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Original Article

An Empirical Analysis on Labor Unions and Occupational Safety and Health Committees' Activity, and Their Relation to the Changes in Occupational Injury and Illness Rate

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Objectives: To find out from an analysis of empirical data the levels of influence, which a labor union (LU) and Occupational Safety and Health Committee (OSHC) have in reducing the occupational injury and illness rate (OIIR) through their accident prevention activities in manufacturing industries with five or more employees.
Methods: The empirical data used in this study are the Occupational Safety and Health Tendency survey data, Occupational Accident Compensation data and labor productivity and sales data for the years 2003 to 2007. By matching these three sources of data, a final data set (n = 280) was developed and analyzed using SPSS version 18 (SPSS Inc., Chicago, IL, USA).
Results: It was found that a workplace with a LU has a lower OIIR than one without a LU. In manufacturing industries with five or more employees in 2007, the OIIR of the workplaces without a LU was 0.87%, while that of workplaces with a LU was much lower at 0.45%. In addition, workplaces with an established OSHC had a lower OIIR than those without an OSHC.
Conclusion: It was found that the OIIR of workplaces with a LU is lower than those without a LU. Moreover, those with the OSHC usually had a lower OIIR than those without. The workplace OIIR may have an impact on management performance because the rate is negatively correlated with labor productivity and sales. In the long run, the OIIR of workplaces will be reduced when workers and employers join forces and recognize that the safety and health activities of the workplace are necessary, not only for securing the health rights of the workers, but also for raising labor productivity.

Key Words: Occupational health, Occupational accidents, Labor unions, Wounds and injuries, Occupational diseases

Introduction

The active participants in the occupational safety and health system of a country consist of the government, the business owner, the occupational safety and health experts, and the worker. The main parties, which participate in the legal and institutional strategies for occupational safety and health, both directly and indirectly, are the government, the laborers, and the workplace. The relationship between them can be described as a relationship of conflicting interests [1]. The benefits from the legal and institutional strategies in the area of occupational safety and health are widely distributed to all the workers of the workplaces, while their overall costs are concentrated on the business owners. To the greatest extent possible, the workplace

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tends to avoid investment unless such investment is returned in the form of profits [2]. Workplaces therefore tend to invest in safety and health only to the level of observing legal obligations and do not actively invest in this area. In addition to the issue of investment in safety and health most of the safety and health activities in the workplace are left to the business owner, while only some are conducted by the government and occupational safety and health experts, which means that the workers, who are the most important stakeholders in this area, are excluded. This illustrates the inefficient state of the occupational safety and health projects in the workplace. As occupational safety and health activities are mostly dependent on the role of the business owner, it has been believed that occupational accidents can be reduced only by the active efforts of the business owner, and that the health of workers can be protected by observing the standards for safety and health defined in the Occupational Safety and Health Act [3]. However, because business owners focus on safety and health activities, which are simply countermeasures adopted to reflect administrative and government prevention strategies rather than activities specifically designed to prevent accidents in their own workplaces, it is difficult to say that occupational accidents are being prevented in the long term through the current business owner-oriented countermeasure activities.

For this reason, many countries over the last 20-30 years have officially acknowledged the participation of the workers in decision-making related to occupational safety and health issues [4], and this has ultimately enhanced the efficiency of the occupational safety and health management of the workplace, as well as the safety and health of the workers [5-7]. In Australia, it is reported that the introduction of the participation system in the area of safety and health has changed the attitudes of both labor and management regarding safety and health. Moreover, it is seen that a sense of responsibility in daily life and the decision making rights of the worker have been enhanced as the result of their participation [8-14]. Furthermore, in seeking agreements between management and labor with regard to safety and health issues, the participation of the workers has been found to be effective in enhancing labor-management relationships. It has also been found that the proper execution of occupational safety and health activities contributes to the enhancement of productivity [15].

In addition to the results of many studies showing that the participation of the workers enhances the level of occupational safety and health in the workplace, we need to consider the nature of the intervention of labor in the safety and health issues in the workplace through their representatives. In practice, it is very difficult for individual workers to intervene in the management of a workplace conducted by the business owner or managers. Therefore, it is common for individual workers to participate in the safety and health area and the management of a workplace by organizing a labor union (LU) at a local or company level. In other words, the participation of labor in safety and health management is usually achieved through their representatives and the LU. In Korea, calls by the LU and workers for participation in safety and health activities and for the protection of the health rights of the workforce are seen as the most effective ways of promoting the interest and participation of business owners in occupational safety and a health management system.

Currently, the most important organization for the occupational safety and health of labor in Korea is the Occupational Safety and Health Committee (OSHC). An OSHC is required under the Occupational Safety and Health Act, 1990 (Article 19). In order to deliberate or resolve matters, a business owner must assign, for example, the establishment of an occupational accident and disease prevention plan, improvement of the work environment, and the investigation of the causes of occupational accidents and diseases. The business owner must also establish and operate an occupational safety and health committee composed of an equal number of workers and employers.

Occupational safety and health issues can be effectively handled by the joint efforts of management and labor, and it is desirable for both management and the labor to organize and activate an OSHC together [16,17]. Moreover, in a survey of the degree of contribution made by management and labor in reviewing the safety and health problems in the workplace and in grasping and resolving such problems, over 70% have shown positive attitudes [3,18].

In other words, the OSHC is a crucial mechanism for the improvement of safety and health in the daily activities of the workplace. Moreover, even when the communication of the demands for safety and health in the workplace does not achieve the desired results, the Committee is a potential venue for communication from laborers and is a mechanism through which the communication of the demands of the laborers can be expanded according to the activities of the Committee [16].

The interests of an LU or the workers increase those of the business owners, and consequently increase the participation of the business owners in safety and health activities [3]. This means that communication between the LU, the workers and the business owner on safety and health results in active safety and health activities. However, it is difficult to expect the desired results with the efforts of only one of these three parties. Occupational safety and health goals will be attained only

through the participation of all parties [19,20].

In the study by Rhee et al. [3], in workplaces, where management-labor participation is active, the health level of workers was higher than in workplaces where this level of participation does not occur.

This research highlights the necessity of both the business owner and the workers changing their understanding, as well as the need to prepare for physical requirements. The physical requirements suggested by the research include the revitalization of the current OSHC and the Honorary Occupational Safety Inspector system, and a system for the introduction of safety and health representatives of the labor force. Finally, it implies that safety and health through independent action rather than safety and health based on laws should be sought in the revitalization of management-labor participation [17]. The finding that worker participation and communication in safety and health activities reduces occupational accidents suggests that the revitalization of the involvement of the OSHC has been a potential means for promoting occupational accident prevention.

The activities of the Committee to address overall safety and health problems of the workplace have encouraged occupational accident preventive actions in the workplace and have consequently reduced the occupational injury and illness rate (OIIR) [21].

The aim of the present study is to determine from an analysis of empirical data the levels of influence exerted by LUs and OSHCs in reducing OIIRs through their accident prevention activities in manufacturing industries with five or more employees.

Materials and Methods

The empirical data used in this study comprised: the Occupational Safety and Health Agency trends survey data for 2005, supplied by the Occupational Safety and Health Institute; 5 Workers' Compensation data for the five-year period, 2003-2007, supplied by the Korea Workers' Compensation and Welfare Service; and workplace sales (per employee) and labor productivity (value added per employee) data supplied by National Information and Credit Evaluation, Inc. By matching these three sources of data, a final data set (n = 280) was developed and analyzed using SPSS version 18 (SPSS Inc., Chicago, IL, USA). Based on this analysis, the LU and OSHC are shown to reduce occupational accidents.

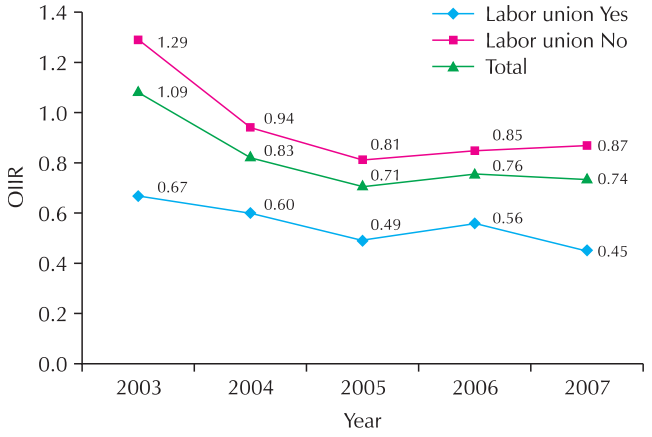

Fig. 1. Changes in the OIIR according to whether or not it has a labor union among the manufacturing industry with 5 or more employees. OIIR: occupational injury and illness rate, (number of occupational injuries and illnesses/total number of workers) × 100. F-value = 8.959 (p = 0.004); between groups is statistically significant.

Results

Differences in OIIRs between workplaces with and without a LU

It was found that a workplace with a LU has a lower OIIR than one without a LU. In manufacturing industries with five or more employees in 2007, the OIIR of workplaces without a LU was 0.87%, while that of workplaces with a LU was much lower at 0.45% (Fig. 1). The difference in OIIRs between workplaces with and without LUs for the entire five year period was statistically significant (t = -4.170, p = 0.003).

When differences in OIIRs were analyzed according the size of the workforce at each workplace (Table 1), the OIIR of the workplaces with 5-49 employees had the highest OIIRs, and this was almost twice higher than the rate for the entire manufacturing industry. However, it is assumed that the difference in the OIIR is larger than expected because workplaces with less than 50 employees were included.

When we analyzed the differences in OIIRs for the workplaces with 50 or more employees according to whether or not they have a LU, we found that the OIIRs of the workplaces without a LU were higher than those with a LU, except in 2006 (Fig. 2). However, the difference in OIIRs over the five years was not significant (t-value = -0.882, p = 0.403).

The rate of the work-related injury accidents shows the same trend as in Fig. 2; in general, a workplace with a LU has a lower the OIIR than one without a LU (t-value = -1.489, p = 0.175) (Table 2).

In contrast, the rates of occupational diseases and work-related illnesses were higher in workplaces with an LU than in

Table 1. Changes in the occupational injury and illness rate* by the size of workplace, according to whether or not it has a labor union among the manufacturing industry with 5 or more employees

Number of workers	Labor union Yes/no	2003	2004	2005	2006	2007
Total, (n)		1.09 (270)	0.83 (272)	0.71 (280)	0.76 (267)	0.74 (262)
5-49	Yes	0.91	1.72	0.00	0.00	0.00
	No	2.27	1.50	1.19	1.57	1.53
	Subtotal	2.17	1.52	1.13	1.48	1.43
50-99	Yes	0.87	0.50	0.43	0.70	0.50
	No	0.94	0.83	0.61	0.38	0.64
	Subtotal	0.92	0.76	0.57	0.45	0.61
100-299	Yes	0.81	0.92	0.77	0.66	0.67
	No	0.63	0.40	0.63	0.73	0.50
	Subtotal	0.72	0.63	0.69	0.70	0.60
300 or more	Yes	0.32	0.21	0.34	0.47	0.32
	No	0.35	0.45	0.50	0.29	0.19
	Subtotal	0.32	0.26	0.46	0.33	0.23

*(number of occupational injuries and illnesses/total number of workers) × 100.

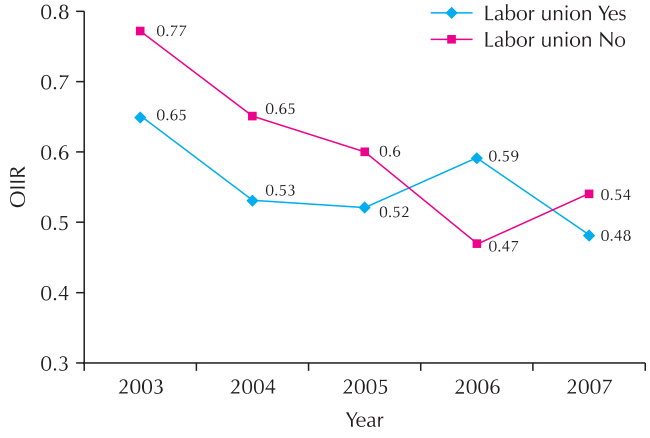

Fig. 2. Changes in the OIIR according to whether or not it has a labor union among the manufacturing industry with 50 or more employees. OIIR: occupational injury and illness rate, (number of occupational injuries and illnesses/total number of workers) × 100. t-value = -0.882 (p = 0.403); between groups is not statistically significant.

those without a LU (t-value = 2.382, p = 0.044) (Table 3). It is assumed that this result reflects the dramatic increase in the diagnoses of cerebrovascular and cardiovascular diseases and musculoskeletal disorders due to the efforts of LUs since 2003.

Table 2. Changes in the rate of occupational injuries* according to whether or not it has a labor union among the manufacturing industry with 50 or more employees

	2003	2004	2005	2006	2007
Labor union Yes	0.59	0.49	0.44	0.44	0.35
Labor union No	0.73	0.61	0.55	0.42	0.49

t-value = -1.489 (p = 0.174); between groups is not statistically significant.
*(number of occupational injuries/total number of workers) × 100.

Differences in OIIRs according to the establishment of an OSHC or LMC

Some workplaces have a Labor Management Council (LMC), which is a consultative body established to improve the welfare of workers and to seek the sound development of businesses through the participation and cooperation between workers and employers (Act Concerning the Promotion of Worker Participation and Cooperation, Article 3). A LMC may be regarded as an alternative to an OSHC. It was found that workplaces, where OSHC had been established or where safety and health issues are addressed through a LMC as an alternative to an OSHC, had a lower rate of occupational accidents than those without an OSHC or a LMC (F-value = 52.654, p = 0.000) (Fig.

Table 3. Changes in the rate of occupational illnesses* according to whether or not it has a labor union among the manufacturing industry with 50 or more employees

	2003	2004	2005	2006	2007
Labor union Yes	0.067	0.043	0.076	0.145	0.126
Labor union No	0.037	0.038	0.050	0.052	0.050

t-value = 2.382 (p = 0.044); between groups is statistically significant.
*(number of occupational illnesses/total number of workers) × 100.

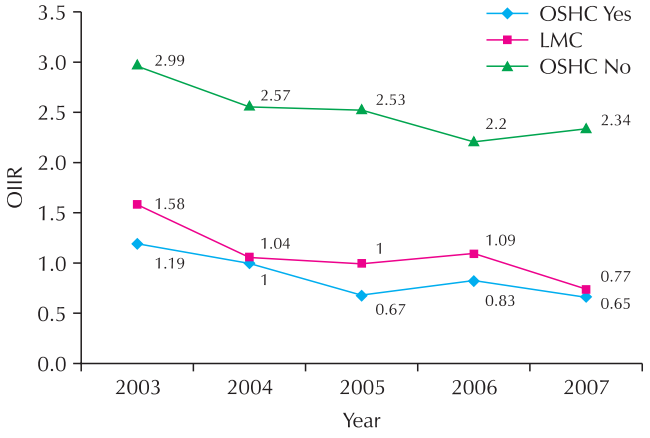

Fig. 3. Changes in the OIIR according to whether or not it has OSHC among the manufacturing industry with 50 or more employees. OIIR: occupational injury and illness rate, (number of injuries and illnesses/total number of workers) × 100, OSHC: Occupational Safety and Health Committee, LMC: Labor Management Council. F-value = 52.654 (p = 0.000); between groups is statistically significant.

3). Addressing safety and health issues through bodies such as an OSHC or LMC seems to reduce occupational accidents.

The difference of the OIIR among the workplaces according to whether or not OSHC has been established was more noticeable. It was found that the OIIR among the workplaces where OSHC is supposed to have been established, but has not, was higher than among those with OSHC or LMC (F-value = 55.157, p = 0.000) (Table 4).

Again in contrast, the rates of occupational diseases and work-related illnesses in workplaces with OSHC were higher than in those with a LMC, as an alternative to OSHC, and higher than those without any form of OSHC (F-value = 24.031, p = 0.000) (Table 5). It is assumed that safety and health activities organized by an OSHC has led to improvements in the diagnoses of workplace diseases in the workplace and has contributed to a resulting improvement in their health.

Table 4. Changes in the rate of occupational injuries* according to whether or not it has the occupational safety and health committee among the manufacturing industry with 50 or more employees

	2003	2004	2005	2006	2007
OSHC Yes	0.89	0.76	0.50	0.60	0.45
LMC	1.53	1.02	0.93	1.00	0.70
OSHC No	2.87	2.47	2.38	2.02	2.20

OSHC: Occupational Safety and Health Committee, LMC: Labor Management Council. F-value = 55.157 (p=0.000); between groups is statistically significant.
*(number of occupational injuries/total number of workers) × 100.

Table 5. Changes in the rate of occupational illnesses* according to whether or not it has the occupational safety and health committee among the manufacturing industry with 50 or more employees

	2003	2004	2005	2006	2007
OSHC Yes	0.31	0.23	0.17	0.23	0.20
LMC	0.05	0.02	0.07	0.09	0.06
OSHC No	0.12	0.09	0.15	0.18	0.14

OSHC: Occupational Safety and Health Committee, LMC: Labor Management Council. F-value = 24.031 (p = 0.000); between groups is statistically significant.
*(number of occupational illnesses/total number of workers) × 100.

The correlation between management performance indicators and OIIRs

Fig. 4 shows that sales (per employee) increase as the OIIR at the workplace decreases. This indicates that the workplace OIIR and sales are negatively correlated.

Similarly, the workplace OIIR and labor productivity (added value per employee) also seem to be inversely related to each other (Fig. 5).

Discussion

According to the results of the survey on the safety and health issues of the workplace, as well as the analysis of the financial management performance indicators and the data on accident rates, it was found that the OIIR of the workplaces with a LU is lower than among those without one. Moreover, those with an OSHC usually had a lower OIIR than those without one. When it comes to the rate of occupational illnesses, workplaces with OSHC showed a higher rate of incidence than those

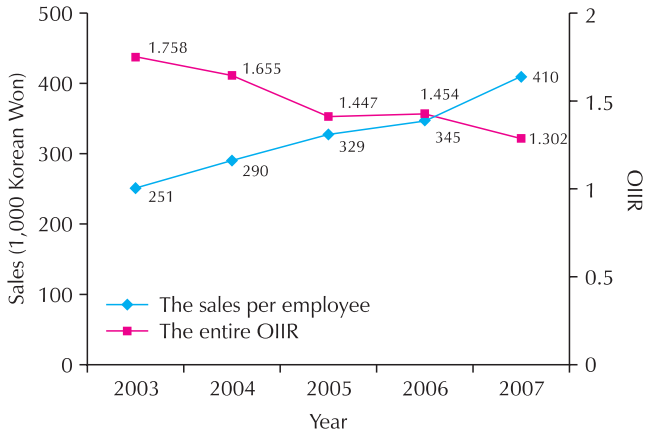

Fig. 4. Relationship between the OIIR and sales per employee. OIIR: occupational injury and illness rate, (number of occupational injuries and illnesses/total number of workers) × 100.

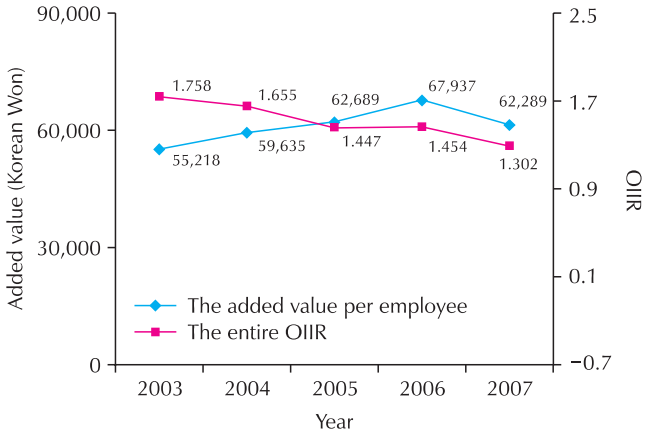

Fig. 5. Relationship between the OIIR and the added value per employee. OIIR: occupational injury and illness rate, (number of occupational injuries and illnesses/total number of workers) × 100.

without one, probably because these workplaces made special efforts to acknowledge and identify cerebrovascular and cardiovascular diseases and musculoskeletal disorders, which are the major factors affecting the rate of occupational diseases in Korea. It may be concluded that the wishes of labor to participate in identifying and addressing safety and health issues in the workplace has been expressed through the LU or the OSHC, and that this has contributed to the removal of some of the causes of accidents and the discovery of hidden diseases in the workplace. Another finding was the inverse relationship between the OIIR and both productivity and sales, as the rate has a negative correlation with labor productivity or sales. Taken together, these findings suggest that when the workers and the workplace business owners collaborate and jointly recognize that the safety and health activities of the workplace are necessary not only for securing the health rights of the worker but also for raising the labor productivity of the workplace, then the OIIR of the workplace will eventually be reduced.

The participation of workers in safety and health issues in the workplace is achieved through the activities of an LU or OSHC. In terms of current practice in Korea, safety and health continues to be regarded merely as a means for the regulation of workplace activities and, as such, is the exclusive domain of workplace owners, thereby reducing safety and health to a series of countermeasures oriented towards simply observing the law and regulations. However, it is important for both workplace owners and workers to change their recognition of these issues by realizing, for example, that occupational accidents in the workplace could eventually decrease productivity and weaken labor power. The findings of this study demonstrate that OSHCs and LUs can assume a very important role in the reduction of occupational accidents. An expansion in the establishment of OSHCs seemed justified and should be done by strengthening the enforcement of the legal requirements for the formation of OHCS. There is also a need to study ways in which the OSHCs can be used to achieve further reductions in occupational accidents.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

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