Potential risk factors for asbestos exposure amongst six-months-old infants living in the township of Soweto, South Africa

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Potential risk factors for asbestos exposure amongst six-month-old infants living in the township of Soweto, South Africa

A. MATHEE[1], Y.E.R. VON SCHIRNDING[2], T. DE WET[2] and K. MOKOETLE[3]

[1]*South African Medical Research Council, c/o the Birth to Ten Project, 7 York Road, Parktown, 2193, South Africa,* [2]*World Health Organisation, Geneva,* [3]*The Birth to Ten Project, South African Medical Research Council and the University of the Witwatersrand*

During recent years there has been increased attention paid to public exposure to asbestos in the non-occupational environment. As part of a longitudinal cohort study of urban child health and development (the Birth to Ten Project) undertaken in Soweto–Johannesburg, environment and health conditions were assessed, including the potential for exposure to asbestos in low-income housing settlements. Respondents from Soweto reported that 52% of a sample of 1488 six-month-old infants, were living in asbestos-roofed houses. Analyses in relation to the asbestos-roofed houses, showed that more than 63% were older than 20 years, and that ceilings were absent in 62% of such houses. Leaking roofs, water damage and flaking interior paint in 17%, 13% and 14% of asbestos-roofed houses, respectively, indicated considerable infrastructural decay. In 6% of houses, household members themselves had undertaken work involving cutting or sawing the asbestos roofs, during the six-month period prior to the interview. Only 10% of respondents thought that asbestos could adversely affect their health, or that of their children. The study indicated a need for vigilance in relation to the potential for current and future community exposure to asbestos in low-cost, ageing housing settlements in South Africa.
Keywords:

Keyword text

Introduction

Whilst asbestos has been known for more than 2000 years, its use increased markedly around the time of the industrial revolution. Given its unique properties, such as high tensile strength, and resistance to fire, heat, acids, and seawater, asbestos became widely used during the past century in particular. Examples of asbestos applications include friction products, the distribution of water and other liquids, fire-, heat- or noise-resistant walls in low-cost housing, roofing, thermal insulation in furnaces, pipe insulation, protective clothing, electrical insulation and liquid filtration. Mining of asbestos was initiated in South Africa during the early twentieth century, and the country currently ranks as the third largest producer of asbestos world-wide (Hart 1988).

Correspondence: A. Mathee.

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Epidemiological, clinical and laboratory studies have shown that under certain conditions, all forms of asbestos may cause respiratory ill-health, including lung cancer, mesothelioma and asbestosis (Huncharek 1994, Nicholson and Landrigan 1996, Landrigan 1998). These health effects have been shown to occur at very low levels of exposure. Consequently, the use of asbestos has been banned in many European countries, and is strictly regulated in the United States of America (Landrigan 1998). However, in many developing countries, for example South Africa, Ghana, Zambia and Senegal (Harington and McGlashan 1998), the use of asbestos has continued, and in some instances increased, with the major portion being applied in building construction and housing products (Hart 1988).

During recent years public health attention has focused increasingly on the exposure of the general public to low levels of asbestos in the environment, as a result of its use in the construction of homes, schools, and public and commercial buildings (Landrigan 1998, Berry 1997). There is a paucity of information available in South Africa in relation to community exposure to asbestos in the living environment, especially in low-cost housing developments. This paper reports on the results of a study conducted to assess environment and health conditions, including risk factors for potential exposure to asbestos in the living environment, amongst six-month old infants in Soweto, South Africa. The data were obtained as part of the ongoing Birth to Ten Project (BTT), a ten-year prospective cohort study of urban health and development in the Soweto–Johannesburg area.

Methods

BTT is a collaborative birth cohort study of determinants of growth, development, health and well-being of children in Soweto–Johannesburg, South Africa. All singleton births to women who were permanent residents in the Johannesburg–Soweto study area during a seven-week period between April and June 1990 were included in the study (Richter and De Wet 1999). Aspects being investigated include pre-natal risk factors, childhood mortality and morbidity, environmental risk factors in the home and broader living environment, air pollution and acute respiratory infections, general health status, growth and psychological development. Detailed methods of the BTT study have been written up and widely published (Richter *et al.* 1995).

At age six months, a questionnaire designed to obtain information about a wide range of environment and health concerns, including child health status, access to environmental health services, housing quality, fuel-use patterns and potential environmental risk factors, was administered in relation to a 1907 (58%) out of a total of 3275 BTT study participants, with whom contact could be made in the allocated interview period. Respondents were also asked about the age and state of the house, the type of roofing material, the presence of a ceiling, the presence of peeling or flaking paint on interior and exterior house surfaces, work undertaken on the roof by household members during the six-month period prior to the interview, and perceptions of the impact of asbestos on health.

Results and discussion

Interviews with the parent or guardian, mostly the mother, showed that 52% (765) of the 1488 infants living in Soweto, were living in houses with asbestos roofing. Further analyses focused only on Soweto infants living in homes with asbestos roofing. As can be seen in Fig. 1, in excess of 63% of asbestos-roofed houses were more than 20 years old. The state of their houses was described as ‘good’, ‘fair’ and ‘poor’ by 11%, 66% and 24% of respondents, respectively.

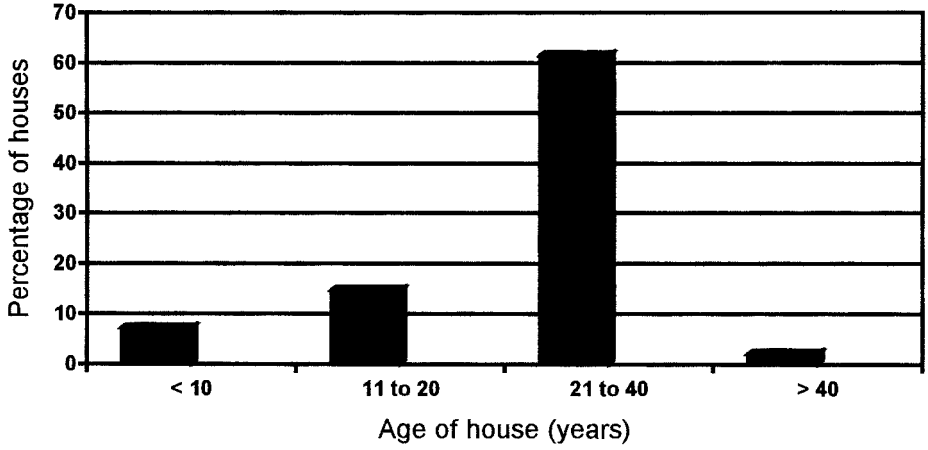

Fig. 1. Age distribution of asbestos-roofed houses.

As can be seen in Fig. 2, around 4% of infants lived in a house which was not painted on the inside, whilst 81% of dwellings were unpainted on the outside. In respect of 14% of houses, paint was reported to be peeling from the inside walls, doors and windowsills. In 62% of asbestos-roofed houses, no ceiling was in place, whilst 17% of roofs and/or ceilings were reported to be leaking. Thirteen per cent of respondents reported problems with leaks or water damage in the house, whilst problems with mould or mildew on indoor surfaces were reported by 3% of respondents.

While there is little data available internationally on housing-related risks to public health from asbestos exposure, concern has been expressed about the potential for exposure as a consequence of building decay, renovation and demolition (Mossman *et al.* 1990). In addition, studies have indicated that weathering, as well as day-to-day use of buildings, have the potential

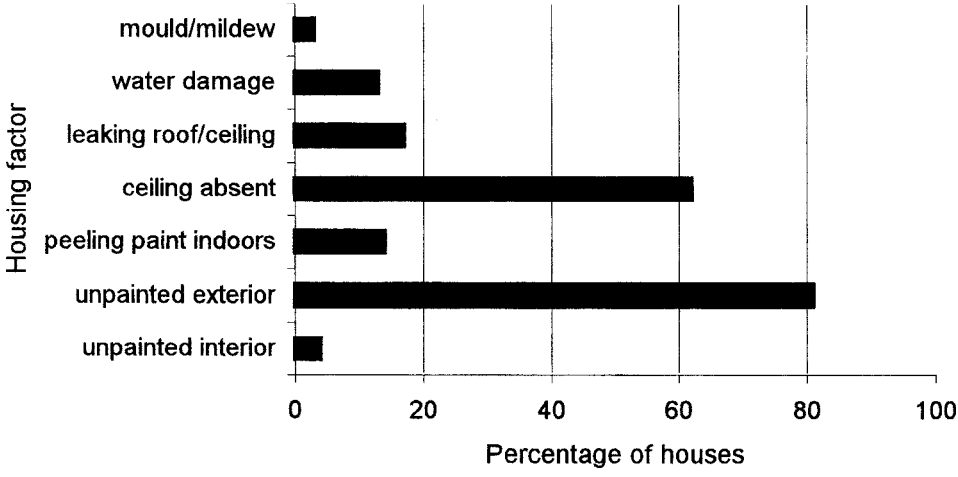

Fig. 2. Housing quality.

to cause corrosion of asbestos cement products both indoors and outdoors, and release asbestos fibres into the environment (Spurny 1989, Sebastien *et al.* 1982). Although regular and effective housing maintenance has been proposed as an important means of controlling asbestos exposure in the living environment, in low-cost housing developments which have been constructed using asbestos cement products, levels of resources and capacity for regular housing maintenance to ensure adequate health protection, are likely to be low. In this study, a large proportion (63%) of houses was more than 20 years old, and a proportion of the houses also showed signs of decay (flaking paint, leaking roofs, and the presence of mould/mildew). Whereas the installation of ceilings may have served as a barrier to indoor exposure to asbestos fibres from weathering or decaying roofs, in this study ceilings were absent in the majority (62%) of houses.

During the six-month period prior to the interview, work on asbestos roofs involving sawing or cutting had been undertaken by household members in 6% (46) of houses. Amongst these, 46% (21) of respondents recalled dust being created at the time. Only 10% of the total sample of 765 respondents thought that asbestos could adversely affect their health, or that of their children. Thirty-three per cent of respondents thought that living with asbestos was not unhealthy, whilst 57% did not know. Sawing or cutting of asbestos cement products may release asbestos dust into the environment (Castleman *et al.* 1980, Berman 1986), Brown 1987), with potential risks to the health of residents. Given that household members undertaking the sawing and cutting of asbestos are unlikely to have adopted adequate health protection measures, their health may also have been directly at risk. Information was not gathered in relation to waste asbestos disposal practices in this setting, where illegal waste dumping is a major concern. It is therefore of particular concern that only 10% of respondents thought that asbestos could adversely affect their health, or that of their children.

Conclusion

This study has highlighted the need for increased vigilance in South Africa regarding potential public exposure to asbestos fibres in ageing, low-cost housing settlements where asbestos has or is being used. Research is needed to determine the extent of past, current and planned use of asbestos in low-cost housing development, and the potential for future community exposure to asbestos in the living environment. Housing policies need to take account of the potential risks of asbestos, and ensure protection of the public against associated health threats, particularly in light of the rapid low-cost housing delivery programmes currently underway in South Africa. A particularly urgent requirement is the implementation of public education programmes aimed at raising awareness of the hazards of asbestos, the need for adequate housing maintenance, and the risks associated with informal or self-implemented repair, renovation, removal and disposal of household asbestos products. Also critical is the provision of services for the safe removal and disposal of asbestos in low-cost housing and schools, as necessary. International health organisations may need to pay attention to the potential risk of community exposure to asbestos in ageing, low-cost housing settlements in various parts of the world.

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