AN URBAN AND RURAL STUDY ON THE PREVALENCE OF ASTHMA IN XHOSA CHILDREN

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INTRODUCTION

Vaughan and Black,1 as early as 1948, asked whether allergic disease was associated with “civilisation” and whether it was, in great measure, a product of the artificial environment in which we live. In the mid-1970s the world literature showed conflicting prevalence rates of asthma from various childhood populations. Reported prevalence rates ranged from 0,25% to 7,14%. The prevalence rates for asthma in children living in westernised, industrialised societies were in striking contrast to those found in children from tropical and less developed societies. The prevalence of childhood asthma in Black children in South Africa at the time was unknown.

Epidemiological studies of asthma in industrialised countries showed no differences in the prevalence rates for children living in urban as compared with rural communities. The onset of asthma generally occurred in the younger child and in the majority of cases, the age of onset was under 6 years in these countries. There was, however, a striking difference for Africa countries where the age of onset was in young adult life.

At the time very few epidemiologic studies of childhood asthma had been done in this country. Shore2 estimated the incidence of childhood asthma in the Cape Province to be at least 7%. Wesley, Clyde and Wallace (1969)3 studied asthmatic children from three racial groups in Durban. The striking finding was the exceedingly low number of “Bantu” children admitted with asthma; only 5 out of 24 732 admissions (0,02%), while asthmatic children represented 0,79% (42/5 313) and 0,77% (26/3 373) of the total White and Indian admissions respectively. Ordman, of Johannesburg, extensively studied various aspects of allergy in South Africa. The races of the children were not specified in any of Ordman’s publications, however, the author merely generalised that the incidence of respiratory allergy was thought to be considerably lower in Bantu people than in the Caucasians.4

To establish the prevalence of childhood asthma in South African Black children, we studied two samples of Xhosa children, aged 6 to 9 years. To eliminate racial differences, only children from the Xhosa nation were selected.

THE STUDY

One group lived in an urban western society, i.e. Guguletu, Cape Town, South Africa. The other lived in a rural, traditional Xhosa society, i.e. Tsolo District, Transkei, South Africa. The samples were selected to represent the broad childhood population of the two areas. The study was conducted from 14th February 1976 and the last child was seen on the 20th August 1976.

From all houses in the Guguletu suburb of the greater metropolitan area of Cape Town thirteen hundred houses were randomly selected. All eligible children from each of the selected houses were included in the final sample. The final sample consisted of 694 children from 416 families.

The people from the Tsolo district, Transkei lived in so-called locations. These locations consisted of families each living in their own homestead and forming small communities of variable sizes. The locations were from 2 to 5 km apart. For the purpose of the study all locations in a radius of 9 km from the St. Cuthbert’s Mission, Tsolo District, Transkei were selected. Eight locations with 896 families fell within a radius of 9 km from St. Cuthbert’s Mission. All eligible children from the 8 locations were studied. The final sample consisted of 671 children from 459 families.

At the time there was no universally accepted definition for asthma. In many epidemiological studies at the time the diagnosis of asthma had been based upon history obtained from parents. The word “asthma” was foreign in rural communities. Exercise-induced asthma was used as the only criterion for identifying the asthmatic children from the selected samples in this study. It was defined as a drop of 15% or more in post-exercise FEV1 and PEFR from pre-exercise levels. The exercise stimulus used in every child
was running on a level in the open for 6 minutes.

In addition to identifying the asthmatic children, factors which may contribute to, or influence the prevalence rate of asthma, were evaluated. These were the social-economic status of each family, exposure to environmental allergens in each individual child, feeding patterns, both current and during infancy, and the sleeping habits.

THE FINDINGS

Most families from Guguletu regarded themselves as being urbanised and most of the children from this sample were born and had grown up there. All but one family from Tsolo district group regarded the rural environment as their home and 35.9% declared themselves as “Red” people with tribal customs.

Twenty-three of the 1365 children, aged 6 to 9 years, studied were identified as asthmatic. Of these, 22 were from the urban Guguletu sample and only 1 was from the rural Tsolo district sample. The point prevalence of childhood asthma for children from Guguletu was 3.17% (31.7 per 1 000 children). In contrast a figure of only 0.14% (1.4 per 1 000 children) was found from Tsolo district. Exercise-induced asthma was found to be a satisfactory way of identifying the asthmatic child. The percentage drop in FEV₁ and PEFR were very similar for each individual asthmatic child. The mean percentage drop in FEV₁ and PEFR for the asthmatic children was 32.7% and 32.2% respectively. The normal non-asthmatic children in both groups showed virtually no change in post-exercise from pre-exercise values.

Both samples came mainly from the lower socio-economic classes, where overcrowding was common. There was no difference in the average income rate of families in the two groups, where a considerable number existed below the bare minimum level. Exposure to allergens was similar in magnitude in both areas although the allergens differed. Exposure to pets was more common for children from Tsolo district. Most of the children in Tsolo district were exposed to maize pollen, whereas it was uncommon in Guguletu. Exposure to grass was common in both areas. The diet of children in both areas included foodstuff which may relate to the development of asthma and no real differences existed between the two samples. There was a striking difference in patterns to breastfeeding during infancy in the two samples. Only 19 or 2.3% of the children from Tsolo district had never been breast fed and the median duration of breast feeding was 20.3 months. The median duration of breast feeding for the 22 asthmatic children from Guguletu was 4.7 months and 5 of the asthmatic children were never breast fed. More than half of the children from Tsolo district slept on mats on the floor. Most children from Guguletu, and the 22 children with asthma, slept on mattresses. The single asthmatic child from Tsolo district slept on a mattress. Mats are made of grass stems and/or reeds which are interwoven and may hinder the infestations by mites.

The prevalence of asthma of 3.7% of the urban Guguletu sample at the time was similar to that calculated mean prevalence rates reported from the United Kingdom (3.49%) for the United States of America (4.46%) and Australia and New Zealand (4.1%). In striking contrast was the prevalence of 0.14% for asthma in children living in Tsolo district, Transkei. This prevalence rate compares closely with the reports from Africa and other less developed communities: 0.18% for children of Patna India, 1.06% for children from Barbados and 0.007% for the rural area of New Guinea Highlands.

A significant difference in the prevalence rates for asthma between the two samples was found. Although the way of life differed vastly in the two areas, no single factor could be incriminated as the reason for the differences in prevalence. Only Xhosa children were admitted into the study from both areas and the differences in prevalence, therefore, were unlikely to be due to either racial or genetic differences. At the time it was speculated that way of life of the urban child exposes him or her to the development of asthma. It would seem as if the Xhosa child born in a rural community is protected from developing asthma.

These findings were a significant contribution to the epidemiological study of asthma in South Africa and beyond. Recent childhood asthma prevalence studies have confirmed the urban-rural differences although the gap may be narrowing. In a recent study in Tanzania, exercise-induced asthma was significantly higher among urban and rural pupils, 6.4% and 2.3% respectively. In a screening study in rural Mongolia, a subsample of 869 subjects was examined. The prevalence of atopic diseases were low in rural Mongolia and increased with increasing urbanisation suggesting that a rural living environment protects against atopy. Reported data from Ecuador suggested that the process of urbanisation is associated with a greater prevalence of asthma in rural communities. The authors concluded that factors associated with greater socioeconomic level and changes towards a more urban lifestyle to be particularly important. In a study of children from two poor communities in Cape Town the authors...
The puzzle of the different environmental exposures including diet, duration of breastfeeding hygiene and infections, allergens and air pollution is complex, and there is no simple explanation or unique hypothesis that would be applicable for every population. The findings of studies looking into differences between urban and rural populations worldwide are in line with what we reported in 1976.

The study “The prevalence of asthma in urban and rural black children: an epidemiological survey,” was submitted as a thesis in part of the requirements for the degree Doctor of Medicine, University of Cape Town, 1979.

ACKNOWLEDGMENTS
My deepest appreciation for my mentors: the late Dr Lorn Shore, the late Prof Boet Heese and Prof Eugene Weinberg

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References: