

Asbestos exposed mine work-force in Transkei region of South Africa

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Abstract

Background: Asbestos production is declining all over the world but still some countries are using it, despite the fact that it has been declared as a dangerous substance. The asbestos industry in South Africa has suffered a decline in production, if it has not stopped completely. However, the utilization of asbestos is still going on. There is no proper regulatory system in place for its control in South Africa.

Objective: To study the prevalence of asbestos exposure of mine-workforce from Transkei.

Method: Between May 1997 and May 2000, 2,027 ex-mineworkers were examined at the Benefit Examination Clinic, a clinic located in the chest section of Umtata General Hospital (UGH), the teaching hospital of the Walter Sisulu University of Science and Technology, Eastern Cape, South Africa. A structured questionnaire with 17 questions were prepared and posted to 644 randomly selected ex-mineworkers. Four hundred and six (63%) duly completed questionnaires were received, which were later, compiled and analyzed with the help of Epi Info6 computer programme.

Results: Out of 406, ex-mineworkers who 81 (20%) has had exposure to asbestos. Half the number 41(50%) of those exposed was between 40 - 59 years old. Among those who had been exposed, 8 (10%) were smokers, 63 (78%) asthmatics, and 56 (69%) had a history of tuberculosis. Seventy- three (90%) complained of deterioration of health. There is no association with asbestos exposure with smoking, asthma and pulmonary tuberculosis (PTB) in this study.

Conclusion: One fifth of the mine workforce has had exposure to asbestos.

Keywords: *Asbestos; Exposure; Mesothelioma; Compensation; Legislation*

Introduction

In 1981, the Republic of South Africa ranked fourth in world production of asbestos, behind the USSR and Canada, the world's major producers, and Zimbabwe, where production was slightly above that in South Africa; China, Brazil and Italy ranked 5th, 6th and 7th respectively and all other producers together furnished a tonnage a little less than that of South Africa [1]. In subsequent years, production levels decreased worldwide, with South African production in 1985 falling to approximately 70% of the 1981 tonnage [2]. In South Africa the health risks associated with asbestos mining and processing is quite high despite the fact that South Africa stopped digging asbestos but is still utilizing what has already been taken out from the mines. This country has mined 8% of world asbestos [3], used and exported large quantities of all three of the main commercially useful asbestos minerals viz crocidolite, amosite and chrysotile. This has left us with a considerable heritage of both past and continuing occupational and environmental exposure to asbestos minerals [4].

The spectrum of asbestos related diseases is changing. In developed countries, the incidence of parenchymal fibrosis (asbestosis) is falling in relation to pleural plaques, which are associated with considerably lower cumulative exposures. Patients with asbestos related

diseases are largely dying of late neoplastic complications, such as mesothelioma and lung cancer, rather than of respiratory failure following lung fibrosis [5,6]. Projections for the next 30 years in Western Europe indicate that the number of men dying of mesothelioma will double by 2018, before the incidence rate for this tumor starts to decline [7].

In addition, the long latent period characteristic of the development of asbestos related diseases, coupled with population shifts to the cities, combine to break the obvious association between early environmental or occupational exposure and the disease in many patients. With the shift of emphasis in the South African health arena from tertiary to primary care, more responsibility for the detection of asbestos related diseases has devolved from occupational physicians to the extended network of health professionals [8].

Asbestos related diseases carry a variable prognosis, ranging from coincidental pleural plaques to fatal cancer. Consequently, it is essential that a specific diagnosis is made and that in counseling people diagnosed with asbestos related diseases, they are given an appropriate assessment of prognosis and future risks [9]. The purpose of this study is to estimate the extent of the problem of asbestos exposure of the mine workforce from Transkei region of South Africa.

Method

Between May 1997 and May 2000, 2,027 ex-mineworkers were examined at the Benefit Examination Clinic, a clinic located in the chest section of Umtata General Hospital (UGH), a tertiary hospital attached to the University of Transkei in the Eastern Cape Province of South Africa. Ex-mineworkers presented themselves voluntarily for examinations.

A profile of 17 carefully structured questionnaires was prepared to distribute among ex-mineworkers. These 649 ex-mineworkers were randomly selected from the records of the clinic to complete the questionnaires. The questionnaires were mailed to the ex-mineworkers asking their responses to information their history in relation to exposure to asbestos. We also asked about history of smoking, asthma, PTB, and their physical health generally. A total of 649 questionnaires, in the local language Xhosa, were distributed and the responses we received were 480. Seventy-four (11%) of these responses were either incomplete or not completed at all and were therefore discarded from the study. Four hundred and six (63%) duly completed questionnaires were compiled and analyzed with the help of Epi 6 Info computer program.

Results

There were 644 questionnaires posted, 406 were returned. Of them 81 (20%) has had exposure to asbestos. Half the number 41 (50%) of those exposed was between 40 - 59 years old (Table 1). Among those who had been exposed, 8 (10%) were smokers, 63 (78%) asthmatics, and 56 (69%) had a history of tuberculosis (Figure 1). Seventy- three (90%) complained of deterioration of health (Figure 2).

Age groups	Asbestos exposed (%)	Asbestos Unexposed (%)	Total (%)
30 to 39	6 (1.5)	57 (14)	63 (15.5)
40 to 49	26 (6.4)	89 (21.9)	115 (28.3)
50 to 59	25 (6.15)	106 (26.1)	131 (32.2)
60 to 69	18 (4.4)	49 (12)	67 (16.5)
70 and above	6 (1.5)	24 (5.9)	30 (7.4)
Total	81 (20)	325 (80)	406 (100)

Table 1: Asbestos exposed vs. non-exposed ex-mineworkers in the Transkei (n = 406).

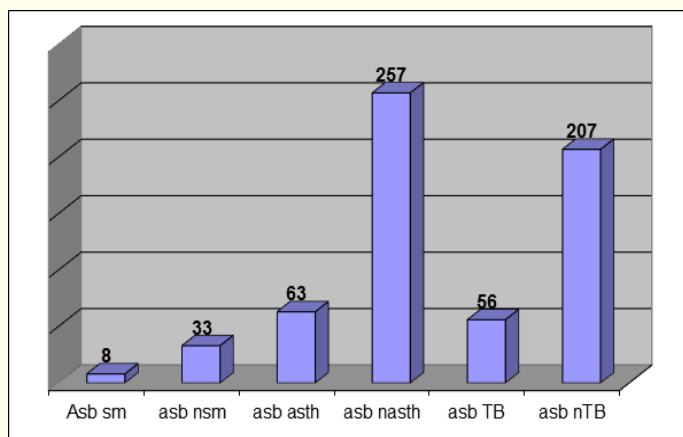


Figure 1: Asbestos exposure in relation to smoking, asthma and PTB.

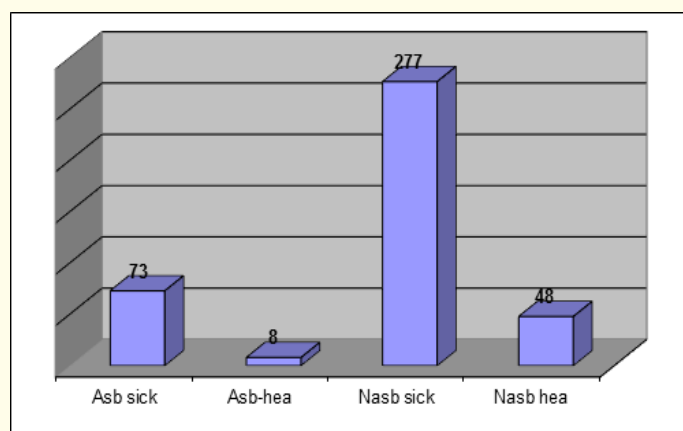


Figure 2: Asbestos exposed sick, healthy vs. non-asbestos exposed sick and healthy mineworkers (n = 406).

Table 2-4, 2 X 2, shows no association between exposure to asbestos and smoking, no association between asbestos exposure and asthma, and no association between asbestos sure and PTB (P > 0.05), OR = less 1 except in PTB where it is 1.28), and X2 is not valid.

		Asbestos Exposure		
		Yes	No	
Smoking	Yes	8	33	41
	No	73	292	365
		81	325	406
		OR = 0.97 (0.7 - 1.4)		p > 0.05

Table 2: Association between Smoking and Asbestos exposure (n=406).

		Asbestos Exposure		
		Yes	No	
Asthma	Yes	63	257	320
	No	18	68	86
		81	325	406
		OR = 0.9 (0.6 - 1.03)		p > 0.05

Table 3: Association between Asthma and Asbestos exposure (n = 406).

		Asbestos Exposure		
		Yes	No	
PTB	Yes	56	207	263
	No	25	118	143
		81	325	406
		OR = 1.28 (0.9 - 1.9)		p > 0.05

Table 4: Association between PTB and Asbestos exposure (n = 406).

Discussion

This study is a descriptive study based on the information supplied by mineworkers. The questionnaires were prepared in order to understand the extent of the problem of asbestos exposure of the mineworkers during their mining career. Lifetime medical surveillance is warranted for people with significant asbestos related diseases or history of asbestos exposure. The major purpose of periodic examinations is the detection of compensable asbestos related disease and the early detection of lung cancer at our clinic. The chest radiograph does not always show the characteristic features of asbestosis, therefore the condition remains undiagnosed or under diagnosed in a number of cases. High resolution CT is useful in suspect cases of asbestosis particularly where pleural changes obscure the parenchyma, but unfortunately, it is an expensive procedure [10].

There has been no asbestos related diseases mortality statistics available with regard to ex-mineworkers in the Transkei. Transkei is one of the former black homelands where the majority of the people choose mining as an occupation, as there are no other job opportunities in the area. There were 2027 ex-mineworkers examined at the Benefit Examination Clinic, and fifty-five (55) died before they could get their claim. The poor trend in getting claims has led to a decrease in the number of mineworkers visiting the clinic in the past few years. This is also very disappointing to the clinic staff. The Medical Bureau of Occupational Disease (MBOD) is supposed to compensate in time to the ex-mineworkers, especially those who have asbestosis [11].

The exact number of deaths among mineworkers is not available as they mostly live in far-flung areas of a wide and scattered Transkei. However, it seems to the author that there is very high mortality among ex-mineworkers and it usually goes without any specific diagnosis, as there is lack of autopsies in the majority of cases. The mining practices of Cape plc, which owned asbestos mines in the Northern Province and the Northern Cape, allegedly left thousands of impoverished South Africans sick and dying of asbestosis and mesothelioma of lung and stomach lining [12].

The number of individuals in Transkei who have been exposed to asbestos is quite high. Eighty-one (20%) of the men who answered the questionnaire had mentioned asbestos exposure in their work place. There is also an additional factor of the miners having been exposed to different kinds of pollutants because of changing from one mine to another quite frequently. These ex-mineworkers were exposed to asbestos when the asbestos mines were at their peak in terms of production. The exposure was therefore at its maximum of impact with these ex-mineworkers who are now retired without their compensation claims. The hygienic conditions of the mines were generally very

poor, and this was especially so at that time as far as the environment in which black mineworkers performed their tasks was concerned. These black mineworkers were exposed to the maximum to the fiber dust because they mainly were working underground.

Half (50%) of the individuals in the middle age group of between 40 to 59 years of age mentioned exposure to asbestos (Table 1). This large number of relatively young mineworkers has no knowledge about their health status. Seventy-three (90%) out of eighty-one asbestos exposed mineworkers indicated that their health is poorer in comparison to those in their community who had not gone to the mines (Figure 2). Ten percent of asbestos exposed mineworkers revealed that they are still smoking (Figure 1). The association between cigarette smoking and lung cancer has been well established. However, the relation between lung cancer and occupational exposure to carcinogens is less well understood, especially amongst the black population of South Africa. Smoking and asbestos act synergistically in the causation of lung cancer. Smoking cessation is the most important step that any person who has been exposed to asbestos can take if they wish to improve their life expectancy [13].

The relationship between asbestos exposure and asthma is not very clear, but it has been found in this study that it is very common. In sixty-three (78%) instances asbestos exposed subjects pointed out that they were suffering from asthma (Figure 1). Asbestosis is considered a restrictive disease because there is reduction in lung volume [14]. There was a recent study carried out among a group of ex-mineworkers of the Transkei by the author, and it was found that one and half percent of the mineworkers are suffering from asbestosis. It has also been proved by several studies that the incidence of lung diseases in ex-mineworkers is significantly higher than that in the general population, and that these lung diseases have a clear progression, clear association with one another; and a clear occupationally related causation [15]. A past history of pulmonary tuberculosis was mentioned by sixty nine percent (69%) asbestos exposed individuals (Figure 1), which seems to be much higher (55%) than an earlier study carried out at Libode in Transkei [16].

There were hardly any researches or health reports, prior to 1994, on black mineworkers, who were usually working underneath the ground and heavily exposed to asbestos. Generally, all studies were carried out on the white miners and these reports usually said that everything is all right! The personal exposure profile for the men who worked as laborers in this labor- intensive industry has not previously been examined [17].

It is a pity that no policy documents are in place for the welfare of ex-mineworkers. Asbestos mining is a dangerous profession. Therefore, the role of occupational health practitioners in identifying patients with exposure and possible asbestos related diseases thus becomes pivotal. The older patient warrants particular attention from his or her doctor in this regard. The asbestos related diseases comprise only a small proportion of morbidity in the general population, but the under-recognition and underestimation of these entities should be a matter of concern. It should be emphasized that management includes facilitating compensation claims where warranted [18].

There has been no relationship established between asbestos exposure and smoking, asthma, PTB and the health of mineworkers as p-value is > 0.05, and Chi-square has also failed to validate the relationship (Table 2, 3 and 4). Findings are not statistically significant; they provide a useful insight and suggest the necessity to carry out a follow up study. The accuracy of the responses given by the mineworkers report on their health could limit the study for generalization.

Conclusion

In general, 20% of the ex-mineworkers had mentioned exposure to asbestos during their mining career. It provides important information that justifies expanded efforts to initiate and develop a program for the screening of former mineworkers in this region.

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