

## Brief Communication



# Working hours and the regulations for night shift workers



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### Competing interests

The author declares that they have no  
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## ABSTRACT

There are several types of shift work in Korea: rotating shift, 24-hour shift, day-night shift, fixed night work, and so on. As a result of analyzing the 8th Korea National Health and Nutrition Examination Survey and the 6th Korean Working Condition Survey, Korean shift workers accounted for 11.6%–13.9% of wage workers. Weekly working hours of shift workers were  $57.69 \pm 1.73$  (24-hours shift) and  $49.97 \pm 0.67$  (fixed night shift), which were significantly longer than day workers. To prevent health consequences of night work, many countries regulate the working hours of night work not to exceed 7–9 hours a day. However, Korea does not regulate working hours for night work, and some occupations may work more hours than the prescribed overtime hours. To prevent health consequences and reduce working hours for Korean night shift workers, it is necessary to regulate the working hours of night shift workers by law.

**Keywords:** Night work; Regulations; Shift work; Working hours

In modern society, many people perform night work for public safety and health services or for economic reasons. When an individual works at night, the circadian rhythm is disrupted, which increases the risk of fatigue, accidents, sleep disturbances, cardiovascular disease, depression, gastrointestinal disorders, and various cancers.<sup>1-5</sup>

Korea had the second longest annual working hours among OECD countries in 2008: Korea's annual working hours were 2,228 hours, 440 hours longer than the OECD average (1,788 hours). Since then, Korea's working hours continued to decrease, but in 2021, annual working hours were 1,915 hours, still 199 hours longer than the OECD average (1,716 hours).<sup>6</sup> Korean workers work long hours even at night: some work 24 hours a day including night work, and some work from 6:00 p.m. to 9:00 a.m. the next morning. The long working hours of night workers is one of the factors that increase working hours in Korea.

This paper reviewed the situation of the night shift work and working hours in Korea and the regulations of night shift work in various countries.

There are various types of shift work in Korea: rotating shift, 24-hour shift, day-night shift, fixed night work, and so on. The details of each shift work are described.

Many manufacturing plant workers and hospital nurses practice rotating shifts. They perform three rotating shifts (morning, evening, and night shift) with four or five teams, and usually work about 6 night shifts a month. Their working hours of night shift is usually 8 hours a day, which is not longer than the legal working hours, but in some manufacturing industries or hospitals, night shift hours are as long as 10 hours.

Twenty-four-hour shift is a type of shift in which two or three teams work alternately for 24 hours. Security guards or security workers in apartments or buildings usually perform this type of shift work. They work 24 hours a day and take one or two off-duty days. They are given 4–6 hours for sleep during night on duty, but when an unusual situation occurs, they have to wake up to deal with it. The weekly working hours are 84 hours (56 hours considering sleep and rest time as 8 hours a day, which is still long).

Some manufacturing workers, taxi drivers, and hospital caregivers perform day-night shift work. They work either a 12-hour day shift and a 12-hour night shift, or an 8–9 hour day shift and a 15–16 hour night shift. For example, care workers in the hospital work two day shifts, two night shifts, and two days off: the day shift is from 8:00 a.m. to 6:00 p.m., and the night shift is from 6:00 p.m. to 8:00 a.m. the next day. The weekly working hours are 56–60 hours (49–55 hours considering rest time).

Some workplaces, including hospitals, have workers dedicated to night shifts only. In these workplaces, full-time workers alternate night shifts every few months, or temporary workers perform fixed night shifts to reduce night work of regular workers. Fixed night workers usually work 15 days a month, from 5:00 p.m. to 8:00 a.m. the next day. The working hours of them are 15 hours a day and 52.5 hours a week.

Public officers who need shift work, such as police officers, firefighters, and correctional officers, are divided into 3 or 4 groups to perform shift work. Police officers usually work a day shift, a night shift, and two off-duty days. Firefighters perform shift work with 3 groups with 3-, 6-, 9-, or 21-day cycles.<sup>7</sup> Correctional officers work in a 4-cycle shift: a day shift, a night shift, an off-duty day, and an off-duty or day shift (the 4th day is day shift or off-duty day alternatively). The working hours are 8 hours of day shift and 15 hours of night shift, and weekly working hours are 40.3–56 hours. However, in case of an emergency, the actual working hours are longer, as they may work even on off-duty day.

There are many types of other shift work in Korea. Social workers in social welfare facility perform 4 times of 24-hour shifts a month, and residents in hospitals usually perform 1 or 2 times of night shifts a week. Also, many bus drivers work from morning until 12:00 or 1:00 a.m., and some bus drivers work at night.

To identify the working hours of shift workers, Korea's national survey data were analyzed using SAS windows version 9.4 (SAS Institute, Inc., Cary, NC, USA). Data were derived from the 8th Korea National Health and Nutrition Examination Survey (KNHANES) conducted in 2019–2021 and the 6th Korean Working Condition Survey (KWCS) conducted in 2020–2021.<sup>8,9</sup> For each data, the weekly working hours of all wage workers, day workers, and shift workers were analyzed considering the weights of each participant. The type of shift work

was classified into rotating shift, 24-hour shift, fixed night shift, and others including irregular and split shift. In order to exclude short-term workers, those who worked less than 20 hours per week were excluded from the analysis.

Weekly working hours of shift workers were significantly longer than day workers ( $p < 0.001$ ). Among the type of shift work, weekly working hours of 24-hours shift and fixed night shift were longest in KNHANES and KWCS, respectively ( $p < 0.001$ ). These results confirm Korean shift workers have been working long hours, compared with day workers (Table 1).

In many countries, the law stipulates statutory working hours. Most countries stipulate 8 hours a day and 40 hours a week as normal working hours. However, statutory limit on maximum working hours is longer than this because overtime hours are separately stipulated.<sup>10</sup> Many countries, except Europe, do not regulate the working hours of night shift work by law. However, in Europe and some countries, the working hours of night shift work are strictly regulated by law. The European Union recommends that normal hours of work for night workers do not exceed an average of 8 hours in any 24-hour period, and night workers with special hazards or heavy physical or mental strain should not work more than 8 hours in any period of 24 hours (directive 2003/88/EC).<sup>11</sup>

Table 2 shows the countries that regulate the working hours of night shift work by law. Most of countries are in Europe, a few in the Middle East, Americas and Africa, but none in Asia. The limit working hours of night work is different among countries. These countries limit the working hours per day or week for the night shift workers. In some cases, it may exceed the limit, but it is stipulated that it cannot exceed an average of 7–9 hours a day calculated over a certain period.<sup>12,13</sup>

According to the Labor Standard Law in Korea, work hours shall not exceed 8 hours a day and 40 hours a week and may be extended by up to 12 hours per week where an agreement is made between the parties. There are no restrictions on the working hours of night shift workers and some exceptions on working hours restriction: employers in the transportation services and health care services may work overtime in excess of 12 hours a week, and the working hours restriction does not apply to employees engaged in surveillance or intermittent work.<sup>14</sup> As mentioned above, since there is no working hours restriction for night shift workers in Korea, many night shift workers are working long hours. In addition, many elderly workers over the age of 60 engaged in security surveillance work in apartments or buildings work over 12 hours or 24 hours a day because the working hours restriction does not apply to surveillance or intermittent work.

**Table 1.** Weekly working hours of shift workers in Korea

Variables	8th KNHANES <sup>a</sup>		6th KWCS <sup>b</sup>	
	No. (%)	Mean ± SE	No. (%)	Mean ± SE
Day workers	2,290 (86.1)	42.83 ± 0.56	22,451 (88.4)	42.50 ± 0.06
Shift workers	369 (13.9)	43.08 ± 0.78	2,935 (11.6)	46.25 ± 0.27
Rotating shift	94 (3.5)	45.37 ± 0.98	581 (2.3)	45.50 ± 0.54
24-hours shift	39 (1.1)	57.69 ± 1.73		
Fixed night shift <sup>c</sup>			790 (3.1)	50.11 ± 0.67
Others <sup>d</sup>	241 (9.1)	40.59 ± 1.00	1,564 (5.9)	44.81 ± 0.36

The data are shown as frequency (%) or mean ± SE.

SE: standard error.

<sup>a</sup>Korea National Health and Nutrition Examination Survey (2019–2021); <sup>b</sup>Korean Working Conditions Survey (2020–2021); <sup>c</sup>Including 24-hour shift; <sup>d</sup>Irregular, split shift, and so on.

**Table 2.** Working hours regulations of night workers in various countries

Continent	Country	Definition of night work	Maximum length of night work
Europe	Aruba	work ≥ 4 hours between 12 a.m. and 6 a.m.	8 hours a day
	Bulgaria	work ≥ 3 hours between 10 p.m. and 6 a.m.	7 hours a day, 35 hours a week
	Croatia	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 4 months)
	Czech Republic	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 26 weeks)
	Denmark	work ≥ 3 hours between 10 p.m. and 5 a.m.	8 hours a day (average in 4 months)
	Finland	work ≥ 3 hours between 11 p.m. and 6 a.m.	8 hours a day (in case of dangerous work)
	France	work ≥ 3 hours between 9 p.m. and 7 a.m.	8 hours a day, 40 hours a week (average in 12 weeks)
	Germany	work ≥ 2 hours between 11 p.m. and 6 a.m.	8 hours a day (average 4 weeks)
	Greece	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day
	Hungary	work between 10 p.m. and 6 a.m.	8 hours a day
	Ireland	work ≥ 3 hours between 12 a.m. and 7 a.m.	8 hours a day (average in 2 months)
	Italy	work ≥ 3 hours between 12 a.m. and 5 a.m.	8 hours a day
	Liechtenstein	work between 11 p.m. and 6 a.m.	8 hours a day (average in 1 year, maximum 12 hours)
	Lithuania	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 1 month)
	Luxembourg	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 7 days)
	Netherlands	work > 1 hours between 12 a.m. and 6 a.m.	10 hours a day, 40 hours a week (average in 16 weeks)
	Norway	work ≥ 3 hours between 9 p.m. and 6 a.m.	8 hours a day (average in 4 weeks)
	Portugal	work ≥ 3 hours between 10 p.m. and 7 a.m.	8 hours a day
	Romania	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 3 months)
	Slovenia	work ≥ 3 hours between 11 p.m. and 6 a.m.	8 hours a day (average in 4 months)
Spain	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 15 days)	
Sweden	work ≥ 3 hours between 10 p.m. and 6 a.m.	8 hours a day (average in 4 months)	
Switzerland	work between 11 p.m. and 6 a.m.	9 hours a day	
United Kingdom	work ≥ 3 hours between 11 p.m. and 6 a.m.	8 hours a day (average in 17 weeks)	
Meddle East	Israel	work ≥ 2 hours between 10 p.m. and 6 a.m.	7 hours a day, 58 hours a week
North America	Mexico	work between 8 p.m. and 6 a.m.	7 hours a day, 42 hours a week
South America	Argentina	work between 9 p.m. and 6 a.m.	7 hours a day
	Venezuela	work between 7 p.m. and 5 a.m.	7 hours a day, 35 hours a week
Central America	Costa-rica	work between 7 p.m. and 5 a.m.	6 hours a day, 36 hours a week
	Guatemala	work between 6 p.m. and 6 a.m.	6 hours a day, 36 hours a week
	Honduras	work ≥ 3 hours between 7 p.m. and 5 a.m.	6 hours a day, 36 hours a week
	Panama	work between 6 p.m. and 6 a.m.	7 hours a day, 42 hours a week
Africa	Angola	work ≥ 3 hours between 8 p.m. and 6 a.m.	10 hours a day
	Kenya	(not defined)	60 hours a week, 144 hours in 2 weeks

Korean version of this article is available with the Online-only Data Supplement (Download PDF).

Night shift work causes disturbances in the circadian rhythm and increase the risk of many health consequences. To prevent health consequences caused by night shift work, many countries regulate the working hours of night work. However, Korea does not regulate working hours for night work, and some occupations may work more hours than the prescribed overtime hours. When workers are exposed to shiftwork and long working hours, adverse health outcomes of shiftwork can be intensified by long working hours. Considering the adverse effect of combined exposures of shift work and long working hours, more strict regulation on long working hours should be needed for shift workers. Therefore, to prevent health consequences and reduce night working hours for Korean night shift workers, it is necessary to regulate the working hours of night shift workers.

## SUPPLEMENTARY MATERIAL

### Supplementary Data 1

Korean version paper

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