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PREVALENCE OF ASTHMA, ALLERGIC RHINITIS AND DERMATITIS IN PRIMARY SCHOOL CHILDREN IN UASIN GISHU DISTRICT, KENYA
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PREVALENCE OF ASTHMA, ALLERGIC RHINITIS AND DERMATITIS IN PRIMARY SCHOOL CHILDREN IN UASIN GISHU DISTRICT, KENYA

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ABSTRACT

Objective; To establish the relative increase in the prevalence of asthma, allergic rhinitis and eczema in primary school children aged 13-14 years over a six year interval.

Design: Cross sectional comparative study.

Setting: Primary schools in three rural divisions at Uasin Gishu district in the Rift Valley Province of Kenya.

Methods: Three thousand two hundred and fifty eight children aged 13-14 years from seventy two primary schools in Uasin Gishu district were studied using the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. All children in the selected schools in this age range whose parents gave consent were included.

Results: There were 47.4% males and 52.6% females as compared to 48.7% and 51.3% respectively in 1995. The cumulative prevalence for wheezing, rhinitis, itchy eyes and dermatitis was 23.6%, 43%, 24.1% and 28.5% respectively which were higher than for 1995 which were 21.2%, 32.4%, 11.8% and 13.8% respectively ($p=0.001$). The period prevalence rates for wheezing, rhinitis and eczema were 13.8%, 31.4% and 21.3% respectively as compared to 10.2%, 25.3% and 14.4% respectively for 1995 ($p=0.001$). The prevalence of asthma, allergic rhinitis and eczema was 12.6%, 38.6% and 28.5% respectively in 2001 compared to 6.6%, 14.9% and 13.9% respectively in 1995 ($p=0.001$).

Conclusion: There was a significant increase in the prevalence of asthma, allergic rhinitis and eczema in children in the study population over the last six years.

INTRODUCTION

Asthma and allergic diseases are increasingly becoming important in developing countries as in developed countries(1-3). In the ISAAC study of 1995 the prevalence rates among African children were lower than for developed countries but were higher than expected(4-7). The aetiology of these diseases still remains poorly understood but genetic, environmental and dietary factors seem to contribute independently and in combination(1,8-10). Several research studies have been carried out to find out why some children develop these disorders while others do not. The main finding has been a positive family history of atopic disease in a significant proportion of these children(3,9). The prevalence of asthma and atopic diseases is increasing worldwide more so in the industrialised and industrialising countries(3,8,11-13). The trends have not been studied in developing countries but the relatively high prevalence levels in the ISAAC studies

in the mid 1990s point to a possible increase in the prevalence of asthma and allergies in these countries(3-7,14-18). It was therefore found necessary to repeat these studies in order to assess trends in the prevalence in all countries of the world that were involved in the ISAAC studies(1). This would provide the study comparisons where more than one site were involved and the within site trends in prevalence. In addition the intercountry and intercontinental comparisons would be made in the context of the international study.

MATERIALS AND METHODS

Design: This was a cross sectional study carried out between February and March 2001 in 72 primary schools in Uasin Gishu district in the Rift Valley province of Kenya. A comparison in the prevalence rates of asthma, allergic rhinitis and dermatitis in 1995 and 2001 is made to establish if there is a trend over the six year period.

Study site and population: A total of 3258 children aged between 13-14 years were studied. This was in the same divisions and schools that were used in the 1995 ISAAC study. The schools were 10-60 km from Eldoret town and were therefore mainly rural schools. They were all in the highlands at 2100 meters above sea level. The study was conducted during the dry season which was the same time the previous study was conducted. This was for comparison purposes between the time interval since conduct during different months would introduce a confounder as a seasonal variable that would complicate the comparisons.

Sampling method and procedure: The schools were sampled from three of the five divisions of the district which were used in the previous study. These were Ainabkoi, Kesses and Kapsaret/Central divisions. All the schools were selected from these divisions and all children in the study age group were identified, recruited and registered for questionnaire administration during a preliminary visit. The schools were then visited by three teams of trained public health nurses and officers for questionnaire administration for the identified children. Each team covered a separate division and started with the schools nearest the local health centre covering two schools per day until all schools were visited. All the selected children that met the criteria were made to sit in one classroom in the school and given the questionnaire to answer individually but the questions were read by one of the trained members of the administering team systemically one question at a time. The students responded by marking an "X" on the appropriate choice after the question was read to them in English.

Informed consent was obtained from the parents of all children through the parents teachers associations (PTA) and

written permission was obtained from the District Education Officer and the Medical Officer of Health in Uasin Gishu district.

The questionnaire was in four sections – demographic data, wheezing and asthma (8 questions), rhinitis (6 questions) and eczema (6 questions). The questions mostly required a "YES" and a "NO" answer with only the yes responders proceeding to the next question but the first and last questions in each of the three sections were to be answered by all children as they addressed the point and cumulative prevalence aspect of asthma, allergic rhinitis and dermatitis. The questionnaire was pretested in several countries by the ISAAC steering committee and the English version was adapted for the Kenyan situation as it was found appropriate and relevant. A minimum of three thousand children were needed for each site in the worldwide ISAAC study to provide a power of 90% and a 5% level of significance. The data was entered into a computer and analysed using the epi-info data base that had been designed for the worldwide ISAAC study. A comparative analysis was then done with the results of the 1995 study.

RESULTS

Table 1 shows the cumulative and period prevalences for asthma and wheezing for the two study periods and there are statistically significant increases in these prevalences in 2001 when compared to 1995. It also shows the severity of the condition in these children and the prevalence of asthma.

Table 1

Prevalence of wheezing and asthma

Variable/question	% for 1995 study (n =3018)	% for 2001 study (n=3258)	Significance p=0.05
Ever had wheezing	21.2	23.6	0.02
Ever had wheezing in the last 12 months	10.2	13.8	0.001
Number of attacks in the last 12 months			
- none	1.1	3.5	0.001
- 1-3	7.2	8.8	0.02
- 4-12	1.1	2.6	0.001
- >12	1.0	2.5	0.001
Has sleep been disturbed in the last 12 months months due to this			
- never	3.3	6.1	0.001
- once a week	3.9	6.1	0.001
- more than once a week	1.9	4.0	0.001
Has the wheezing caused speech limitation in the last 12 months	2.9	7.4	0.001
Ever had asthma	6.6	12.6	0.001
Ever had exercise induced asthma in the last 12 months	15.4	27.9	0.001
Ever had a dry cough at night in the last 12 months.	18.0	32.2	32.2

Table 2

Prevalence of rhinitis and conjunctivitis

Variable/question	% for 1995 study (n = 3018)	% for 2001 study (n = 3258)	Significance (p = 0.05)
Ever had sneezing or running nose when not having a common cold	32.4	43	0.001
Ever had sneezing/running nose when not having a common cold in the last 12 months	25.3	31.4	0.001
Ever had itchy eyes associated with running nose in the last 12 months	11.8	24.1	0.001
Has the nose problem interfered with normal activities (school, work etc.)			0.002
- never	5.6	7.8	
- a little	8.2	15.6	0.001
- moderate	3.4	6.2	0.001
- a lot	6.7	3.5	0.001
Ever had hay fever	14.9	38.6	0.001

Table 3

Monthly variation in the prevalence of rhinitis

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1995	3.3	2.4	2.0	2.1	2.7	2.0	1.9	2.2	1.9	1.8	1.5	2.0
2001	5.3	5.2	5.5	5.9	9.0	6.3	4.3	4.8	3.8	3.9	2.0	3.2
p-value	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.1	0.03

Table 4

Prevalence of allergic dermatitis

Variable/ question	% for 1995 study (n= 3018)	% for 2001 study (n=3258)	Significance (p=0.05)
Ever had an itchy recurrent rash	23.8	28.5	0.001
Have had an itchy recurrent rash in the 12 months	14.4	21.3	0.001
Ever had an itchy recurrent rash in the flexural areas	11.4	19.8	0.001
Has the rash ever cleared completely in the last 12 months	7.8	15.9	0.001
Has the rash ever kept you awake at night	5.5	7.6	0.002
- never			
- one night per week	4.6	9.7	0.001
- more than one night per week	2.2	5.9	0.001
Ever had eczema	13.9	28.5	0.001

Table 2 shows the cumulative and period prevalences for rhinitis and conjunctivitis for the two studies with statistically significant higher prevalences for the latter study except for severe rhinitis which is lower. It also shows the severity of the conditions in some of these children and the prevalence of allergic rhinitis (hay fever).

Table 3 shows the month by month prevalence of rhinitis for the two studies and there are higher

prevalence values for the 2001 study. No clear seasonal pattern is seen for both study periods.

Table 4 shows the cumulative and period prevalence of allergic dermatitis (eczema) for the two studies which also shows significantly increased prevalence in 2001. It also shows the severity of the condition and the prevalence of eczema which is the same as the cumulative prevalence of allergic dermatitis.

DISCUSSION

Asthma and other allergic disorders are common in children especially in developed countries where high prevalence rates have been found, with higher rates occurring during the winter season(3,9,10). The prevalence of these conditions were 6.6%, 14.9% and 13.9% for asthma, allergic rhinitis and eczema respectively in the study conducted in 1995 among the rural primary school children in Uasin Gishu district in the western highlands of Kenya(2). Corresponding prevalences for urban childhood population of the city of Nairobi were about 15.4%, 25% and 9.4% respectively(4-7) and for the developed countries the prevalence rates were even higher with figures of over 35% for asthma in New Zealand, over 25% for Malta for rhinitis and 20% for the United Kingdom for Eczema(4-7). However, Nigeria and Ethiopia recorded over 35% and 20% for rhinitis and eczema respectively which were higher than most developed countries(5). Several theories have been suggested for the increasing prevalence of these conditions worldwide. These include climatic factors due to high prevalence in winter and during the rainy seasons, dietary changes as most families adopt western styles and environmental factors that include industrial pollution(3,9,10). The postulate that the high immunisation status against the common immunisable diseases through the expanded programme on immunisation plays a role in the aetiology of these diseases has been found not to be true in one study(19).

Asthma has become an important disease in Kenya with a prevalence of wheezing of 10-30% which is still lower than in developed countries like Australia which have upto 40-70%(1,2,4-7). The severe symptoms of interference with activities such as speech and sleep are commonly observed in these children and these have been found to be increasing as shown in our study and this has been observed in other studies(4,5,20-22). Prevalence variations have however been observed within and between countries as is the case between developed and developing countries(4,5,14-18). Differences have been observed between urban and rural populations in the prevalence of asthma and this was also the case for Kenya in the 1995 ISAAC study in which the prevalence of asthma was higher in Nairobi primary school children than the Uasin Gishu children using the same study instrument(2,4). These differences therefore seem to point to environmental and dietary factors as aetiological risk factors among many other possible associations(2,9,18,23-25). There is a trend to increased prevalence of asthma in children over the years as shown in our study. This would be expected as affluent life styles are being adopted by many families including those in the rural areas of developing countries and as more persons move to urban centres.

Allergic rhinitis is more difficult to diagnose as there are no clear features, other than itchiness, that distinguish it from the non-allergic rhinitis with which it is interrelated at most times(1,26). Rhinitis is usually allergic if the causative allergen can be identified. In this study rhinitis was considered allergic if it was recurrent and associated with itchiness and conjunctivitis associated with itchiness of the eyes(2,5-7,19,26). There are large variations in the prevalence of allergic rhinitis worldwide ranging from 10-40% but the pattern is similar to that for asthma although it tends to be more prevalent(1,2,5-7). Most studies show a higher urban prevalence than in rural population which could be attributed to environmental pollution(5,6,26). There was no clear seasonal variation in both the studies carried out in the rural children as the prevalence was similar in the different months and there was no increase in prevalence between May and August which are the cold and rainy months in the study areas(2). This is in contrast to western countries in which the prevalences have been noted to be higher in winter possibly due to indoor pollution by mites as most people stay indoors(1,5,6). As is the case in asthma, the prevalence of allergic rhinitis is on the increase in our study population over the years.

Atopic dermatitis (eczema) has been observed to be on the increase in all parts of the world including Kenya but there are marked variations with high prevalence rates in developed countries(2,5,6). This increase is noted in our studies as was the case for asthma and allergic rhinitis. The factors responsible for the increasing prevalence could be the same for these three conditions but some studies have indicated a higher prevalence of eczema among the high social class populations(27). This has been supported by reduction of these conditions in the communist independent states with the decline of the socioeconomic status over the years(7,22). The diagnosis of eczema appears easier than for asthma and allergic rhinitis as the cumulative prevalence for itchy rash was the same as for eczema in our recent study although this was not the case in 1995(2,22).

In conclusion, there is increasing prevalence of asthma, allergic rhinitis and dermatitis among children in the study population. There is no clear seasonal variation in the prevalence of rhinitis in the study area.

We recommend that more studies should be carried out to assess the possible roles of dietary and environmental factors in the increasing prevalence of asthma and allergies in children.

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