

# Allergic conjunctivitis in Jos-Nigeria

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## ABSTRACT

**Background:** Allergic conjunctivitis (AC) may follow seasonal or perennial pattern. There are climatic and racial risk factors involved in some types of AC. It is more prevalent in warm climatic conditions and among Afro-Caribbeans, Arabs and Asians and less among the White populations. Clinical presentations also seem to follow climatic and genetic predisposition. The purpose of this study is to determine the prevalence of AC and its clinical presentations in a hospital setting in this region in people of all ages. **Materials and Methods:** This is a hospital-based retrospective study of new patients seen at Adoose Specialist Hospital, Jos the capital city of Plateau State in North Central Nigeria with clinical diagnosis of AC from 2000 to 2009. **Results:** There were 972 subjects, 474 (48.8%) males and 498 (51.2%) females with M:F ratio of 1:1.05. The most common symptom was itching followed by redness, pains, watery/mucoid discharge, sticky eyes, puffy eyes and photophobia. The presence of papillae in the upper tarsal or lower conjunctiva, a discrete or confluent gelatinous hypertrophy of the limbal conjunctiva (Trantas dots), hyperpigmentation, hyperemia/chemosis of the conjunctiva were the common signs. AC was more prevalent in those aged 1–16 years 38.4% decreasing to 4.9% in the age group above 50 years. The presentation followed perennial pattern, with a peak around July. The most prevalent ocular comorbid condition was refractive error (distant RE and presbyopia) in 15.4%, followed by pterygium/pinguecula 3.6%, bacterial conjunctivitis in 2.2%, glaucoma 2.1% and eyelid disorders 1.7%. Cataract was present in 1.3%, and keratopathy 1.1%. Other conditions such as episcleritis, dry eye, vitamin A deficiency and posterior segment disease were also present in decreasing order. Systemic association were few with generalised body atopy in 0.3%. **Conclusion:** The prevalence of AC was 32% and is similar to what pertains in some of the African hospital studies, but differs in presentation from the Caucasians.

**Key words:** Allergic conjunctivitis, African continent, perennial and seasonal variations

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## INTRODUCTION

Allergic conjunctivitis (AC) is inflammation of the conjunctiva and other ocular surface as a result of reaction to an allergen.<sup>1,2</sup> AC is typically a type 1 IgE-mediated hypersensitivity reaction with cell-mediated Th-2 involvement in some types.

The ocular allergic response is a cascade of events that are coordinated by mast cells.<sup>3</sup> The presence of an allergen makes the body to mount an antigen specific response with T-helper cells-2 (Th2), releasing cytokines and also producing antigen-specific immunoglobulin E (IgE).

IgE then binds to mast cells with release of histamine and further release of cytokines, prostaglandins and platelet-activating factor with other intermediaries. These intermediaries cause an allergic inflammation and symptoms through the activation of inflammatory cells.<sup>4</sup> Histamine binds to H1 receptors on nerve endings and causes the ocular symptom of itching and binds to H2 receptors of the conjunctival vasculature and produces vasodilatation and lacrimation. These mast cell-derived cytokines also recruit neutrophils and TH2 cytokines recruit eosinophils promoting increased sensitivity. This process could then progress to chronic allergic inflammation<sup>5-7</sup> where there is proliferation of fibroblast in the conjunctiva with resultant development of papillae in some patients.<sup>8,9</sup>

These events are responsible for the usual presentations in patients, with bilateral severe itching, watery discharge, acute or chronic redness, swollen eyelids and burning or foreign body sensation, with photophobia. AC may occur on a yearly basis in a particular season, giving rise to seasonal form or throughout the year as in perennial AC. Most of the

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hypersensitivity reactions are to specific allergens. Pollens are responsible for seasonal conjunctivitis associated with hay fever and tend to recur at the same time each year in those with atopy. Perennial conjunctivitis occurs as a result of several allergens such as house mites, animal dander and cosmetics. Symptoms occur all year round and may be worse in the mornings. Other allergens such as contact lenses, sutures and prostheses following eye surgery could give giant papillary AC. Reactions to eye drops, preservatives in the eye drops and cosmetics could give rise to contact dermatitis. These tend to resolve once the irritant is removed. AC can follow seasonal variations at the early onset of the disorder but may become perennial as time goes on. Seasonal and perennial AC are said to occur in association with a history of other body allergies like asthma, hay fever, rhinitis, eczema or atopic dermatitis and or family history of the same. AC could seriously affect the patient's quality of life especially during the acute episodes. It could lead to children missing school for some days as a result of acute conjunctival inflammation with attendant discomfort. Most of the AC that affect children occur from the age of 5 to adolescence and rarely proceed beyond the age of 25. Before puberty more boys than girls are affected but beyond puberty there is no gender bias. There are also climatic and racial risk factors involved in some types of AC. It is more prevalent in warm climatic conditions and more among Afro- Caribbeans, Arabs and Asians and less among the white population.<sup>5-8,10-13</sup> The prevalence seems to be declining among the Caucasians. Among the Caucasians atopy in patients or family history of atopy is present in over 80% of those with AC and strong association of keratoconus.<sup>11</sup> In African continent such associations have not been frequent.<sup>14,15</sup> AC constitutes the highest group of eye problems seen in most out- patient eye consultations in the developing world, including Nigeria.<sup>14-23</sup>

Usually clinical diagnosis of AC is straightforward. A conjunctival swab excludes other forms or causes of conjunctivitis of infective means or associations. Serum immunoglobulin E (IgE) may be raised, radioallergosorbent test (RAST) skin prick testing may be negative or nonspecific.<sup>7</sup> Conjunctival scrapings for eosinophils may help determine the cause of the allergy.

The purpose of this study is to determine the prevalence of AC seen at a private hospital in Jos.

## MATERIALS AND METHODS

This is a descriptive hospital-based study of patients seen at Adoose Specialist Hospital, Jos the capital city of Plateau State in North Central Nigeria with clinical diagnosis of AC. All available records of patients who presented to the hospital for the first time with clinical diagnosis of AC at the hospital from 2000 to 2009 were reviewed. The patients' demographic information extracted included date of

presentation to the hospital, address, age, sex, occupation and presenting complaints and duration of disease and previous drug administration. Also extracted were the medical history of atopy and other allergic disorders such as asthma. Other associated ocular and systemic disorders, visual acuity (VA) were also retrieved from the patients' notes. The Snellen lettered chart and the tumbling "E" chart were used to determine the distant VA for the literate and the illiterate, respectively. For children below 2 years, their VA was determined by their ability to follow light, faces and to reach out for shiny objects. A pen torch and slit lamp biomicroscope (Marco model 2B, S/N 2999422) were used for assessing the anterior segment while direct and indirect ophthalmoscopes were used for posterior segment. The diagnosis of AC was made based on the history of itching and burning, redness or brownness, lacrimation, photophobia and a mucinous, ropy discharge and or clinical presence of papillae in the lower or upper tarsal conjunctiva. The data was statistically analyzed using Statistical Package of the Social Sciences (SPSS) version 17.0 software (SPSS Inc., Chicago, IL, USA). Simple frequencies or cross-tabulations were used to present the data and chi-squared test was used to compare variables and a *P*-value less than 0.05 was considered to be statistically significant. Ethical clearance was obtained from the Board of Adoose Specialist Hospital.

## RESULTS

During the period under review 1007 patients presented with conjunctivitis out of which 972 (96.5%) were due to allergy. The age range was 8 months to 80 years (median 22.0). There were 474 (48.8%) males and 498(51.2%) females with male: Female of 1:1.05. Table 1 shows age and sex distribution of patients with AC.

The subjects who presented with AC had various complaints. The most frequent was itching in 516 (20.8%), followed by redness in 432 (17.4%), pains in 324 (13.0%), watery discharge in 288 (11.6%), sticky eyes in 120 (4.8%), mucoid discharge in 114 (4.6%), puffy eyes in 108 (4.3%) and photophobia. Other complaints included headaches, dry eyes, and body itching with seasonal eye problems

**Table 1: Age and sex distribution of patients with allergic conjunctivitis**

Age group in years	Sex		
	Male, N (%)	Female, N (%)	Total, N (%)
0-10	142 (30.0)	98 (19.7)	240 (24.7)
11 to 20	93 (19.6)	114 (22.9)	207 (21.3)
21-30	81 (17.1)	146 (29.3)	227 (23.4)
31-40	73 (15.4)	73 (14.7)	146 (15.0)
41-50	54 (11.4)	50 (10.0)	104 (10.7)
>50	31 (5.5)	17 (3.4)	48 (4.9)
Total	474 (100)	498 (100.0)	972 (100.0)

N= Number, %= percent.

(itchy, watery, red eyes). Table 2 shows the distribution of patients' complaints.

Figure 1 shows the age distribution of those with AC.

AC also showed an association with occupation. It was most common among the students 348 (35.8%) followed by pupils 225 (23.1%) and least among the clergy 8 (0.8%). Table 3 shows the relationship between occupation and AC.

The incidence of AC was steady between January and April, starting to rise from May, and peaking in July, then declining thereafter and reaching the lowest level in December. Figure 2 shows the monthly distribution of patients presenting with AC.

Some ocular disorders were seen in association with AC. Some patients had more than one ocular comorbidity. The most prevalent ocular comorbid condition was refractive error (distant RE and presbyopia) in 151 (15.4%), followed by pterygium/pingualar in 35 (3.6%), bacterial conjunctivitis in 22 (2.2%), glaucoma in 21 (2.1%) and

eyelid disorders in 17 (1.7%). The eyelid disorders included stye in 7, blepharitis in 5, chalazion in 3, molluscum contagiosum and entropion in each. Other comorbid findings are as shown in Figure 3.

Few patients had systemic diseases associated with AC. There was history of migraine in 5 (0.5%), generalised body atopy in 3(0.3%) and 1 each of rhinitis, vitiligo and otitis media.

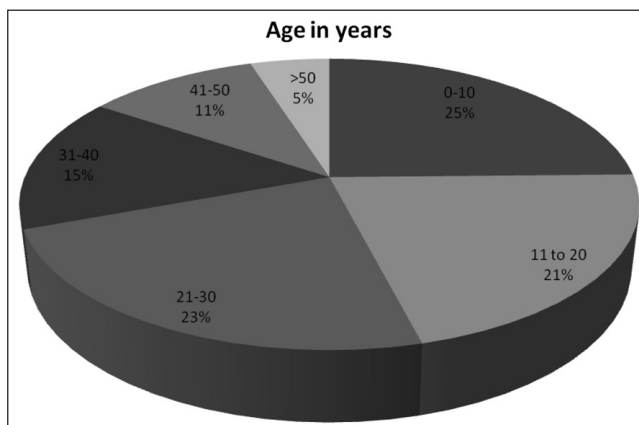
## DISCUSSION

AC is a complex disease, with its characteristic symptoms of itching redness, pains, watery/mucoid discharge, sticky eyes, puffy eyes and photophobia which make normal activities and function difficult to the sufferers. It presents a difficult problem for the patient and the eye-care physician because of the chronic nature of the disease. It was the commonest presentation, occurring in 32% of patients who presented for eye care during the period. AC constitutes the most common eye problems seen in most out-patient eye consultations in the developing world.<sup>14,15,19-23</sup> At an Eye Care Centre in Gambia Wade and colleagues found 7.9% of patients presented with one or other of the ocular allergies, making it one of the commonest ocular disorder in the unit clinic.<sup>14</sup> Hall *et al.*, in a tertiary referral paediatric eye clinic in Tanzania found about 25% of children presented with AC.<sup>20</sup> Isaac *et al.*, found 40% in an out-patient eye unit in Ghana with one type of conjunctivitis or the other.<sup>21</sup> Abah

**Table 2: The distribution of patients' complaints**

*Complaints	Frequency	Percent
Itching	516	20.8
Redness	431	17.4
Pains	324	13
Watery discharge	288	11.6
Poor vision	164	6.6
Sticky eyelids	120	4.8
Headache	120	4.8
Mucoid discharge	114	4.6
Puffy eyes	108	4.3
Photophobia	96	3.9
Dry eyes	84	3.4
Body itching	60	2.4
Seasonal eye problems	60	2.4
Total	2486	100

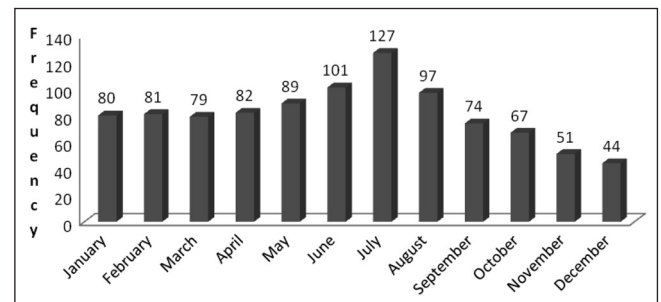
\*Complaints- multiple response



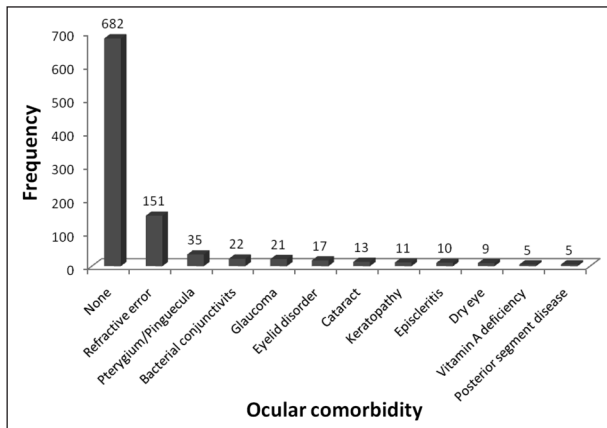
**Figure 1:** Age distribution of patients with allergic conjunctivitis

**Table 3: The relationship between occupation and allergic conjunctivitis.**

Occupation	Frequency	Percent
Student	348	35.8
Pupil	225	23.1
Civil servant	169	17.4
House wife	63	6.5
Traders	113	11.6
Unemployed	24	2.5
Artisan	14	1.4
Farmer	8	0.8
Clergy	8	0.8
Total	972	100



**Figure 2:** Monthly distribution of patients with allergic conjunctivitis



**Figure 3:** Distribution of ocular comorbidity in patients with allergic conjunctivitis

*et al.*,<sup>22</sup> in Zaria school children found AC in (7.3%) to be the commonest ocular disorder among the children. The present study compares favourably with Adenuga's finding of 42% at the Air-force Hospital in Jos.<sup>23</sup> The variations in prevalence could be as a result of differences in location of, and the type of study. Abah *et al.*, studied a school population, and had relatively low prevalence, whereas the hospital studies in Ghana and Nigeria are more closely related in their findings.

More females presented with AC similar to the findings by Wade *et al.*, in Gambia,<sup>14</sup> Kawuma in Uganda<sup>15</sup> and Adenuga<sup>23</sup> in Jos Nigeria. This is in contrast to previous findings of male preponderance.<sup>12-14,19,20</sup> The subjects who presented with AC had various complaints. The most frequent were itching 20.8%, redness 17.4%, pains 13.0% and watery discharge 11.6%. Less common complaints included headaches, dry eyes, and body itching with seasonal eye problems. AC was significantly more prevalent in the younger age groups, showing a prevalence of 38.4% in those aged 0–16 years and least in the age group above 50 years (4.9%). This is similar to findings in previous studies that noted AC as one of the most frequent paediatric presentation to most out-patient eye units in Africa and countries with hot climates.<sup>12-15,19-21,23-27</sup> AC is shown to affect children from about age three and usually gets resolved by puberty. It presents a difficult problem for the patient and the eye-care physician because of the chronic nature of the disease.<sup>7,11</sup> Sex hormones have been implicated in part for the pathogenesis of the disease, with spontaneous resolution at puberty.<sup>25</sup> The incidence of AC was steady between January and April but rose from May, peaking in July and declining thereafter, with the lowest level in December. This is consistent with what is to be expected. The rains set in around April, and amount of pollen increases thereafter, reaching a peak at about July-August and declining thereafter to a low level in December when most of the pollen-bearing plants

die off. During the drier months dust from harmattan may contribute to allergens in the environment, leading to perennial distribution, though at a lower level. Some ocular disorders were seen in association with AC. Some patients exhibited one or more ocular co-morbidity. The most prevalent ocular comorbid condition was refractive error in 15.4%. Mimura *et al.*,<sup>26</sup> found 22.1% patients with AC had RE and postulated that RE could be a risk factor for AC. Wade *et al.*, also found RE to be the most common associated ocular morbidity. Pterygium/pinguecula in 3.6% was the second-most common ocular association. It is a conjunctival degenerative condition with UV light as a risk factor. The frequent scratching of the eyes with all the other irritants may encourage the growth of pinguacular and pterygium.

In the tropics it is common in clinical practice to see patients with AC also coming in with cobacterial conjunctivitis as was noted in 2.2% of the patients. These may be secondary infections as a result of prolonged steroid use, exposure to dusty environment and scratching with dirty hands. Glaucoma was present in 2.1% of the patients and cataract 1.3% in this study. These may also be complications from long-term steroid use. Group and individual counseling and health education is critical in breaking the cycle of a frustrated patient moving from one clinic to the other. It is important for patients and their relatives to be aware of the chronic nature of the disease and other remedies that are less harmful to the eyes. Keratopathy (1.1%) included conditions such as corneal scar 4, corneal abrasion 3, and moorens' ulcer, Delens' ulcer, pannus and keratoconus in one case each were seen. These are conditions that eventually would lead to visual impairment in patients with AC. About 10% of patients with AC are known to develop corneal ulcers. The prevalence is expected to be higher in counties with hotter climatic conditions.<sup>11</sup> The prevalence is lower in the present study because these were patients seen for the first time. Long-term follow-up may give a higher figure. This is similar to the findings by Wade *et al.*,<sup>14</sup> who found 1.1% corneal scars. Few patients had systemic diseases associated with AC. There was history of migraine headaches in 0.5%, generalised body atopy in 0.3% and one each of rhinitis, vitiligo and otitis media. Systemic associations to AC seem to be lower than in other studies. Various studies have shown systemic associations to AC such as hypogonadism or hypoadrenalism, rhinitis, asthma or hay fever in high proportion. Other African studies also have recorded low associations.<sup>12,19,20</sup>

## CONCLUSION/RECOMMENDATIONS

This study has shown AC to be the commonest eye condition seen in this out-patients clinic in Jos. It is commonest in children and declines with age. It could lead to children missing school for some days as a result of acute

conjunctival inflammation with attendant discomfort. AC presents a difficult problem for the patient and the eye-care physician because of the chronic nature of the disease.

Eye health education is needed for both children and their caregivers.

Planning and allocation of medical resources are needed in this age group.

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