

Original article

Asthma and allergies in schoolchildren of Maputo

Aim: The study aimed to determine prevalence and severity of asthma, rhinitis and eczema in Maputo, Mozambique.

Methods: The International Study of Asthma and Allergies (ISAAC) protocol was applied in 27 schools in urban, suburban and semi-rural areas.

Results: A total of 2630 completed questionnaires were obtained from students aged 13–14 years, and 2383 from schoolchildren aged 6–7 years. The prevalence of current asthma was 13.3% in the two groups, the prevalence of rhinoconjunctivitis and eczema was 23% and 10% in teenagers and 8.8% and 8.5% respectively in children 6–7 years old. Overall, 35% of the adolescents and 23.8% of children were found to have at least one atopic condition or asthma in the last year. In symptomatic adolescents, the conditions were: rhinoconjunctivitis (41.3%), asthma (20%) and eczema (12.4%). In symptomatic children, asthma was the principal condition (36.2%), followed by eczema (20.3%) and rhinoconjunctivitis (19.1%). In adolescents, asthma was more frequently associated with rhinoconjunctivitis (28%). About 4% of all surveyed children had three atopic conditions associated. In adolescents, past year rhinitis was more frequent and severe in the urban area. Hay fever was commoner in the semi-urban area. Eczema was significantly more recurrent in suburban and semi-rural area. Exercise-induced wheeze, nocturnal cough and ever asthma were more reported in children of suburban area.

Conclusion: Asthma and allergic diseases are important public health problems in Maputo and improvement in prevention and management plans are required.

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Asthma is a significant medical problem worldwide, and is the commonest chronic disease in children leading to disability and school absence. Geographical differences in asthma prevalence, morbidity, and mortality have been noted by various studies. Studies have shown that in African and other non-industrialized countries, childhood asthma was rare, with a reported prevalence varying between 0.007% and 1.96% (1). More recently, the International Study of Asthma and Allergies (ISAAC) has reported that asthma prevalence is increasing in the world including Africa (2). ISAAC is a study that introduced standardized methods to compare the prevalence and severity of asthma and allergic diseases (3, 4). In young children, 6–7 years old, ISAAC found a fivefold difference in prevalence between countries, varying from 4.1% to 32.1% with the lowest rates in India, Indonesia, Iran and Malaysia and the highest rates in Australia, Brazil, Costa Rica, New Zealand and Panama (3). Reported prevalence of asthma ranged in Africa from 5.1% in Nigeria (5) to 26.8% in South Africa (6). In adolescents, 13–14 years old, prevalence of

asthma ranged from 2.1–4.4% in Albania, China, Greece, Georgia, Indonesia, Romania and Russia, to 29.1–32.2% in Australia, New Zealand, Republic of Ireland and the UK. In African adolescents, the prevalence of asthma varied from 6.2% in Ethiopia to 16.1% in South Africa (2). Furthermore, practising African doctors have the perception that asthma and other allergic diseases nowadays constitute an important medical problem, without having appropriate estimates of the burden of these diseases (7). The fact that the prevalence increased more in African urban zone than in semi-rural areas strongly implicates environmental factors related to western lifestyle. In order to explore this hypothesis, the present study focuses on asthma and other allergic diseases in Maputo city, the capital of Mozambique. Maputo is a town with a population of about 1 000 000 inhabitants living in urban, suburban and semi-rural areas (8). No studies at the community level have ever been carried out in Mozambique to examine the occurrence and the severity of asthma and allergies.

Methods

We carried out a cross-sectional study in May 2004 in Maputo, Mozambique, according to the International Study of Asthma and Allergies (ISAAC) protocol. The target population was constituted of two groups of schoolchildren aged 6–7 years and 13–14 years, respectively, who were recruited from randomly chosen schools in Maputo. One month before the study, a pilot study was carried out using the ISAAC written questionnaires in a school that was not selected for the final survey. The pilot study was carried out by the principal investigator (SMM) with three other field workers.

Criteria to define the area of schools

The criteria to define the area of schools (urban/suburban/semi-rural) were based on administrative and physical factors such as: type of building, electricity, water supply and the distance from the town centre. In the urban area the buildings are strong structures, the roads providing easy access. Suburban areas are more adjacent to cities, the majority of roads are not paved, and some buildings are considered slums because the structures are not secure. They are overcrowded the people having a lifestyle similar to that of the urban area. Conversely, semi-rural areas were more distant from the town, less crowded with migrant populations, the water was supplied more likely from the well and there were no or only rarely electricity and telephone connections.

Selection of study population

From a total of 126 schools registered in Maputo, 21 primary schools and six secondary schools were randomly selected by stratifying for geographic (urban, suburban and semi-rural) location and inhabitant's density so as to be representative of the distribution of the population in Maputo. Regarding primary schools, nine were in the urban area, eight in the suburban area and four in the semi-rural area. All primary schools were public schools except three, which were private schools. Among the secondary schools, three were located in the urban area, two in the suburban area and one in the semi-rural area; only one of them was a private school. We selected children by their actual age, regardless of the grade within the school, by selecting several grades. In the case of the 13–14-year group, the inclusion of students of the right class of age was made by visiting each classroom in each school and requesting those who attained 13 years of age and at most 14 years 11 months to stand up. Those remaining seated were requested to vacate the class. The others stayed on to fill the questionnaire.

Questionnaires and health outcomes

The ISAAC written and video questionnaires were used in the survey. Although several tribal languages are spoken in Mozambique, Portuguese is the official language. For the purpose of the survey, the Portuguese version of the ISAAC written core questionnaire was enriched with questions on risk factors (9) and the Score For Allergic Rhinitis (SFAR) (10). The written questionnaire had five sections for children and seven sections for adolescents. The sections included demographic data, wheezing and asthma (eight questions), rhinitis (six questions), eczema (six questions) and risk factors (21 questions) for all groups. Additional questions about allergic rhinitis (10 questions) and video questionnaire (five sequences followed by three questions) were included only for teenagers. In this group, the written questionnaire was filled by the respondents simultaneously as the interviewer read the questions

and offered explanations as necessary. After the completion of the written questionnaire, this was collected by members of the staff and, when the logistic conditions allowed it, adolescents were invited to answer the international version AVQ3.0 of the video questionnaire. In the 6–7-year group, the questionnaires were initially distributed with an explicative letter to the teachers in order to be sent via the children to the parents. After the distribution, one member of the field staff returned to the school to collect the questionnaires within 3 days. Successively, we had to change this method because the rate of participation was <50%. Thus we asked the Principal of the school to invite the parents to the school and collective interviews were conducted by the members of the study team who spoke besides Portuguese also the principal traditional languages used in Maputo (Ronga and Xangana). The questions written in Portuguese were translated by the interviewers into the language chosen by the parents or guardians, a method found to give reproducible results in other studies carried out in Africa (11). Instead of the terms 'hay fever' and 'eczema' which are rarely used in Maputo, the term 'allergic rhinitis' and 'muna' (traditional language) were employed, respectively.

Health outcomes considered in the analyses were as in ISAAC symptoms 'in the past year' and 'lifetime diseases'. Wheezing during the previous 12 months (based on the question, 'Have you (your child) had wheezing or whistling in the chest in the last 12 months?') was used to define current asthma. For current asthma, the questionnaire allowed to assess the frequency of attacks, sleep disturbance, speech limitation during attacks, exercise-induced wheezing and nocturnal cough. Questions pertaining to allergic rhinoconjunctivitis (or rhinoconjunctivitis) included sneezing or a running or blocked nose (in the absence of flu) associated with itchy-watery eyes in the last 12 months. The presence of an itchy, relapsing skin rash in the preceding 12 months that had affected the flexural areas was considered atopic eczema ('Have you had this itchy rash at any time in the last 12 months? Has this itchy rash at any time affected any of the following places: the folds of the elbows, behind the knees, in front of the ankles, under the buttocks, or around the neck, ears or eyes?'). Furthermore, allergic rhinitis was defined on the basis of the SFAR, a quantitative score ranging between 0 and 16, based on symptoms, seasonality, triggers, personal history and perception of allergic disease (10). Lifetime diseases included asthma, hay fever or allergic rhinitis and eczema.

Ethical considerations

The study was approved by the Bio-ethics Committee of Ministry of Health in Mozambique. Informed consent to carry out the study was obtained from Maputo Director of Education, the directors of the selected schools and the parents of the children and all participants gave a verbal consent to participate.

Statistical analysis

The data were entered in Microsoft Office Access 2000 and analysed with STATA Intercooled version 8.2 (StataCorp, College Station, TX, USA). The statistical analyses comprised frequencies, percentages, mean and odd's ratio (OR) calculations using the logistic regression model. For past year symptoms and lifetime diseases of asthma, allergic-rhinoconjunctivitis and atopic eczema, the prevalence was estimated by dividing the number of positive responses to each question by the number of completed questionnaires. Comparison of proportions was performed using the chi-squared test. Statistical significance was defined by P -value ≤ 0.05 using a two-tailed test.

Table 1. Characteristics of the population-based samples

	6–7 years	13–14 years
Number of schools (<i>n</i>)	21	27
Number of children (<i>n</i>)	2383	2630
Response rate (%)	80	85
Sex ratio	1.0	1.1

Results

All the approached schools agreed to participate. The characteristics of the children are described in Table 1.

13–14 years

In the adolescent group, a total of 3096 eligible schoolchildren were identified from the class registers of the selected classrooms of the 27 selected schools. The number of valid responses was 2630 (response rate = 84.9%). Of the 2630 children who completed the questionnaire, 1238 were male and 1392 female (female: male ratio of 1.1:1). The lifetime prevalence of wheezing was 26.2%, and the prevalence of current asthma (wheezing in the previous year) was 13.3% (Table 2). Wheezing was reported by 690 of the students (26.2%), with 221 (32%) having current asthma. The lifetime prevalence of rhinitis was 59.7%. The prevalence of rhinitis in the last year was 38.7%; rhinitis was more

frequent in the urban area ($P = 0.02$) and the prevalence of allergic rhinoconjunctivitis (rhinitis with itchy watery eyes) was 23.1%; 19.4% of the adolescents answered positively to the question about hay fever (Table 2). The highest report of rhinitis symptoms was recorded during January–June, with a peak in May. Past year rhinitis was more frequent in the urban area (Table 2). No sex difference was evident (Table 3). Two hundred and sixty-four adolescents (10%) had recurrent itchy rash involving the flexural areas in the preceding 12 months. Four hundred and thirty-six children (16.6%) reported having eczema, this occurrence being significantly more important in the suburban and in the semi-rural areas ($P < 0.001$). Female sex was significantly associated with eczema ($P < 0.001$) (Table 3). Rhinoconjunctivitis is the single atopic condition in the majority of adolescents (Fig. 1).

Overall, 35% of the adolescents were found to have at least asthma or one atopic disorder in the last year. In symptomatic adolescents, the conditions by order of frequency were: rhinoconjunctivitis (41.3%), asthma (20%) and atopic eczema (12.4%). The majority of symptomatic teenagers reported symptoms of only one condition. Asthma was more frequently associated with rhinoconjunctivitis (28%).

The majority of wheezing adolescents had mild symptoms. Only 2% of the total population had experienced four or more attacks of wheeze during

Table 2. Prevalence rate of asthma and allergies according to the zone

Symptom	6–7 years					13–14 years				
	Urban	Suburban	Semi-rural	Total	<i>P</i> -value*	Urban	Suburban	Semi-rural	Total	<i>P</i> -value*
Total	627	1127	629	2383		716	1383	531	2630	
Asthma-like symptoms										
Wheeze ever	129 20.6	261 23.2	126 20.0	516 21.7	NS	213 29.7	343 24.8	134 25.2	690 26.2	0.04
Wheeze last 12 months	74 11.8	163 14.5	79 12.6	316 13.3	NS	110 15.4	172 12.4	70 13.2	352 13.3	NS
≥4 attacks	21 3.3	48 4.3	19 3.0	88 3.7	NS	28 3.9	30 2.2	18 3.4	76 2.9	0.10
Sleep disturbance	47 7.5	114 10.1	46 7.3	207 8.7	0.06	51 7.1	95 6.9	43 8.1	189 7.2	NS
Speech disturbance	15 2.4	54 4.8	25 4.0	94 3.9	0.05	37 5.2	61 4.4	24 4.5	122 4.6	NS
Exercise cough	55 8.8	155 13.8	72 11.4	282 11.8	0.01	206 28.8	401 29.0	136 25.6	743 28.3	NS
Night cough	133 21.2	349 31.0	173 27.5	655 27.5	0.0001	274 38.3	613 44.3	231 43.5	1118 42.5	0.03
Ever asthma	130 20.7	306 27.2	161 25.6	597 25.1	0.03	189 26.4	370 26.8	140 26.4	699 26.6	NS
Rhinitis										
Ever	154 24.6	339 30.1	191 30.4	684 28.7	NS	429 59.9	853 61.7	287 54.0	1569 59.7	0.09
Last 12 months	115 18.3	243 21.6	137 21.8	495 20.8	NS	300 41.9	526 38.0	192 36.2	1018 38.7	0.02
Rhinoconjunctivitis	46 7.3	108 9.6	58 9.2	212 8.9	NS	175 24.4	327 23.6	105 19.8	607 23.1	NS
Activity interference	60 9.6	102 9.1	72 11.4	234 9.8	NS	161 22.5	262 18.9	81 15.3	504 19.2	0.01
A lot activity interference	0 0	0 0	0 0	0 0		8 1.1	37 2.7	11 2.1	56 2.1	0.06
Hay fever	62 9.9	147 13.0	78 12.4	287 12.0	NS	118 16.5	277 20.0	116 21.8	511 19.4	0.03
Atopic dermatitis or eczema										
Eczema ever	104 16.6	228 20.2	104 16.5	436 18.3	0.07	179 25.0	330 23.9	108 20.3	617 23.5	NS
Itchy rash last 12 months	74 11.8	167 14.8	64 10.2	305 12.8	0.01	118 16.5	207 15.0	69 13.0	394 15.0	NS
Itchy flexural areas	49 7.8	104 9.2	50 7.9	203 8.5	NS	76 10.6	141 10.2	47 8.9	264 10.0	NS
Rash ever cleared completely	35 5.6	93 8.3	30 4.8	158 6.6	NS	65 9.1	103 7.4	41 7.7	209 7.9	NS
Kept awake by rash	31 4.9	76 6.7	30 4.8	137 5.7	NS	50 7.0	116 8.4	35 6.6	201 7.6	NS
Eczema	25 4.0	64 5.7	30 4.8	119 5.0	NS	78 10.9	259 18.7	99 18.6	436 16.6	0.001

*Among the zones.

Table 3. Prevalence rate of asthma and allergies according to sex

Symptoms	6–7 years					13–14 years				
	Male		Female		P-value	Male		Female		P-value
Total	1207		1176			1238		1392		
Wheeze ever	264	21.9	252	21.4	NS	316	25.5	374	26.9	NS
Wheeze last 12 months	165	13.7	151	12.8	NS	164	13.2	188	13.5	NS
≥4 attacks	48	4.0	40	3.4	NS	41	3.3	45	3.2	NS
Sleep disturbance	111	9.2	96	8.2	NS	95	7.7	94	6.8	NS
Speech disturbance	47	3.9	47	4.0	NS	50	4.0	72	5.2	NS
Exercise cough	144	11.9	138	11.7	NS	310	25.0	433	31.1	0.001
Night cough	339	28.1	316	26.9	NS	499	40.3	619	44.5	0.03
Ever asthma	326	27.0	271	23.0	0.03	296	23.9	403	29.0	0.03
Rhinitis ever	339	28.1	345	29.3	NS	729	58.9	840	60.3	NS
Rhinitis last 12 months	244	20.2	251	21.3	NS	479	38.7	539	38.7	NS
Itchy eyes with runny nose	98	8.1	114	9.7	NS	270	21.8	337	24.2	NS
Activity interference	109	9.0	115	9.8	NS	87	7.0	95	6.8	NS
A lot activity interference	0	0	0	0		31	2.5	25	1.8	NS
Hay fever	148	12.3	139	11.8	NS	240	19.4	271	19.5	NS
Eczema ever	210	17.4	226	19.2	NS	237	19.1	380	27.3	0.001
Itchy rash last 12 months	141	11.7	164	13.9	0.10	131	10.6	263	18.9	0.001
Itchy flexural areas	92	7.6	111	9.4	0.11	80	6.5	184	13.2	0.001
Rash ever cleared completely	77	6.4	81	6.9	NS	75	6.1	134	9.6	0.001
Kept awake by rash	56	4.6	81	6.9	0.02	57	4.6	144	10.3	0.001
Eczema	56	4.6	63	5.4	NS	167	13.5	269	19.3	0.001

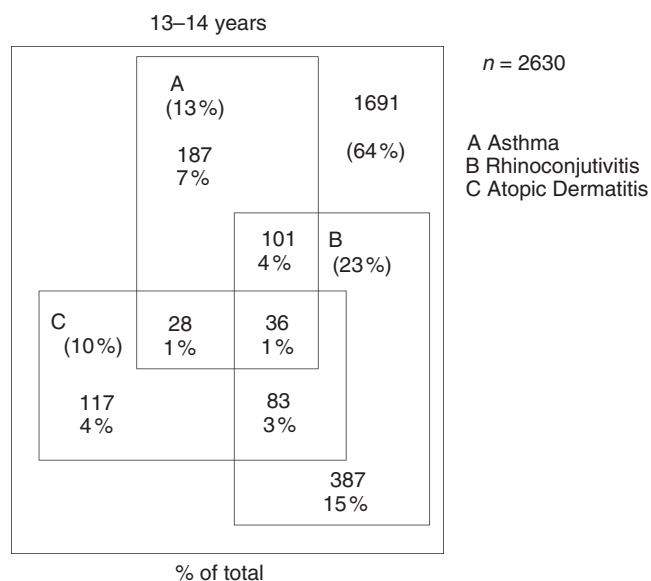


Figure 1. Distribution of asthma and allergic diseases in adolescents.

the preceding 12 months, while 7.2% reported sleep disturbance one night or more per week. Regarding the severity of asthma, we did not find any difference between the different areas. However, nocturnal cough was more reported in the suburban and semi-rural areas. In about 21.3% of students, rhinitis interfered with daily activities moderately or a lot. Activities of urban students were more likely affected by rhinitis (Table 2). Regarding eczema, 68 adolescents (2.5%)

reported severe disease, which kept them awake at least one night per week. Ever eczema was less common in the urban zone ($P < 0.001$).

6–7 years

A total of 3000 questionnaires were administered to the parents and a total of 2383 were returned (participation rate = 79.4%); 1207 children were male (50.7%) and 1176 (49.3%) female. In this age group, 569 (23.8%) children had at least one atopic condition. Three hundred and sixteen (13.3%) of the parents reported that their children had wheezing in the past year (current asthma). The 12-month period prevalence of allergic rhinoconjunctivitis was 8.9% and that of atopic dermatitis was 8.5%. No parents reported severe rhinitis (Table 2).

Of those reporting current asthma, 35% also had current symptoms of other atopic diseases, leaving 65% reporting current asthma alone (Fig. 2). Current asthma was the single condition in the majority of children (Fig. 2). Ever-diagnosed asthma was reported by 597 (25.1%) of the children, and of them, 217 (36.4%) had current asthma.

Overall, 23.8% of children were found to have at least one atopic disorder. The majority of symptomatic children reported symptoms of only a condition. In symptomatic children, asthma was the principal condition (36.2%), followed by atopic dermatitis (20.3%) and rhinoconjunctivitis (19.1%). Association of current asthma and atopic eczema was found in 11% of children, and the association between current asthma and rhinoconjunctivitis in 16% (Fig. 2).

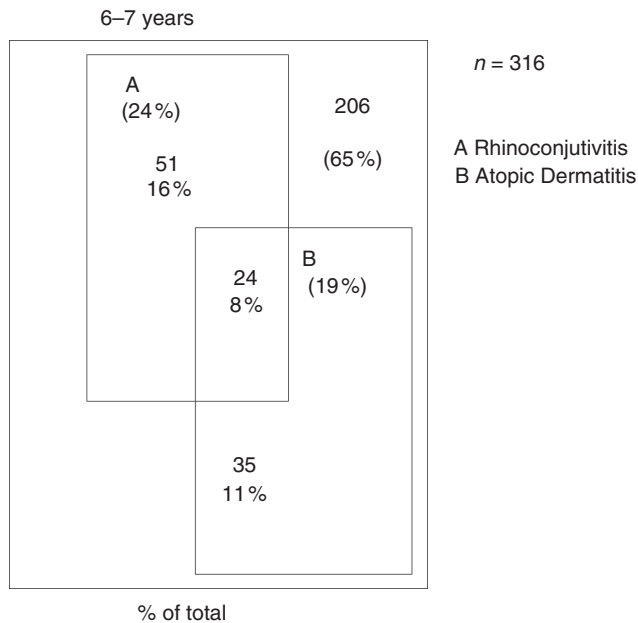


Figure 2. Current wheezing in young children.

Regarding the severity of symptoms, 3.7% of the parents reported that their children had four or more attacks of asthma in the last year and 8.7% that wheezing had disturbed their sleep. Asthma was significantly more frequent and more severe (speech disturbance, exercise-induced wheezing and nocturnal cough) in the suburban and semi-rural areas. Symptoms of rhinitis interfered in the activity of 9.8% of the schoolchildren and 5.7% had been kept awake by itchy rash affecting the flexural areas (Table 2).

Discussion

The present study documents that asthma and allergic diseases are common in Maputo and not only in the urban area. Overall, 35% of the adolescents and 23.8% of 6-7-year-old children were found to have at least one of these disorders. The majority of symptomatic children reported symptoms of only a condition, as already reported in previous studies (2). In symptomatic adolescents, the conditions by order of frequency were: rhinoconjunctivitis (41.3%), asthma (20%) and atopic eczema (12.4%). In symptomatic young children, asthma was the principal condition (36.2%), followed by atopic dermatitis (20.3%) and rhinoconjunctivitis (19.1%). These findings are consistent with the literature (allergic march). The cumulative prevalence of asthma was higher than 20% in both children and adolescents, while the 12-month prevalence was about 13% in both groups. Our prevalence values were higher than those observed in Portugal (9% and 12% in 1995 and 2002, respectively) (12). Our results are similar to those reported in Kenya –

21.2% and 10.2%, respectively (13). High prevalence of current asthma had also been observed in other African countries: 10.7% in Nigeria (14), 15.6% in Ivory Coast (15) and 16.1% in Cape Town, South Africa (2). A study in Reunion Island reported that asthma and allied diseases are less frequent and less severe in metropolitan France than in Reunion Island (16). These findings support evidence that the prevalence of asthma is increasing in Africa as it has been shown for countries in Europe, North America and Australia (17–20). Actually in Africa, asthma prevalence rates are higher than those reported in studies conducted during the late 1970s and early 1980s. This has been attributed to the fact that lifestyle has become more urbanized or ‘westernized’ in these countries (1, 21–24). Socioeconomic changes, semi-rural–urban migration and rapid industrialization coupled with a western lifestyle are inevitably associated with changes in lifestyle and dietary habits, which in turn affect the health of the population. We have previously shown that asthma is more frequent in children born and living in the urban area of Maputo and those early weaned from maternal breast milk, which characterized the western lifestyle (25). The present study supports this hypothesis in teenagers for whom wheezing ever is frequent in urban area. However, in young children the signs of bronchial hyperreactivity (night cough and exercise cough) are clearly more frequent in the suburban and semi-rural areas. Asthma is also more severe in the suburban and semi-rural areas probably linked to the lower social conditions in these areas. Another explanation for the urban/suburban or semi-rural differences could be due to parents’ response bias. We had previously reported that parental knowledge of asthma was scanty in Maputo (26).

In Ethiopia, wheeze or sensitivity to *Dermatophagoides pteronyssinus* was positively associated with housing style, bedding materials, and use of malathion, but no single factor accounted for urban–semi-rural differences (27). Like other studies, we also reported a high rate of exercise-induced wheeze and dry night cough in the last 12 months. The prevalence of dry night cough is similar to the one assessed in Argentina and the UK, and is one of the highest reported in African children (3, 15). Regarding the severity of asthma (impairment of the speech), our result is similar to that reported in Brazil (4.6%). In our studies like in other data, the symptoms of asthma in adolescents were more frequent in girls than in boys (12, 28).

It cannot be excluded that the prevalence of asthma was underestimated in our study. It has been reported that asthma symptoms, although common, are poorly recognized by parents of asthmatic children (26). In Curitiba (Brazil) in the group of asthmatic schoolchildren, only 26% of parents of children and 28% of adolescents recognized the asthmatic symptoms (28). Indeed, in some African countries including Mozambique, people did not accept the diagnosis of asthma easily. We were surprised with the finding that

independent of age group, about a quarter of the surveyed people referred ever asthma. However, only a third of them have current asthma.

The prevalence of rhinoconjunctivitis (23.1%) in teenagers is one of the highest reported in Africa, comparable with from the one estimated in Abidjan, Ivory Coast (20.9%) (13). The peak of rhinitis was observed in May, which highlights the possibility of a bias as the study was carried out in May. In our study, the prevalence of atopic dermatitis (eczema) as defined by itchy rash in flexural areas was lower (between 8.5% in children and 10% in adolescents) than in other countries. This could mean that the questionnaire succeeded in avoiding other skin diseases, which are quite common in Africa. However, the higher report of ever eczema from suburban and semi-rural schools compared with urban schools in adolescents may indicate that this term was not well understood by children from these areas even if we wrote the translation term also in Ronga (local traditional language). This finding calls for further epidemiological studies with objective assessments, and concomitant environmental analysis. All questions concerning atopic dermatitis were replied significantly more positively by females. Similar observations were reported in Ethiopia (27).

It was not easy to conduct this community-based survey of young children in Maputo using a self-administered questionnaire at home. A study conducted in Portugal using the same methodology had reported a higher participation rate (97%). Factors linked to an inadequate return of the questionnaires included: socio-economic background, parental occupation and cultural habits. In our first approach to parents, the high illiteracy rate was probably the principal cause of low participation rate. The lack of direct communication between the study group and the parents might also have influenced the participation in the study, probably because the letter sent to the parents could not clarify and sensitize them. When the parents were invited by school principals who explained the purpose of the study, they participated more easily. In the Cape Town study, the symptom prevalence based on a self-administered and interviewer-administered questionnaire for some of the questions related to sleep disturbance, speech disturbance, night cough, tight chest and asthma were close to each other. For recent wheeze, wheeze frequency and wheeze ever, the interviewer-administered questionnaire produced significantly higher prevalence (14). Later we successfully applied to parents a collective interview. Thus, we increased the participation rate to near 80%, and the results are consistent with that reported in 13–14-year group.

Furthermore, it must be underlined that some terms used are not even well understood by the majority of the Mozambican people; such as 'Pieira' used in the Portuguese translation of wheezing; 'febre dos fenos' used in the Portuguese translation of hay fever; and 'eczema' the Portuguese translation of eczema. This suggests that language factors may have led to differences in symptom prevalence. We observed that in the urban schools the children understood better the written questionnaire and took less time to filling it. Probably, the video questionnaire must be developed and adapted not only for asthmatic symptoms but also for allergic rhinoconjunctivitis and atopic eczema.

Prior to these surveys, no study at the community level had been carried out in Mozambique to examine the occurrence of childhood asthma and allergies and hence local determinants for these diseases also remain largely unknown. Our data show that asthma and allergies are a growing public health problems in Maputo, and improvement in prevention and management plans are required to control such diseases.

Conclusion

In some African countries, the prevalence of asthma and allergic diseases is higher than in some European countries, although the cause of this observation is not identified. We observed a similar prevalence of asthma and atopic eczema in the two groups of children. In young children, asthma was more frequent in boys than in girls. Conversely, in adolescents, asthma prevalence was higher in girls than in boys. Adolescents presented more frequently than children signs of bronchial hyper-reactivity (nocturnal cough and exercise wheeze). As expected, the prevalence of rhinoconjunctivitis was more in 13–14-year-old students. In this age group, rhinoconjunctivitis was the commonest single atopic condition while in young children asthma was.

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