A Study on Chronic Obstructive Lung Disease (COPD) in Ex-mineworkers of the Transkei. A Misunderstood Clinical Condition

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Abstract

Background: There is no diagnostic indicative mark for chronic obstructive pulmonary disease (COPD). It is a general assessment of the patient leading to a diagnose as COPD. In most cases, there is a mixed picture of severe lung diseases including fibrosis, tuberculosis, silicosis, etc. In fact, COPD is the commonest and terminal entity in the majority of ex-mineworkers who were suffering primarily from the dust-lung-disease which is complex in origin.

Objectives: To establish the prevalence of chronic obstructive pulmonary diseases in ex-mineworkers of the Transkei, South Africa.

Methodology: During the period of 28 May 1997 to 27 May 1999, 2080, ex-mineworkers were examined at the Benefit Examination Clinic (BEC) in the chest section of Umtata (Mthatha) General Hospital (UGH). Physical examination along with standard chest x-rays were carried out; the mining history of each worker was taken, and identification forms were completed.

Results: There were 13% of ex-mineworkers suffering from chronic obstructive pulmonary disease. Out of them, 56% of the subjects (COPD) were associated with conditions like chronic bronchitis, emphysema, and bronchial asthma. The rest (44%) were associated with other lung diseases like tuberculosis and silicosis. Out of this number, 33% were associated with tuberculosis and 11% with silicosis. Most of the ex-mineworkers were suffering from an association of diseases ranging from simple tuberculosis to silicosis and their secondary effects.

Conclusion: Every seventh ex-mineworkers were suffering from chronic obstructive pulmonary disease. About half of them were having associated parenchymal diseases like tuberculosis and silicosis.

Keywords: *Ex-mineworkers, chronic bronchitis, emphysema, pulmonary tuberculosis, silicosis*

Introduction

Chronic obstructive pulmonary disease (COPD) is a complex under-diagnosed and under-reported cocktail of lung conditions in the ex-mineworkers of South Africa. A study conducted by the author showed that 78.3% of former mineworkers are suffering from lung diseases.[1] A majority of them suffer from either silicosis or tuberculosis or both. COPD is a component associated with most of the ex-mineworkers' lung condition, but it is often not diagnosed. In fact, it is submerged by the presence of other complications like tuberculosis, silicosis, fibrosis, etc. and as a result remains under-diagnosed even though it exists practically in most of the lung

condition of the ex-mineworkers. With the increase in cigarette smoking, environmental pollutants, and other noxious exposures, the incidence of COPD has increased dramatically in the past few decades and now ranks as a major cause of activity-restricting or bed-confining disability in the United States.[2]

COPD is combination of overlapping diseases: chronic bronchitis, emphysema, and asthma. Chronic bronchitis is defined by the Medical Research Council and occurs commonly, affecting around 10% of the population.[1] In an average group practice of 5,000 patients with a smoking rate of 30%, there will be 75-100 patients with COPD. In an inner-city practice with a predominantly working-class population and a high smoking rate the number will be higher. Many of these patients will be undiagnosed. [3] With the frequent component of reversible airway hyper-reactivity (asthma) in these patients, one can understand the utility and popularity of the word COPD.[2] Smoking is the leading cause of COPD. Although it is still a mystery why more than 80% of smokers will develop it, those who do get COPD must stop smoking. The COPD patient almost invariably has a significant smoking history. COPD is rare in someone with a genuinely light smoking history (less than 20 packs per year).[2] Trends in asthma mortality over the past three decades have attracted considerable interest to understand the epidemiology of this condition and to identify preventable causes. Concern was aroused by a sharp rise in asthma deaths rates in people 5-35 years in some countries during the 1960s.[4]

Little is known about asthma prevalence or mortality in South Africa. A 1983 study reported high asthma mortality rates among African and colored people. These rates were considerably higher than comparable rates in the United Kingdom and Wales.[5] COPD and asthma both cause airflow obstruction. The major difference between the two are that asthma is variable and reversible. Asthma varies in severity from day-to-day, season-to-season, or over long periods. The COPD patient shows little or no day-to-day variability in symptoms and little reversibility. Asking the simple question, "Do you have good days or bad days?" can be illuminating. Pneumonia, bronchiolitis, and other serious lung diseases in early childhood are risk factors for COPD independent of cigarette smoking.[6] During the first two years of life, while alveoli and airways are maturing, insults can have permanent effects. Passive exposure to cigarette smoke, particularly from maternal smoking, puts children at higher risk of serious lung disease.[7] Low birth weight is another independent risk factor for COPD.[8]

There is heavy burden of silicosis among young ex-mineworkers in the Transkei region. The strong association between silicosis and tuberculosis in southern Africa combined with the HIV epidemic makes elimination of silicosis an important public health issue.[9] A study published in Unisa Journal of Psychologica in 2002 showed that many mineworkers were diseased and disabled due to the harsh environments caused by mining operations. When mineworkers become diseased and disabled, they are retrenched and sent home where they must face the psychological and social consequences of unemployment and the stigmatization due to illness.[10]

The purpose of this article is to establish the prevalence of chronic obstructive pulmonary diseases in ex-mineworkers of the Transkei, South Africa.

Methodology

During the period of 28 May 1997 to 27 May 1999, 2080, ex-mineworkers were examined at the "Benefit Examination Clinic" at the chest section of Umtata General Hospital (UGH). Physical examination along with standard chest x-rays were carried out, the mining history of each worker was taken, and identification forms were completed. The data was collected from

the record registers and analyses.

Results

There were 270 (13%) ex-mineworkers suffering from chronic obstructive pulmonary disease. Of the 2080 participants 1164 (56%) of the subjects (real COPD) were associated with conditions like chronic bronchitis, emphysema, and bronchial asthma. The remaining 915 (44%) were associated with other lung diseases like tuberculosis and silicosis. Out of this number, 687 (33%) were associated with tuberculosis and 228 (11%) with silicosis. Most of the ex-mineworkers were suffering from an association of diseases ranging from simple tuberculosis and silicosis, and their secondary effects.

Discussion

This preliminary report on prevalence of COPD in the ex-mineworkers is probably the first report in the Transkei region of South Africa. There is deficiency in diagnosing and establishing COPD as there is no litmus test of diagnosis. It complicated more when there are many other elements such tuberculosis and silicosis which are also found in the same mineworkers.[9] Smoking is also common among mineworkers, and it is considered as one the greatest risk factor in developing COPD. A study carried out by the author (2021) showed that there is a strong correlation between lung abnormalities and smoking among ex-mineworkers of Transkei.[11] Work in the South African gold mines attracts black men from all over southern Africa. Their labours in the mines are poorly remunerated. The men risk developing occupational lung disease to a degree that should encourage the mining companies to improve the underground environment.[1] The gold mining industry employs approximately half a million men and is estimated to indirectly support more than five million people. It is thus to be hoped that the necessary improvements can be made to the mines without altering their labour-intensive structure, which is so vital to the Southern African region.[12]

There were 13% of former mineworkers who were suffering from COPD in this study. An x-ray-based study carried out in 2002 showed that 7% of them were suffering from COPD.[1] It is difficult to diagnose COPD based on an x-ray and it is always under reported. COPD is both a structural and a functional abnormality. The radiologist can pick the structural problem, but it is difficult to assess the physiological function. Therefore, it has always remained under diagnosed without examining the patient. Dust-related disorders are very common among mineworkers as they are exposed to dust underground when there is a dry drilling of rocks in an enclosed space. Although a face mask is given to the miners by the mining company it plays a very limited role in preventing dust inhalation. The larger dust particles reach the larger bronchi and produce a chronic bronchitis symptom complex.[13] These larger and some intermediate size particles that also reach the smaller airways produce chronic airflow limitation.[13] Both the bronchitis symptoms and chronic airflow limitation may also be aggravated by underground environmental pollutants other than silica- containing dust. The smallest, respirable particles, which have until recently attracted the major attention, reach the airspaces and have the potential to cause silicosis if their free silica content is sufficiently high.[10] Chronic, uncomplicated (simple) silicosis in black South African gold miners is associated with significant pulmonary dysfunction. A study conducted by Cowie et al. (1987) showed that 1.4% of mineworkers develop silicosis, [14] which is in contrast with the study carried out by the author, where silicosis with or without pulmonary TB was found in 78.3% of the cases. This study was carried out on the former mineworkers who were retired or retrenched and sent back to the Transkei to die.[1] Furthermore, Cowie et al. (1991) claimed that tobacco smoking produces chronic airflow limitations. It cannot be denied that

smoking is certainly a risk factor in COPD,[11] but it is not the only factor in mineworkers. There is also an association with silica which an underground rock breaker constantly inhales.[12]

A heavy burden of silicosis, tuberculosis and COPD was found in former gold miners.[15] The onset of disability is insidious, and sufferers almost unconsciously adjust their lives to fit their disability. They avoid visiting their GP to be lectured on their smoking habits! There are claims made by all kinds of pneumoconiosis but hardly any claim made because of COPD. COPD can be caused by various environmental factors other than smoking. It is difficult to decide how much smoking contributes to the causation of COPD. There are considerable challenges remaining to provide compensation and prevention services to all mine workers and their families to receive benefits in South Africa.[15]

Limitation of this study

There is a limitation of this study as it was undertaken in bits and pieces with very little data, but it should give some insight into the common problem of former mineworkers. It may help them to carry out further study.

Conclusion

Chronic obstructive pulmonary disease is a hidden disabling component of a mining job which is difficult to isolate from other dust-borne diseases. Silicosis and smoking are the precipitating factors for COPD, and it is again difficult to differentiate between silicosis or smoking induced or both. There is a need for an overall assessment of the lung diseases in the ex-mineworkers, including respirometric studies and gas analysis to understand the reliability of diagnosis. Compensation authorities must provide facilities like respirometers to the individual physicians who are carrying out the examination of ex-mineworkers for their compensation claims. The assessment calls for a more careful evaluation of the physical examination of an individual.

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Ethical issue: The author has ethical permission for case report publication (approved project No. 4114/1999) from the Ethical Committee of the University of Transkei, South Africa. This is an old study and could not publish because of the lack of time. Still, it has some relevance to the former mineworkers.

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