

Prevalence of Asbestos-Exposed- Mine Workforce from Transkei Region of South Africa

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Abstract

Background: Asbestos production is declining all over the world but some countries are still using it, despite the fact that it has been declared a dangerous substance.

The asbestos industry in South Africa first suffered a decline in production and then stopped mining completely. However, asbestos is still used. There is no proper regulatory system in place for its control in South Africa.

Objective: To study the prevalence of exposure to asbestos of the mine workforce from Transkei, South Africa.

Method: Between May 1997 and May 2000, 2 027 ex-mineworkers were examined at the Benefit Examination Clinic, which is 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 was prepared and posted to 644 randomly selected ex-mineworkers. Four hundred and six (63%) duly completed questionnaires were received, which were later processed and analyzed with the help of the Epi Info6 computer programme.

Results: Out of 406 ex-mineworkers 81 (20 %) had been exposed to asbestos. Half of those who had been exposed (41 - 50%) were between 40 and 59 years old. Among those who had been exposed, eight (10%) were smokers, 63 (78%) were asthmatics, and 56 (69%) had a history of tuberculosis. Seventy-three (90%) complained of a deterioration in their 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 had been exposed 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 are quite high, despite the fact that the country stopped digging asbestos. It is still using what has already been taken from the mines. This country has mined 8% of world asbestos [3] and has used and exported large quantities of all three of the main commercially useful asbestos minerals, viz crocidolite, amosite and chrysotile. This has left people 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 exposure. 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 of 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 in 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 be made and that in counseling people diagnosed with asbestos-related diseases, they are given an appropriate assessment of the 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 the Transkei region of South Africa.

Method

Between May 1997 and May 2000, 2027 ex-mineworkers were examined at the Benefit Examination Clinic, which is 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 to 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, requesting them to supply information on their history of exposure to asbestos. The researchers also asked about their history of smoking, asthma, PTB and their physical health generally. In total 649 questionnaires in the local language, Xhosa, were distributed and 480 responses were received. 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 processed and analyzed with the help of the Epi 6 Info computer program.

Results

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



Figure 1: Asbestos exposed vs unexposed mine workforce in Transkei region, South Africa (n = 406).

Age Group	Asb. Exposed	Non-exposed	Total
20 to 29	0	1 (0.3%)	1 (0.3%)
30 to 39	6 (7%)	56 (17%)	62 (15%)
40 to 49	26 (32%)	89 (27%)	115 (28%)
50 to 59	25 (31%)	106 (33%)	131 (32%)
60 to 69	18 (22%)	49 (15%)	67 (17%)
70+	6 (7%)	24 (7%)	30 (7%)
Total	81 (20%)	325 (80%)	406 (100%)

Table 1: Asbestos exposed vs. non-exposed min workforce (n = 406).

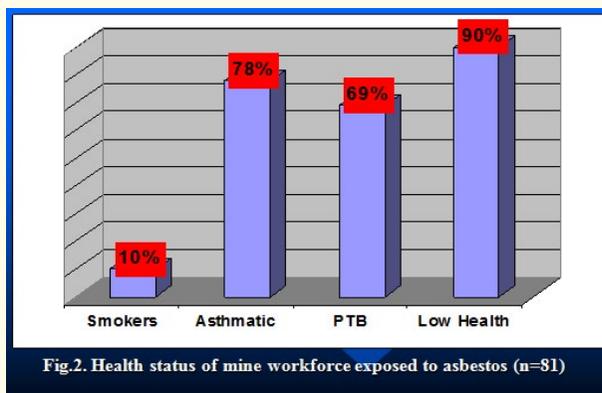


Figure 2: Health status of mine workforce exposed to asbestos (n = 81).

Tables 2, 3, 4, 5, and 6 show no association between exposure to asbestos and smoking, no association between asbestos exposure and asthma, and no association between asbestos exposure and PTB ($P > 0.05$, OR = less 1 except in PTB where it is 1.28), and Chi-Square (X^2) is not valid.

		Asbestos Exposure		
		Yes	No	
Smoking	Yes	8	33	41
	No	73	292	365
		81	325	406
		OR = 0.97	p = < 0.9	
		95% Confidence		

Table 2: Association between asbestos exposed mineworkers and smoking (n = 406).

		Asbestos Exposure		
		Yes	No	
Asthma	Yes	63	257	320
	No	18	68	86
		81	325	406
		OR = 0.93	p = < 0.9	
		95% Confidence		

Table 3: Association between asbestos exposed mineworkers and asthma (n = 406).

		Asbestos Exposure		
		Yes	No	
PTB	Yes	56	207	263
	No	25	118	143
		81	325	406
		OR = 1.28	p = < 0.8	
		95% Confidence		

Table 4: Association between asbestos exposed mineworkers and PTB (n = 406).

		Asbestos Exposure		
		Yes	No	
Health	Yes	73	277	350
	No	8	48	56
		81	325	406
		OR = 1.58	p = < 0.4	
		95% Confidence		

Table 5: Association between asbestos exposed mineworkers and health (n = 406).

		Asbestos Exposure		
		Yes	No	
Working	Yes	4	20	24
	No	77	305	382
		81	325	406
		OR = 0.79	p = < 0.8	
		95% Confidence		

Table 6: Association between asbestos exposed mineworkers and number currently working (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 a history of exposure to asbestos. The main purpose of periodic examinations at our clinic is the detection of compensable asbestos-related disease and the early detection of lung cancer. A 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].

No mortality statistics for asbestos-related diseases are available with regard to ex-mineworkers in the Transkei. Transkei is one of the former black homelands where most people choose mining as an occupation, as there are no other job opportunities in the area. Of the 2027 ex-mineworkers examined at the Benefit Examination Clinic, 55 died before they could claim compensation. The poor trend in honoring claims has led to a decrease in the number of mineworkers visiting the clinic in the past few years. This is very disappointing to the clinic staff. The Medical Bureau of Occupational Disease is supposed to pay compensation in time to the ex-mineworkers, especially those who have asbestosis [11].

The exact number of deaths among mineworkers is not known, as they mostly live widely scattered in far-flung areas of Transkei. However, it seems to the author that there is very high mortality among ex-mineworkers and this usually goes without any specific diagnosis, as in most cases no autopsies are done. 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 the 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 mentioned asbestos exposure in their workplace. 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 production in the asbestos mines was at its. The exposure therefore had its maximum impact on these ex-mineworkers who have now retired without having their compensation claims paid out. Hygienic conditions in the mines where black mineworkers performed their tasks were generally very poor, especially at that time. These black mineworkers suffered maximum exposure to the fiber dust because they were mainly working underground.

Half (50%) of the individuals in the middle-aged group of between 40 and 59 years of age mentioned exposure to asbestos (Table 1). This large number of relatively young mineworkers know nothing about their health status. Seventy-three (90%) out of eighty-one mineworkers who had been exposed to asbestos indicated that their health was poorer in comparison to that of others in their community who had not gone to the mines (Figure 2). Ten percent of mineworkers exposed to asbestos revealed that they were 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 among the black population of South Africa. Smoking and asbestos act synergistically in causing lung cancer. Ceasing smoking is the most important step that any person who has been exposed to asbestos can take if he/she wishes to improve his/her life expectancy [13].

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

Prior to 1994 hardly any research was undertaken among black mineworkers, who were usually working underground and were heavily exposed to asbestos. Generally, studies were carried out on white miners and these reports usually said that everything was satisfactory. The personal exposure profile for the men who worked as laborers in this labor-intensive industry has not previously being 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. The role of occupational health practitioners in identifying patients who had suffered exposure and developed possible asbestos-related diseases thus becomes pivotal. The older patient warrants particular attention from his or her doctor in this regard. Asbestos-related diseases comprise only a small proportion of morbidity in the general population, but their under-recognition and underestimation should be a matter of concern. It should be emphasized that management includes facilitating compensation claims where warranted [9].

No relationship has been established between exposure to asbestos and smoking, asthma, PTB and the health of mineworkers; the p-value is > 0.05 and Chi-square analysis has also failed to validate the relationship (Table 2, 3, 4, 5 and 6). Findings are not statistically sig-

nificant; nevertheless, they provide useful insight and suggest the necessity to carry out a follow-up study. The accuracy of the responses given by the mineworkers reporting on their health could limit the use of the study for generalization.

Conclusion

In general, 20% of the ex-mineworkers mentioned exposure to asbestos during their mining career. These responses provide 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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