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An Investigation of the Occurrence of Atopic Dermatitis in Khomas Region School Children, Windhoek, Namibia

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Abstract

The aetiology of atopic dermatitis remains poorly understood in Namibia despite considerable research in other developing and developed countries. Although there is growing knowledge about factors that may predispose to the onset of atopic dermatitis (AD), as well as factors which may exacerbate existing disease among school children in Namibia very little is known about the epidemiology of atopic dermatitis (AD), and studies from Southern Africa and Namibia in particular are limited. The researcher sought to investigate the frequency, and perceived risk factors associated with AD, asthma, rhinitis and dermatitis in children living the Khomas region, Namibia. The study adopted The International Study of Asthma and Allergies (ISAAC) in Childhood Phase II questionnaire to survey a representative sample of children ≤ 12 years old in the Khomas Region. The results of laboratory tests were reviewed by pathologists and parents completed a standardized questionnaire with the assistance of a registered Medical Officer. The study found that Atopic diseases, including allergies rhinitis, allergic dermatitis and asthma were common in Khomas region school children based on parental reports. Prevalence rates were between 20% and 78%. Atopic dermatitis was common in Khomas Region and prevalence rates were 80.0% and 72.0% for AD ever and current AD, respectively. The findings of this study revealed that a small percentage (21.4%) of the children aged ≤ 12 years had experienced symptoms of allergic rhinitis.

Keywords

Atopic dermatitis, Allergy, Prevalence, Children, Epidemiology, ISAAC

Abbreviations

AD: Atopic Dermatitis; ISAAC: International Study of Asthma and Allergies College

Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin disorder, characterized by cutaneous dryness, intense itching, scratching, skin damage, and secondary infections [1]. Civelek et al. found that in chronic AD, flexural dermatitis becomes more prominent. The disease is closely associated with asthma and allergic rhinitis and results in significant morbidity, leading to school absenteeism and emotional stress in children. Its causes remain unknown, although it is probably a combination of genetic, environmental, and immunologic factors [2]. The prevalence of AD has risen substantially in many countries in recent decades, and this increase has been attributed mainly to changes in lifestyle, nutrition, and environmental factors [1].

AD affects one fifth of all individuals and prevalence varies around the world. About half of the people develop AD in the first year of life with 95% developing AD before 5 years of age. AD is increasing in developing countries where it remains a serious health concern. In industrialised countries AD increased from the 1950s to around 2000. Notable risk factors include genetics and environmental factors. Many genes have been associated with AD especially those associated with structural proteins and elements of the immune system. Western lifestyles have been reported as being associated with an increase in eczema [3].

The prevalence of Atopic dermatitis (AD) in high income countries and low income countries is approximately 10-30% in children and 2-10% in adults representing a two- three fold increase in recent decades [1]. AD is associated with hyper-reactivity of the skin to environmental trigger factors that are harmless in normal individuals. Major contributors to this hyperactivity are the many immune and inflammatory changes taking place in the skin and in AD individuals [4]. AD can be classified into several subgroups, each with different immune and pathological features, suggesting a multifactorial disease and heterogeneity. Ladoyanni argues that two types of AD have been identified. They include the "extrinsic or allergic" type of AD, which is characterized by Immunoglobulin E (IgE) mediated sensitization (immediate, type I hypersensitivity) and occurs in 70-80% of individuals. The "non-allergic or intrinsic" type of AD affects 20-30% of individuals and is defined by a more T-cell driven feature (delayed, type IV hypersensitivity), with low IgE levels and absent IgE sensitization [4].

Diagnosis of atopic dermatitis is complex as other conditions should be considered in the differential diagnosis. Continuation of atopic dermatitis in childhood is easy to diagnose and compared to adult onset atopic dermatitis. The physical and environmental factors responsible for atopic dermatitis in adults are different from those responsible for its development in children. Total IgE levels do not correlate to severity of AD and are increased in about 80% of the cases [5].

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Table 1: Response rate.

Name of Hospital/clinic	Proposed target	Actual response	Percentage of proposed target	Percentage(%) actual response
Khomasdal Clinic	20	5	3.33	1.14
Robert Mugabe Clinic	20	10	3.33	2.27
Donkerhoek Clinic	20	10	3.33	2.27
Wanaheda Clinic	20	5	3.33	1.14
Okuryangava Clinic	70	60	11.67	13.64
Hakahana Clinic	20	20	3.33	5
Dordabis Clinic	10	10	1.67	2.27
Groot Aup Clinic	10	10	1.67	2.27
Katutura Health Centre	30	10	5	2.27
Windhoek Central Hospital	250	200	41.67	45.45
Katutura Hospital	130	100	21.67	22.73
Total	600	440	100%	100%

Table 2: Child experienced wheezing in last 12 months.

	Frequency	Percentage
Wheezing	100	22.7
No wheezing	340	77.3
Total	440	100

Table 3: Responses by participating mothers on perceived causes of skin disease.

	Unknown cause of skin disease	Heat as perceived cause	Cold as perceived cause
Frequency	96	50	100
Percentage	39.0	20.3	40.7

Table 4: Frequency of other conditions in children as reported by participating mothers.

Condition	Yes Frequency (%)	No Frequency (%)
Asthma	100 (22.7)	340 (77.3)
Rhinitis	94 (21.4)	346 (78.6)
Atopic dermatitis	246 (55.9)	194 (44.1)

Table 5: Results of allergic sensitisation and IgE.

Test	Positive Frequency (%)	Negative Frequency (%)
Paediatric phadiatop	34 (66.7)	17 (33.3)
Serum IgE	41 (80.4)	10 (19.6)

Most of the literature on the occurrence of AD and associated factors of AD among children is from Europe, USA and China. There is no published research in Southern Africa and Namibia on AD in children. It is against this background that this study was undertaken. This study sought to explore and understand the prevalence of AD as well as the risk factors associated with AD among children aged ≤ 12 years in selected public health clinics in the Khomas region.

Material and Methods

Study design

This was a cross sectional study that utiliseda structure questionnaire to collect data. Total IgE and paediatric phadiatop was measured using the Phadia™ 250 Immunoassay Analyzer - Thermo Fisher Scientific, Uppsala (Sweden).

Population

The study population was made up of 440 Namibian children ≤ 12 years old (1 month to 12 years) whose mothers visited public health clinics and hospitals in the Khomas region with their children for medical attention related to any disease. The group of children only comprised of natives of the Wambo, Herero, Nama, Damara and Afrikaana tribes. Convenience sampling was used to select participating mothers and their children.

Sample-size and sampling procedures

The study targeted a sample size of 600 subjects which was the representative sample size. However, a total of 440 respondents took part. Fifty one children showing signs of severe skin rash were selected for serum IgE and paediatric phadiatop screening.

Statistical Analysis

The data was analysed using SPSS version 22 (SPSS Inc. Chicago, Illinois, USA). Statistical analyses included descriptive statistics such as tabulation and percentages.

Results

The results of this study were presented using descriptive statistics. There were more females (55.9%) than males (44.1%) in the study population. The children in the study population were ≤ 12 years of age with 56.8% of them in the age group > 0 to ≤ 1 year old. A total of 56.8% of the subjects had a family history of asthma. The study targeted 600 respondents and 440 of the participants responded representing a 73.3% response rate.

The response rates of participants from for each of the 11 public health facilities in the Khomasregion are presented in table 1.

The 440 Mothers who took part in the survey were asked to indicate whether their children had experienced wheezing as well as the frequency of wheezing attacks (Table 2).

A total of 77.3% of the respondents indicated that their children had not experienced wheezing in the past 12 months. Of those who responded that their child had experienced wheezing, 9.1% of the mothers reported that their children had experienced 1-3 attacks of wheezing, followed by 6.8% of the respondents who indicated that their children had experienced 4-12 attacks of wheezing during the past 12 months and 6.8% had experienced wheezing more than 12 attacks in the last 12 years.

The 440 respondents were asked to indicate if their children had suffered a skin disease and state the factors they perceived as contributing factors to their childrens' skin diseases. Two hundred and forty six children were reported by their mothers to have suffered skin disease. Table 3 shows the responses by mothers whose children had suffered a skin disease in the last 12 months and the perceived factors causing their children's skin diseases.

A total of 246 of the respondents indicated that their children had suffered skin diseases. Of these respondents more mothers (40.7%) attributed cold weather as responsible for the cause of their children skin diseases. The participants were asked to respond on whether their children had presented with selected conditions in the last 12 months. Table 4 indicates the participating mothers' responses (Table 4).

Most mothers indicated that their children had presented with atopic dermatitis and itchy rash in the last 12 months. A total of 78.4% of the mothers further reported that their children had presented with rash around the elbows, behind the knees, in front of the ankles, on the buttocks, around the neck, ears, face, head or eyes. However, most of the mothers (79.6%), indicated that the rash had cleared completely.

When responding to the possible causes of AD in children, the

participating mothers responded as follows: Maternal smoking in first year (65.9%), family history of allergic disease as a predictor (56.8%), current rhino conjunctivitis (56.8%) and incomplete vaccination (43.2%).

A total of 51 children had a skin test done to determine allergic sensitisation. Also, blood (serum) IgE antibody tests were conducted on 39 of the children. The results for the skin test and Immunoglobulin E (IgE) are presented in table 5. Most of the children tested had a positive paediatric phadiatop (66.7%) and a positive serum IgE result (80.4%).

Discussion

The number of female children in this study was 55.9% compared to the male children who were 44.1%. More than half 56.8% of children in this study were aged ≤ 11 months. The prevalence of asthma (previous or current) in the 440 children who participated in this study was 43.2%. Current wheezing symptoms and wheezing or whistling in the chest in the past 12 months was used to determine the prevalence of children who had experienced wheezing (22.7%). Also, 9.1% of the respondents reported that their children had experienced 1-3 attacks of wheezing, followed by 6.8% of the respondents who indicated that their children had experienced 4-12 attacks of wheezing during the past 12 months. Additionally, 2.3% of the respondents indicated that their children had attacks more than 12 times during the past 12 months. In a study done in Africa in 1990, the prevalence of asthma was estimated at 12.1% in children below 15 years of age [6]. Although there was belief in that study that asthma cases were under reported, the prevalence in that study was not very different from our study.

Current rhino conjunctivitis symptoms were evaluated as positive if the child had a problem with sneezing or a runny or blocked nose when he/she did not have a cold or flu and if this problem had been accompanied by itchy/watery eyes. The findings revealed that 21.4% of the children aged ≤ 12 years had experienced symptoms of allergic of rhinitis. Global reports estimate prevalence of allergic rhinitis to be between 4.5 to 38.3%. An ISAAC study in South Africa in 2009 showed a prevalence of 16-17% in the 13-14 years age group [7]. These studies agree with our study on the prevalence of allergic rhinitis in children.

Dermatitis ever was defined as a positive response when a child had an itchy rash which was coming and going for at least 6 months or was accepted as physician-diagnosed AD. Current AD symptoms were investigated on the basis of a child having had itchy rash at any time in the past 12 months and when the itchy rash at any time affected any of the following places: folds of the elbows; behind the knees; in front of the ankles; under the buttocks; or around the neck, ears, or eyes. To investigate the burden of AD, parents were asked how often, their child was kept awake at night by this itchy rash.

The study found that Atopic dermatitis was common in the Khomas region with prevalence rates between 20.0% and 80.0% for AD ever and current AD, respectively. The prevalence of AD in this current study was higher than those observed in developed countries [8-12]. Prevalence of AD was noted to be increasing in Africa as noted in a study by Deckers et al. 2012 in a number of African countries [13]. However, there is no comparative data in Namibia to analyse for changes in prevalence of AD over the years. The study by Deckers was done more than 10 years ago and this could explain the lower prevalence rates in the African countries studied as compared to our study. The study by Deckers had a population of children between 13 and 14 years while this current study had a population of children between 1 month and 12 years. This could be another contributing factor to the differences in the prevalence rates between the two studies as the group used in this current study is the one prone to developing AD [3].

The prevalence for current dermatitis in our study (77.3%) was much higher than that reported in a sample of American children (17.2%) [14] and 24.0% reported in Japanese children aged 5-6 years [15]. Similarly, in a study from Italy, the prevalence of AD ever and point eczema were found to be 15.2% and 5.8% [11], both which were lower than the findings of the current research. This current research used parental reports as compared to physician diagnosed AD which is used in most of the studies. The differences in study designs can be attributed to a high prevalence in our study compared to similar studies.

Namibia is a dry and arid area with large parts of the country being a desert. The country experiences extremes of both heat and cold [16]. Both conditions have an effect on the skin and its interaction with allergens [13]. This could explain the higher prevalence of AD in Namibia compared to other countries, including African and European countries.

The most important risk factors perceived by respondents to be influencing Atopic Dermatitis (AD) were found to be current allergic diseases, family history of allergic disease, maternal smoking in the first year of life, current rhino conjunctivitis and incomplete vaccination. The findings of this current research agree with those of a similar study done in Turkey by Civelek et al. in 2011 who found the same factors as being attributed to causing AD by participants [17]. Thirty four (66.7%) out of a total 51 children had a positive paediatric phadiatop and 17 (33.3%) were negative. The Immunoglobulin E (IgE) Test was used to determine the level of antibodies among the 39 children. The results revealed that 41 (80.4%) out of a total 51 children were positive compared to 10 (19.6%) who were negative. The results of this current study agree with other similar studies [5] which have shown that total IgE is high in 80% of the people with AD although it does not indicate severity od disease.

Conclusion

Atopic dermatitis was common in Khomas with prevalence rates of 80.0% and 72.0% for AD ever and current AD, respectively.The findings of this study revealed that most of the children aged ≤ 12 years who took part had experienced symptoms of allergic rhinitis. The prevalence of AD in this current study is higher than studies done in other African countries and in Europe. A total of 20.5% of the children had experienced either blocked nose/sneezing or hay fever. The prevalence of asthma is not different from global estimates. The prevalence of wheezing was low with fewer children having suffered wheezing attacks. The most important risk factors participants associated with AD were current allergic diseases, family history of allergic disease, Maternal smoking, family history of allergic disease, incomplete vaccination and current rhino conjunctivitis.

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Ethics

Permission to perform the study was obtained from the Ethics Committee of the Ministry of Health and Social Service, Namibia and the Medical Officers in charge of the respective hospitals and clinics. Written parental consent was obtained separately for each subject who took part in the research as they were minors.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Bologna JL, Jorizzo JL, Schaffer JV (2013) Dermatology. (3rd edn), Elsevier, China.
2. Civelek E, Comert S, Sahiner UM, Buyuktiryaki B, Tuncer A, et al. (2014) Development of rhinitis may be an indicator for the persistence of childhood asthma. Int J Pediatr Otorhinolaryngol 78: 843-849.
3. Pereira C, Zhu Z (2014) Atopic Dermatitis: Natural History, Diagnosis, and Treatment. International Scholarly Research Notices.
4. Ladoyanni E (2012) Trigger Factors, Allergens and Allergy Testing in Atopic Dermatitis.
5. Werner Sinclair, Jamila Aboobaker, Robin Green, Francois Jordaan, et al. Guidelines on the management of atopic dermatitis in South Africa.
6. Adeloye D, Chan KY, Rudan I, Campbell H (2013) An estimate of asthma prevalence in Africa: a systematic analysis. Croat Med J 54: 519-531.
7. Butler Nadine (2009) National Guidelines at a Glance: Allergic Rhinitis. South African Pharmaceutical Journal 48.
8. Kiken DA, Silverberg NB (2006) Atopic dermatitis in children, part 1: epidemiology, clinical features, and complications. Cutis 78: 241-247.
9. Williams HC (1992) Is the prevalence of atopic dermatitis increasing? Clin Exp Dermatol 17: 385-391.
10. García-González JJ, Vega-Chicote JM, Rico P, del Prado JM, Carmona MJ, et al. (1998) Prevalence of atopy in students from Malaga, Spain. Ann Allergy Asthma Immunol 80: 237-244.
11. Girolomoni G, Abeni D, Masini C, Sera F, Ayala F, et al. (2003) The epidemiology of atopic dermatitis in Italian schoolchildren. Allergy 58: 420-425.
12. Dickel H, Kuss O, Schmidt A, Kretz J, Diepgen TL (2002) Importance of irritant contact dermatitis in occupational skin disease. Am J Clin Dermatol 3: 283-289.
13. Deckers IA, McLean S, Linssen S, Mommers M, van Schayck CP, et al. (2012) Investigating International Time Trends in the Incidence and Prevalence of Atopic Eczema 1990-2010: A Systematic Review of Epidemiological Studies. PLoS One 7: e39803.
14. Laughter D, Istvan JA, Tofte SJ, Hanifin JM (2000) The prevalence of atopic dermatitis in Oregon schoolchildren. J Am Acad Dermatol 43: 649-655.
15. Sugiura H, Umemoto N, Deguchi H, Murata Y, Tanaka K, et al. (1998) Prevalence of childhood and adolescent atopic dermatitis in a Japanese population: comparison with the disease frequency examined 20 years ago. Acta Derm Venereol 78: 293-294.
16. Namibia Weather Network.
17. Civelek E, Sahiner UM, Yüksel H, Boz AB, Orhan F (2011) Prevalence, burden, and risk factors of atopic eczema in schoolchildren aged 10-11 years: a national multicenter study. J Investig Allergol Clin Immunol 21: 270-277.