

## Data Profile



## OPEN ACCESS

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### Abbreviations

COVID-19: coronavirus disease 2019;  
Eurofound: European Foundation for  
the Improvement of Living and Working  
Conditions; EWCS: European Working  
Conditions Survey; KWCS: Korean Working  
Conditions Survey; OSHRI: Occupational  
Safety and Health Research Institute.

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# Data resource profile: the Korean Working Conditions Survey (KWCS)

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## ABSTRACT

The Korean Working Conditions Survey (KWCS) is a state-approved statistical survey that has been conducted by the Occupational Safety and Health Research Institute (OSHRI) every 3 years since 2006 to monitor changes in the working conditions of Koreans. This cross-sectional national survey involves a sample of 50,000 employed people aged 15 or older. KWCS measures various working conditions through > 130 survey questions, including questions regarding working hours, labor intensity, work-life balance, degree of exposure to risk factors, and subjective health status. Professional survey interviewers visit households and conduct face to face interviews. KWCS provides data and statistics for occupational safety and health polices and research in Korea. Furthermore, OSHRI holds academic conferences every year, awards high-quality academic papers, and supports researchers using data. Microdata is publicly available through the OSHRI website (<https://oshri.kosha.or.kr>).

**Keywords:** Working conditons; Occupational health; Employment; Workplace; Quality of life

## BACKGROUND

The Korean Working Conditions Survey (KWCS) is a cross-sectional survey used to monitors the various working conditions affecting Koreans' occupational safety and health for employed persons aged 15 and older, including the self-employed individuals, living throughout the Republic of Korea. It aims to collect data for occupational safety and health policies and research. The survey's main objectives are to measure the working conditions in Korea, analyze relationships between different aspects of working conditions, identify groups at risk, and monitor trends over time.

In Korea, the industrial incidence rate, which is the number of workers who suffer an occupational injury or disease per 100 workers in a year, has been continuously decreasing, from 4% in the 1970s to < 1% since 1995; however, since 2003, occupational diseases caused by the working conditions, such as musculoskeletal disorders, have emerged as a social problem.<sup>1</sup> Thus, there is an increased need for data on employees' complex working conditions such as psychosocial factors, ergonomic factors, and work-life balance, in addition to mechanical, physical, and chemical risk factors. In response, the Occupational

Accidents Prevention Fund of the Ministry of Employment and Labor.

#### Disclosure

There are no financial or other issues that might lead to conflict of interest.

Safety and Health Research Institute (OSHRI), an organization affiliated with the Ministry of Employment and Labor, launched the first KWCS in 2006 by benchmarking the European Working Conditions Survey (EWCS) of the European Foundation for the Improvement of Living and Working Conditions (Eurofound), an agency of the European Union.<sup>2</sup> KWCS is currently conducted every 3 years and six surveys have been completed so far. The seventh survey is underway in 2023. The survey is conducted by trained interviewers who visit households and conduct face-to-face interviews with one employed person per household. In addition, KWCS has been approved by Statistics Korea since the first survey, ensuring the reliability of the data.

#### Ethics statement

KWCS is a government-approved statistical survey that is not subject to Institutional Review Board review because its primary purpose is to create administrative data, not research data.

## DATA RESOURCE AREA AND POPULATION COVERAGE

The target population of KWCS is employed persons aged 15 years or older residing in Korea. The survey population comprises employed persons aged 15 years or older living in households in the apartment and general survey districts, using the data of The Population and Housing Census, a national household survey conducted by Statistics Korea, as the sampling frame. KWCS defines “employed person” as a person who has worked for at least 1 hour for income in the past week at the time of the survey.

The KWCS sample is designed using secondary probability proportion-stratified cluster sample surveys. The primary sampling unit considered from the sample distribution applicable as a survey unit is the enumeration district, the second sampling unit is the household, and the final sampling unit is the working household members.

The sample design first stratifies and allocates samples (survey districts), stratifying the country into 17 metropolitan administrative regions, and then divides the provinces into sub-regional units. For a sample size of 50,000 people, 10 households per survey district are surveyed in 5,000 survey districts. To ensure that the sample sizes of each of the 17 provinces can produce statistics with precision, 150 survey districts are allocated at first; remaining survey districts are then proportionally allocated based on the size of the survey districts and the type of housing in each region. And in the case of Sejong City, 40 survey districts are prioritized to ensure a minimum valid sample. The results of the survey district allocation for the third KWCS in 2020 are shown in **Table 1**.<sup>3</sup>

A sample of 10 households is extracted from each survey district using systematic sampling. The survey unit is one person per household. A professional survey interviewer identifies eligible respondents after evaluating the list of household members. If there are two or more eligible respondents, one is randomly selected by Tablet PC-Assisted Personal Interviewing. The limit of maximum permission error for the estimation of population proportion was approximately 0.5%p at a 95% confidence level.<sup>4</sup>

Weighted values for KWCS were obtained through an adjustment step using design weights and information on the population. The design weight was calculated as the reciprocal of the household sampling rate by stratum. Weight adjustment, using population information,

**Table 1.** Details of enumeration districts in each strata (sixth Korean Working Conditions Survey)

Administrative district	Allocated number		Sampling rate (enumeration district)
	Enumeration district	Household	
Whole country	5,000	50,000	0.0136
Seoul	906	9,060	0.0132
Busan	336	3,360	0.0132
Daegu	222	2,220	0.0131
Incheon	257	2,570	0.0132
Gwangju	150	1,500	0.0147
Daejeon	150	1,500	0.0143
Ulsan	150	1,500	0.0186
Sejong	40	400	0.0177
Gyeonggi	1,121	11,210	0.0132
Gangwon	160	1,600	0.0132
Chungbuk	160	1,600	0.0132
Chungnam	215	2,150	0.0132
Jeonbuk	184	1,840	0.0132
Jeonnam	187	1,870	0.0132
Gyeongbuk	283	2,830	0.0132
Gyeongnam	329	3,290	0.0132
Jeju	150	1,500	0.03

matches the population and sample structures and increases the accuracy of estimation. Using the results of Korea’s representative employment statistics survey, the “Economically Active Population Survey” conducted by Statistics Korea as auxiliary information for the population, the weights are adjusted by applying the raking ratio method for the number of employed persons by gender, age group, industry classification, and employment status.<sup>3</sup>

The number of respondents is shown in **Table 2**.

## SURVEY FREQUENCY AND RESPONSE RATE

KWCS conducted its first survey in 2006 and then in 2010, 2011, 2014, 2017, and 2020. The sixth survey has been completed, followed by the seventh survey in 2023. When the first survey was conducted in 2006, the survey cycle was planned to be conducted every 4 years with a sample size of 10,000; however, after the second survey in 2010, the cycle was shortened to 1 year because the results were deemed to be highly useful. As the need for microlevel research on various groups considering occupation and industry increased, the sample size has been enlarged to 50,000 since the third survey in 2011, while a 3-year cycle

**Table 2.** Characteristics of Korean Working Conditions Survey respondents

Variables	1st (2006)		2nd (2010)		3rd (2011)		4th (2014)		5th (2017)		6th (2020)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sex												
Male	6,393	63.7	5,440	54.3	29,069	58.1	28,943	57.9	28,679	57.1	28,898	57.2
Female	3,650	36.3	4,579	45.7	20,964	41.9	21,064	42.1	21,526	42.9	21,640	42.8
Age												
15–19	36	0.4	132	1.3	313	0.6	486	1.0	417	0.8	314	0.6
20–29	1,322	13.2	1,012	10.1	5,572	11.1	6,876	13.7	7,002	13.9	6,776	13.4
30–39	3,102	30.9	2,403	24.0	12,859	25.7	11,095	22.2	10,578	21.1	9,843	19.5
40–49	3,157	31.4	3,038	30.3	14,653	29.3	13,035	26.1	12,323	24.5	11,817	23.4
50–59	1,790	17.8	2,006	20.0	10,049	20.1	11,422	22.8	11,704	23.3	11,882	23.5
60+	636	6.3	1,428	14.3	658	13.2	7,093	14.2	8,182	16.3	9,906	19.6
Total	10,043	100.0	10,019	100.0	50,038	100.0	50,007	100.0	50,205	100.0	50,538	100.0

**Table 3.** History of KWCS

Variables	1st KWCS	2nd KWCS	3rd KWCS	4th KWCS	5th KWCS	6th KWCS
Conducted year	2006	2010	2011	2014	2017	2020
Survey cycle	4 years	1 years	3 years	3 years	3 years	3 years
Number of surveys enumeration district	1,000	1,000	5,000	5,000	5,000	5,000
Sample size	10,000	10,000	50,000	50,000	50,000	50,000
Fieldwork period	Jun 2006– Sep 2006	Jun 2010– Oct 2010	Jun 2011– Nov 2011	Jun 2014– Aug 2014	Jul 2017– Sep 2017	Oct 2020– Apr 2021

KWCS: Korean Working Conditions Survey.

**Table 4.** The response rate, cooperation rate, refusal rate, and contact rate of KWCS

Variables	KWCS						EWCS		
	2020	2017	2014	2011	2010	2006	2015	2010	2005
Response rate	0.349	0.449	0.330	0.354	0.355	0.349	0.425	0.442	0.47
Cooperation rate	0.598	0.640	0.699	0.662	0.616	0.590	0.676	0.596	0.66
Refusal rate	0.235	0.253	0.142	0.180	0.221	0.242	0.204	0.299	0.24
Contact rate	0.590	0.721	0.494	0.566	0.600	0.592	0.655	0.763	0.77

Values are presented as percentage. Each of the above rates is calculated according to American Association for Public Opinion Research standard definitions for response rate 3, cooperation rate 3, refusal rate 2, and contact rate 2.

KWCS: Korean Working Conditions Survey; EWCS: European Working Conditions Survey.

was deemed appropriate for identifying trends in the working conditions due to the burden on the budget, so it was changed to a 3-year cycle, and to date, the survey has been conducted on a 3-year cycle for 50,000 people. The fieldwork period takes approximately 3–4 months, beginning in June or July of the year and completed in October or November. However, for the sixth survey in October 2020, due to the coronavirus disease 2019 (COVID-19) pandemic, the fieldwork period took approximately 7 months to complete, including a three-month break, and ended in April 2021 (Table 3).

The response, cooperation, refusal, and contact rates of KWCS are shown in Table 4, along with the response rate of EWCS for reference.<sup>4</sup> In the case of the sixth KWCS, the response rate was 0.349, cooperation rate was 0.598, refusal rate was 0.235, and contact rate was 0.590, which were lower than the results of the previous survey due to the COVID-19 pandemic. These rates are calculated by applying the response rate 3, cooperation rate 3, refusal rate 2, and contact rate 2 formulas recommended by the American Association for Public Opinion Research standard definitions.

## MEASURES

KWCS comprised over 130 questions on employee characteristics such as gender, age, occupation, and employment status; working environment such as weekly working hour, degree of exposure to risk factors, shift work pattern; and health status and satisfaction with working conditions. The contents of KWCS are listed in Table 5.

The survey interviewer is required to pass the test after undergoing the training programs, such as role-playing practical training. To increase the possibility of contact with the respondents, the sample households were visited at least four times, varying by day (weekdays and weekends) and time (morning and afternoon). OSHRI has managed the survey and data processing processes during the survey through external expert institutions such as the Korean Statistical Society for reliable statistical quality.<sup>4</sup>

**Table 5.** Survey contents of sixth Korean Working Conditions Survey

Survey contents	Main content
Characteristics of employed persons	
Household status	Number of household members, Household members, etc.
Status of field of work	Occupation, industry, Employment status (self-employed, employee, etc.), Employment type (regular, temporary), Type of working hours (full-time, part-time), Size of the working place, Period of employment, Proportion of women in the workplace, etc.
Respondents' information	Gender, Age, Nationality, Educational background, Average monthly income, Degree of balance between income and expenditure, etc.
Working conditions	
Working hours	Working days per week, Working hours per week, Desired working hours per week, Average number of nights, weekends, and overtime days of exceeding 10 hours per month, etc.
Work environment	Degree of exposure to vibration, noise, high temperatures, low temperatures, organic solvents, chemicals, postures that cause pain, and handling heavy loads, etc., Customer interactions, Main place of work (workplace, home, etc.), Use of personal protective equipment, and provision of health and safety information, etc.
Job features	Labor intensity (fast pace, strict deadline), Presence of repetitive work, Factors determining work speed, Job autonomy, Job stress, Degree of emotional labor, Shift work pattern, Flexibility of working hours, Work-life balance, etc.
Organizational environment	Social support from superiors and colleague, Teamwork, Job autonomy, Fair distribution of work, Trust between management and employees, Cooperation between colleagues, etc.
Education/Training	Skill level, Presence of education or training, Job prospects after education or training, etc.
Violence/Discrimination	Experience of discrimination based on age, ethnic background, race, sex, religion, educational background, etc., Experience of verbal abuse, unwanted sexual attention, threats, etc.
Health status and satisfaction	
Health status	Subjective health status, Presence of chronic diseases, Health problems (backache, upper/lower limb muscular pains, headaches, anxiety, overall fatigue), Insomnia, Presenteeism, WHO-5 well-being index, etc.
Satisfaction with working conditions	Job continuity, satisfaction with working conditions, etc.

WHO-5: World Health Organisation-Five Well-Being Index.

## DATA RESOURCE USE

KWCS data are widely used by government organization and researchers. When the Ministry of Employment and Labor established a new law to protect emotional laborers in 2018, KWCS data provided parameter estimates of emotional workers and information on their working conditions. Furthermore, KWCS has provided supporting statistics for the establishment of the 5-year plan for Occupational Safety and Health, a mid- and long-term strategy for the protection of the safety and health of workers established by the Ministry of Employment and Labor every 5 years. KWCS data are also used for international comparative studies, for example, to describe the working conditions in Korea for the publication of "Working conditions in a global perspective," a research report for the international development of working conditions published by the International Labour Organization and Eurofound in 2019.<sup>5</sup>

Meanwhile, a search with the keyword "KWCS" in Korean and English using Google Scholar shows that the number of studies using KWCS data has increased since 2015, when the results of the 4th KWCS were announced (**Fig. 1**).

Choi and Park<sup>6</sup> analyzed 155 papers using KWCS data published in the academic journal database RISS and PubMed from January 1, 2006 to March 5, 2019, and reported that the number of papers using KWCS data was steadily increasing every year. Moreover, KWCS data were consistently used in papers dealing with traditional occupational safety and health topics, and the topics covered became more diverse every year, such as emotional labor and work-life balance (**Fig. 2**).

Since 2014, a contest has been held annually for papers using KWCS data to foster emerging researchers in the field of occupational safety and health and discover new research topics.

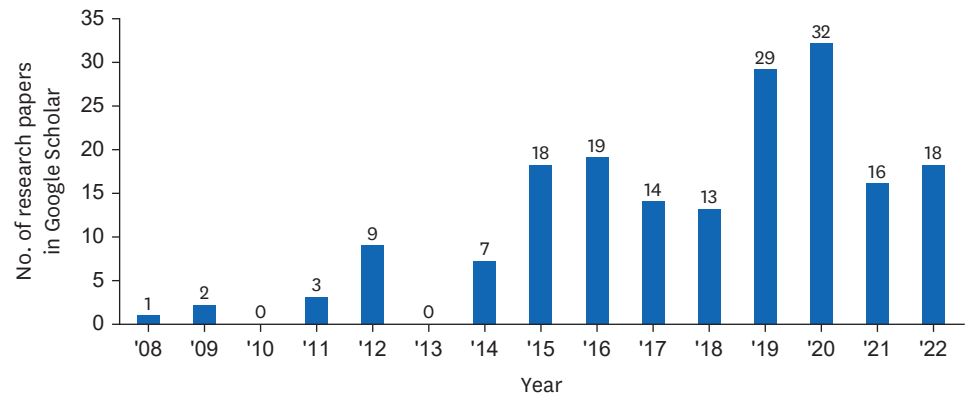


Fig. 1. Number of papers using Korean Working Conditions Survey data from Google Scholar.

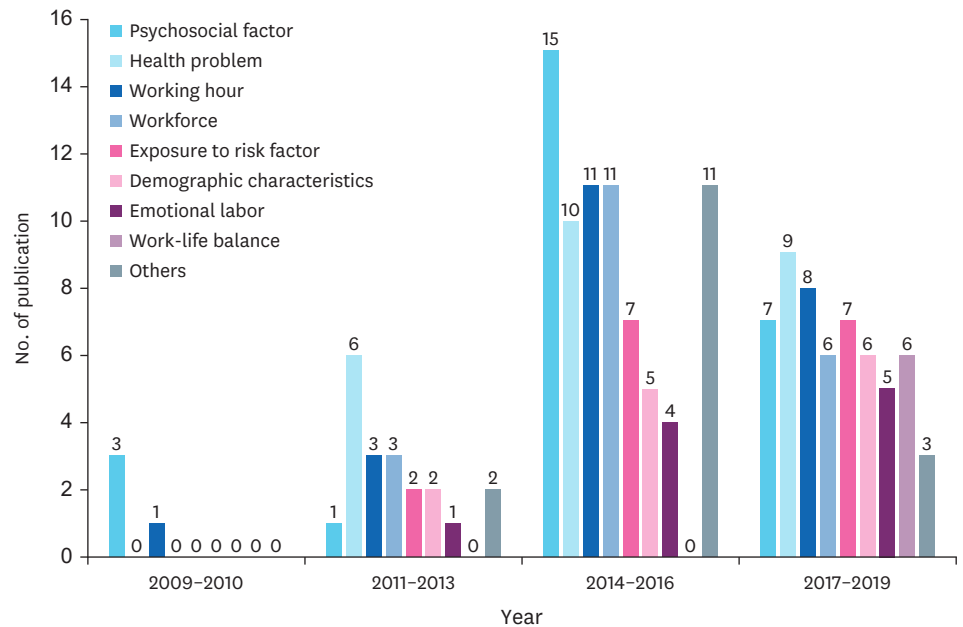


Fig. 2. Number of publications using Korean Working Conditions Survey data by topic. Reprinted from Choi YG, Park JI. The Korean Working Conditions Survey (KWCS): a review on the utilization of the survey database. *J Occup Environ Hyg* 2019;29(4):431-41.<sup>6</sup>

The 10th KWCS paper contest was held in 2023, and the number of papers submitted in the contest has also continuously increased.

## STRENGTH AND WEAKNESS

KWCS is a large-scale survey with a sample size of 50,000, representing the working conditions for all employed people in Korea, including not only employees but also self-employed people. To improve the quality of the results, continuous quality control is performed not only at the time of the survey but also after the survey. In addition, conducting the survey every 3 years makes it possible to monitor changes in the working environment over an extended period. Another advantage of KWCS is that it can be compared and analyzed with the results of surveys from European countries, as it uses the same questions as the

EWCS. KWCS provides information on the industry in which the respondent is employed up to the second (2-digit) of the Korean Standard Industrial Classification, and occupation up to the third level (3-digit) of the Korean Standard Classification of Occupations. This allows for analysis of specific industries and occupations of interest.

Nevertheless, KWCS also has some limitations. Similar to other surveys, the responses are subjective, based on the respondent's beliefs and opinions. For questions about experiences over the past 1 or 3 years, the responses are based on the respondent's memory. Additionally, responses about health status, back pain, and headaches are based on the respondent's subjective judgment rather than a professional medical diagnosis. From a researcher's perspective, it is a cross-sectional survey that collects data from a new sample every 3 years; therefore, it is impossible to confirm causality when conducting research with KWCS data. Therefore, the limitations of KWCS data should be carefully considered when interpreting the results of analyses.

## DATA ACCESSIBILITY

KWCS microdata and reports are available and can be downloaded for free from the website of OSHRI (Korean: <http://oshri.kosha.or.kr/oshri/researchField/workingEnvironmentSurvey.do>, English: <http://oshri.kosha.or.kr/eoshri/resources/KWCSDownload.do>). Microdata is provided with questionnaires and a data usage manual, and are available in various file formats, including SPSS, SAS, and STATA. In addition, questionnaires and microdata in English are also available. The materials in English can be downloaded from the English website of the OSHRI. To enable more researchers around the world to use KWCS data, KWCS data will be deposited and provided in major foreign data repositories. In early 2024, KWCS data will be available through Harvard Dataverse (<https://dataverse.harvard.edu/>).

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**CROSSREF**