

The epidemiology of respiratory disease in Zimbabwe

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Abstract

This review of the burden of respiratory diseases in children and adult Zimbabweans is based on limited available literature and highlights a need for more descriptive epidemiological studies. In children, the commonest reported causes of respiratory mortality were acute pyogenic pneumonia, *Pneumocystis carinii* pneumonia, and tuberculosis, with different patterns of diseases evident between HIV-positive and HIV-negative children. Asthma and other atopic conditions are common but under-reported due to a predominance of publication on HIV-related subjects. In adults, exposure to indoor air pollution due to burning of biomass fuels is probably associated with acute respiratory infections, asthma, chronic obstructive pulmonary disease, lung cancer, and nasopharyngeal and laryngeal cancers in Zimbabwe as in other regions. These conditions also have other common risk factors including malnutrition and tobacco smoking but the prevalence rates of these conditions and their associations with risk factors are not known. In adults with chronic cough, tuberculosis is the most common diagnosis among HIV infected adults but lower respiratory tract infections and asthma were more common among HIV-negative patients. Factors associated with tobacco smoking in Zimbabwe are discussed.

Introduction

As in much of sub-Saharan Africa, respiratory diseases are one of the main causes of presentation to primary care and admission to hospitals in Zimbabwe. The advent of the HIV/AIDS pandemic has been accompanied by an increase in case-notification rates of tuberculosis and other respiratory opportunistic infections for the past two decades, but other respiratory presentations are also an important health burden. This review will look at the burden of infectious and non-infectious respiratory diseases in Zimbabwean children and adults and discuss what needs to be done to improve the situation. We searched the published literature using *PubMed* with

terms including the general terms 'Zimbabwe and lung diseases', as well as specific diseases, e.g. 'Zimbabwe and tuberculosis', 'Zimbabwe and asthma', etc. Further publications were identified from references cited in relevant articles.

Respiratory diseases in children

Infectious diseases

Infectious diseases are an important cause of morbidity and mortality in Zimbabwean children. Diagnosis and treatment are difficult and more epidemiological research is needed in order to guide diagnostic algorithms and treatment guidelines.

A large necropsy study in Zambia¹ showed that the three most common respiratory causes of child mortality are acute pyogenic pneumonia (39.1%), *Pneumocystis carinii* pneumonia (PCP, 27.5%), and tuberculosis (18.8%). Patterns of disease frequency, however, differed depending upon HIV-1 status. PCP, cytomegalovirus infection, shock lung, and lymphocytic interstitial pneumonitis were more frequently found in HIV-1-positive children, whilst interstitial pneumonitis, acute pyogenic pneumonia, tuberculosis, and pulmonary oedema were more common in HIV-1-negative children. Similar studies of Zimbabwean children by Nathoo et al² and Ikeogu et al³ have confirmed the prevalence of opportunistic infections in HIV-1-positive children in Zimbabwe but with a lower prevalence of tuberculosis in both HIV-1-positive and HIV-1-negative children in Zimbabwe compared to Zambia.^{4,5}

In a published audit of the management of 100 infants with chronic cough and HIV-related pneumonia, 54% of infants received antibiotics in primary care (penicillin, aminoglycoside, and co-trimoxazole) but of these, only 30% complied with *Essential Drug List of Zimbabwe* recommendations, and the overall mortality was 27%.⁶

Non-infectious respiratory diseases

There are few published studies on asthma and allergy from Zimbabwe. Kambarami et al⁷ reported that of 84 children aged below 12 years who presented with atopic conditions, 25.5% had asthma and 15.6% had allergic rhinitis. Gender differences were not significant ($p = 0.687$). Dust mite (*Dermatophygoidea pteronyssinus* and *D farinae*) and Bermuda grass were the commonest allergens whilst allergies to cats and moulds were rare.

Indoor air pollution

Children exposed to biomass fuel smoke are at increased

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risk compared to those living in households that use liquid petroleum gas, natural gas, or electricity. A study by Mishra et al⁸ found that babies born to Zimbabwean mothers who cook using biomass fuels were 175 g lighter on average than those born to mothers using other fuels. This result is likely to be confounded by the influence of poverty but the health impact of biomass fuel use is an urgent topic for further investigation in both children and adults.

Smith and Mehta² have estimated that 64% of the deaths associated with indoor air pollution are due to acute respiratory infections and occur in children under the age of 5. Younger children are exposed to high levels of indoor air pollution both because of the large amount of time these children spend with their mothers in the kitchen each day and because their small stature leaves them closer to the source of smoke than adults.

Respiratory diseases in adults

Infectious respiratory diseases

In the past two decades, the HIV epidemic in Africa has caused the incidence of tuberculosis to increase to such a large extent that it contributed to a total global rise of 1% in 2003 despite a general decline in the rest of the world.¹⁰ In Zimbabwe, tuberculosis notification rates peaked around 2002 and are now falling, although the low rate in 2005 may be due to under-reporting.¹¹

In primary healthcare settings in urban Harare, tuberculosis was the most common diagnosis amongst adults presenting with chronic cough: 46% of HIV-positive patients and 30% of HIV-negative patients had confirmed or probable tuberculosis.¹² These results are consistent with findings by Corbett et al¹³ in which the incidence of culture-positive tuberculosis amongst HIV-positive patients was more than 20 times higher than that of HIV-negative patients. Of these, 70% of HIV-positive patients and 74% of HIV-negative patients were smear-positive. HIV-positive patients with tuberculosis are often less infectious than HIV-negative patients because they have less cavitating lung disease and the sputum has lower concentrations of mycobacteria, as shown by lower scores on sputum microscopy.¹⁴ In addition, HIV-positive patients show faster disease progression and therefore remain mobile and infectious for a shorter time if untreated.¹³ The combination of increased susceptibility in HIV-positive individuals and prolonged transmissibility of untreated HIV-negative individuals is the underlying mechanism for the dramatic increases in tuberculosis incidence seen in areas where HIV is prevalent. Bacterial pneumonia is also common and associated with HIV infection but no recent prevalence studies showing the association of HIV and bacterial pneumonia from Zimbabwe were found. The most common opportunistic infections after tuberculosis and bacterial infections were PCP and cryptococcosis,^{15,16} however their combined prevalence was a low 3%.⁹

Limited access and resources to tuberculosis culture are often perceived as a diagnostic obstacle in resource-

poor settings. Tuberculosis culture results, however, added little to the results of sputum microscopy in a Zimbabwean study: only 3.3% of HIV-positive patients and 2.2% of HIV-negative patients were smear-negative but culture-positive for tuberculosis.¹³ Hence, the focus should be on improving the sensitivity of smears and perhaps even using radiology as second-line investigation instead of tuberculosis culture.

Healthcare workers remain a high-risk group for institutional transmission of tuberculosis. Tuberculin skin test (TST) conversion rates between nursing students (representing the institution) and polytechnic students (representing the community) were 12.5 and 2.8 conversions per 100 person-years respectively.¹⁷ Better prevention measures must be applied to reduce this rate.

Non-infectious respiratory diseases

Among adults presenting to primary care clinics in urban Harare with chronic cough, 16% of HIV-negative patients were diagnosed with asthma, significantly higher than in HIV-positive patients (2.6%).⁴ The use of biomass fuel and coal has also been associated with chronic obstructive pulmonary disease, asthma, lung cancer (for coal smoke only), and nasopharyngeal and laryngeal cancers.¹⁸ But clearly, there are other risk factors that also contribute to these, particularly tobacco smoking.

A cross-sectional survey amongst factory workers in Harare found that 17% of workers were current smokers and 7% were ex-smokers. Among the smokers, a higher proportion of workers were HIV-positive (27% compared to 17% among non-smoking participants).¹⁹ Women were less likely than men to be current or ex-smokers and those with higher education level were less likely to smoke than poorly educated workers. This finding suggests that smoking cessation should be encouraged as part of HIV care. Zimbabwe is a major tobacco exporter (tobacco makes up 23% of the total export earnings)²⁰ and so tobacco control will be difficult in the face of a potential negative economic impact. The economic case for tobacco cessation (alternative use of land, reduced health costs, current burden of tobacco-related disease) is an important subject for future epidemiologic research in Zimbabwe. Recently, for example, the incidence of oesophageal cancer amongst Zimbabwean adults has risen significantly, to a level far higher than those reported in Western populations.²¹ If an association was shown between tobacco smoking and oesophageal cancer in Zimbabwe, this might be a significant motivation for changes in both lifestyle and government policy.

Discussion and comment

Zimbabwe has a high seroprevalence of HIV and therefore health systems are under considerable pressure. Some commentators report that patients without HIV/AIDS are displaced from health care in these conditions.²² A hospital in Bulawayo has seen a significant increase in hospital mortality from 13.3% in 1992 to 28.6% in 2000, accompanying a significant reduction

in the proportion of patients with non-communicable diseases from 55% in 1992 to 40% in 2000.¹¹ Despite the urgency and severity of the AIDS pandemic in sub-Saharan Africa, however, there is a need to describe the considerable burden of respiratory disease in order that a very treatable burden of infectious and non-infectious disease can be alleviated.

This review was limited primarily by the fact that published literature was scarce and incomplete, and that many references were now very dated (a PubMed search of 'lung cancer' and 'Zimbabwe' produces only one article published in the 2000s, the other 21 articles were published between 1967 and 1998). In addition, results from various studies were often limited to urban settings and therefore may not be applicable to rural areas.

Whilst one can choose to use older studies or data from neighbouring countries to infer a burden of disease in Zimbabwe, the main conclusion from this review is that there is an urgent need for new studies of respiratory disease in this region.

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