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Prevalence of allergic conjunctivitis in school children of Karachi

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Abstract

Objective: To determine the prevalence of allergic conjunctivitis in children in selected schools in Karachi, Pakistan.

Methods: This cross-sectional study was conducted in September and October 2008 as part of the School Eye Health Initiative launched by the Aga Khan University, Karachi and the Adamjee Eye Hospital, Karachi. Children in the selected schools underwent vision assessment and a slit lamp examination by an ophthalmologist. The main objective was to detect allergic conjunctivitis which was ascertained by the presence of papillae in the upper tarsal conjunctiva, redness of the eyes, and presence or history of itching and burning.

Result: A total of 818 children aged 5-19 years were examined. Of these, 19.2% (95% CI 16.5 % to 21.9%) had allergic conjunctivitis. There was a significant association between increasing age and allergic conjunctivitis (Odds ratio: 1.19, 95% CI: 1.12, 1.26; $P < 0.001$). Boys had a higher burden of allergic conjunctivitis than girls; however this difference was not statistically significant (Odds ratio: 1.31, 95% CI: 0.90, 1.91, $p = 0.153$).

Conclusion: There is a very high prevalence of allergic conjunctivitis in children in the selected schools in Karachi. Further research is needed to identify factors that contribute to such a high burden of this condition and to assess whether a similar pattern is also observed elsewhere (JPMA 60:371; 2010).

Introduction

The burden of allergic conjunctivitis and related allergic diseases have been increasing worldwide. It is speculated that environmental factors are essentially responsible for this increase.^{1,2} Because of environmental degradation, especially in urban cities within developing countries, children are confronted with an array of new problems of allergic diseases including allergic conjunctivitis. Allergic conjunctivitis is a condition seldom associated with visual loss; however, it is important from the perspective of quality of life.

Estimates of prevalence of this allergic condition have been published previously in various studies. A study conducted among 3024 primary-school children in the Ankara region of Turkey found that 4.6% of the children had allergic conjunctivitis.³ A nationwide survey of a sample of 38,955 children in Korea showed a prevalence of about 10% for rhinoconjunctivitis.⁴

Several studies have consistently related the increase in allergic conditions to urbanization. For example, in Mongolia, a population-based survey revealed a striking association between the prevalence of allergic conjunctivitis and the extent/degree of urbanization — the prevalence was 9.3% in villages, 12.9% in rural towns and 18.4% in the cities.⁵ A small hospital-based case-control study conducted in Nigeria identified living close to major commercial centres as a risk factor for chronic allergic conjunctivitis as it increases the risk of exposure to smoke

and other air pollutants.⁶

In Pakistan, there is little or no data on its prevalence in the paediatric population. The main focus of our study was to assess the prevalence of allergic conjunctivitis in school children in Pakistan's metropolis Karachi, which is amongst the largest urban centres in the world with some of the worst indicators of air pollution. Allergic diseases are therefore expected to be a common problem faced by the people of Karachi.

Methods

This cross-sectional study was conducted during September and October 2008 as part of the School Eye Health Initiative launched by the Aga Khan University, Karachi and the Adamjee Eye Hospital, Karachi. The initiative involved screening for refractive errors and other childhood eye diseases in different schools across Karachi. Four schools—Government Iqra Girls Secondary School, Government Iqra Boys Secondary School, Government Iqra Girls Primary School, and The Citizens Foundation School—Shirin Sultan Dosa Campus — were selected based on availability. Permission to conduct the study was obtained from the head/principal of each school.

In each school, the unit of selection was class or section if the class had sections (e.g. a, b or c). The selection of classes/sections was based on convenience (e.g. because they were administratively available at the time of visit by the survey team). All children, present on

the designated days for the survey in the selected classes/sections, were screened for allergic conjunctivitis. In the Citizens Foundation School and Government Iqra Girls Primary School, all sections of all the classes were screened. However, in the other two schools, only some of the sections were screened based on their availability. Allergic conjunctivitis was ascertained by the presence of papillae in the upper tarsal conjunctiva, redness of the eyes, and presence of itching and burning. Children underwent vision assessment by a refractionist and a slit lamp examination by an ophthalmologist. Data were recorded on age, sex, signs and symptoms of allergic conjunctivitis. Children with allergic or other forms of conjunctivitis were prescribed medication while those with refractive errors were given glasses. Those who had squint were referred to Civil Hospital Karachi for further assessment. The data were entered in Microsoft Office Excel 2007 and subsequently exported SPSS for Windows version 15 statistical software (SPSS Inc, Chicago, Illinois) for analysis.

Results

During September-October 2008, a total of 818 children aged 5-19 years were examined for the presence of allergic conjunctivitis. Of the total children 71.5% were

Table-1: Prevalence of allergic conjunctivitis in children (n=818) in selected schools in Karachi.

| Age Group | Examined | Allergic Conjunctivitis | |
|-----------|----------|-------------------------|------|
| | | Number | % |
| 5-9 | 306 | 34 | 11.1 |
| 10-14 | 410 | 89 | 21.7 |
| 15-19 | 102 | 34 | 33.3 |
| Total | 818 | 157 | 19.2 |

Table-2: Proportion of different signs and symptoms as seen in children with allergic conjunctivitis (n=157).

| Signs and symptoms | Number of cases | % of cases with signs and symptoms |
|--------------------|-----------------|------------------------------------|
| Redness | 145 | 92.4 |
| Discharge | 85 | 54.1 |
| Itching | 153 | 97.5 |
| Watering | 149 | 94.9 |
| Papillae | 152 | 96.8 |

girls. Overall, 19.2% (95% CI 16.5 % to 21.9%) had allergic conjunctivitis. There was a significant association between increasing age and allergic conjunctivitis (Odds ratio: 1.19, 95% CI: 1.12, 1.26; P<0.001). The prevalence of the condition in relation to age is shown in Table-1. Boys had a marginally higher burden of allergic conjunctivitis (22.3%) than had girls (17.9%). However, the difference

was not statistically significant (Odds ratio: 1.31 95% CI: 0.90, 1.91, p = 0.153). The different signs and symptoms among cases is shown in Table-2.

Discussion

Our study, to the best of our knowledge, is the first to report on the significant burden of allergic conjunctivitis in school children in one of the world's largest and most populated cities, Karachi. The city faces numerous environmental challenges due to rapid urbanization and the striking finding of our study was that one out of every five children had allergic conjunctivitis. This in addition to other non sight-threatening eye conditions, is not the focus of any significant attention of either the national or international eye health initiatives/programmes at present.

The reported prevalence is alarmingly high and draws attention to an under diagnosed and overtly widespread condition. Comparable population-based representative data are lacking. A study conducted in a village in Chakwal, Punjab, a province of Pakistan found that the condition affected 3.7% of the surveyed population.⁷

Allergic conjunctivitis is associated with watering, itching, and swelling. Children with allergic conjunctivitis often have a history of asthma, allergies or other systemic conditions. Unfortunately, we did not ask about any associated conditions or the duration of the symptoms, but believe that most of the cases were of a chronic nature and can be attributed to air pollution as its levels are unacceptably high across Karachi. A strong association between allergic conjunctivitis and increasing age (11.1%, 21.7% and , 33.3 % in age groups 5-9, 10-14 and 5-19 years, respectively also strengthens the argument that an increasing duration of exposure increases the risk of this disease.⁸ Other researchers have also observed similar trends.^{7,9} In a study of air quality in 18 megacities in the world, Karachi was ranked as the most polluted megacity in terms of total suspended particles (TSP), and only forth in terms of multi-pollutant index.¹⁰ Karachi is growing in size and population rapidly with all the problems of a mega-city.¹¹ Reducing the number of vehicles, switching to clean fuels and decreasing the dust level of air in Karachi will help reduce the burden of allergic conjunctivitis and associated conditions. Treatment of allergic conjunctivitis depends on its underlying causes (both acute and chronic). However, attention needs to be directed to identifying its risk factors as the treatment is prolonged and expensive and is associated with complications such as steroid-induced glaucoma. Our findings can be of great assistance to existing school eye

health programmes that are focusing mainly on the problems of refractive errors in children.

The association between gender and allergic conjunctivitis remains non-conclusive. When examined for gender, a male predilection was seen in our study. However, it was not statistically significant. The relatively high disease burden among boys in our study is consistent with the findings of 4 other studies^{4,6,8,9} and it could be because boys are more exposed to environmental pollutants as they spend most of their time outdoors; By contrast girls by and large stay indoors due to cultural, social as well as religious reasons.

Additional risk factors for the development of allergic ocular diseases have also been reported. The higher occurrence of allergic conjunctivitis among paediatric population of Asians compared to whites in the Bradford based study, conjectures on the genetics aspects of this disease.⁸ However, there is little data to support this proposition. There is an increase in the number of cases during the spring season due to pollen induced allergy. However, this association cannot be explained by our study due to several reasons. First, Karachi does not witness the spring season, second, the data was collected at the end of the year and lastly much of the greenery in Karachi has been wiped out. Hence, the high percentage of cases among the paediatric age group in our study is unlikely to be influenced by season.

The pattern of ocular symptoms we found was similar to that described in previous studies with itching being the most common symptom.^{6,7}

It is estimated that by the year 2020, more than 50% of the population in Pakistan will be living in urban cities.¹² This means that countless people of all ages will be in continuous contact with environmental pollutants. Environmentalists should be involved in controlling modifiable factors such as pollution and smoking that can greatly reduce the burden of allergic conjunctivitis and related diseases.

Conclusion

One out of every 5 children suffers from allergic conjunctivitis which significantly decreases quality of life. A better understanding of risk factors for allergic diseases is needed for the prevention and appropriate management of this condition.

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