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Original Article

# A Comparison between the Second Korean Working Conditions Survey (KWCS) and the First KWCS

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ABSTRACT

*Background:* The study was designed to assess the changes in working conditions through a comparative analysis of the characteristics of working conditions in 2006 and 2010.
*Methods:* We performed a comparative analysis of the data related to the first Korean Working Conditions Survey (KWCS) and the second KWCS in the categories of demographic characteristics, quality of labor, exposure to hazards, and health problems.
*Results:* From our analysis of the demographic characteristics, we saw an increase in labor force participation rate of women and elderly people. As a result of the investigation with regards to working hours, the ratio of employees who worked for $\geq$ 49 hours per week was decreased and the ratio of employees who worked for $\geq$ 40 h/wk increased. As for exposure to hazards, exposure to tobacco smoke notably decreased in 2010 compared with 2006. With regards to health problems, there was a sharp increase in the number of people who complained of muscle pain in their arms and legs.
*Conclusion:* KWCS data included many aspects of working conditions as a nationwide sample. In addition, because this is a periodic nationwide survey, the labor force, working hours, harmful factor exposure, and the change in health problems characteristics according to the flow of time could be investigated. The information comparing the main results of the first survey conducted in 2006 and the second survey conducted in 2010 obtained through this study can be used as an important base material for the establishment of the national policy.


## 1. Introduction

Korea's economy has been more rapidly developed than any other country on Earth through several 5-Year Plans of Economic Development from the 1960s. This occurred after Korea obtained independence from the Japanese colony in 1945 and experienced the Korean war from 1950–1953. In the 1960s, most industries were light industries, but because heavy chemical industries began to develop in the 1970s, many workers have been suffering work-related diseases caused by acute or chronic occupational poisoning by dust, heavy metals, and exposure to organic solvents until 1990. Since the 2000s, however, the issue of musculoskeletal disorders in workers has become a big social problem, with job stress problems also beginning to gradually emerge.

In Korea, until 2006, the statistical data associated with workers' health care only referred to the worker's health diagnosis results data, industrial accident statistical data, and the work environmental exposure survey data of manufacturers. These data are most of the health outcome data, and the work environmental exposure survey of manufacturers are the data related to the chemicals used in manufacturing industries. Musculoskeletal disorders or job stress problems were new and emerging industrial health issues, and the acquisition of information on the exposure of the actual condition and the occupational risk factors in order to build up

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precautionary measures against these problems was urgent. The Korea Occupational Safety and Health Agency (KOSHA) conducted the Korean Working Conditions Survey (KWCS) for the first time in 2006 after receiving the designated statistics approval of the National Statistical Office and the budget support from the Ministry of Labor.

KWCS has benchmarked the research methods and the research contents, and has merely modified some of the criteria such as employment type, occupation, business type, drinking, and smoking based on the master questionnaire of the European Working Conditions Survey (EWCS) while also considering cultural differences [1].

In this study, the authors report on how the working environment in Korea has changed as time has passed, by comparing the results of the second survey conducted in 2010 with the results of the first survey in 2006.

## 2. Materials and methods

### 2.1. KWCS data

There were no differences in the survey methods between the primary survey and the secondary survey, except for the target population (Table 1). The target and method of the primary survey has been published in previous papers [2,3].

The second KWCS between June 20$^{th}$ 2010 and October 10$^{th}$ 2010, was conducted through pen-and-paper interviews in house-to-house visits, targeting nationwide employed people who were aged $\geq$ 15 years [4]. Targeted sample size was 10,000 and the completed sample size comprised of 10,019 people. For the sampling method, we used a two stage stratified probability proportional to size systematic method, and as included in the standard definition of a survey evaluation [5] developed by the American Association for Public Opinion Research, the cooperation rate (COOP3) was 0.616, contact rate (CON2) was 0.600, refusal rate (REF2) was 0.221, while response rate (RR3) was 0.355. The sample in the first KWCS targeted employed people aged between 15 years and 64 years, differing from the targeted employed people who were aged $\geq$ 15 years as defined in the second KWCS.

### 2.2. Statistical analysis

In this study, weighted frequency was used to calculate the estimations regarding Korea's working conditions status. To analyze changed working condition in 2006 and 2010, a statistical comparison test was performed by calculating odds ratio and a 95% confidence interval. This analysis was performed using SAS (Statistical Analysis System) 9.3.

Odds ratio was calculated using a proportion of the change from 2006 to 2010 compared with the change from 2006 to 2010 from the reference group. In the case of working hours per week, the reference is the group who worked 40–48 hours. Except for the odds ratio in the group of 49–59 hours, the others are over 1.00. This means that the changes of the proportion in each group may be compared to the change of proportion of reference group. This reference group may be regarded as the standard working hours in Korea.

**Table 1**
Overview of survey characteristics of the first Korean Working Conditons Survey (KWCS) and the second KWCS

| Wave survey period | 2$^{nd}$ KWCS | 1$^{st}$ KWCS |
|---|---|---|
| Target population | Workers $\geq$ 15 y | Workers 15–64 y |
| Survey method | PAPI | PAPI |
| Sample size | 10,019 | 10,043 |
| Survey period | Jun. 20$^{th}$ to Oct. 10$^{th}$ 2010 | Jun.–Sep. 2006 |
| Sampling design and allocation | Two stage stratified probability proportional to size systematic method | Two stage stratified probability proportional to size systematic method |
| Response rate (RR3) | 35.5% | 34.9% |
| Cooperation rate (COOP3) | 61.6% | 59.0% |
| Refusal rate (REF2) | 22.1% | 24.2% |
| Contact rate (CON2) | 60.0% | 59.2% |

KWCS, Korean Working Conditions Survey; PAPI, paper-and-pencil interviewing.

## 3. Results

### 3.1. Socio-demographical characteristics

The analysis shows great changes in the demographic characteristics of Korean workers (Table 2). As compared with the data from the first KWCS, the second KWCS data highlights labor force participation from aged workers, women, and those who are self-employed without employees. Firstly, the labor force participation by near-senior workers was 23.8% in the first KWCS, which increased to 37.9% in the second KWCS. Secondly, the labor force participation by female workers was very low –34.9% in the first KWCS, which increased from 10.6% to 45.5% in the second KWCS. Thirdly, the proportion of secondary education or postsecondary nontertiary education increased. The proportion of the group, which was 42.3% in the first KWCS, increased from 10.8% to 53.1% in the second KWCS. Fourthly, when compared to the fourth EWCS, the proportion of service workers and shop and market sales workers were ranked top in the first and second KWCS. Fifthly, the ratio of the self-employed without employees increased. In the first KWCS, their proportion was 22.3%, which increased to 28.3% in the second KWCS. Due to the interaction effects among seniors, females, and those who are self-employed without employees, who lead the change in the labor market, there was a palpable increase in aged female workers, aged self-employed people, and female self-employed people.

### 3.2. Quality of labor

With labor lasting 49–59 hours per week, we found a slight decrease from 15.4% in the first KWCS to 13.4% in the second KWCS. If long working hours is defined as over 49 hours, the proportion of long working hours decreased from 45.0% in 2006 to 43.9% in 2010. In the analysis of work intensity, speedy work throughout working hours decreased by 2.9%, from 5.5% in 2006 to 2.6% in 2010. As for strict deadlines enforced through working hours, we found a decrease of 1.6%, from 4.28% in 2006 to 2.7% in 2010. Besides, the proportion of workers who worked a minimum of 4 days including a Saturday or Sunday registered an increase compared with results from 2006, which is thought to have come about from the increase in the number of workers in services. By contrast, the proportion of those who worked 1–3 days including a Saturday or Sunday registered a decrease in 2010 compared with 2006 (Table 3).

### 3.3. Exposure to hazards

As the aged, women, and self-employed people participated in the labor force market and more workers joined services in 2010 compared with 2006, the hazards that workers are exposed to in places of business registered a lot of change. The comparative

**Table 2**
Workers' demographic characteristics in the second Korean Working Conditons Survey (KWCS) compared with the first KWCS

| Variable | | 2nd KWCS | | 1st KWCS | | Oddsratio | 95% CI lower | 95% CI upper |
|---|---|---|---|---|---|---|---|---|
| | | *N* | % | *N* | % | | | |
| Sex | Male | 5,419 | 54.1 | 6,540 | 65.1 | Reference | | |
| | Female | 4,600 | 45.9 | 3,503 | 34.9 | 1.58 | 1.50 | 1.68 |
| Age | < 29 | 1,038 | 10.3 | 1,323 | 13.2 | 0.96 | 0.88 | 1.05 |
| | 30–49 | 5,186 | 51.8 | 6,326 | 63.0 | Reference | | |
| | > 50 | 3,795 | 37.9 | 2,394 | 23.8 | 1.93 | 1.82 | 2.06 |
| Education | No education | 405 | 4.0 | 130 | 1.3 | 5.05 | 4.11 | 6.20 |
| | Primary education or 1st stage of basic education | 931 | 9.3 | 713 | 7.1 | 2.12 | 1.89 | 2.37 |
| | Lower secondary or 2nd stage of basic education | 1,001 | 10.0 | 1,050 | 10.5 | 1.55 | 1.40 | 1.71 |
| | (Upper) secondary education or post-secondary non-tertiary education | 5,319 | 53.1 | 4,250 | 42.3 | 2.03 | 1.90 | 2.17 |
| | 1st stage of tertiary education | 2,125 | 21.2 | 3,444 | 34.3 | Reference | | |
| | 2nd stage of tertiary education | 238 | 2.4 | 456 | 4.5 | 0.85 | 0.72 | 1.00 |
| Occupation | Professionals or technicians, and associate professionals | 2,362 | 23.6 | 3,088 | 30.7 | 0.81 | 0.74 | 0.89 |
| | Legislators, senior officials, and managers | 353 | 3.5 | 328 | 3.3 | 1.15 | 0.97 | 1.36 |
| | Clerks | 1,233 | 12.3 | 1,312 | 13.1 | Reference | | |
| | Service workers and shop and market sales workers | 2,900 | 28.9 | 2,317 | 23.1 | 1.33 | 1.21 | 1.46 |
| | Elementary occupations | 1,394 | 13.9 | 1,015 | 10.1 | 1.46 | 1.31 | 1.63 |
| | Skilled agricultural and fishery workers | 954 | 9.5 | 496 | 4.9 | 2.05 | 1.79 | 2.34 |
| | Armed forces | 27 | 0.3 | 64 | 0.6 | 0.45 | 0.28 | 0.71 |
| | Plant and machine operators and assemblers or Craft and related trades workers | 796 | 7.9 | 1,423 | 14.2 | 0.60 | 0.53 | 0.67 |
| Status of engaged on | Self-employed without employees | 2,830 | 28.25 | 2,236 | 22.26 | Reference | | |
| | Self-employed with employees | 599 | 5.98 | 732 | 7.29 | 0.65 | 0.57 | 0.73 |
| | employed | 6,220 | 62.08 | 7,075 | 70.45 | 0.69 | 0.65 | 0.74 |

analysis of the exposure to physical, chemical, and psychological hazards in the first and second KWCS shows increased exposure to vibration, low temperature, chemicals, and infectious materials and decreased exposure to noise, high temperature, dust, steam, and cigarette smoke. As for vibration, the 2006 proportion of workers who were exposed to it for a minimum of 25% of their working hours was 16.8%, which increased in 2010 to 23.5%, thus registering the largest exposure among all hazards. Noise was registered as the second largest exposure, 24.4% in 2006, which decreased from 2.16% to 22.23% in 2010. The most significant decrease was in exposure to cigarette smoke. The proportion decreased by a large amount, from 10.5% to 19.6% in 2006 and then to 9.0% in 2010 (Table 4). For increases in chemicals and infectious materials, further study is needed.

**Table 3**
Quality of work in the second Korean Working Conditons Survey (KWCS) compared with the first KWCS

| Variable | | 2nd KWCS | | 1st KWCS | | Oddsratio | 95% CI lower | 95% CI upper |
|---|---|---|---|---|---|---|---|---|
| | | *N* | % | *N* | % | | | |
| Working h per week | < 40 h | 1,641 | 16.4 | 1,225 | 12.2 | 1.45 | 1.33 | 1.57 |
| | 40–48 h | 3,981 | 39.7 | 4,296 | 42.8 | Reference | | |
| | 49 - 59 h | 1,341 | 13.4 | 1,543 | 15.3 | 0.94 | 0.86 | 1.02 |
| | ≥ 60 h | 3,056 | 30.5 | 2,979 | 29.7 | 1.11 | 1.04 | 1.18 |
| How many times a month do you work on Saturdays? | 0 or not applicable | 3,261 | 32.6 | 2,498 | 24.9 | Reference | | |
| | 1 | 336 | 3.3 | 574 | 5.7 | 0.45 | 0.39 | 0.52 |
| | 2 | 1,233 | 12.3 | 1,825 | 18.2 | 0.52 | 0.47 | 0.57 |
| | 3 | 253 | 2.5 | 503 | 5.0 | 0.39 | 0.33 | 0.45 |
| | 4 | 4,837 | 48.3 | 4,438 | 44.2 | 0.83 | 0.78 | 0.89 |
| | 5 | 99 | 1.0 | 205 | 2.0 | 0.37 | 0.29 | 0.47 |
| How many times a month do you work on Sundays? | 0 or not applicable | 6,763 | 67.5 | 5,815 | 57.9 | Reference | | |
| | 1 | 322 | 3.2 | 781 | 7.78 | 0.35 | 0.31 | 0.41 |
| | 2 | 904 | 9.0 | 1,400 | 13.9 | 0.56 | 0.51 | 0.61 |
| | 3 | 234 | 2.3 | 417 | 4.2 | 0.48 | 0.41 | 0.57 |
| | 4 | 1,765 | 17.6 | 1,548 | 15.4 | 0.98 | 0.91 | 1.06 |
| | 5 | 31 | 0.3 | 82 | 0.8 | 0.33 | 0.21 | 0.49 |
| Shiftwork | Yes | 687 | 6.9 | 844 | 8.4 | 0.80 | 0.72 | 0.89 |
| | No or not applicable | 9,332 | 93.1 | 9,199 | 91.6 | Reference | | |
| Working at very high speed | All the working hours | 263 | 2.6 | 554 | 5.5 | 0.14 | 0.12 | 0.16 |
| | Part of the working hours | 331 | 3.3 | 766 | 7.6 | 0.13 | 0.11 | 0.15 |
| | 3/4 of the working hours | 324 | 3.2 | 626 | 6.2 | 0.15 | 0.13 | 0.18 |
| | 1/2 of the working hours | 731 | 7.3 | 1,575 | 15.7 | 0.14 | 0.12 | 0.15 |
| | 1/4 of the working hours | 1,214 | 12.1 | 1,693 | 16.9 | 0.21 | 0.19 | 0.23 |
| | Almost never | 2,436 | 24.3 | 3,451 | 34.4 | 0.21 | 0.19 | 0.22 |
| | Not at all | 4,720 | 47.1 | 1,378 | 13.7 | Reference | | |
| Working to tight deadlines | All of the working hours | 269 | 2.7 | 430 | 4.3 | 0.22 | 0.19 | 0.19 |
| | Part of the working hours | 263 | 2.6 | 596 | 5.9 | 0.16 | 0.13 | 0.13 |
| | 3/4 of the working hours | 249 | 2.5 | 521 | 5.2 | 0.17 | 0.14 | 0.14 |
| | 1/2 of the working hours | 600 | 6.0 | 1,130 | 11.2 | 0.19 | 0.17 | 0.17 |
| | 1/4 of the working hours | 985 | 9.8 | 1,457 | 14.5 | 0.24 | 0.22 | 0.22 |
| | Almost never | 2,714 | 27.1 | 4,173 | 41.6 | 0.23 | 0.21 | 0.21 |
| | Not at all | 4,939 | 49.3 | 1,736 | 17.3 | Reference | | |

**Table 4**
Exposure to hazards in the second Korean Working Conditons Survey (KWCS) compared with the first KWCS.

| Variable | | 2nd KWCS | | 1st KWCS | | Odds ratio | 95% CI lower | 95% CI upper |
|---|---|---|---|---|---|---|---|---|
| | | *N* | % | *N* | % | | | |
| Vibration | ≥ 25% of working hours (WH) | 2,358 | 23.5 | 1,685 | 16.8 | 1.53 | 1.42 | 1.64 |
| | < 25% of WH | 7,661 | 76.5 | 8,358 | 83.2 | Reference | | |
| Noise | ≥ 25% of WH | 2,228 | 22.2 | 2,449 | 24.4 | 0.89 | 0.83 | 0.95 |
| | < 25% of WH | 7,791 | 77.8 | 7,594 | 75.6 | Reference | | |
| High temperature | ≥ 25% of WH | 2,221 | 22.2 | 2,440 | 24.3 | 0.89 | 0.83 | 0.95 |
| | < 25% of WH | 7,798 | 77.8 | 7,603 | 75.7 | Reference | | |
| Low temperature | ≥ 25% of WH | 1,074 | 10.7 | 999 | 10.0 | 1.09 | 0.99 | 1.19 |
| | < 25% of WH | 8,945 | 89.3 | 9,044 | 90.0 | Reference | | |
| Dust | ≥ 25% of WH | 1,654 | 16.5 | 1,981 | 19.7 | 0.80 | 0.75 | 0.86 |
| | < 25% of WH | 8,365 | 83.5 | 8,062 | 80.3 | Reference | | |
| Fumes | ≥ 25% of WH | 530 | 5.3 | 555 | 5.5 | 0.95 | 0.84 | 1.08 |
| | < 25% of WH | 9,489 | 94.7 | 9,488 | 94.5 | Reference | | |
| Chemicals | ≥ 25% of WH | 779 | 7.8 | 707 | 7.0 | 1.11 | 1.00 | 1.24 |
| | < 25% of WH | 9,240 | 92.2 | 9,336 | 93.0 | Reference | | |
| Tobacco smoke | ≥ 25% of WH | 903 | 9.0 | 1,965 | 19.6 | 0.41 | 0.37 | 0.44 |
| | < 25% of WH | 9,116 | 91.0 | 8,078 | 80.4 | Reference | | |
| Contagious materials | ≥ 25% of WH | 343 | 3.4 | 146 | 1.5 | 2.40 | 1.98 | 2.92 |
| | < 25% of WH | 9,676 | 96.6 | 9,897 | 98.5 | Reference | | |

### 3.4. Health conditions

In the 2010 KWCS, more workers complained of health problems related to work such as muscle pain in their arms and legs and overall fatigue, while fewer workers complained of skin troubles and stomachache. The current study cannot verify whether this increase in health problems is caused by exposure to hazards or an increase in senior workers. To specify health problems by category, 19.0% of workers complained of muscle pain in their arms and legs in 2006, registering the highest rate. This increased from 21.3% to 40.3% in 2010. Overall fatigue registered at 17.8% in 2006, which increased from 8.9% to 26.7% in 2010. Backache slightly increased from 17.3% in 2006 to 18.0% in 2010. This highlights the most common health complaints related to musculoskeletal diseases. In other categories, a decrease was registered from 3.22% in 2006 to 1.5% in 2010 for hearing problem complaints; from 5.0% in 2006 to 1.8% in 2010 for skin troubles; from 6.9% in 2006 to 0.5% in 2010 for stomachache; from 2.2% in 2006 to 0.5% in 2010 for respiratory difficulties; from 1.2% in 2006 to 0.5% in 2010 for cardiovascular diseases; from 7.6% in 2006 to 2.0% in 2010 for injuries; from 5.4% in 2006 to 1.1% in 2010 for depression and anxiety disorder; and from 5.7% in 2006 to 2.3% in 2010 for insomnia or general sleep difficulties (Table 5).

## 4. Discussion

Based on KWCS data, we have seen rapid changes in the socio-demographic characteristics of workers. First of all, the age of

**Table 5**
Workers' health complaints in the second Korean Working Conditons Survey (KWCS) compared with the first KWCS.

| Variable | | 2nd KWCS | | 1st KWCS | | Odds ratio | 95% CI lower | 95% CI upper |
|---|---|---|---|---|---|---|---|---|
| | | *N* | % | *N* | % | | | |
| Hearing problems | yes | 152 | 1.5 | 323 | 3.2 | 0.46 | 0.38 | 0.56 |
| | no | 9,867 | 98.5 | 9,720 | 96.8 | Reference | | |
| Skin problems | yes | 180 | 1.8 | 505 | 5.0 | 0.35 | 0.29 | 0.41 |
| | no | 9,839 | 98.2 | 9,538 | 95.0 | Reference | | |
| Backache | yes | 1,804 | 18.0 | 1,736 | 17.3 | 1.05 | 0.98 | 1.13 |
| | no | 8,215 | 82.0 | 8,307 | 82.7 | Reference | | |
| Muscular pains | yes | 4,035 | 40.3 | 1,907 | 19.0 | 2.88 | 2.70 | 3.07 |
| | no | 5,984 | 59.7 | 8,136 | 81.0 | Reference | | |
| Headache, eye strain | yes | 1,691 | 16.9 | 1,347 | 13.4 | 1.31 | 1.21 | 1.42 |
| | no | 8,328 | 83.1 | 8,696 | 86.6 | Reference | | |
| Stomachache | yes | 52 | 0.5 | 690 | 6.9 | 0.07 | 0.05 | 0.09 |
| | no | 9,967 | 99.5 | 9,353 | 93.1 | Reference | | |
| Respiratory difficulties | yes | 51 | 0.5 | 221 | 2.2 | 0.23 | 0.17 | 0.31 |
| | no | 9,968 | 99.5 | 9,822 | 97.8 | Reference | | |
| Cardiovascular diseases | yes | 52 | 0.5 | 118 | 1.2 | 0.44 | 0.32 | 0.61 |
| | no | 9,967 | 99.5 | 9,925 | 98.8 | Reference | | |
| Injury(ies) | yes | 196 | 2.0 | 762 | 7.6 | 0.24 | 0.21 | 0.29 |
| | no | 9,823 | 98.0 | 9,281 | 92.4 | Reference | | |
| Depression or anxiety | yes | 111 | 1.1 | 544 | 5.4 | 0.20 | 0.16 | 0.24 |
| | no | 9,908 | 98.9 | 9,499 | 94.6 | Reference | | |
| Overall fatigue | yes | 2,673 | 26.7 | 1,787 | 17.8 | 1.68 | 1.57 | 1.80 |
| | no | 7,346 | 73.3 | 8,256 | 82.2 | Reference | | |
| Insomnia or general sleep difficulties | yes | 235 | 2.4 | 568 | 5.7 | 0.40 | 0.34 | 0.47 |
| | no | 9,784 | 97.6 | 9,475 | 94.3 | Reference | | |

workers stands out, and the Economically Activity Population Estimation and Projection (EAPEP) [6] published by International Labor Organization (ILO) projects that in 2020 40% of the labor force participation will be aged $\geq$ 50 years. In the meantime, the second KWCS shows that the proportion of those who were aged $\geq$ 50 years had reached 37.88%. Since an aging workforce is likely to not only have an influence on social welfare but also an increased exposure to occupational accidents, we would need institutional devices to protect those workers. Secondly, it is the increasing proportion of those who are self-employed without employees, where we witnessed a growing trend: a number of wage workers reaching the age of 50 years or older leaving corporate employment and becoming self-employed without employees. Many of these people create a new place of business and work long hours in poor working conditions in pursuit of a successful entry into the market. Accordingly, we urgently need to come up with a prevention strategy to protect these people. Thirdly, the analysis of labor quality shows that Korea, while involved in longer hours of work, registers a relatively low work intensity as compared to the countries surveyed for EWCS. Long working hours or overtime work exerts a negative influence on the balance between work and life [7]. High work intensity may cause work–site accidents or influence health as it combines with poor working conditions. Also, pressure from speed is related to not only the psychological working conditions but also the greater likelihood of experiencing physical risks and symptoms at work places. Fourthly, it is a decrease in the exposure to physical and chemical hazards which has traditionally been a concern in the area of industrial safety and health. Especially outstanding is the decreased exposure to cigarette smoke, which is presumed to have resulted from the recent government-led smoke-free workplace campaigns. However, we saw a very high level of stress which is a psychological hazard [8]. Fifthly, we saw a noticeable increase in complaints of muscle pain in arms and legs among other health problems in the first and second KWCS. To find the cause of this, we would need to perform in-depth studies, and at this point, we only presume that the increased complaints derive from the increase in senior workers whose bone joints and muscles are aged. As demonstrated in the results of the study, KWCS data has identified those groups that are vulnerable in terms of quality of labor, hazards, and health problems through a comparative analysis including countries of European Union that performs a quantitative measurement of working conditions. Looking ahead, KWCS continues surveys and research to ensure its application as basic data for policies. In the near future, the change of labor force from 2006 to 2010 can be investigated by indepth analysis with the consideration of the changes in industrial and occupational structure. Based on the above findings, working hours and work intensity may be cohesively analyzed in order to analyze the quality of the Korean workforce.

KWCS data included a lot of aspects of working conditions as a nationwide sample. In addition, because this is the periodic nationwide survey, the labor force, working hours, harmful factor exposure, and the changes in health problem characteristics according to the flow of time could be investigated. The information comparing the main results of the primary survey conducted in 2006 and the secondary survey conducted in 2010 obtained through this study can be used as an important base material for the establishment of the national policy.

## Conflicts of interest

All authors declare that there are no conflicts of interest.

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