

고용형태에 따른 근로자의 위험 및 건강에 대한 비교

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Comparison of Occupational Danger and Physical Health Problems of Workers according to the Form of Employment

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<Abstract>

Objectives: The study aims to compare indirect form of employment with direct form of employment on the variables of occupational danger and physical health. **Methods:** I studied based on the data of 5th Korean Working Conditions Survey (KWCS) which was performed by Occupational Safety & Health Research Institute of Korea Occupational Safety and Health Agency in 2017. SAS 9.4 was used for statistical analysis of the final data. **Results:** Based on the verification result, the hazard is higher for direct employment than for dispatch or subcontract in case of exposure to risks in the health and social welfare industry. Based on cross tabulation, significant differences were found in the proportions of harmful and safe tasks in direct employment and those in outsourcing in the physical health industry. It was found that the risk of hazard is 2.18 times higher in outsourcing jobs than in direct employment. **Conclusions:** It is necessary to consider a dispatch and subcontract partner as a strategic partner and not simply hand over dangerous or hard tasks to them. Active and aggressive cooperation along with support from the employer enterprise built in the contract is necessary for the safety and health of dispatch or subcontract laborers.

Key Words : Outsourcing, Laborer's Health, Indirect Employment, Occupational Danger

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I . Introduction

In accordance with the uncertainty of global finance, rationalization of production, shift of business environments due to IT development, and employment of part-time jobs have been increasing for employment flexibility. Domestic part-time employees have increased from 6,740 thousand in 2016, 6,791 thousand in 2017, 6,739 thousand in 2018 to 6,668 thousand in November 2019[1]. Though the definition of 'part-time employee' may vary according to national backgrounds, they are generally defined as employees who are not guaranteed their age of retirement, and who have to work for only certain periods[2]. There are various forms of employment for part-time employees, such as indirect employment[3], which includes contracted work, working for one day, special employment, subcontract work, and dispatched work. These services, subcontracting and outsourcing of labor in particular, may provide companies with benefits such as employment flexibility, slimming of organizations, increase in employment, and efficient use of professional personnel[4][5]. In contrast to the benefits, indirect employment including part-time, dispatching, and subcontracting have demonstrated high increases in industrial accident rates and number of deaths, compared to full-time employment in domestic markets. According to the Ministry of Employment and Labor, the death rate of industrial accidents in Korea is the highest in countries part of the Organization for Economic Cooperation and Development (OECD) and subcontract laborers

constitute 40% of that total[6]. In particular, 90% of construction employees were subcontracted, and about 20 deaths over the past 5 years from 5 power generation companies were that of subcontracted employees. Furthermore, among accident casualties that occurred at the Korea Electric Power Corp. over the past 5 years, 18 were full time employees but 710 were subcontractors, which is about 39 times higher. While full-time employees were also given safety equipment worth 730,000KRW per year, it was not confirmed whether these were given to the 7,145 subcontract laborers[7]. This indicates that industrial accidents, deaths caused by outsourcing, and risk factors are considered for subcontractors. Two employees who died due to a screen door accident at Gu-ui Station in 2016 and Tae-an Thermal Power Plant last December share common ground, they were an in-house subcontractor and a new employee with a low salary. As risky demands are outsourced and are given to subcontractors, labor conditions become worse, and subcontractors hire low-paid workers who only possess rudimentary skills in order to cut costs.

Preceding studies on employment and physical health mostly focused on separate studies and analyzes of exposure to risks and physical health of full-time and part-time employees[8][9][10]. A study by Jae-sung Lee and Joon-ki Ahn exhibited the high rate of exposure of subcontractors to unsafe working environments but did not verify other aspects such as physical health, satisfaction, etc.[11]. Du Plessis stated that it is necessary to study both full and part-time employees to identify the

differences of physical health conditions[12]. OHP (Occupational Health Psychology) also emphasizes the need to analyze variables such as exposure to risks, satisfaction, risk perception, participation in decision making, stress, and job requirements related to employee's health and safety[13][14].

This study aims to present the differences between employees' exposure to occupational danger and physical health of the dispatch and subcontracted workers, which is defined as indirect employment, compared to that of direct employment. The study also aims to understand the differences between exposure to risks, health conditions, safety, psychological conditions, and satisfaction between direct and indirect employees in the health and social services industry. Further cross tabulation of health problems according to different forms of employment, naturally leading to the risk of health conditions of different forms of employments. This will in turn provide various implications for safety and health conditions of employees as well as countermeasures for employees' health conditions.

II. Method

1. References for this Study

This study was designed based on the 5th KWCS (Korean Working Conditions Survey) conducted by the Institute for Industrial Safety and Health at Korea Health and Safety Corporation in 2017. In order to increase

credibility, the study was approved by the institutional review board (IRB) at the IRB Center in Young-san University (YSUIRB-201910-HR-057-02). KWCS was designed after benchmarking Europe's EWCS (Europe Working Conditions Survey) and England's LFS (Labor Force Survey), investigating questionnaires on forms of work, forms of employment, type of occupation, type of business, exposure to risks, employment stability, working environment, targeting domestic employees who are 15 years old and over. In its census, KWCS examines households in apartment survey districts and general survey areas as a population and examines those who meet the standards of sampled employed people. Therefore, KWCS provides credible data guaranteeing the representation of the national level and will be useful for this study to compare the risks of direct and indirect employment and to investigate mobility.

2. Analysis Target

This study selected categories related to- risks, health conditions, safety from KWCS categories, and set the first analysis sample target as being Korean born, a paid worker who works more than 4 days a week among a total number of 50,205 workers. Those who were not sure where their salary came from or where they worked, and refused to answer, were exempted; consequently, a total of 28,038 were initially selected.

For statistical verification, analysis covered

5,873 workers who were employed in at least five by types of employment (direct employment, dispatch, subcontracting) based on the Korean Standard Industry Classification from the first selection. Type of occupation included 3 major jobs, 1,856 people in the construction industry, 1,476 people in business facilities management, and business support services, and 2,541 in the health and social welfare services. A total of 2,404 workers were directly employed, 110 were dispatched, and 27 were subcontracted in the health and social welfare services.

3. Main Variable

In order to separate direct/indirect employment, the study used questions such as, 'Did you get paid at your workplace? or did

you get paid from the dispatch or the subcontracted companies?'. Moreover, the following variables were used to analyze exposure to risks, safety, health conditions, and satisfaction. The degree of every question was based on the degree of the working environment.

a. Exposure to risk factors: An average of 9 questions were asked with regards to 'Vibration, noise, high temperature, low temperature, inhalation of smoke/dust, inhalation of organic vapor, use and/or contact with chemical products, degree of contact to tobacco smoke, contagious matters'. Responses to each question were recorded on a 7-point Likert scale, ranging from 1=never been exposed to 7=exposed during all working hours. The Cronbach's α values

<Table1> Demographic Characteristics of Samples by Major Industries.

Variables		Construction Industry	Facility Management and Support Industry	Health and Social welfare Industry
		n(%)	n(%)	n(%)
Size of Organization	5 or more	731(39.4)	555(37.6)	1111(43.7)
	10~29	542(29.2)	339(23.0)	627(24.7)
	30~49	202(10.9)	181(12.3)	242(9.5)
	50~99	148(8.0)	105(7.1)	189(7.4)
	100~299	120(6.5)	129(8.7)	176(6.9)
	300~499	20(1.1)	22(1.5)	38(1.5)
	500~999	36(2.0)	74(5.0)	71(2.8)
	1,000~	57(3.1)	71(4.8)	87(3.4)
Form of Employment	Direct Employment	1707(92.0)	639(43.3)	2,398(94.4)
	Dispatch	47(2.5)	232(15.7)	117(4.6)
	Subcontract	102(5.5)	605(41.0)	26(1.0)
Gender	Male	1544(83.2)	722(48.9)	363(14.3)

were .903 in construction industry, .874 in health and social welfare services, and .886 in Business facilities management and business support services.

b. Exposure to muscular skeletal diseases: An average of 5 questions were asked with regards to 'Postures that lead to tiredness and/or pain, lifting up other person or moving them, pushing, pulling and/or moving something heavy, standing for a long time, repetitive movements of hand and/or arm movements'. Responses to each question were recorded on a 7-point Likert scale, ranging from 1=never been exposed to 7=exposed during all working hours. Cronbach's α values were .756 in construction industry, .651 in health and social welfare services, and .677 in Business facilities management and business support services.

c. Satisfaction with working environment: The question asked in this regard was, 'How do you think of your general working environment?' Responses to this question were recorded on a 4-point Likert scale, ranging from 1=never been satisfied to 4=very satisfying.

d. Occupational danger: The question asked in this regard was, 'Does your occupation harm your health or is dangerous in any way?' Responses to this question were recorded as 'Yes' or 'No'.

e. Task load: The question asked in this regard focused on whether the employees 'work very fast' or 'work on strict deadlines'.

Responses were recorded on a 7-point Likert scale, ranging from 1=never to 7= all working hours. Cronbach's α values were .875 in construction industry, .833 in health and social welfare services, and .867 in Business facilities management and business support services.

f. Physical health problems: Employees were asked an average of 10 questions about whether they experienced health issues over the past 12 months (hearing, skin, back pain, upper extremity muscle pain, lower extremity muscle pain, headache/eye fatigue, damage, depression, anxiety, systemic fatigue). Cronbach's α values were .705 in construction industry, .703 in health and social welfare services, and .715 in Business facilities management and business support services.

g. Health perception: The responses to this question, which focuses on general health condition, were recorded on a 5-point Likert scale.

h. Mood change for 2 weeks: An average of 5 questions were asked with regards to moods such as 'I was exciting and happy', 'I was calm and relaxed,' 'I was lively and energetic,' 'I felt refreshed,' and 'I had interesting things in my daily life.' Responses were recorded on a 6-point Likert scale, ranging from 1=always to 6=never. Cronbach's α values were .925 in construction industry, .915 in health and social welfare services and .926 in Business facilities management, and business support services.

i. Stress: The question asked in this regard focused on whether the work tasks led to stress. Responses were recorded on a 5-point Likert scale, ranging from 1=never to 5= always.

j. Participation: An average of 3 questions were asked in this regard, the potential responses to which were 'I ask myself before setting my work goals', 'I participate in improving the work organization or the work process' and 'I can apply my ideas to my work'. Responses were recorded on a 5-point Likert scale, ranging from 1=never to 5= always. Cronbach's α were .844 in construction industry, .816 in health and social welfare services, and .852 in Business facilities management and business support services.

k. Experience in accidents/illnesses: The questions asked in this regard were 'Have you been absent or treated for work-related accidents in the past 12 months?' 'Have you been absent or treated for physical and mental illness caused or aggravated by work over the past 12 months?' The responses to these were recorded with either 'yes' or 'no'; if the answer was a 'yes,' occurrence frequency was measured. This study measured accidents and illness experiences with using questions.

4. Method of Analysis

SAS 9.4 was used for statistical analysis of the final data. Frequency analysis, square contingency analysis, and technical statistics were used to identify demographic characteristics of

those surveyed. A covariate analysis (ANCOVA) that controlled age and size of organization was conducted to verify the differences in key variables according to form of employment. ANCOVA was used to test for differences in form of employment. Age contained both actual age recorded and size of the organization to consider the scale of organization. The Bonferroni method was used for post-hoc analysis.

III. Results

1. Comparison of average exposure, risk, satisfaction, and health according to form of employment

<Table 2> analyzed the comparisons between exposure, risk, satisfaction, and health by employment type in health and construction industry. As result of analysis in health industry, the covariate analysis indicated significant differences in exposure to risk factors, satisfaction with the working environment, physical health problems, two-week sentiment, and form of employment. Specifically, the post-verification results demonstrated that exposure to risk factors was higher for direct employment than for indirect employment.

Satisfaction with the working environment was lower for indirect employment than it was for direct employment, and there was no difference between dispatched employees and subcontracted employees. The physical health problem variables indicated that indirect

employment had more problems than direct employment. Sentiment was lower for indirect employment than that of direct employment. Participation was lower for indirect employment staff, and there was no difference between dispatched employees and subcontracted employees. Exposure to musculoskeletal disease, hazardous work, task load, health perception, stress, and accident/illness experiences did not demonstrate any significant differences between direct and indirect employment.

Dispatch and subcontracted work indicate higher hazard exposure than direct employment in the exposure to risks according to the form of employment based on the covariates analysis in the construction industry. The average satisfaction for direct employment is higher than subcontracted work as per difference verifications for the work environment satisfaction variable. In case of hazard work, dispatch and subcontracted workers are doing more dangerous work than direct employment workers. In case of task load, dispatch and subcontracted workers demonstrate higher task loads during the work time than direct employment workers. In case of physical health problems, dispatch and subcontracted employees had more physical health problems than direct employment employees. In case of change of moods for 2 weeks, we found that emotional pleasure in direct employment was lower than that in subcontract work. In case of recognized health, direct employment employees indicated that they were healthier than subcontracted workers. In case of participation, there is more active

participation in the work place for direct employment than subcontract work. In case of stress and accident/disease experience, there are no meaningful differences between direct employment, dispatch, and subcontract employment.

2. Cross analysis of form of employment with health issues

Issues regarding health effects were studied using cross-analysis according to form of employment. Employment types were divided into direct employment and indirect employment. Indirect employment was analyzed as a variable that combined the dispatch and the subcontracted employees. In direct employment, 83.14 percent said their health was unharmed, while only 16.86 percent in indirect employment stated this. The results of square contingency indicated significant differences in the proportion of work without health issues and outsourced employees showed 2.18 times higher risk compared to that of direct employment employees. Cross examination of the health effects according to form of employment has shown that health effects are not independent. In other words, when compared with direct employees, outsourced employees were found to have affective health issues, the odds ratio of which was 1.52.

3. Cross analysis of form of employment and health issues.

A cross analysis of form of employment and

<Table2> Result of ANOVA according to the Form of Employment in Health and Social Welfare and Construction Industry

Variables	Health and social welfare industry						Construction Industry					
	Direct Employment M(SD)	Dispatch M(SD)	Subcontract M(SD)	F	Post-hoc		Direct Employment M(SD)	Dispatch M(SD)	Subcontract M(SD)	F		
Exposure to risks	1.58(0.58)	1.39(0.45)	1.49(0.54)	5.56**	a>b		2.37(1.06)	3.23(0.82)	3.19(1.05)	29.84***		
Exposure to muscular skeletal illnesses	4.18(0.91)	4.12(1.06)	3.87(0.78)	1.07	ns		3.91(0.88)	4.17(0.76)	4.13(0.82)	3.64*		
Satisfaction to working environment	2.84(0.49)	2.67(0.65)	2.52(0.64)	10.04***	a>b,c		2.70(0.57)	2.40(0.65)	2.29(0.64)	21.64***		
Occupational danger	0.07(0.25)	0.10(0.30)	0.08(0.27)	0.70	ns		0.26(0.44)	0.49(0.51)	0.55(0.50)	19.22***		
Task load	2.86(1.51)	2.50(1.29)	2.46(1.50)	1.50	ns		3.33(1.59)	4.00(1.56)	4.18(1.81)	13.27***		
Physical health problems	0.09(1.42)	0.12(1.53)	0.18(1.93)	3.04*	a<c		1.11(1.55)	2.15(1.56)	1.97(1.75)	16.02***		
Health perception	3.82(0.63)	3.54(0.67)	3.41(0.80)	4.29	ns		3.78(0.64)	3.53(0.72)	3.38(0.65)	11.67***		
Mood change for 2 weeks	3.99(0.98)	3.58(1.01)	3.13(1.25)	11.79***	a>b,c		3.88(1.04)	3.67(0.88)	3.46(1.10)	5.88**		
Stress	3.12(0.83)	2.97(0.90)	2.92(0.74)	0.04	ns		3.11(0.76)	3.26(0.67)	3.22(0.74)	2.44		
Participation	2.78(1.21)	2.12(1.28)	2.09(1.10)	9.00***	a>b		3.02(1.05)	2.82(0.96)	2.43(1.46)	16.42***		
Experience in accidents/illnesses	0.92(0.27)	0.92(0.28)	0.89(0.32)	0.45	ns		0.90(0.30)	0.91(0.28)	0.88(0.32)	0.25		

*: p<.05, **: p<.01, ***: p<.001,

a: Direct Employment, b: Dispatch, c: Subcontract

health issues was conducted. Form of employment and backache, headache, and fatigue did not share a relationship.

IV. Discussions and Conclusion

The study analyzed the differences in physical health problems, exposure to risks, occupational

danger, change of mood, and satisfaction with the working environment between indirect and direct employment, that is outsourcing in the form of employment. Also, the risk was analyzed by a cross analysis of health issues according to the form of employment.

Based on the results of this study, there was a meaningful difference between the risk factors

<Table 3> Result of Chi-square Test between Form of Employment and Health Condition

Health Condition \ Form of Employment	Indirect Employment	Direct Employment	χ^2 (p)	Odd ratio (95% CI)	
	harmful to health condition	293(30.6%)			664(69.4%)
Unharmful to health condition	827(16.8%)	4,079(83.2%)			
Form of Employment \ Health Condition	Indirect Employment	Direct Employment	21.22*** (0.000) <th rowspan="3">1.52 (1.27–1.82)</th>	1.52 (1.27–1.82)	
	Affective	815(19.8%)			3,292(80.2%)
	Not affective	168(13.9%)			1,034(86.1%)

***: p<.001

<Table 4> Result of Chi-square Test between Form of Employment and Health Issues

Form of Employment	Backache		χ^2 (p)
	yes	none	
Indirect Employment	47(35.6%)	205(31.5%)	0.83 (0.074)
Direct Employment	85(64.4%)	445(68.5%)	
Form of Employment	Headache		0.72 (0.080)
	yes	none	
Indirect Employment	39(23.1%)	117(20.0%)	
Direct Employment	130(76.9%)	466(80.0%)	
Form of Employment	Fatigue		2.00 (0.128)
	yes	none	
Indirect Employment	49(22.8%)	367(27.4%)	
Direct Employment	166(77.2%)	973(72.6%)	

* : p<.05, **: p<.01, ***: p<.001

according to the form of employment based on the results of comparison analysis for the average exposure to risks, occupational danger, satisfaction with working environment, and physical health problems according to the form of employment in each type of occupation. Examining post verification results in detail, in case of exposure to risks in health and social welfare industry, the exposure to risks in direct employment is higher than dispatch and subcontracted employment. It can be explained by the environment, as most tasks are handled by direct employees in the health and social welfare industry who possibly face with regards to worker dispatch . However, the exposure to risks in dispatch and subcontracted employment is higher than direct employment in the construction industry. In case of employment environment satisfaction, the satisfaction of direct employment is higher than dispatch and subcontracted employment in both health and social welfare and construction industries. The risks for dispatch and subcontracted work is higher than that for direct employment for occupational danger, task load and physical health problems in the construction industry. In case of change of mood for 2 weeks, dispatch and subcontracted work demonstrate an active mood in both health and social welfare and construction industries. Participation is better for direct employment when compared to indirect employment. In summary, the abovementioned results can be evidence supporting that 'Outsourcing of risks' is occurring for indirect employers, especially for subcontracted employers than for direct employers. In case of

the factors there are not meaningful differences, the average value of positive mood decreased in the order of direct employment, dispatch, and subcontract employment. Normality tests and homogeneity of variance tests were conducted prior to analysis. However, this study has some limitations, the ratio of dispatch and subcontract workers were different from direct employment employees.

The cross-analysis of health effects according to employment patterns was conducted. Form of employment was divided into direct employment and indirect employment of labor. Outsourced laborers were verified by variables combining the employment patterns of dispatch and subcontracted employees. The results of the square contingency indicated significant differences in the proportion of the work in terms of harming health, for direct employment and indirect employment, and the odds ratio (risk) was 2.18 times higher for indirect employment compared to direct employment. Cross-examination of the health effects of the form of employment and work has indicated that health effects are not independent. In other words, and the odds ratio (risk) was 1.58 times higher for indirect employment compared to direct employment.

The wage and welfare benefits of indirect employees are lower than those of direct employees[16][17]. However, indirect employment workers are also vulnerable in the health and safety areas, which is not in alignment with the benefits expected from indirect employment. In

other words, the safety and health conditions of indirect employments directly and/or indirectly affect the companies who outsource their work. Therefore, it is necessary to regard indirect service employees as strategic partners in the business, and not as objects to be given dangerous or hard work.

The findings of this study may imply that the resolution to this problem is direct employment. In other words, the problem may be so simple that it can drive simple policy changes as a solution. Laborers with outsourced jobs find it very difficult to get approval for their health problems from industrial accidents. Thus, indirect employment workers have short working hours in a single job and move from one job to another, making it difficult to apply for or prove an industrial disaster. This can positively impact the health of workers[18][19]. Risk is not a fixed object or a state of being vulnerable to danger, but a matter of social norms surrounding the cause. This study hopefully expects to reconstruct the working environment and norms surrounding risks, creating a safer and healthier working environment for all employees.

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<국문초록>

목적 : 본 연구에서는 간접고용이 직접고용의 고용형태가 위험과 건강에 얼마나 차이를 나타내는가를 알아보고자 하였다. **방법** : 연구는 안전보건공단 산업안전보건 연구원에서 2017년에 실시한 5차 근로환경조사(Korean Working Conditions

Survey: KWCS)자료를 바탕으로 조사하였다. **결과** : 보건업에서 위험 요인 노출의 경우 파견, 용역에 비해 직접고용의 위험 노출이 더 높게 나타났다. 반면 건설업에서는 직접고용보다 파견과 용역에서 위험 노출이 더 높은 것으로 나타났다. 고용형태에 따른 건강영향의 교차분석을 실시하였다. 교차분석의 결과 직접고용과 외주에 따라 업무가 건강에 위해하지 않음과 위해함의 비율에 대한 차이는 유의하게 나타났고, 직접고용에 비해 외주의 경우 위험도는 2.18배 높게 나타났다. **결론** : 파견과 용역의 고용형태는 직접고용에 비교하여 근로자가 더 위험에 노출되어 있는 것으로 답변하였다. 또한 직접고용에 비해 외주는 근로자의 건강위해에 2배 가까운 위험도를 나타냈다. 이를 해결하기 위해 파견과 용역의 파트너에게 위험하거나 힘든 일을 전가하는 것이 아닌 사업의 전략적 파트너로서 간주할 필요가 있다. 즉 파견, 용역 근로자의 안전보건을 위해 계약에서의 원청업체의 능동적이고 적극적인 협력 및 지원이 필요하다. 이 연구를 통해 위험을 둘러싼 근로 환경과 규범이 재구성되어, 모든 근로자에게 더 안전하고 건강한 직장환경이 조성되기를 기대한다.