	44.4	44.3–44.6	15.9	15.6–16.2
Craft and related trades workers	4.9	4.9–4.9	1.2	1.1–1.4	5.2	5.3–5.3	2.2	2.1–2.3	13.7	13.7–13.7	11.9	11.6–12.2
Equipment, machine operator and assembler	2.6	2.6–2.7	0.6	0.4–0.8	2.7	2.7–2.7	2.4	2.3–2.5	8.5	8.5–8.5	3.3	3.1–3.5
Elementary workers	12.2	12.2–12.2	0.8	0.8–0.8	14.2	14.1–14.2	2.6	2.6–2.6	40.2	40.2–40.2	5.2	5.2–5.3

Abbreviations: ASM, age standardized mortality; CI, confidence interval.

**TABLE 3** Results of the Committee of Occupational Disease Judgment for cerebro-cardiovascular disease, mental disorder, and suicide

Disorder	2014		2015		2016		2017		Sep. 2018	
	C (N)	A (N, %)	C (N)	A (N, %)	C (N)	A (N, %)	C (N)	A (N, %)	C (N)	A (N, %)
CCVD	2,088	471 (22.6)	1,970	462 (23.5)	1,911	421 (22.0)	1,809	589 (32.6)	1,528	645 (42.2)
Death due to CCVD	675	176 (26.2)	622	156 (25.1)	619	161 (26.0)	562	198 (35.2)	463	195 (42.1)
Mental disorder	135	45 (33.3)	150	46 (30.7)	169	70 (41.4)	186	104 (55.9)	130	99 (76.2)
Suicide	45	13 (35.2)	42	6 (14.3)	49	10 (20.4)	59	29 (49.2)	32 <sup>a</sup>	22 (68.8)

Abbreviations: A, approval cases; C, claimed cases; CCVD, cerebro-cardio vascular disease; N, number.

<sup>a</sup>This number and percent were collected in August 2018.

Source: Korea Workers Compensation & Welfare Service.

in 2013-2016. This indicates that cases of overwork-related CCVDs were not 100% recognized even in cases where the average working hour per week was more than 60 hours, and this result also means that the CCVD cases claimed by workers with an average weekly working time of 52-60 hours per week were less likely to be recognized as occupational diseases. After the recognition criteria for CCVD changed in 2018, 88.4% of CCVD were approved for compensation when the AWWH was more than 60 hours.

## 5 | POLICY ISSUES AND CHALLENGES FOR WORKERS' COMPENSATION

### 5.1 | Mental disorders

The occupational disease standard on Schedule 3 only provided physical, chemical, and biological risk factors and related diseases. Post-traumatic stress disorder (PTSD) was the first mental disorder to be added to the schedule. In 2016, the Ministry of Employment and Labor (MOEL) amended the Enforcement Decree IACI Act and added depressive episodes or adjustment disorders due to third-party workplace violence or stress directly related to work. Unlike CCVDs, there are no regulations providing detailed recognition criteria for mental disorders. The COMWEL guide to investigation and decision for work-related mental disorders or suicide also do not provide quantitative criteria.

### 5.2 | Cerebro-cardiovascular disease

The Korean occupational disease recognition standard has determined that CCVDs caused by acute, subacute, and chronic overwork should be recognized as an occupational disease; this is similar to the standard in Japan and Taiwan. However, precise quantitative criteria for CCVDs are not provided in Schedule 3. Accurate quantitative standards were to be created by the MOEL, and this notification about recognition criteria were amended in December 2017.<sup>18</sup> Regarding working hour criteria, weekly average

working hours that exceeded 60 hours during the 12-week period prior to disease occurrence (or 64 hours on average for 4 weeks prior to the disease occurrence) is an absolute recognition criterion for compensation of CCVD cases. New criteria for CCVD cases made by workers with weekly average working hours between 52 and 60 were newly introduced in December 2017. According to these criteria, if claimed cases involved both one workload risk factor and long working hours (more than 52 hours per week), the case could be recognized as an occupational disease. The following seven are statutory workload risk factors to consider: unpredictable work schedule, shift work, lack of

**TABLE 4** List of main stressful events related to suicide in IACI data (2016-2017) (n = 103)

Stressful events	Claimed	Approved	Percent
Most frequent events (more than 10 claimed cases)			
Conflict with supervisor	24	14	58.3
Relocation	14	8	57.1
Change of pace or activity	13	7	53.8
Change or job contents or workload	12	5	41.7
Usually approved events that are not frequently claimed			
Workplace harassment, mobbing, violence	8	8	100.0
In charge of new business or company reconstruction	4	4	100.0
Retirement pressure	4	4	100.0
Losing promotion	2	2	100.0
Complaints from client	5	4	80.0
Experiencing or witnessing a severe accident or fire	4	3	75.0
Change in work arrangements or shift	4	3	75.0
Sexual harassment	6	4	66.7

Abbreviation: IACI, Industrial Accident Compensation Insurance.



holidays, risky working environment (cold, temperature change, noise), heavy physical workload, frequent business trip with large time zone differences, and high psychological tension. The Korean government also provided criteria for the cases where the weekly average working hours do not exceed 52 hours for 12-week, which state that cases that have exposure to multiple workload factors can be approved as occupational disease. Another important change was that, in the case of night work between 10:00 PM and 6:00 AM, 30% of daily working hours is added to calculate the average weekly working hours, with the exception of those employed in monitoring or intermittent work. For example, if an employee worked four hours between 10:00 PM and 6:00 AM, the working time of 5.8 hours would be used to calculate the average working hours per week (Table S1).

## 6 | POLICY ISSUES AND CHALLENGES TO PREVENT OVERWORK-RELATED DISORDERS

Implementation of policies for the prevention of overwork-related disorders is relatively slow, while policies for compensation are rapidly changing. Fundamental working condition changes as well as occupational health approaches are important because the traditional occupational health approach has many limitations such as labor market changes or increased job insecurity. In recent years, deaths due to CCVDs and suicide have attracted attention in Korea, as these deaths occur not only in the

**TABLE 5** Approval rate of cerebro-cardio vascular diseases by diagnosis from February 2013 to June 2016

	Claimed	Approved Case (%)
Diagnosis		
Intracerebral hemorrhage	1,358	382 (28.1)
Subarachnoid hemorrhage	839	252 (30.0)
Cerebral infarction	1,222	252 (20.6)
Other brain disease	70	18 (25.7)
Myocardial infarction	792	235 (29.7)
Aortic dissection	87	21 (24.1)
Cardiac arrest	497	135 (27.2)
Average weekly working hours during the 12 weeks prior to diagnosis		
<40	1609	210 (13.1)
40-51.9	1513	218 (14.4)
52-59.9	913	298 (32.6)
>60	863	576 (66.7)
Total	4,898	1,302 (26.6)

elderly but also in young workers employed in a wide variety of industries: youth who develop games, female public officers who were reinstated after parental leave, IT workers of one-line game development companies, and student interns who worked as call center counselors.<sup>19</sup>

In response, the National Assembly passed legislation to shorten working hours in February 2018, with the revised law to be applied on an annual basis depending on the size of the workplace.<sup>20</sup> The main changes of this revision to the Labor Standard Act are as follows. The working hours under the revision comprise 40 hours per week and up to 12 hours for overtime work. Under the current rule, a worker can be expected to labor for a maximum of 68 hours per week, including up to 16 hours on the weekend. This new rule was applied to companies with 300 or more workers on July 1, 2018; firms with 50-299 workers and companies with 5-49 workers will be subject to the new rule starting January 1, 2020, and July 1, 2021, respectively. The number of business types that are exempt from the working hour limits will be curtailed from the previous 26 to only 5, which involve transportation services and health care. Statutory paid holidays currently given to employees of the government and public institutions will be applied to private companies (under the previous law, only Sundays and Labor Day were paid holidays).<sup>21</sup>

## 7 | DISCUSSION

We reviewed the recent situation and conditions of overwork-related diseases in Korea, including CCVD, mental disorders, and suicide. Increasing mortality due to CCVD or suicide has resulted in increasing public concern regarding working hours, and there have subsequently been important policy changes, such as changes to compensation criteria for CCVD cases and working hour regulations.

Although weekly working hours and the proportion of long working days have decreased, workers in small companies with fewer than five employees and workers in the service sector continue to work long hours. The age standardized mortality due to CCVD and suicide was highest among those with managerial roles. In total, 589 CCVD cases and 104 mental disorder or suicide cases were compensated as occupational disease by IACI in 2017. The Korean government has introduced various policies to reduce working hours and to increase compensation approval rate for overwork-related CCVDs.

However, in Korea, the legal working hours regulation in the Labor Standard Act does not apply to businesses with fewer than five employees. As a result, there are no regulations on working hours for these small businesses. Furthermore, the Occupational Safety and Health Act has no specific instructions for employer obligations regarding

prevention of overwork-related health problems, physical fatigue, or mental stress. Suicide-related issues are usually dealt with by the Ministry of Health and Welfare, and other issues related with working condition are dealt with by the MOEL. This means that comprehensive approaches across departments for the promotion of mental health is currently very difficult, and overwork focused policy may be ignored. Because of this, some stakeholders, such as labor unions or non-governmental organizations for occupational health, have called for the introduction of special laws to prevent overwork-related disorders and to emphasize the general role of the government to cover workers who have not yet been protected by working time regulations or the occupational health system, as has been done in Japan. This demand is based on the perception that the problem of overwork-related death is closely related to labor rights, working conditions, and the working culture in Korea. As workers with long working hours who are self-employed or working in small companies have little protection from the Labor Standard Act or Occupational Safety and Health Act, an independent law specifying the role of government and supporting changes in organizational culture is needed.

Other stakeholders also ask the government to expand its obligation to appoint health managers to other service industries and small- and medium-sized companies, which is currently primarily focused on manufacturing and construction companies of relatively large size. A few non-government organizations have also argued that because the LSA is not applicable to workplaces with fewer than five employees, other policies, including community-based approaches, for these small-sized companies are necessary. Finally, the policies to prevent over-work related death should include primary prevention policies for reducing risk factors such as long working hours and job stress, or secondary prevention policies for preventing CCVDs or suicide and improving mental health.

In conclusion, the issues of prevention and compensation for overwork-related disorders or death have been addressed in part with prevention and compensation policies that have improved working condition in Korea. Many have realized that working conditions, such as long working hours, is a very important factor in the health of workers. Preventing overwork-related disorders may be a long-term task because policy priorities may fall behind in Korean society where the social welfare system is poor, and polarization is severe. We have a duty to continue to study the problem and continue discussions with various stakeholders to prevent overwork-related disorder and death in Korea.

## DISCLOSURE

*Approval of the research protocol:* N/A. *Informed consent:* N/A. *Registry and the registration no. of the study/trial:* N/A. *Animal studies:* N/A. *Conflict of interest:* N/A.

## AUTHOR CONTRIBUTIONS

Inah Kim conceptualized the study and led the wiring of the manuscript. Min Ji Koo performed statistical analysis for the study. Hye-Eun Lee and Young Lim Won participated in data collection and writing of the manuscript. Jaechul Song contributed critical revision for manuscript.

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## REFERENCES

1. Organisation for Economic Co-operation and Development. *Hours worked (indicator)*. Paris: Organisation for Economic Co-operation and Development; 2018. <https://data.oecd.org/emp/hours-worked.htm>. Accessed October 29, 2018.
2. Organisation for Economic Co-operation and Development. *Suicide rate (indicator)*. Paris: Organisation for Economic Co-operation and Development; 2018. <https://data.oecd.org/healthstat/suicide-rates.htm>. Accessed October 29, 2018.
3. Kim BJ, Lee SH, Ryu WS, et al. Excessive work and risk of haemorrhagic stroke: a nationwide case-control study. *Int J Stroke*. 2013;8(Suppl. A100):56-61.
4. Jeong I, Rhie J, Kim I, et al. Working hours and cardiovascular disease in Korean workers: a case-control study. *J Occup Health*. 2014;55:385-391.
5. Jang TW, Kim HR, Lee HE, et al. Overwork and cerebrocardiovascular disease in Korean adult workers. *J Occup Health*. 2015;57:51-57.
6. Shin KS, Chung YK, Kwon YJ, Son JS, Lee SH. The effect of long working hours on cerebrovascular and cardiovascular disease; a case-crossover study. *Am J Ind Med*. 2017;60:753-761.
7. Kim I, Kim H, Lim S, et al. Working hours and depressive symptomatology among full-time employees: results from the fourth Korean National Health and Nutrition Examination Survey (2007–2009). *Scand J Work Environ Health*. 2013;39:515-520.
8. Lee KH, Kim JE, Kim YK, et al. Long working hours and emotional well-being in Korean manufacturing industry employees. *Ann Occup Environ Med*. 2013;25:38.
9. Kim W, Park EC, Lee TH, Kim TH. Effect of working hours and precarious employment on depressive symptoms in South Korean employees: a longitudinal study. *Occup Environ Med*. 2016;73:816-822.
10. Seo HJ. Development of a tailored analysis system for Korean working conditions survey. *Saf Health Work*. 2016;7:201-207.
11. Park J, Kim Y, Han B. Long working hours in Korea: based on the 2014 Korean Working Conditions Survey. *Saf Health Work*. 2017;8:343-346.
12. Statistics Korea. *Cause of Death Statistics in 2017*. Daejeon, South Korea: Statistics Korea; 2017. <http://kostat.go.kr/portal/eng/press-Releases/8/1/index.board>. Accessed November 5, 2018.
13. Kwon SC, Kim HR, Kwon YJ. The administrative process for recognition and compensation for occupational diseases in Korea. *J Korean Med Sci*. 2014;29:S3-S11.



14. Kang DM, Kim I. Compensation for occupational neurological and mental disorders. *J Korean Med Sci.* 2014;29:S59-S65.
15. Won JU, Kim I. Compensation for work-related cerebrocardiovascular diseases. *J Korean Med Sci.* 2014;29:S12-S17.
16. Lee J, Kim I, Roh S. Descriptive study of claims for occupational mental disorders or suicide. *Ann Occup Environ Med.* 2016;28:61.
17. Kim I. [자살의 업무관련성 판단과 쟁점] (The current situation for recognition of suicide). The Korean Society of Occupational and Environmental Medicine. <http://www.ksoem.or.kr/?r=conference201802&c=188&idx=498>. Accessed November 12, 2018.
18. Ministry of Employment and Labor. [뇌혈관질환또는심장질환및근골격계질환의업무상질병인정여부결정에필요한사항] (Notification for recognition of cerebro-cardiovascular disease and work-related musculoskeletal disease). [http://www.moel.go.kr/info/lawinfo/instruction/view.do?bbs\\_seq=20171200411](http://www.moel.go.kr/info/lawinfo/instruction/view.do?bbs_seq=20171200411). Accessed November 5, 2018.
19. Labor Today. Workers are dying due to overwork. <http://www.labortoday.co.kr/news/articleView.html?idxno=146856>. Updated September 13, 2017. Accessed November 5, 2018.
20. National Assembly Republic of Korea. [Summary] Amendment to the Labor Standards Act. [http://korea.assembly.go.kr/res/tra\\_list.jsp](http://korea.assembly.go.kr/res/tra_list.jsp). Accessed November 5, 2018.
21. Lee SH, Kim W. Changes to Labour Standards Act: National Assembly passes new bill to curb working hours. International Law Office. <https://www.internationallawoffice.com/Newsletters/Employment-Benefits/South-Korea/Lee-Ko/Changes-to-Labour-Standards-Act-National-Assembly-passes-new-bill-to-curb-working-hours#> Updated March 21, 2018. Accessed November 5, 2018.

## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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