VIEWPOINT

Occupational lung diseases and global occupational health on the Net

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Occupational lung disease is a major area of concern in occupational health, exhibiting a diverse panorama across countries. While pneumoconiosis is deemed to be the most common occupational disease in many developing countries, emphasis is shifting towards asbestos-related lung diseases and occupational asthma in industrialized countries. Following the Occupational Health for All strategies set forth by the World Health Organization, we propose that a model system based upon the Global Health Network can serve as an effective vehicle towards the prevention of occupational lung diseases on a global scale. It has the potential to: (1) enhance transmission of data and collaboration with the primary health care system in disease surveillance; (2) strengthen research and information transfer; and (3) promote education and training at all levels of prevention, with a possible application to the interpretation of chest radiograms.

Key words: Chest radiogram; Global Health Network; Internet; pneumoconiosis; silicosis.

INTRODUCTION

In May 1996, the World Health Organization (WHO) Assembly adopted a resolution, the WHO Global Strategy for Occupational Health for All (OHA). The resolution emphasizes that the Global Strategy for OHA would contribute to global health as a vital element of the implementation of WHO Health for All Strategy. It marks a significant step forward in occupational health, as the working population seldom obtained a priority position on the health policy agenda — either internationally or in many countries with serious occupational health problems. This is so in spite of the recognition that substantial economic losses are incurred by health and safety hazards at work and by reduction or loss of working capacity. It has been estimated that such loss may amount to 10–20% of GNP in some countries.

Occupational lung disease is one of the most frequently occurring, most severely disabling and most amenable to prevention of all the categories of occupational diseases. Consequently, occupational lung disease has been listed as one of the priority areas in occupational health by the WHO, and pneumoconiosis in particular, by the International Labour Organization (ILO). Pneumoconiosis is by far the most common and most serious of occupational lung diseases seen in developing countries today. In the USA occupational lung disease is designated as one of the five major areas of concern in pulmonary medicine by a task force appointed by the National Institute of Health. Current issues on occupational lung diseases should be discussed in perspective of global occupational health.

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We are currently in an information revolution with the Internet on its forefront. This could be enormously important for occupational health. The Internet integrates local computer networks into a global network through a common protocol thus allowing smooth and easy transmission of information from network to network and thus from individual to individual. The remarkable development and growth of the Internet is evidenced by a growth rate of over 12% per month. It is estimated that currently 40 million people in over 91 countries are connected worldwide. It is our belief that a network could be established for occupational lung diseases in the same way as the Global Health Network (GHNet). The GHNet is based upon the Internet framework and forms an alliance of experts in health and telecommunication who are actively developing the architecture for a health information structure for the prevention of disease in the 21st century. The professionals involved in GHNet bring together expertise from the essential areas of government, international organizations, business and academia. The primary components of GHNet include connectivity, a global health information server, telemonitoring of disease and global education and training.

A model system based upon the GHNet could be established to address several of the proposed priority objectives of WHO. WHO has proposed 10 priority objectives to accomplish the goal of OHA. Along the lines of these objectives, we propose that the utilization of GHNet will serve as an effective vehicle towards the prevention of occupational lung diseases. The following objectives have particular relevance to this task: (1) establishment of registration and data systems, development of information services for experts, effective transmission of data and raising of public awareness through public information; (2) development of collaboration in occupational health and with other activities and services and (3) development of human resources for occupational health.

Global surveillance of occupational lung diseases

A diverse panorama is exhibited by occupational lung disease across countries. In developing countries where mining and mineral extraction constitute the backbone of economic development, the occurrence of pneumoconiosis is high and increasing. Silicosis is the most common occupational disease in China. In industrialized countries pneumoconiosis is decreasing, but paralleled by an increase of asbestos-related lung diseases with a growing concern towards occupational asthma.

Unfortunately the worldwide distribution of occupational lung diseases cannot be quantified because comparable national statistics do not exist. An occupational health network can help quantify the frequency of occupational lung diseases. Such statistics inherently depend on the type of industries, stage of industrialization or economic development, notification and compensation system and research interests. For example, statistics available for silicosis are often based on compensation figures and thus on selected cases. Further, the modes of definition and the laws of compensation differ widely from one country to another and even within the same country (e.g., the USA), as do criteria for, and methods of, assessing lung disability for compensation purposes. Van Sprundel, in reviewing the situation of pneumoconioses in developing countries, correctly pointed out that available data represent limited, cross-sectional data obtained in epidemiological surveys, and not surveillance data. Another major impediment is a feature common to occupational diseases, i.e., they remain for the most part unrecognized and unregistered and consequently undiagnosed and untreated. Thus low rates of diagnoses and reporting speak for the inability of the health system but not the magnitude of the problem. Despite these limitations, data suggesting high prevalence rates of pneumoconiosis even as high as 50% in heavily exposed workers should prompt immediate action.

Surveillance is defined as 'the ongoing scrutiny of disease occurrence', generally using methods distinguished by their practicality, uniformity, and frequently their rapidity, rather than by complete accuracy. Its main purpose is to detect changes in trends or distributions in order to initiate investigative or control measures. Thus surveillance is central in occupational health practice in view of its role in identifying the successes and failure of prevention efforts. In practice, occupational health surveillance connotes disincentives for physicians and others to report occupational diseases as well as complexities which relate to the necessary inclusion of hazard (exposure) information. Thus surveillance of occupational lung diseases is rare, and where it exists, it is faced with obstacles.

Several surveillance systems in industrialized countries may serve as contrastive models for developing countries. That in the USA is led by the National Institute of Occupational Safety and Health (NIOSH) and characterized by direct surveys specifically designed for detecting occupational risks (e.g., Sentinel Event Notification System for Occupational Risks (SENSOR) and Coal Workers’ X-ray Surveillance Program (CWXSP)), combined with indirect surveys of existing federal data sources designed for purposes such as death certificate and hospital discharge. The UK system is the Surveillance of Work Related and Occupational Respiratory Disease (SWORD) which is based on voluntary reporting of lung diseases thought to be due to occupational factors by members of the British Thoracic Society and the Society of Occupational Medicine. In Finland new cases of occupational lung diseases are registered based on the law that requires physicians to report every case of occupational disease or disease related to work. Each system has strengths and limitations reflective of
resources in health and other socioeconomic milieu. Thus any model should be tailored to specific national conditions and practice.

The GHNet can be applied to both industrialized and developing countries with or without existing surveillance systems for occupational lung diseases. The incorporation of GHNet into existing systems will promote incentives of reporting personnel, standardized data collection and/or exploration of previously untapped data, thereby effecting parallel data systems. Parallel data systems are useful to assess the degree of underreporting due to disincentives. Further, new statistical approaches are available to control for undercount of diseases and have already been integrated into GHNet.

On the other hand, the GHNet can enhance the establishment of new surveillance systems in countries with weak infrastructures once these countries seize the opportunity to deploy telecommunications and information infrastructures. In consideration of scarce resources in occupational health, WHO has proposed effective networking of the existing educational, research and information resources, programmes and institutions. To this end, the GHNet provides a technically feasible and cost-effective solution in its capacity to raise public awareness through public information, enhance transmission of data and, where necessary and appropriate, collaboration with the primary health care system.

Strengthening of research and information transfer

Occupational health research provides the basis of policy formation, and as such, is a facilitator of development. Nevertheless research is lacking in most developing countries. For example, in a review of the Index Medicus entries from 1988–93, of 2,322 references cited for research on occupational lung diseases, only six had to do specifically with developing countries. Research of occupational lung diseases should encompass areas ranging from surveillance of diseases and exposures to setting of exposure limits, epidemiology in terms of dose–response relationship, and control of exposures and prevention. Such research can be strengthened by GHNet through its capacity to enhance connectivity among researchers, institutes and programmes. In addition, multicenter studies or studies using pooled data can be planned and organized.

Information transfer, as it relates to prevention in occupational health, can be defined as providing developing countries with models for risk management. Such information can be provided as guidelines or collections of reports through a global information server which is another primary component of the GHNet. Efforts should be made to involve international bodies such as WHO and ILO to develop and maintain, for example, a 'global homepage for prevention of occupational lung diseases.' Developing countries would benefit from making reference to this information for reviewing their own system and data.

Global education and training

Education is another vital area in the prevention of occupational lung diseases. It must go hand-in-hand with regulatory and technologic approaches especially at the level of primary prevention. For pneumoconiosis, control of dust exposure (primary prevention) is enhanced through enlightening legislators and should involve education of engineers, inspectors, managers and workers. Equally important is the early detection of pneumoconiosis by screening (secondary prevention) and prevention of disability or complications (tertiary prevention). This can be promoted by professional training of occupational health and/or primary care physicians with emphasis on production and classification of chest radiograms. Unfortunately developing countries suffer shortage of human resources and training at all levels of prevention.

Recently a scheme for global training in public health, with inclusion of short courses and degree programmes, has been proposed as a primary component of the GHNet. The utility of the homepage for short courses in diabetes has already been demonstrated. Internet resources enable instant exchange of ideas as well as various educational materials including text, graphics, audio and video between parties half-way around the world from each other. In comparison to conventional distance learning methods, global network training is quick, inexpensive and capable of reaching a much larger audience. Occupational health training programmes should also take these advantages. First a standard curriculum should be organized and then distributed to key regional institutions (e.g., WHO collaborating centres in occupational health). After adjustments are made for language and other local needs, the programme could be supervised at the local level. The trainees can enrol to the entire programme or a subset of it and receive feedback from their supervising institutes and interact with each other.

Application of GHNet to the ILO international classification of radiographs of pneumoconioses offers a promising example. The ILO system was designated to standardize classifications and facilitate international comparisons and has won acceptance in the most developed countries. Unfortunately ILO films are rarely utilized in the large areas of the world where silicosis is rampant, which is attributable to the cost of the film and further problems of acquiring the necessary training. The first level of application would be the distribution of information on training opportunities and obtaining of films, textbooks and other learning sources. This should parallel the identification and networking of key persons and institutes capable of reaching remote areas without access to Internet. The next level of application would be the on-line provision of basic knowledge and skills in the production and classification of chest radiograms. At present, standard films need to be obtained separately, perhaps by mail, for reference purposes. The Canadian

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programme to provide reading skills of pneumoconiosis films has attested that a system based on mailing of films is a practical proposition.31 If a similar scheme is combined with Internet resources, the efficiency of correspondence and the chances of reaching those who are in need, are likely to improve.

Perhaps the most exciting possibilities in the application of the GHNet are the online expert consultation on interpretation of films and on-line training course in radiographic skills. With improvement in the quality and speed in transmitting radiographic image data, standard film images can be made accessible and compared with target films, on-line. The development of such a programme is yet to be instituted, but should be explored to enhance the role of telecommunication in the prevention of occupational lung diseases.

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