Risk factors and control strategies for silicotuberculosis as an occupational disease

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Abstract

Silicotuberculosis is critical in community settings among workers and employees exposed to silica dust. Older age of entry (>30 years), male sex, infection with human immunodeficiency virus (HIV), exposure duration, smoking, chronic obstructive pulmonary disease, migration, the severity of the silicosis and the intensity of the exposure are potential risk factors. Lack of timely diagnosis and treatment for tuberculosis (TB) may also raise the rate of infection; previous treatment of TB is possibly associated with the development of silicotuberculosis in more than half of patients, increasing with age (>40 years). Identification of risk factors benefits not only the academic research community, but also the workers or employees and policy making. Some strategies can be implemented, such as controlling or reducing exposure to silica dust, ensuring continuity of treatment of TB or extended anti-TB treatment, management of the situation by occupational health professionals, prevention of oscillating migration, providing workers with compensation, training and education in occupational health, improving the quality of life of miners and workers, intensive medical surveillance and TB screening in routine health check ups, and policy making for higher immunity to inhibit inhalation of dust by workers or employees.

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Context

Silicosis caused by the entry of silica dust into the lungs is a chronic lung disease. Silica is among the predominant minerals in the earth’s crust. Workers are predisposed to and are at risk for silicosis when working in jobs where they are exposed to silica particles [1]. Silicosis disease or even exposure to silica without initiating the disease is associated with predisposition or risk of progress in various co-morbidities. Recently, the incidence rate of tuberculosis (TB) has been reported as 1.9% per year [2]. Fortunately, the number of incident cases has been falling annually since 2006 because of reform in population health and the global Stop TB Strategy. Approximately one-eighth of individuals diagnosed were co-infected with human immunodeficiency virus (HIV), among which 82% were in the WHO African Region in 2010 [3]. Furthermore, the disease has a high rate of death among those who work with exposure to dust. Tuberculosis is one of the critical infectious diseases in terms of morbidity and mortality worldwide. There is a close relation between silicosis and TB [6]. The burden of the infection among exposed workers is not known in developing countries because of lack of surveillance and poor access to health services. The risk of silicosis-related TB is 2.8 to 39 times higher than that of the healthy population [3,4]. The pleural (61%) and pericardial forms are the most common signs, followed by the lymph node form [5–7]. The time duration of TB following silicosis might be several years. The silica impairs the activity of alveolar macrophages, and severe exposure leads to macrophage apoptosis [8]. In addition, excessive surfactant...