A New Profile of Tuberculosis Epidemiology*

Rungsun Pushpakom, M.D., M.Sc.
Wanchai Dejsomritrutai, M.D.
Somchai Bovornkitti, M.D., D.Sc.Med

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That tuberculosis is a ubiquitous disease, known to have existed from ancient times, was amply proved by Babylo-Assyrian records, the writings of the Hindus contained in the Rig Veda, the scriptures of the Hebrews, Greek works from the days of Homer, and ossuary relics of tuberculous lesions in Neolithic man and Egyptian mummies (1). But it was not until the great discovery of the causative organism, *Mycobacterium tuberculosis*, in 1882 by Robert Koch (2) that tuberculosis was proved to be an infectious disease.

However, infection by *M. tuberculosis* is different from most other infectious diseases in relation to the

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*From the Division of Respiratory Disease and Tuberculosis, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

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outcome. Not everyone who receives the infecting organisms suffers the typical symptoms of the disease; those who refrain from the disease are conferred immunity. What ones call disease is, after all, the result of a face-off between the infecting organisms and the body’s immune mechanisms in which the invaders get the upper hand. Another interesting phenomenon is that any individual infected by the TB bacillus is destined to harbour the germs within his body for the rest of his life. These people may be described as having subclinical infection; the bacillus can lurk dormant in their lungs and other organs without causing any trouble - unless something should happen later on in life such as malnutrition or other causes of a defect in immunity. In such situations the bacilli could overcome the body’s resistance, with clinically overt disease ensuing.

In the early days when there were no effective specific drugs for treatment, the control of tuberculosis depended on identifying infected persons with active causes of the disease, segregating them from others to prevent transmission of the germs, and curing them by conservative methods, usually by putting them in sanatoria. In such institutions, they could be provided with ample rest, proper nourishment, and in some cases their lesions could be immobilised by pulmonary collapse therapies and/or fixation of bone and joint lesions. BCG vaccination was concurrently advocated for the prevention of natural infection. Using these modalities, Europe and the continental United States saw tuberculosis mortality start to decline gradually (3-5).

Then came the discovery in the mid-1950s of chemical agents that act against the TB bacillus. Such agents together with research and trials provided the knowledge and techniques needed for elimination of the disease. As a result, there was a markedly accelerated decline in the number of cases reported annually, especially in technically advanced countries. Even in developing countries it was predicted that the disease was conquerable. The decrease occurred to such a remarkable extent that many people-including physicians - began to lose interest in the disease. It must be mentioned that, by that time compared with 1882, the year Robert Koch discovered M. tuberculosis, the rate of decline of new TB cases as a whole was lower than the rate of population increase, especially in Asia and Africa where 75 per cent of the world’s population live and where most cases of tuberculosis occur. All along tuberculosis had been seen as a typical Third World disease, associated with poverty, overcrowding, malnutrition and other such factors (6).

But in 1986, not long after medical experts predicted its eventual eradication, the situation suddenly changed. From that time, all forms of tuberculosis again have been increasingly seen, and more conspicuously so, in advanced countries. For the first time in 33 years, the annual number of reported cases increased in the United states (7). Currently a worldwide resurgence of tuberculosis has been convincingly documented (8-19). Several factors have led to the reactivation of tuberculosis, a disease the world had once assumed was being tamed. These factors include more poverty and homelessness, increased drug abuse, greater overcrowding in inner city areas and immigration from countries with a high prevalence of tuberculosis. However, the dramatic changes in the incidence of tuberculosis appear to parallel closely the emergence of the acquired immunodeficiency syndrome (AIDS) pandemic, which is a result of infection with the human immunodeficiency virus (HIV). The basic reason for this is that resistance to tuberculosis is mediated by T-lymphocytes, a type of white blood cell destroyed by the HIV. Therefore, not only is a person harbouring the TB bacillus more likely to develop active tuberculosis if he is infected by HIV, but also those people who become infected with HIV are more likely to develop tuberculosis if exposed to people carrying the germ. This is the same type of occurrence as seen in diabetics when exposed to patients with active tuberculosis. Also, with their immune systems out of action, AIDS cases will almost certainly develop a rapidly progressive disease rather than a subclinical infection.

Hence, there is no doubt that the sudden and unforeseen presence of HIV infection has immensely complicated the global problem of tuberculosis control. Tuberculosis and HIV disease are serious enough on their own; in combination, their effects are proving to be deadly. In sub-Saharan Africa, for example, where the prevalence of dual infections with both M. tuberculosis and HIV are the highest in the world, the recent remarkable upsurge in the number of cases of tuberculosis has swamped the already scant health care services and contributed to a serious shortage of hospital beds, drugs and personnel. All predictions indicate that the situation will worsen substantially during the 1990s (20).

Although anti-tuberculosis chemotherapy remains
effective in drug-sensitive HIV-seropositive patients - isoniazid prophylaxis has even been recommended for those with positive tuberculin skin tests (16) - the management of tuberculosis in advanced countries is becoming more complicated. This is due to the recent increasing incidence of primary drug resistance transmitted by immigrants from high-prevalence developing countries (21) or by infection that occurs during visits to those countries where the bulk of tuberculosis patients with drug resistance live.

In the more affluent parts of the world, it is not merely the relatively few afflicted with poverty who fall victim to tuberculosis. The social changes wrought by affluence - for example, intravenous drug abuse and changed sexual mores - have taken their toll on the state of immunity in those countries, with the consequent change in their populations' vulnerability to TB infection.

REFERENCES