

Incheon Occupational Disease Surveillance System in Korea – Providing Updated Information and Education.

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Abstract

The occurrences of occupational illness and injury have been seriously underestimated in Korea. Surveillance systems for occupational diseases have recently emerged as important strategies for the control of occupational hazards and the implementation of intervention programs to protect workers. However, health service providers do not actively diagnose occupational diseases and are unwilling to report occupational diseases. With the rapid growth of Internet usage in Korea, the computer network has become the predominant means of communicating and sharing information. Therefore, we developed a web-based updated information and education network to assist the health services providers in reporting occupational diseases.

Information systems for occupational disease surveillance were also designed to support occupational disease reporting. Commonly available database systems, such as web databases, are useful to manage occupational diseases data efficiently. Standardized case definitions and report guidelines were also established, which included cumulative trauma disorder, occupational asthma, occupational contact dermatitis, and occupational cancer. This system may provide the basis of an efficient and continuously updated source of educational information and provide specific information concerning the occurrence of occupational diseases in specific areas.

Background information on occupational diseases obtained in this way will be invaluable for preventing hazards and enforcing occupational disease prevention programs. Moreover, our experiences in establishing these information systems will be of great use in other countries and settings.

Keywords:

Surveillance system; Information network; Education

network; Occupational diseases; Web database

Introduction

Public health surveillance was defined as 'the ongoing, systemic collection, analysis and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with timely dissemination of these data to those who need to know'. The final link of the surveillance chain is the application of these data to prevention and control [1]. Surveillance programs in the workplace can be used to monitor trends of illness, injury, or exposure to workplace hazards. In such activities, surveillance data are used to assess variations in rates between (a) different industrial group (b) different geographic areas, and /or (c) different time periods. In this way, surveillance of health or exposure trends can be used to evaluate the efficacy of programs designed to control occupational hazards [2-8]. Occupational diseases often have been under-diagnosed and under-treated without preventive measures. Major efforts are under way to perform surveillance of occupational diseases in many countries to prevent occupational diseases [9-11]. However, new strategies are required to provide continuing education and up-to-date occupational information for health providers to assist them in reporting occupational diseases.

Rapid economic development has occurred in Korea in the last three decades. This dramatic economic development was possible due to the backbreaking efforts of Korean employees and employers. However, the high incidence of occupational diseases and injuries places too great a burden on the Korean economy. Over certain short periods, these incidence rates of occupational diseases and injuries have decreased. Korea now has well-developed

preventive system for occupational hazards, because all industries having more than one employee should periodically perform medical screening and environmental measurement by the law.

However, certain occupational diseases have not been controlled well. Few occupational diseases, with the exception of pneumoconiosis and noise-induced hearing loss, have been recorded in existing medical screening data in Korea. Rarely reported are the occupational diseases such as occupational lung diseases, occupational skin diseases, and cumulative trauma disorders. We believe that occupational disorders are considerably under-reported in Korea. This under-diagnosis and under-reporting of occupational illnesses and injuries subsequently contribute to difficulties in performing effective control of occupational hazards and implementing intervention programs to protect workers [12-16].

Surveillance systems for occupational diseases have recently emerged as important strategies for the control of occupational hazards and the implementation of intervention programs to protect workers in Korea. Two workshops were held on occupational disease surveillance, one in 1999 and the other in 2000. These two workshops were important events to introduce occupational disease surveillance in Korean occupational health systems [17-18]. With the rapid growth of Internet usage in Korea, the computer network has become the predominant means of communicating and sharing information [19-25]. Therefore, we develop a web-based updated information and education network to assist the health services providers in reporting occupational diseases.

Approach and Methods

Construction of the information and education network:

1) Development of the contents of the information and education network

Target diseases for surveillance, standardized case definitions and report guidelines were established, which included cumulative trauma disorder, occupational asthma, occupational contact dermatitis, and occupational cancer. Surveillance case definitions included exposure information, subjective symptoms, objective signs, and confirmatory test findings. However, the confirmatory test was not necessarily needed. Updated information concerning etiologies and diagnostic methods of occupational diseases in Incheon was prepared for health services providers to report occupational diseases.

2) Analysis and design of the information and education network: Web Database

The information systems for occupational disease surveillance were also designed to support occupational disease reporting. Available web database system and on-line reporting form were analyzed and designed for collecting and providing information about occupational

diseases. Standardized data classification system was also investigated to standardize information.

3) Construction of the information system and education network

Occupational Health Information Services (<http://www.ohis.net>) was constructed as a web-based information and education network. A web-based occupational diseases databases were also constructed. This was programmed using Perl with MySQL database, Linux 6.0 Window NT server.

Results

1) An information and education system based on the Internet

An information and education system for occupational disease surveillance was built in Korea for the first time. The occupational health services provided on the web (<http://www.ohis.net>) are as follows (Figure 1,2) ; (a) target diseases for surveillance, (b) standardized case definitions and report guidelines, (c) updated information concerning the etiologies and diagnostic methods of occupational diseases including cumulative trauma disorder, occupational asthma, occupational contact dermatitis, and occupational cancer. (d) reporting form and reporting guidelines, (e) results of surveillance activities, (f) surveillance activities in other countries, (g) references concerning occupational disease surveillance.

The occupational disease surveillance activities are performed in 3 steps; (a) First, detect occupational diseases and deaths, and estimate the amount of these diseases and deaths. It is an important process to estimate the severity and occurrences of these diseases and deaths. (b) Second, analyze and interpret data to understand the trends and characteristics of occupational diseases. (c) And third, intervene for preventing occupational diseases. These activities provide a feedback of information to health providers, educate employees and employers, aid the operation of an efficient medical screening program, improve the working environment, assist in toxicologic and epidemiologic studies, aid in establishing new health promotion programs, support enactments of occupational health and safety reforms, and so on. This program was designed to assist these surveillance activities.

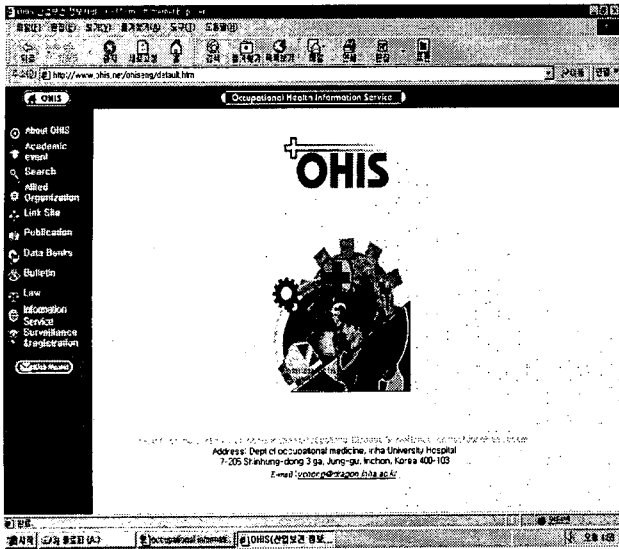


figure 1. occupational health information services homepage

The on-line reporting form for occupational diseases consists of patient information (name, registration number, occupation), information on the working environment (company name, address, telephone, industry, process), clinical status (diagnosis date, disease name, hazard exposure, risk factor, level of work relation), and reporter information (name, job, telephone). Code classifications are used for describing patient occupation, hazard exposure, risk factor, and level of work relation. Patient occupation is coded using Korean standardized occupation classification system. Over-exposure to all hazards should be documented. The level of work relation should be categorized among A (definite occupational disease), B (probable occupational disease), C (possible occupational disease), or D (suspicious occupational disease). Risk factors are classified as chemical agents, physical agents, biological agents, and ergonomics. Description in details concerning risk factors are also required; for example, exposure to organic solvents such as toluene, trichloroethylene.

Information systems for occupational disease surveillance were also designed to support occupational disease reporting. Reported information was collected on Web server and fed back to reporters with updated information. The database server contained occupational surveillance database obtained from other existing data as well as the occupational database from health providers' reporting (Figure 2). At the manager's menu on the web, managers can easily obtain and analyze detailed information such as risk factors, hazard exposures, and time trends of occupational diseases. This system will be useful in providing information and supporting the case reporting of occupational diseases

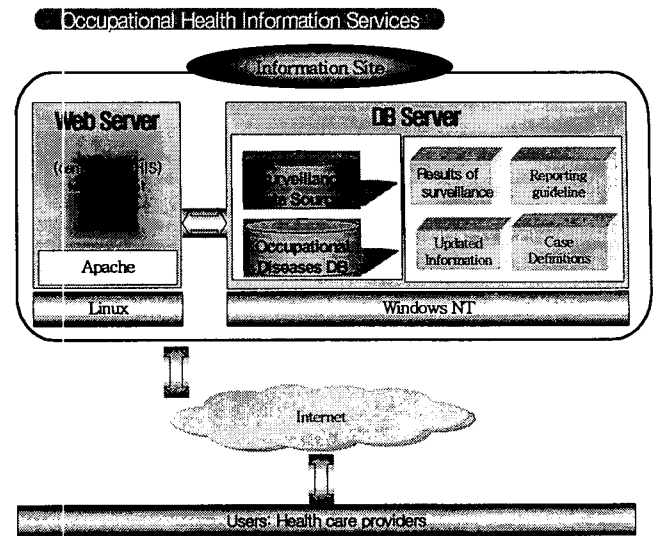


Figure 2. Configuration of OHIS

2) Pattern of occupational disease by the Incheon Occupational disease surveillance system

The pattern of occupational disease collected over 3 years by Incheon Occupational disease surveillance system is shown at Table 1. Noise-induced hearing loss and pneumoconiosis comprised 95% of occupational diseases in Korea according to existing data such as specific medical screening. However, according to the Incheon surveillance data, cumulative trauma, occupational asthma, occupational contact dermatitis formed 40-60%, 10-30%, 20-30%, respectively. Cumulative trauma disorders are increasing among various workers such as VDT (visual display terminals) workers, mail sorters, poultry processing industry workers, machine assemblers, welders, simple laborers, and meat packers. Ergonomic risk assessment and early intervention are required because many workers are exposed to ergonomic risk factors repeatedly. These data also show significantly higher incidence rates of occupational asthma than the previously reported rates. The major etiologic factors of occupational asthma were TDI (toluene diisocyanate) and reactive dyes. These facts indicate that there are many woods processing industries and dye manufactures in Incheon. More occupational skin diseases are believed to occur than the reported number in Incheon. Because the symptoms of these skin diseases are not severe, workers often do not complain these diseases and health providers ignore them easily. Therefore, careful monitoring and examination will be required to assess the occupational skin diseases, especially for high-risk groups. Approximately 4,000 cancer cases occur annually in Incheon. 5-10% of these cancers may be due to occupational causes. Active surveillances are necessary for the recognition and prevention of occupational cancers.

Discussions

Some occupational diseases such as cumulative trauma disorder, occupational asthma, occupational contact dermatitis, occupational cancer and other occupational diseases are under-diagnosed and under-treated in Korea. We have established the first occupational disease surveillance system that provides updated information and education of these conditions. Our information system gives health services providers' updated information and education about these under-diagnosed occupational diseases. Our occupational disease surveillance and information system also will enhance the efficiency of existing occupational services systems in the management of occupational diseases. We expect that our system will reduce the morbidity and mortality of these under-diagnosed diseases, and promote the quality of workers' lives.

With the rapid growth in Internet usage, computer network has become popular. Because the WWW (World Wide Web) can provide information by using images, voice, and animation, information networks using the WWW rapidly have spread widely. These recent developments in the information network make the world an information-oriented society that has no borders. With the development of high-speed information networks and general Internet usage, the world will become a highly information oriented society by the 2010s. The developmental level of the information network will decide the quality of people's life, efficiencies in all aspects of society as well as in a nation's administrations and industries. Because of these trends, both the developed countries as well as developing countries are constructing nationwide information networks. A worldwide information network is also developing.

In Korea, the computer network has become the most popular means of communicating and sharing of information. With the rapid growth of the Internet network, various kinds of Internet usage are increasing. Many efforts are being made to standardize information and to construct information centers and information support systems. Advances in medical informatics enables us to use medical information whenever we want and wherever we are. Many hospital and medical institute homepages are providing a variety of information, example of which are such things as medical counseling [25], occupational health services [16,19], hospice care [23], and drug adverse monitoring [20]. A web-based database also has been built, for example, for a laboratory-information-accessing system [21].

Web-based networks have more advantages than client /server networks, because their programs can be used anywhere in the Internet and by a PC base without the necessity to install and update the program. The information network has been constructing primarily in university based as well as large hospitals, and spread to primary care clinics more than 88 percent in Korea [26]. Web based network will be more popular, because Internet usage is easily accessible, economical, and the database can handle even more information.

This computerization and management of personal

data may cause some ethical issues concerning the leakage of private information. Careful data management is therefore required to prevent accidental harm to people in the listed in the database.

The level of Internet usage concerning occupational medicine is also rising [16,19]. However, these Internet sites are as yet small and do not provide certain kinds of information about occupational diseases. Various data, such as workers' health data and environmental measurement data, are not managed or well controlled or integrated in the database. It was not possible up to now to efficiently prevent occupational diseases, because we have not had the computerized system to analyze the association of hazard exposure and the health outcome, and to estimate the accumulative health effects of hazard exposure. Development of the Internet and a well-controlled database management system is necessary to promote efficiency in existing occupational health services. The developmental level of Internet network and a well-controlled database management system will determine the efficiency of occupational health services systems.

Surveillance systems for occupational diseases have recently become important strategies for the control of occupational hazards and the implementation of intervention programs to protect workers. But health service providers are unwilling to report occupational diseases and have not much experience to diagnose occupational diseases.

To educate these health service providers and encourage case reporting of occupational diseases, we constructed an information and education network. This computerized information and education system will be helpful in occupational diseases surveillance by improving the health services providers' capacity to diagnose occupational diseases. The Incheon models have the advantage of efficiently using local resources. Moreover, such local surveillance systems will provide a framework for the establishment of a nationwide surveillance system.

In summary, we established the first web-based surveillance and information system concerning the occupational diseases in Korea. This system may provide the basis for an efficient and continuously updated source of educational information and provide specific information concerning the occurrence of occupational diseases in specific areas. Background information regarding occupational diseases obtained in this way will be invaluable for preventing health and occupational hazards, and enforcing the establishment of occupational disease prevention programs. Furthermore, our experiences in establishing these information systems will be of great use in other countries and settings.

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