

Occupational Safety and Health Officials' Perception of Safety and Health Education for Business Owners

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Abstract: This study was intended to provide basic data for discussion on the introduction of safety and health education system for business owners to prevent industrial accidents. To this end, a questionnaire survey was conducted on 548 occupational safety and health officials, of which 86.7% expected that the introduction of safety and health education for business owners would be very helpful in preventing accidents in the workplace. On the other hand, it was pointed out that the effectiveness of safety and health education for business owners needs to be raised as it deals with the areas considered to be important in the job and basic competencies of business owners. The study subjects also most highly agreed with the need for annual regular training for business owners at all workplaces.

Keywords: Industrial accidents, Safety and health education, Business owner, Disaster prevention

1. Introduction

While the national industrial accident rate has gradually decreased for the last 10 years, from 0.71 in 2008 to 0.54 in 2018, thanks to the efforts of the government and industrial sites, the number of industrial accident victims has not declined but rather has shown a slight rise, with about 100,000 victims every year [1, 2]. The rise in the number of industrial accident victims despite the decreased accident rate suggests that the numbers of workplaces and workers are increasing [1, 2] and that stronger efforts to reduce accidents are required as the efficiency of the existing measures may gradually diminish.

Meanwhile, many preceding studies have reported that safety and health education introduced to reduce industrial accidents is highly effective in reducing the incidence rate of industrial accidents [3, 4, 5]. Although the Occupational Safety and Health Act prescribes that safety and health education must be carried out for the persons in charge of management, workers, management supervisors, safety managers, health managers, safety and health managers, etc. [6, 9], education for business owners, which is the most important for accident prevention, is not mandatory under the act. There is only a provision on lowering the premium rate of industrial accident compensation insurance for workplaces where business owners have completed the related education and established industrial prevention plans that are recognized by the relevant authorities in Article 15 (Special Cases of Premium Rate) of the Act on the Collection, Etc. of Premiums for Employment Insurance and Industrial Accident Compensation Insurance [7]. Notably, when the Occupational Safety and Health Act was amended in January 1900, Article 32 (Education for Business Owners) was newly included; however, as regulations on occupational safety and health were greatly relaxed later, the act was amended once again (Act No. 8562, July 27, 2007, Partial Amendment) with the deletion of the provision related to education as penalties on business owners (Article 32, Paragraph 1, Subparagraph 4), as part of efforts to remove the regulations that lacked feasibility to enhance the industrial accident prevention effects of the act.

The safety and health management policy of a business site, which is closely related to the management philosophy on safety, is established based on the safety awareness of the business owner. It is well known that this policy covers and affects all areas related to compliance with the Occupational Safety and Health Act, safety and health plan establishment, and the composition and operation of a safety and health management organization [8]

Therefore, this study aims at providing valid data for discussion on the introduction of safety and health education system for business owners by conducting a survey for occupational safety and health officials about their expectation level on industrial accident prevention effect by the introduction of such system, their perception of competencies required of business owners, the target group of education, and adequate education cycle for the development of educational programs

Study Methods

2.1 Study Subject and Data Collection

To gather opinions from industrial sites on the introduction of safety and health education for business owners, this study conducted data collection via a survey for over two months from July 2 to September 10, 2018 with business owners and management supervisors mostly from workplaces where safety and health education for them have been provided by institutions designated by the Ministry of Employment and Labor. The survey

was carried out on the study subjects' expectation level on industrial accident prevention effect by the introduction of safety and health education system for business owners, their perception of competencies required of business owners, the target groups of education, and adequate education cycle. A total of 548 copies of the questionnaire were retrieved, and 453 of them were used for analysis after the exclusion of 95 copies due to insufficient information.

2.2 Data Analysis

To fulfill the purpose of this study, the collected data were analyzed with the PASW Statistics 18.0 program. First, the Cronbach' α coefficient was calculated to assess the internal consistency of the survey tool. The Cronbach' α coefficient of the entire survey tool was .904, indicating a high level of reliability. To understand the general characteristics of the study subjects, frequencies and percentages were calculated and descriptive statistics were conducted to explain the collected data. In addition, an independent sample t-test and a one-way ANOVA (analysis of variance) were conducted to analyze differences in perception depending on the general characteristics of the study subjects. Lastly, Scheffe was conducted as a post-hoc test

2.3 Survey Results

2.3.1 General Characteristics of the Respondents

Among the subjects, males outnumbered females by 85.7% to 14.3%, and the largest age group (35.5%) was those in their 40s. The business category with the largest number of respondents was manufacturing (48.8%). The largest proportion of respondents' workplaces (32.9%) were classified as SMEs with 1-49 workers. The most common position among the respondents was management supervisor, with a percentage of 43.7%. In terms of work experience, those with a career of 6-10 years (19.4%) accounted for the largest proportion of all respondents.

2.3.2 Expectation Level on Industrial Accident Prevention Effect

The survey also assessed the respondents' expectation level on industrial accident prevention effect by the introduction of safety and health education system for business owners. The results are as shown in <Table 1>.

<Table 1> Expectation Level on Industrial Accident Prevention Effect by the Introduction of Education System for Business Owners (N=453)

Expectation level on industrial accident prevention effect	Frequency (person)	Percentage (%)	Mean	Standard deviation	Skewness	Kurtosis
Very low	1	2	4.29	.789	-.996	.719
Low	12	2.6				
Neutral	52	11.5				
High	178	39.3				
Very high	210	46.4				

According to the survey results on the respondents' expectation level on accident prevention effect by the introduction of safety and health education system for business owners, the groups with "high" and "very high" expectation accounted for 39.3% and 46.4%, respectively, totaling 85.7%, which is a very large portion of the total respondents. In addition, the average (standard deviation) of the expectation level was also as high as 4.29 (.789). It is thus considered that the respondents expect the introduction of education system for business owners to be very helpful in preventing accidents in the workplace.

As a result of analyzing differences in the respondents' expectation level on industrial accident prevention effect depending on their general characteristics, it was found that differences according to general characteristics factors except for age were statistically insignificant. In terms of age, however, the group in their 50s showed the highest expected level mean (standard deviation) of 4.43 (.726) on industrial accident prevention effect compared to other age groups. The difference was statistically significant at the significance level of .05 ($F=3.119$, $p=.015$). These results suggest that all groups of the respondents, regardless of their general characteristics, expect the introduction of education system for business owners to be effective in preventing industrial accidents.

<Table 2> Differences in Expectation Level Depending on the Respondents' General Characteristics (N=453)

Variable		Frequency (person)	Mean	Standard deviation	t/F	p
Gender	Male	388	4.32	.776	2.356	.019
	Female	65	4.08	.835		
Age	20s ^a	48	4.43	.771	3.1	.

			29		19*	015 ^d > ^e
	30s ^b	121	4. 21	.798		
	40s ^c	161	4. 32	.771		
	50s ^d	101	4. 43	.726		
	60s or over ^e	22	3. 82	1.006		
Business category	Manufacturing	221	4. 32	.810	.41 7	.837
	Service industry	72	4. 28	.736		
	Construction	44	4. 27	.817		
	Industrial accident prevention organization	39	4. 26	.715		
	Safety and health education institution	12	4. 00	.603		
	Other	65	4. 28	.839		
Size of the workplace (number of employees)	1-49 employees	149	4. 17	.817	2.0 80	.102
	50-299 employees	124	4. 30	.796		
	300-499 employees	41	4. 41	.741		
	500 or more employees	139	4. 37	.754		
Position	Management supervisor	198	4. 33	.754	1.1 66	.325
	Safety and health manager	125	4. 26	.824		
	Person in charge of safety and health management	13	3. 92	1.038		
	Business owner	8	4. 00	.756		
	Other	109	4. 30	.776		

* $P < .05$

2.3.3 Education Target Group

According to the survey results on the perception of the target group of safety and health education for business owners, 277 respondents chose “business owners at all workplaces,” accounting for the largest percentage (61.1%).

A total of 277 respondents selected “business owners at all workplaces” as the target group of safety and health education for business owners, taking up the largest proportion of all respondents. There were statistically significant differences in their perception of the target group depending on their business categories, which is one of the general characteristic factors. In particular, the respondent group engaged in the service industry had the largest proportion of those who chose “business owners at all workplaces” (69.4%) compared to other business category groups.

<Table 4> Differences in the Perception of the Safety and Health Education Target Group Depending on Business Categories (N=453)

Business category	Classification	Business owners at all workplaces	Business owners at workplaces with poor industrial accident management	Business owners at autonomously participating workplaces	Business owners at small and medium-sized workplaces	Business owners at fully autonomously participating workplaces	Total
Total	Frequency	277	55	64	40	17	453
	%	61.1%	12.1%	14.1%	8.8%	3.8%	100.0%
Manufacturing	Frequency	144	29	23	15	10	221
	%	65.2%	13.1%	10.4%	6.8%	4.5%	100.0%
Service industry	Frequency	50	5	8	6	3	72
	%	69.4%	6.9%	11.1%	8.3%	4.2%	100.0%
Construction	Frequency	23	3	14	3	1	44
	%	52.3%	6.8%	31.8%	6.8%	2.3%	100.0%
Industrial accident prevention organization	Frequency	18	4	6	10	1	39
	%	46.2%	10.3%	15.4%	25.6%	2.6%	100.0%
Safety and health education institution	Frequency	7	1	3	1	0	12
	%	58.3%	8.3%	25.0%	8.3%	.0%	100.0%
Other	Frequency	35	13	10	5	2	65
	%	53.8%	20.0%	15.4%	7.7%	3.1%	100.0%
Pearson's chi-square=39.002**/p=.007							

** $p < .01$

2.3.4 Important Competencies Required of Business Owners

The selection of educational contents is very important to increase the effectiveness of safety and health education for business owners and its relevance to workplaces. Therefore, the job and basic competencies that are perceived to be important to business owners were identified through the survey.

a. Perception of Important Job Competencies Required of Business Owners

Among employers' job competencies, the competency related to the "economic value of losses due to accidents" received the average rating (standard deviation) of 3.81 (.858), which indicates that the respondents put the greatest importance on this competency.

As a result of analyzing the differences in the perception of business owners' important job competencies depending on the general characteristics of the study subjects, it was found that the general characteristics excluding age and size of the workplace led to the statistically significant differences in the average score of each group's perception of these competencies. In respect to age, the respondents in their 20s received the highest average score (standard deviation) of 3.90 (.682) regarding the perception of business owners' important job competencies, showing a statistically significant difference ($F=3.26$, $p=.012$) at the significance level of .05 compared to other groups. In terms of the size of the workplace, those working for businesses with 300 to 499

employees acquired the highest average score (standard deviation) of 3.84 (.768) regarding the perception of business owners' important job competencies. They showed a statistically significant difference ($F=6.291$, $p=.000$) at the significance level of .001. compared to other groups.

b. Perception of Important Basic Competencies Required of Business Owners

Among employers' basic competencies, interpersonal relationship skills received the average rating (standard deviation) of 3.76 (.890), which suggests that the respondents consider this competency most important.

As a result of analyzing the differences in the perception of business owners' important basic competencies depending on the general characteristics of the study subjects, it turned out that the general characteristics excluding age, size of the workplace, and position led to the statistically significant differences in the average score of each group's perception of these competencies. In respect to age, the respondents in their 20s received the highest average score (standard deviation) of 3.83 (.597) regarding the perception of business owners' important basic competencies, showing a statistically significant difference ($F=4.193$, $p=.002$) at the significance level of .01 compared to other groups. In terms of the size of the workplace, those working for businesses with 500 or more employees acquired the highest average score (standard deviation) of 3.77 (.716) regarding the perception of business owners' important basic competencies, with a statistically significant difference ($F=4.351$, $p=.006$) at the significance level of .01 compared to other groups. With regard to position, those in charge of safety and health management gained the highest score of 3.96 (.638) and they had a statistically significant difference ($F=1.294$, $p=.043$) at the significance level of .05 in comparison with other groups.

When conducting safety and health education for business owners, it is necessary to thoroughly grasp the roles of business owners and apply the frame of safety and health education in an extensive way. In other words, the educational contents should not be confined to the field of safety and health, but address various areas perceived as important as business owners' job and basic competencies, in order to enhance the participation rate of business owners in education and its relevance to workplaces.

<Table 5> Important Job Competencies Required of Business Owners (N=453)

Competencies Required of Business Owners	Skewness	Kurtosis	Mean	Standard deviation
① Understanding of government policies related to safety and health	-.029	-.457	3.67	.919
② Understanding of laws related to occupational safety and health	-.181	.197	3.60	.969
③ Competency related to the economic value of losses due to accidents	.110	1.142	3.81	.858
④ Competency related to partner and supplier management	.102	.354	3.60	.866
⑤ Understanding of safety culture	-.108	.550	3.72	.927
⑥ Understanding of safety management system	-.151	.248	3.62	.942

> Differences in the Perception of Important Job Competencies Depending on the General Characteristics of the Respondents (N=453)

Variable		Frequency (person)	Mean	Standard deviation	t/F	p
Gender	Male	388	3.65	.810	-.934	.351
	Female	65	3.75	.829		
Gender	20s ^a	48	3.9097	.68240	3.260*	.012 a>c b>c
	30s ^b	121	3.8072	.79233		
	40s ^c	161	3.5311	.86305		
	50s ^d	101	3.6238	.78374		
	60s or over ^e	22	3.6061	.76902		

Business category	Manufacturing	221	3.6 493	.7903 0	.917	.469
	Service industry	72	3.7 685	.8357 0		
	Construction	44	3.7 614	.8239 0		
	Industrial accident prevention organization	39	3.4 530	.8651 4		
	Safety and health education institution	12	3.7 083	.4930 1		
	Other	65	3.6 872	.8692 8		
Size of the workplace (number of employees)	1-49 employees ^a	149	3.4 519	.7820 5	6.291 ***	.000 a<d
	50-299 employees ^b	124	3.6 895	.8322 0		
	300-499 employees ^c	41	3.8 415	.7682 5		
	500 or more employees ^d	139	3.8 333	.7955 2		
Position	Management supervisor	198	3.5 968	.7813 9	1.383	.239
	Safety and health manager	125	3.7 467	.8028 3		
	Person in charge of safety and health management	13	3.8 077	.8356 8		
	Business owners	8	3.2 708	.4623 7		
	Other	109	3.7 248	.8869 7		

* $p < .05$, *** $p < .001$

<Table 7> Important Basic Competencies Required of Business Owners (N=453)

Basic Competencies Required of Business Owners	Skewness	Kurtosis	Mean	Standard deviation
⑦ Communication skills (skills related to understanding and preparing documents, ability to listen attentively, linguistic ability)	.107	-.785	3.71	.879
⑧ Mathematical skills (basic calculation and statistics, chart analysis and creation)	.388	-.056	3.43	.795
⑨ Problem solving ability (thinking ability, problem handling)	.150	-.543	3.65	.864
⑩ Self-development ability (self-awareness, self-management, career development)	.220	-.472	3.60	.858
⑪ Resource management capacity (management of time, budget, material and human resources)	.204	-.591	3.64	.848
⑫ Interpersonal relationship skills (teamwork, leadership, conflict management)	.089	1.009	3.76	.890
⑬ Information handling ability (computer skills, information processing)	.435	.095	3.42	.801
⑭ Technical capacity (understanding of technology, selection of technology, adaptation to new technology)	.301	-.299	3.59	.814
⑮ Understanding of the organization (international mindset, understanding of organizational system and management, understanding of different jobs)	.050	-.888	3.75	.902
⑯ Occupational ethics (work ethics, community ethics)	.051	-.835	3.74	.910

<Table 8> Differences in the Perception of Important Basic Competencies Depending on the General Characteristics of the Respondents (N=453)

Variable		Frequency (person)	Mean	Standard deviation	t/F	p
Gender	Male	388	3.61	.709	1.076	.283
	Female	65	3.71	.820		
Age	20s ^a	48	3.8375	.59738	4.193**	.02b >c
	30s ^b	121	3.7835	.73805		
	40s ^c	161	3.5000	.72844		
	50s ^d	101	3.5356	.74358		
	60s or over ^e	22	3.6909	.61172		
Business category	Manufacturing	221	3.6032	.68586	1.349	.242
	Service industry	72	3.7417	.78341		
	Construction	44	3.7545	.72093		
	Industrial accident prevention organization	39	3.4154	.76003		
	Safety and health education institution	12	3.6000	.51522		
	Other	65	3.6385	.80014		
Size of the workplace (number of employees)	1-49 employees ^a	149	3.4725	.71931	4.351**	.06d >a
	50-299 employees ^b	124	3.6371	.73623		
	300-499 employees ^c	41	3.6902	.67335		
	500 or more employees ^d	139	3.7705	.71642		
Position	Management supervisor ^a	198	3.5343	.68466	1.294*	.043b >c, c <e
	Safety and health manager ^b	125	3.7352	.67767		
	Person in charge of safety and health management ^c	13	3.9692	.63821		
	Business owners ^d	8	3.4000	.52099		
	Other ^e	109	3.6541	.84739		

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$p < .05$,

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$p < .01$

2.3.5 Perception of Adequate Education Cycle

<Table 9> Adequate Cycle of Safety and Health Education for Business Owners (N=453)

<Table 9> shows the survey results on the respondents' perception of the adequate cycle of safety and health education for business owners.

Regarding the cycle of safety and health education for business owners, 187 respondents selected "regular education on an annual basis," accounting for the largest proportion (41.3%) of the total.

Among the general characteristics, gender and age were the factors that led to statistically significant differences in the perception of the safety and health education cycle for business owners between groups. With regard to gender, the view that regular education on an annual basis needs to be adopted was more prominent in the female group than in the male group. In terms of age, the group in their 30s chose "regular education on an annual basis" with the highest percentage.

Education cycle	Frequency (person)	Percentage (%)
Regular education on an annual basis	187	41.3
Regular education on a biennial basis	153	33.8
Regular education every 3 years	105	23.2
Regular training every 5 years	3	.7
One-off education after the establishment of the business (within a year after business registration)	5	1.1

<Table 10> Differences in the Perception of Safety and Health Education Cycle for Business Owners Depending on Gender (N=453)

Gender	Classification	Regular education on an annual basis	Regular education on a biennial basis	Regular education every 3 years	Regular education every 5 years	One-off education after the establishment of the business	Total
Total	Frequency	187	153	105	3	5	453
	%	41.3%	33.8%	23.2%	.7%	1.1%	100.0%
Male	Frequency	158	131	94	3	2	388
	%	40.7%	33.8%	24.2%	.8%	.5%	100.0%
Female	Frequency	29	22	11	0	3	65
	%	44.6%	33.8%	16.9%	.0%	4.6%	100.0%

Pearson's chi-square=10.467*/p=.033

* $p < .05$

<Table 11> Differences in the Perception of Safety and Health Education Cycle for Business Owners Depending on Age (N=453)

Age	Classification	Regular education on an annual basis	Regular education on a biennial basis	Regular education every 3 years	Regular education every 5 years	One-off education after the establishment of the business	Total
Total	Frequency	187	153	105	3	5	453
	%	41.3%	33.8%	23.2%	.7%	1.1%	100.0%
20s	Frequency	16	21	8	0	3	48
	%	33.3%	43.8%	16.7%	.0%	6.3%	100.0%
30s	Frequency	61	35	24	1	0	121
	%	50.4%	28.9%	19.8%	.8%	.0%	100.0%
40s	Frequency	65	53	42	1	0	161
	%	40.4%	32.9%	26.1%	.6%	.0%	100.0%
50s	Frequency	40	36	22	1	2	101
	%	39.6%	35.6%	21.8%	1.0%	2.0%	100.0%
60s or over	Frequency	5	8	9	0	0	22
	%	22.7%	36.4%	40.9%	.0%	.0%	100.0%

Pearson's chi-square=28.929*/p=.024

* $p < .05$

III. Conclusions

This study conducted a survey for occupational safety and health officials in order to provide data for discussion on the introduction of safety and health education system for business owners. Based on the survey results, this study comprehensively analyzed the officials' expectation level on industrial accident prevention effect by the introduction of such system, their perception of competencies required of business owners, the target group of education, and adequate education cycle. The results of the analysis are as follows.

(1) According to the survey results on the officials' expectation level on industrial accident prevention effect by the introduction of safety and health education system for business owners, 86.7% of the respondents had a positive view toward the effect. This shows that such system is considered essential in enhancing the safety and health environment and awareness of workplaces. Therefore, it needs to actively promote the introduction of safety and health education system for business owners to reduce industrial accidents.

(2) The analysis of the survey results on the perception of business owners' important job and basic competencies showed that the respondents put the greatest importance on competency related to the economic value of losses due to accidents among job competencies and interpersonal relationship skills among basic competencies. This suggests that an effective curriculum be developed as safety and health education for business owners needs to include contents that can help business owners to strengthen such competencies.

(3) As a result of analyzing the respondents' perception of the target group of safety and health education for business owners, the largest proportion (61.1%) of the study subjects selected "business owners at all workplaces." In addition, in terms of education cycle, it was "regular education on an annual basis" that the largest percentage (41.3%) of respondents chose. To be short, the respondents prefer that regular education will be carried out every year for business owners at all types of workplaces.

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