



Demographic distribution of allergic conjunctivitis in selected schools in Ovia North East Local Government Area, Benin City, Edo State

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Abstract

Background: The burden of allergic diseases and conjunctivitis has been on the increase, especially in developing countries, prompting several studies across varying populations to investigate the causes and prevalence of these conditions. Epidemiological studies have been concerned largely with the prevalence of allergic conjunctivitis in the adult population and little is known about its prevalence in the paediatric population. The purpose of this study was to determine the prevalence of allergic conjunctivitis among school children in Ovia North East Local government Area, Benin City.

Materials and Methods: A cross-sectional study was conducted using a sample size of 300 children aged 5 to 17 years from selected schools. Case history was taken through a structured questionnaire after which the children were screened. Visual acuity was measured using the Snellen Acuity chart. Internal and external eye examinations were done using a direct ophthalmoscope, magnifying loupe and penlight respectively. Data obtained was presented in percentages and tables. Chi square test was utilized to test for association between variables.

Results: A total of 190 participants were examined: 78 males and 112 females (12.9 ± 2.39 years). The study revealed that allergic conjunctivitis was present in 48.4% (92) of the participants, with itching being the most commonly experienced symptom. There was no association between allergic conjunctivitis and either age or gender ($p < 0.05$).

Conclusion: Allergic conjunctivitis was prevalent among children in the southern part of the country, stating the need for enlightenment among parents/guardians, use of relief methods, and recommendation of further research.

Keywords: Allergic Conjunctivitis, Prevalence, Symptom, Demography.

Introduction

The ocular surface may exhibit a wide variety of immunologic responses resulting in inflammation of the conjunctiva and the cornea. When such an inflammation is caused by increasing bombardment of allergens affecting the conjunctiva in particular, allergic conjunctivitis is said to occur.¹⁻³ The eye is a reservoir for allergic reactions. Although the conjunctiva is mostly involved in ocular allergy, the lids and cornea can also be affected. Acute allergic conjunctivitis results from type I hypersensitivity reaction seen in previously exposed individuals. This type of allergy appears in two main forms: seasonal allergic conjunctivitis (SAC), which coincides with the season when pollens are abundant in the air. The other is

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perennial allergic conjunctivitis (PAC) which may occur at any time throughout the year. Examples are allergies to animal dander or dust mite faeces; smoke, smug etc.⁴ Allergic conjunctivitis is often diagnosed empirically by a thoroughly conducted case history and clinical observation. Because antigens trigger inflammatory and allergic

cascades, avoidance of the offending antigens is noted to be an effective mechanism against all types of allergic conjunctivitis.

The following constitute the chronic variants of Allergic conjunctivitis: Atopic Keratoconjunctivitis (AKC), Giant Papillary Conjunctivitis (GPC) and Vernal Keratoconjunctivitis (VKC).⁵ Presentation of allergic conjunctivitis could be bilateral and sometimes, asymmetric.⁴

Signs and symptoms of ocular allergy may differ in terms of intensity and severity. They consist of, itching (severe for VKC), redness, swelling of eyelids, tearing, ropy/clear mucous discharge, photophobia, sandy sensation, pain/burning sensation, presence of papillae in the tarsal conjunctiva, conjunctiva, chemosis and Horner-Trantas dots. These symptoms have been reported to hamper students' academic performance as well as their vision-related quality of life.^{6,7}

Given that the sole cause of allergic conjunctivitis has been difficult to ascertain, factors such as air pollution in urban areas, pets, global warming, genetics, and childhood exposure have been identified.⁵ Due to environmental degradation occasioned by climate change, children are easily exposed with a variety of allergens that precipitate allergic reactions including allergic conjunctivitis.⁸ This occurs more in cities within developing countries.⁸ Allergic Conjunctivitis can occur with co-morbidities such as asthma, eczema, and rhinitis.⁹

Whereas allergic conjunctivitis comes in different forms and variants with mild and chronic presentations, it poses a threat to the quality of life of those affected including adults and children. The question of which gender is affected more by this condition remains controversial. Most epidemiological studies have focused on the prevalence of this condition with their co-morbidities; others had paid more attention to the adult population.^{9,10} In Nigeria, there is little data on the prevalence of allergic conjunctivitis in children. Therefore, this study sought to determine the prevalence of allergic conjunctivitis among school children in Ovia North East Local Government Area. The focuses are on distribution in terms of gender and age, as well as the major signs and symptoms of allergic conjunctivitis.

Materials and methods

This was a cross-sectional study conducted in five schools in Ovia North East Local Government Area, Benin City, Edo State. The study included children aged 5-17 years from five selected schools and it lasted for a period of 2 months. Convenient sampling was adopted. The five schools were selected based on convenience (those initially picked randomly were unavailable, had busy schedules, or did not want their activities disrupted). Ethical Approval: Permission to conduct the study was sought and obtained from the school principals, proprietors or proprietresses of each school. Ethical approval was also obtained from the Department of Optometry Research Ethics Committee.

Procedure: The classes were chosen in each school based on convenience sampling technique. All the participants present on the day were screened. A calculated sample size of 300 participants was used for this study and participants between the age range of 5 to 17, in the primary and secondary schools in the selected Local Government Areas were included.

A well-structured questionnaire was used to obtain participants' demographics, symptoms and medical data in the respective schools. The tests used for the study were properly explained to the participants and teachers/parents present. The Snellen Acuity chart was used to measure the visual acuity of the participants. External eye examination was done using a pen light and a magnifying loupe to check for ocular surface abnormalities (eversions of the eyelids were performed to check for presence of papillary reactions). This was followed by ophthalmoscopy for internal eye examination using the direct ophthalmoscope. The participants were divided into four groups, according to age: Group 1: 5-8 years old; Group 2: 9-12 years old; Group 3: 13-16 years old; Group 4: 17 years old. Allergic conjunctivitis was diagnosed empirically based on bilateral eye itch, burning or sandy sensation, tearing, ropy or clear mucous discharge, and photophobia. Ocular signs were based on the presence of papillary reaction, eye redness, brownish coloration of the corneo-limbus, visible Horner-Tranta's dots, etc.^{8,11}

Data Analysis: Analysis of data was determined using IBM Statistical Package for Social Sciences (SPSS) version 26.0 which utilized descriptive and

distribution statistics for the data collected. Chi-square test was used to determine the association between categorical variables (allergic conjunctivitis, gender and age group). Data was presented in frequencies, tables and charts.

Results

There were 190 participants screened: 78 (41.1%) males and 112(58.9%) females. The mean age of participants was 12.9 (\pm 2.39). The prevalence of Allergic conjunctivitis (AC) in the schools sampled revealed that, out of a 190 participants, 92(48.4%) had Allergic conjunctivitis.

Prevalence of allergic conjunctivitis based on age and gender showed that, out of the 92 diagnosed participants, 34 (33.96%) were males and 58 (63.04%) were females. The age group 13-16 years recorded the highest number of cases, 50 (54.34%). Those in the age group 5-8 years, recorded the lowest number of cases, 3(3.2%).

Furthermore, the distribution of signs and symptoms of allergic conjunctivitis the participants showed that itching was the most frequent complaint (97.8%), followed by eye grittiness (66.3). Eye redness 43.5% was the most frequent sign encountered.

On the Chi-square test for association between age and prevalence of allergic conjunctivitis in young children, there was no statistical significance $p > 0.05$. Also, the association between gender and prevalence of allergic conjunctivitis in children was not statistically significant $p > 0.05$.

Table 1: Prevalence of Allergic Conjunctivitis by Age and Gender

Age Group (Years)	Frequency		
	Male	Female	Total
5-8	2	1	3 (3.2%)
9-12	11	23	34 (36.96%)
13-16	18	32	50 (54.34%)
17	3	2	5 (5.5%)
Total	34 (36.96%)	58 (63.04%)	92 (100%)

Table 2: Distribution of Signs and Symptoms in Children with AC

SIGNS/SYMPTOMS	FREQUENCY (%)
Itching	97.8
Redness	43.5
Grittiness	66.3
Tearing	53.3
Photophobia	56.5
Clear mucous discharge	51.1
Papillae	38.0
Brownish limbal hyper pigmentation	2.2
Conjunctival chemosis	0
Ropy/ stringy mucous discharge	2.2

Table 3: Association between Demographic Data and Age and Gender

Demographic Data	With Allergic Conjunctivitis n (%)	Without Allergic Conjunctivitis n (%)	P-value
Age			0.470
5 - 8 years	4 (57.1)	3(42.9)	
9 -12 years	33(47.1)	37(52.9)	
13 – 16	50(51.5)	47(48.5)	
17	5(31.3)	11(68.8)	
Gender			0.266
Male	34(43.6)	44(56.4)	
Female	58(51.8)	54(48.2)	

Discussion

Allergic conjunctivitis in childhood is one condition that could easily lead to urgent ophthalmological/optometric consultations. Ocular morbidity associated with this condition in children does not only affect learning ability, but also adjustment in school, and personality.¹² Studies have indicated manifest increase of allergic throughout the world during the past 40 years. This has been made worse by urbanization, increased air pollution, dust, smoke, sunlight, dandruff, grass, pollen and cosmetics.¹² All of these have been reported as precipitating factors for allergic conjunctivitis. In Nigeria, studies that highlight the burden of allergic conjunctivitis in children are sparse. Available information are either focused on a clinical type of allergy¹³ or are studied marginally with other visual anomalies.¹⁴

The prevalence, which was reported to be 48.4% i.e. 92 out of 190 children, was high and widespread (Table I), supporting a general continued increase of the condition amongst children.^{7,10,12,14-17} Although there are no comparable studies with specific reference to this locality (Ovia North East Local Government Area) to ascertain an increase as it was done by Downs et al. 2001,¹⁸ which compared the rise in allergic diseases among school children aged 8-11 between the year 1982 and 1997. What is manifestly obvious is that there is an increase in prevalence of allergic conjunctivitis. This is also corroborated by Bernadine et al., 2017,¹⁴ who found the prevalence of allergic conjunctivitis to be 18.8%, recording the highest among all the causes of ocular eye disorders.

It is pertinent to note that children with allergic conjunctivitis often have history asthma, allergic otitis, eczema, and other systemic conditions.¹⁹ In their study, medical records obtained from the

diagnosed children showed that 3.2% had food allergy, 2% had drug allergy, 5% had asthma while 90% occurred in isolation. Results from this study has shown that participants diagnosed with allergic conjunctivitis were 36.96% (34) males and 63.04% females (58). This shows that females exhibited more predilection to allergic conjunctivitis than males- also corroborated by.¹⁷ This result did not agree with studies which provided contrasting data.^{8,12,14} Although, the association was not statistically significant ($p > 0.05$), similar to the study by Feng et al., (2017),¹⁰ the sample size and level of significance may have affected the result. For example, Baig et al., (2010)⁸ used a sample size of 818 and p value of 0.001 resulting in a weak association for gender (males).

The prevalence of allergic conjunctivitis was more in the age-group 13-16 years, 50 (54.4%). Kumah et al. (2015)¹⁶ had the highest number of cases in the same age group, which is comparable to this study. However there is no association between age group and gender ($p > 0.05$). This is consistent with three other studies.^{10,12,14,16} However the study conducted by Baig et al. (2010)⁸ was in contrast with this study. However, results from this study in terms of symptoms most experienced was itching (97.8%) which is consistent with other studies.^{7,8,10,12,14,16,17} Other symptoms and signs include grittiness (66.3%), photophobia (56.5%), tearing (53.3%), clear mucinous discharge (51.1%), redness (43.5%), and papillae (38%). It was noted that 89.1% of children diagnosed had never been treated for this condition. This could be attributed various reasons ranging from poor public enlightenment on the part of parents/guardian to poverty and illiteracy.¹⁶

Conclusion and Recommendations

Allergic conjunctivitis is a highly prevalent ocular disease among school aged children from the selected schools in Ovia North East Local Government area, and in many cases, as discovered in the study, it is overlooked and only treated when it is severe. There was no statistically significant association between allergic conjunctivitis and either age or gender.

This therefore calls for a much more practical approach and proactive measures to curb the effects on these children by bringing symptoms under

control, and thereby prevent blinding complications, loss of concentration and improve the quality of life in children. A better understanding of the risk factors is needed for the adequate management and prevention of the condition.

There is need to create more awareness among parents/guardians on the importance of regular eye check-up for their children/wards, educating them on the triggers and effects of the condition to encourage prompt treatment. Also, considering that the setting for this study were in schools, implementing interventions within the school environment will be effective. Such interventions could involve, regular eye checks, and creating an environment that minimizes allergens. Health care providers, including school nurses should be trained to detect and manage allergic conjunctivitis. This could proper diagnosis, some form of treatment as well as activation of referral protocols for more severe cases.

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