[Report]

Pneumoconiosis Problem among the Vietnamese Coal Mine Workers

Nguyen An LUONG¹ and Shinya MATSUDA²

¹*National Institute of Labour Protection. Hanoi, Vietnam*

²*Department of Preventive Medicine and Community Health, School of Medicine, University of Occupational and Environmental Health, Japan. Yahatanishi-ku, Kitakyushu 807-8555, Japan*

Abstract : In this report, the authors present the pneumoconiosis problem among Vietnamese coal mine workers. As coal is one of the most important products for export, its production has been intensified recently. With the strong incentive for rapid economic development, health problems of miners tend to take second place. As shown in the present report, miners' working conditions are very bad, and health protection measures are not sufficiently implemented. It is apparent that official statistics underestimate the actual situation because of the inadequacy of the reporting system. Because the financial barrier to establishing a sufficient reporting system for pneumoconiosis is enormous, an epidemiologic study is the most effective way to assess the actual situation. It is also useful to conduct epidemiologic studies as part of an international collaborative project, in order to transfer necessary knowledge and epidemiologic skills from the developed countries to Vietnam.

Key words : pneumoconiosis, coal mine, Vietnam, international collaboration.

(Received 15 May 1998, accepted 18 September 1998)

Introduction

The coal mine sector is one of the most important industries in Vietnam. This sector has been in existence from the pre-World War I period. At present, there are about 100 coal mines located in the North and Central regions of Vietnam, especially Quang Ninh province. The total number of staffs and workers employed in the coal mine industries was 65,300 in 1997. Among them, 8,500 persons are engaged in coal exploitation, of which 4,300 workers are propping up pits and hoeing up coal, 1,200 are drilling and using explosive to break up stone, and 3,000 are carrying coal ores. Nearly half of these workers are working in open coal mines.

The total output of exploited coal in 1996 was 9.3 million tons, of which 3.4 million was from underground coal mines and 5.9 million tons from open

coal mines. In 1996, 3.5 million tons of exploited coal was exported, of which 1–1.5 million tons was for Japan. According to the exploitation strategy of the coal mine industry up to the year 2,000, the output of coal is targeted to the volume of 12 to 15 million tons per year and the number of coal mine workers is expected to be doubled.

However, under this strong incentive for a rapid economic growth, the health problems of coal mine workers have not been given enough attention. In this report, we describe the actual situation of occupational health and safety problems of coal mine industries.

Working Conditions of the Coal Mine Workers

Most of the coal mines are located in the mountainous areas. The general working conditions are very bad; the work is mostly non-mechanized and the working environment is seriously polluted. Coal mine workers have a lot of difficulties in their daily living, because most of the coal mines are located in the deep mountainous areas, where the general sanitation situation is very bad and health resources are scarce.

In the case of open air coal mine exploitation, the workers are directly exposed to the severe tropical environment, that is, heavy rain and hot and humid climate. In the summer time, the average temperature is around 30°C, and sometimes it reaches to 38°C. Radiation is very high, ranging from 1.2 to 1.6 Kcal/cm²/minute. The dust concentration in the atmosphere is 80 to 1,200 particles/cm³, of which about 40% is able to be inhaled. The concentration of SiO₂ in the dust is around 12 to 28%. In addition, there are also problem of noise, vibration and toxic gases such as CO.

In the case of underground coal mine exploitation, working conditions are even worse. Most of the underground coal mines in Vietnam are small and narrow. The workers have to walk several kilometers from the gate of the tunnel to their workplace. The in-tunnel-passage is narrow and muddy, lighted only by an old-fashioned and unsafe electric line along the ceiling, which could very easily be a cause of electric shock accidents and explosions. The workers are exposed to many occupational risks; heat and high humidity, coal dusts, SiO₂, CO, CO₂, and NO₂. During our field study in a coal mine in the Quang Ninh province, we experienced some occupational risks and have noted them in Table 1. The workplace is hot and humid (about 29°C and over 90%). CO concentration is 5–6 times higher in the workplaces than outside. Dust concentration is very high; the figure of mass concentration is 35 times higher than the national standard, and the number of particles is ten times higher. The coal dust contains 3.6 to 13.5% of SiO₂ (average: 8.5%) and stone dust is 12.0 to 28.0% of SiO₂ (20.0%).

Table 1. Results of an environmental measurement in a studied underground coal mine of Quang Ninh district**Microclimate**

Area	Temperature (°C)	Humidity (%)	Air velocity (m/s)
Coal transportation road in mine	29.0	95	0.6
Coal exploitation place	29.2	90	1.4

Gas concentration

Area	O ₂ (%)	CO ₂ (mg/l)	CO (mg/l)
Coal transportation road in mine	20.0	3.6	0.030
Coal exploitation place	19.9	3.0	0.017
Outdoors	20.6	1.2	0.004

Dust concentration

Area	mass concentration (mg/cm ³)	particles (number/cm ³)
National standard	2.0	200
In coal mine	67.6	2246

SiO₂ concentration in dust

	Highest (%)	Lowest (%)	Average (%)
Coal dust	13.5	3.6	8.5
Stone dust	28.0	12.0	20.0

Source: National Institute of Labour Protection, Vietnam

Health Situation of Coal Mine Workers

According to the health examination records of the studied coal mines, the common problems are as seen in Table 2. Inflammation of the upper respiratory tract is the most common disease, followed by skin diseases (45%), joint pain (38%), stomachache (31%).

So far as the designated occupational diseases are concerned, pneumoconiosis is the most important problem at the national level as shown in Table 3. Most of the cases are coal mine workers. As will be explained later, these figures are apparently underreported ones, due to an insufficient health examination system.

Table 2. Health problems of workers in a studied coal mine of Quang Ninh district

Health problems	Rate of cases (%)
Inflammation of the upper respiratory tract	55.0
Skin diseases	31.0
Joint pain	38.0
Stomachache	45.0

Source : National Institute of Labour Protection, Vietnam

Table 3. Official statistics of Occupational diseases and occupational accidents

<i>Occupational diseases (total number to the end of 1994)</i>	
Silicosis	6507
Asbestosis	1
Tuberculosis (occupational)	13
Noise-induced hearing loss	840
Lead poisoning	60
Mercury poisoning	6
Others	68
Total	7495
<i>Occupational accidents (in 1993)</i>	
Fatal cases	212
Number of deceased workers	231

Source : National Institute of Labour Protection

Furthermore, a lot of other occupational health problems of coal mine workers are not fully investigated. For example, there should be many cases of vibration disorder, CO intoxication, and noise-induced hearing loss among the coal mine workers.

As the coal mine sector is one of the most important industries in Vietnam, the government has paid special attention to the health problems of coal mine workers. They have conducted some special field studies but unfortunately, they are not always sophisticated ones. According to a governmental report based on the field research of several coal mines, a very high rate of pneumoconiosis cases exist (Table 4). If these figures are applicable to other coal mines, there are a tremendous number of pneumoconiosis patients in Vietnam. Unfortunately, we did not have an opportunity to investigate the real status of this problem mainly because of the shortage of materials and financial resources. It is an urgent task for us to conduct well planned descriptive epidemiologic studies in order to clarify the actual condition of pneumoconiosis among coal mine workers and to implement some effective countermeasures for prevention and treatment.

Table 4. Frequency of pneumoconiosis cases among coal mine workers according to working period and age category.

Working period (year)	Rate of pneumoconiosis (%)
6–10	5.09
11–15	14.40
16–20	28.24
21–25	28.04
over 25	24.20

Age (years old)	Rate of pneumoconiosis (%)
25–30	0.38
31–40	11.52
41–50	49.37
over 50	38.71

Source: Government of Vietnam

Pneumoconiosis Registration System in Vietnam

Figure 1 shows the flow-chart for the diagnosis of pneumoconiosis cases in Vietnam. According to the labor code and its related decrees, employers are obliged to organize an annual health examination for their workers. In the case of workers exposed to dust, this examination includes a chest X-ray examination. The chest X-ray examination is conducted by company-managed-clinics in the case of large companies, or by the department of occupational diseases in provincial hospitals where specialists in occupational diseases are working. When a worker is suspected of being a pneumoconiosis case, his medical record and chest X-ray film are sent to the provincial expertise board of occupational diseases. If the case is difficult to diagnose, the record and film are referred to the National Institute of Medical Expertise, where four specialists of occupational respiratory diseases are working. These specialists make a final decision on whether the suspected case is pneumoconiosis. If the cases are recognized as victims of pneumoconiosis, they can receive a cash compensation from the government. The amount of compensation is 75% of the worker's salary and is paid over a period of five years.

As can be easily imagined, this scheme is not always applied to all miners, mainly because of financial difficulties. The chest X-ray film costs 10 US dollar each, which is too expensive for an employer to conduct a chest X-ray examination for all of the employees exposed to the dust. In reality, only workers with some respiratory symptoms are subject to the X-ray examination. In the case of an early stage of pneumoconiosis, the cases with apparent respiratory symptoms are

Fig. 1. The Flow-chart of the diagnosis of pneumoconiosis in Vietnam.

not so many. Furthermore, most workers themselves hesitate to tell their health problems during the health examination, for fear of losing their job. Thus the official data of pneumoconiosis becomes under-reported.

Conclusion

Since the introduction of a new market economy in 1986, Vietnam has undergone a rapid economic growth. The modernization of the economy in Vietnam has been brought about by investments by foreign countries. Technology transfer from foreign countries has stimulated the Vietnamese economy by increasing productivity. In addition, it may be contributing to the

improvement of working conditions by reducing the physical burden of heavy manual work. But in the case of the coal mine sector, it seems that the workload has been intensified in order to increase the productivity, although working conditions still depend on traditional manual work. Under the strong incentive for rapid economic development, the health problems of miners tend to take second place. As shown in the present report, miners' working conditions are very bad, and health protection measures are not sufficiently implemented. It is apparent that official statistics underestimate the actual situation because of the inadequacy of the reporting system. Furthermore, there is a methodological problem in the previous field studies as shown in some tables of this report. They were not conducted under sophisticated epidemiologic principles. Thus we could not rely on these data in order to estimate the real working conditions and health problems of the Vietnamese coal miners. There is no doubt that they have many occupational safety and health problems. We need proper information regarding these problems in order to implement appropriate countermeasures in a financially efficient way. Considering the financial barrier to establishing a sufficient reporting system for occupational diseases including pneumoconiosis, an epidemiologic study is the most effective way to assess the actual situation. It is also useful to conduct epidemiologic studies as part of an international collaborative project, in order to transfer the necessary knowledge and epidemiologic skills from the developed countries to Vietnam. In fact, we have started a new study on OSH (occupational safety and health) problems among coal miners under the international collaborative program between Vietnam (National Institute of Labour Protection: NILP) and Japan (UOEH, National Institute of Industrial Health). We believe this program will contribute to improving the working conditions of Vietnamese coal mine workers and at the same time to establish a good partnership relation between the two countries. We hope that many OSH researchers in Japan and other developed countries will pay attention to the OSH problems in developing countries such as Vietnam.

Acknowledgement

We are very grateful to Prof. K. Higashi (Editor-in-chief of J. UOEH) for giving us an opportunity to explain the actual situation of the OSH problems of the Vietnamese coal miners.

ベトナムの炭坑労働者におけるじん肺問題の現状

グウェン・アイン・ルオン¹, 松田 晋哉²¹ベトナム労働保護研究所²産業医科大学医学部 公衆衛生学教室

要 旨： この報告において、著者らはベトナムの炭坑労働者におけるじん肺問題の現状について紹介している。石炭はベトナムにとって最も重要な輸出品であることから、近年その産出活動が強化されてきた。しかしながら、経済発展への強いインセンティブのために、労働者の健康問題は必ずしも最も重要なものと考えられているわけではない。ベトナムにおける炭坑労働者の労働条件は劣悪であり、健康保護対策も十分には実行されていない。情報システムが未整備であるために、公式統計は実態を過小報告している。じん肺の情報システムを構築するために必要な財政的負担の大きさを考慮すると、現状を明らかにするための疫学的調査を行うことがもっとも効率的な方法である。また、疫学的調査を国際協力の枠組みの中で行うことは、疫学に関する基礎的知識と技術を先進国からベトナムに対して移転するためにも有用であると考えられる。

J UOEH (産業医大誌) 20 (4): 353-360 (1998)