Occupational Health Services for Small-Scale Enterprises in Korea

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Received May 18, 2001 and accepted September 6, 2001

Abstract: Korea needs national strategies to handle problems of Small Scale Enterprises (SSEs) systematically. Since 1993, the Korean government has begun to provide financial subsidy programs for Occupational Health Services (OHSs) in SSEs from Occupational Injury Prevention Fund. To identify the health care status in SSEs in Korea, 5,080 factories, which had participated in the Government-funded Subsidy Program in 1997, were surveyed. The overall morbidity of the workers in these SSEs was higher than the national average for both general and occupational diseases. Based on the health examinations for occupational disease of those workers exposed to occupational hazards such as noise, dust, or solvents, we could find the industry-specific occupational disease patterns. From this result, we would plan the targeted occupational health services to specific groups. In spite that the effectiveness of this program is not completely assessed, our results indicate that it is desirable for this program to be continued in Korea. In addition, this program may be a good model for rapidly developing countries.

Key words: Small-scale enterprises (SSEs), Occupational health, Government-funded, Developing country

Introduction

Enterprises with fewer than 50 employees constitute more than 87% of all enterprises in Korea, and their employees are more than 40% of the total workforce. They vary from labor-intensive to high-tech industries, and are not localized into specific regions but are distributed throughout the country. Moreover, most of these enterprises are very small companies where the owner also works for administration, production, and sales. In addition, the financial structure is weak¹⁾. They often engage in subcontract work handling hazardous chemicals and have a poor working environment that can adversely affect the employees' health. Although the incidence of occupational accidents and diseases is high, the knowledge and concern for occupational health and

safety are scanty, and the financing for occupational health services to improve working conditions is relatively difficult to obtain^{2, 3)}.

In Korea, the Occupational Safety and Health Act stipulates the basic responsibilities of the employer. The employer in Korea with more than 50 employees must designate the health manager (medical doctors, nurses, or industrial hygienist) to provide care for the health of workers. Recently the government has changed the rule loosely about the size of the workplace under the regulations for occupational health service in order to stimulate the economic growth.

In 1990, the Occupational Safety and Health Act was revised and a new OHS system was introduced for medium-sized enterprises. While most large enterprises with more than 300 workers could afford legally mandated full time health managers, medium-sized enterprises with 50 to 300 workers had some difficulties in hiring a full time health

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manager. The revised law opened the way to have part-time occupational health personnel from outside health service organizations instead of hiring a full-time health manager. This occupational group health service has gained popularity rapidly. Currently, 54 occupational health service organizations are providing this service all over the country⁴⁾. The Korean government extended this approach for SSEs with less than 50 workers by starting a subsidy program for occupational group health services for small workplaces⁵⁾.

Since 1993, 5% of the Occupational Injury Compensation Insurance Premium was set aside as the Occupational Injury Prevention Fund. The subsidy program for SSEs was financed from this fund. There has been no evaluation of the effectiveness for this subsidy program, since the launch of this program.

The purpose of this study is to provide an overview of the problems among SSEs in Korea, and to assess the subsidy programs as a potential strategy for improving working conditions related to health and safety in SSEs that can be applied to other developing countries.

Materials and Methods

The definition of small-scale enterprises varies according to the situation⁶⁾. It is defined in this study as the one with less than 50 workers like WHO definition. Small-scale enterprises provide rich job opportunities and contribute strongly to economic growth⁷⁾ in many countries.

The Government-funded Subsidy Program for Occupational Health was composed of basically same group health services available to medium-scale enterprises. They should provide yearly two special health examinations for workers exposed to specific occupational hazards, two workplace environmental measurements, and biweekly health education sessions and counseling. Work environment measurement was based on the health hazards present at the workplace. National criteria for permissible exposure limit (PEL) are based on time (8 hour) weighted average. For noise, PEL is 90 dB. For dust, PEL is various from 2

mg/m³ (type I), 5 mg/m³ (type II), and 10 mg/m³ (type III) with the types of dusts. PEL criteria for solvents and heavy metal are various with the kinds of evaluation items. Here, we introduce the PEL criteria for toluene and lead as a representative example for solvent and heavy metal. We use 100 ppm for toluene and 0.05 mg/m³ for lead. In the case of light, PEL criteria varies as 150 lux (usual work), 300 lux (detail work), and 750 lux (more detail work) depends on types of work. For hazardous radiation, we use 0.1 μ W/cm².

This study is to identify the health care status in small-scale enterprises in Korea. To accomplish this purpose, 5,080 factories, which had participated in Government-funded Subsidy Program in 1997, were surveyed. We got replies from 4,811 of the 5,080 enterprises funded by this Subsidy Program in 1997. The response rate was 94.7%.

This study was conducted during the first half of 1997. We collected basic information about small-scale enterprise in Korea through documentary review and reanalysis of government census data. We contacted all the enterprises which had participated in this Government-funded Subsidy Program, and information about health and safety were collected by reviewing the legally mandated records in these workplaces (Table 1). For the comparison, we used National statistic⁸⁾ of 1995.

We analyzed these data with PC-SAS 6.11 version.

Results

General characteristics of the industries

Most of them located in big cities such as Seoul, Daegu, and Incheon. Representing overall distribution feature of small enterprises, 83% of them were in the cities and 42% of them were in industrial towns. This geographic location provided easy access for external health service personnel. However, 16% of the small workplaces were located in remote rural areas in Korea, posing difficulties for access to this type of service.

The most active participating industry to this Subsidy Program was automobile manufacturing and repair industry

Table 1. Survey contents

Contents	Detailed contents
General characteristics of the industries	Geography, location, scale, job, worker
Problems of the occupational health	General health exam, Special health exam, Work environment assessment, Occupational accident
Social economy and management	Subcontract, Union establishment, Government-funded Subsidiary Occupational Health Program

Table 2. The number of workers by enterprises (%)

Enterprises	No of Enterprises (%)	No of workers(%)	Mean Workers
Automobile manufacture and repair	507 (10.5)	9,875 (9.6)	19.5
Chemical industry	495 (10.3)	10,178 (9.9)	20.6
Metal industry	485 (10.1)	10,983 (10.7)	22.6
Mechanical manufacture	391 (8.1)	9,530 (9.3)	24.4
Electric manufacture industry	293 (6.1)	7,145 (7.0)	24.4
Plating industry	280 (5.8)	4,403 (4.3)	15.7
Manufacture industry	225 (4.7)	4,678 (4.6)	20.8
Textile manufacture (chemical)	181 (3.8)	4,971 (4.8)	27.5
Printing industry	176 (3.7)	2,851 (2.8)	16.2
Metal material manufacture	173 (3.6)	3,734 (3.6)	21.6
Wood manufacture	153 (3.2)	2,746 (2.7)	17.9
Textile manufacture (woven)	145 (3.0)	3,178 (3.1)	21.9
Others	1,307 (27.1)	28,228 (27.6)	21.5
Total	4,811 (100.0)	102,500 (100.0)	21.3

(10.5%) followed by chemical (10.3%) and metal industry (10.1%) (Table 2). Of 4,811 enterprises, 24% employed 20–29 workers, 33% employed 10–19 workers, and 17% employed less than 10 workers with an average number of employees per industry of 21.3. The proportion of male workers was 73%, and that of blue-collar workers was 74% of the total workforce.

The proportion of migrant workers was 3.5% of the total work force. They were employed by 942 (20%) work sites with an average of 3.8 persons per work site.

Among the surveyed enterprises, the number of workplaces engaged in subcontract work were 1,430 (29.8%), and the type of these subcontracts varied. The industry with high proportion of subcontract work was the electric manufacturing (48.4%), plating (48.3%), and followed by mechanical manufacturing industry (41.1%).

Most of the surveyed workplaces opened only one shift (85%), and less than 15% of the total surveyed workforce were engaged in two or more shifts. Only 1.2% out of 4,622 workplace had organized unions.

Health and safety status

Work environment: During 1995, work environment was measured in 4,077 (84.7%) out of 4,811 enterprises in SSE. Workplaces with the exposure exceeding the permissible exposure limit were 30.8% for the noise level, 15.3% for the air concentration of total dust or fume, 14.3% for hazardous radiation, 5.0% for organic solvent and 4.1% for heavy metal. In the case of light, 9.3% were below the permissible exposure limit (Fig. 1).

When the results were analyzed by industry, the textile

Fig. 1. The percent of company exceed the permissible exposure limits (PEL) in work environment evaluation during 1995.

IL: intensity of illumination, RAD: hazardous radiation.

manufacturing industry had the highest number of workplaces with the noise level over the permissible exposure limit. For the air concentration of the dust, over the permissible exposure limit, the number was highest in the metal material manufacturing. For the heavy metal, the most frequently violated industry was the plating and for the solvent, that was the printing industry.

General diseases: In 1995, the morbidity rate per 1,000 for general disease among workers in the surveyed SSE enterprises was 68.8, which was higher than that from the national statistic⁸⁾ of 57.8. This increase of the morbidity rates was mainly due to liver diseases and hypertension. The morbidity rate per 1,000 among this workforce was 21.6

Fig. 2. General disease prevalence per 1,000 workers by general health exam in 1995.

LIVER: Disease of liver, HT: Hypertension, DM: Diabetes mellitus, HL: Hyperlipidemia, ANEMIA: Anemia, TB: Pulmonary tuberculosis, SSE: Small scale enterprises.

for liver diseases, 21.0 for hypertension, 8.4 for diabetes mellitus, 5.7 for hyperlipidemia, 3.5 for anemia, 2.1 for tuberculosis, and 1.7 for renal diseases (Fig. 2).

The disease profile was not even across industries. Chronic diseases like hypertension were more prevalent in wood, metal material, and textile manufacturing industries, while pulmonary tuberculosis was most prevalent in printing industry.

Occupational disease: In the case of occupational disease in SSE, the overall morbidity rate per 1,000 workers was shown to be 5.4, which was higher than that from the national statistic of 3.5. There was a 3-fold difference in the overall morbidity rate of occupational diseases between the highest and lowest-risk industries. The majority of the occupational disease was noise-induced hearing loss (84 cases, 7.5 per 1,000). But the morbidity rate per 1,000 was 8.1 (19 cases) for metal intoxication, 3.9 (26 cases) for pneumoconiosis, and 2.5 (17 cases) for solvent intoxication (Fig. 3).

The industry with the most prevalent occupational diseases was the primary metal and metal material manufacturing industry. Noise induced hearing loss was high in the wood manufacturing and printing industry while pneumoconiosis was high in electric manufacturing industry; and metal intoxication was high in automobile parts and repair industry.

Occupational accident: The overall accident rate, which was higher than national statistic of 16.2, was 26.0 per 1,000

Fig. 3. Occupational disease prevalence per 1,000 workers by special health exam in 1995.

NIHL: Noise - induced hearing loss, SOLVENT: Intoxication due to chemicals and solvent, METAL: Intoxication due to metal, PN: Pneumoconiosis, SSE: Small-scale enterprises.

Fig. 4. Occupational accident rate per 1,000 workers by types of industry in 1995.

Chemical: Chemical industry, Mechanical: Mechanical manufacture industry, Electronic: Electronic manufacture industry, Textile: Textile manufacture industry (woven), Metal: Metal material manufacture industry, Wood: Wood manufacture industry, SSE: Small-scale enterprises.

workers among the surveyed SSE enterprises. The rate for fatal accident was about 0.3 per 1,000 workers in 1995. The highest accident rate (38.8 per 1,000) was registered in the metal material (Fig. 4) in SSE.

Discussion

The surveyed enterprises in this study could represent small-scale enterprises in Korea in terms of location, size, profile of workers, and working conditions. The overall morbidity rate and accident rate among these enterprises was not better than national average.

We could identify poorer working conditions and higher morbidity rate for occupational diseases in these enterprises when compared with overall national statistics including larger workplaces.

The morbidity rate for general disease and occupational disease of workers in small scale enterprises were higher than that from the national statistic⁸⁾.

In the work environment evaluation, the noise level was the most commonly evaluated factor and exceeded over the permissible exposure limit most frequently. However, other factors affecting the work environment were not sufficiently evaluated and the results of health examinations can not be properly interpreted with the work environments. According to the national statistics in 1995, the rate of occupational accidents was 1.0% in all industries but 1.6% in small-scale industries which was lower than ours (2.6%). The accident rate was shown to be the highest in metal material manufacturing industry and lowest in electric manufacturing industry.

As for occupational health hazards in these workplaces, the number of hazards per workplace was smaller but the proportion of exposed workers per workplace was higher compared to the larger companies. It reveals that relatively simple working processes are carried out, however the exposures to hazards are not effectively controlled in these small workplaces. Based on this relatively limited number of occupational health hazards and industry specific profiles of occupational diseases, we could identify several subgroups of small-scale enterprises requiring different occupational services.

However, as in many other countries, there are no stipulations for occupational health service personnel or facilities for enterprises with less than 50 workers⁹⁾. Furthermore, little enterprise has organized unions which can ask for active occupational health service to the employer. The awareness and practice of basic occupational hygiene and health among workers is inadequate, and only small proportion of those with provided protective gears actually utilized or wear the personal protective devices^{10, 11)}. These poor conditions of SSEs make the utilization of manpower and skills of outside occupational health service organizations highly unlikely in Korea.

As a way of circumventing this inertia in the SSEs, the Korean government initiated the subsidy program. This subsidy program can be an initiator for developing inbreeds occupational health program in these SSEs.

We needed a systematic and viable strategy for occupational health services for these small-scale enterprises, but before our study, the information on occupational health in SSEs was lacking. As we mentioned above, the morbidity and accident rate of these SSEs was higher than the national average. Based on the health examinations for occupational disease of those workers exposed to occupational hazards such as noise, dust, or solvents, we could find the industry-specific occupational disease patterns. The overall rate of voluntary participation in the Government-funded Subsidy Occupational Health Program by small-scale industries was only 12.7% in 1996, but it has been more and more increased since 1995 (7.9%). From this result, we would plan the targeted occupational health services to specific groups. In spite that the effectiveness of this program is not completely assessed, our results indicate that it is desirable for this program to be continued in Korea because the morbidity and accident rates of the SSEs was higher than national average and the rates of voluntary participation in this program has been increased.

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