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Original Article

FACTORS ASSOCIATED WITH THE PREVALENCE OF ALLERGIC CONJUNCTIVITIS AMONG PATIENTS RECEIVING EYE CARE SERVICES IN JINJA REGIONAL REFERRAL HOSPITAL EYE CLINIC. A CROSS-SECTIONAL STUDY.

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ABSTRACT

The purpose of the study

To determine the prevalence and associated factors of allergic Conjunctivitis among patients attending the eye clinic at Jinja Regional Referral Hospital.

Methods

This was a cross-sectional study design employing quantitative methods of data collection. The study area was the eye clinic of Jinja RRH.

Results

The study revealed that in the prevalence of allergic conjunctivitis, the majority 55/72 (76%) was seen mostly in children and only 17/72 (24%) were adults. The majority 58/72 (80%) of the respondents were living in dust places while 14/72 (19.4%) were not living in a dust place. The majority 48/72 (66.7%) of the respondents agreed that environmental allergen exposure was a factor contributing to allergic conjunctivitis while the least 24/72 (33.3%) disagreed. On the weather condition of the respondents, the majority 53/72 (73.6%) agreed while 19/72 (26.4%) disagreed that weather conditions could not bring about allergic conjunctivitis among patients. The majority, 43/72 (59.7%) of the respondents agreed that occupational exposure was also contributing to allergic conjunctivitis and the least 29/72 (40.3%) disagreed. Regarding airborne irritants, the majority, 52/72 (72.2%) of respondents agreed that it is a factor that contributes to allergic conjunctivitis among patients while the least disagreed 20/72 (27.8%) disagreed.

Conclusion

Children have been found to have a higher prevalence compared to adults, which can be attributed to factors such as immature immune systems, increased exposure to allergens, and higher susceptibility to environmental triggers.

Recommendations

Environmental Control Measures should be put in place to reduce exposure to environmental triggers such as dust, pollen, and airborne irritants. This should include regular cleaning and dusting of living spaces, using air purifiers, minimizing outdoor activities during high pollen seasons, and avoiding exposure to known irritants or allergens.

Keywords: *Allergic Conjunctivitis, Eye Care Services, Jinja Regional Referral Hospital, Eye Clinic*
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Background of the study

Allergic conjunctivitis (AC) is the inflammation of the conjunctiva which is caused by exposure to allergens. Avery common ocular disorder in patients and is frequently overlooked, misdiagnosed, and under-treated. Allergic conjunctivitis is prevalent in 6%- 30% of the general population. The major causes of allergic conjunctivitis are allergens and irritants, such as pollen dust and mold (Dai Miyazaki, et, al, 2020). Allergic conjunctivitis is a common ocular condition characterized by inflammation of the conjunctiva due to an allergic reaction. It affects a significant portion of the population, causing discomfort, itching, redness, and watering of the eyes.

Allergic conjunctivitis is one of the most common ocular allergic conditions worldwide. Its incidence is increasing because of the changing climate, pollution, increased pollen loads, and the subject's heightened immunological sensitivity in response to environmental changes. (Stacey Ackerman, et, al, 2016). Alteration of environmental factors and air pollution affects the trend of allergic conjunctivitis especially in cities such as Tehran, (Raheleh Shokouhi Shoormasti, et, al Iranian Journal of public health 47 (11), 1749, 2018)

Globally according to WHO (2010), Allergic conjunctivitis has proved to be a monster to sight of a human being Worldwide affecting 15-20 % of the world's population.

The prevalence of allergy-related diseases (ARDs), including rhinitis, allergic conjunctivitis, and eczema, is on the increase globally. The cause of this increase is not well established. (Harriet Mpairwe et al. Clin Exp Allergy. 2021 Jan). The United States population has been affected by 10% with seasonal allergic conjunctivitis while in sub-Saharan Africa 12% of the population has suffered.

In Africa, specifically Nigeria Allergic conjunctivitis may follow a seasonal or perennial pattern. There are climatic and racial factors involved in some types of allergic conjunctivitis. 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 prevalence of allergic conjunctivitis was 32% and is similar to what pertains in some of the African hospital studies. (KN Malu, journal of the Nigeria Medical Association, 2014). The highest prevalence was observed in Africa (18%) and Latin Africa (17.3%) (D Miyazaki, 2020). In Africa and other low- and middle-income countries (LMICs), the prevalence of these conditions is higher in urban than in rural areas. Although data on risk factors for ARDs from Africa are scarce, evidence suggests that there may be important differences in risk factors between high-income countries (HICs) and LMICs. The prevalence of AC in Kenya is approximately 27.3%

In East Africa specifically Uganda, the study was conducted as a secondary analysis of a large asthma case-control involving 1700 schoolchildren, 5-17 years, in urban Uganda, and this suggests a similar underlying cause for all allergy-related diseases, associated with exposure to urban lifestyles and environment in Uganda. (Harriet Mpairwe et, al, 2021)[Pubmed].

Pediatric eye clinic at Mulago Hospital, Uganda Allergy is about 8% and trauma at 5% were similarly prevalent, often presenting late, (H Posner,(2016) Pubmed [Google Scholar].

The purpose of the study was to determine the prevalence and associated factors of allergic Conjunctivitis among patients attending the eye clinic at Jinja Regional Referral Hospital.

Specific objectives

1. To determine the prevalence of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital
2. To determine the associated factors of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital
3. To assess the impact of environmental factors on the prevalence of allergic conjunctivitis among patients seeking eye care services at Jinja Regional Referral Hospital

METHODOLOGY

Study Design

This was a cross-sectional study design employing both quantitative and qualitative methods of data collection. The study design was selected and it took a short period during data collection.

Study area

The study area was the eye clinic of Jinja RRH. The hospital is located in the Eastern region of the country in Jinja Central division, Jinja City near the source of the Nile which is 80 km east of Kampala Capital city of Uganda. It was founded in 1962 and has a bed capacity of 600. The hospital serves several clients/ patients across the region, some of whom are referred from other hospitals and health center IVs while others are self-referred. This study was carried out from October 2022 to April 2023.

Study Population

The study population included all patients with Allergic conjunctivitis attending eye care services at the eye clinic Unity in Jinja Regional Referral Hospital (JRRH) during the period of the study.

Sample size determination

The sample size was calculated using the method below according to Mbuto Samuel (2004)

Sample size=DxH/T Where:

D- Number of days available for data collection, H- number of hours per day,

T- Total time that was spent on each event

D=20days, H=3hours, T =50 minutes

(20*3)/.83=72 patients

The principal investigator used 72 respondents

Sampling technique.

A simple random sampling method was used to obtain the respondents in the study. Because everyone in the target group had equal chances of being included in the study it saved time during the sampling and eliminated the bias for the respondents.

Sampling procedures.

The principal investigator carries out a simple random sampling of the patients affected by allergic conjunctivitis who come to the Jinja regional referral hospital clinic and any with relevant information and are in the Jinja regional referral hospital. The researcher had a box of 150 papers with 72 of them written ‘participate’ and the rest written ‘don’t participate’ and every day the patients who attended the clinic and had Allergic Conjunctivitis were requested to pick a paper from the box those patients who picked papers written on “participate” were taken for the study.

Data collection method

Data was processed both qualitatively and quantitatively by tallying and using Microsoft Excel to make tablets, figures, and bar graphs.

Data collection tools.

Data was collected using an interviewer-administered questionnaire. The principal investigator started by creating rapport with the patients and reassuring them about confidentiality. The questions were read and interpreted for the patients to understand.

Answers were given in the local language (Lusoga and Luganda) and written in English by the principal

investigator and his assistants at the end, the patients were thanked for their cooperation.

Data collection procedure

Before giving out the questionnaires, the researcher fully explained the questions to the respondents and after being answered, they were used to collect data. Each filled-in questionnaire was checked for accuracy.

Study variables

Dependent Variable: Prevalence of Allergic Conjunctivitis

Independent Variables: These variables are factors that are hypothesized to be associated with the prevalence of allergic conjunctivitis Age, Gender, Environmental Factors, Occupational Exposures, and Socioeconomic Factors.

Quality control

The principal investigator was assisted by one research assistant who was selected according to their level of education, communication skills, ability to speak the local language, and knowledge about the research topic. He was involved in the pre-testing of the questionnaire and gave ample time for data collection.

Selection criteria

This study included:

- children(1-10yrs)
- adults (10-45yrs)
- elderly (45yrs and above)

Exclusion criteria

- Health workers
- Patients with chronic conditions

Piloting the study

Before the study, the principal investigator visited Jinja Regional Referral Hospital's eye department to obtain permission from the relevant authorities to carry out the study and ascertain that the study was relevant and needed.

Data analysis and presentation

Data was analyzed manually using a scientific calculator and tabulations were made to establish the relationship between the variables, Microsoft Excel and Word were used to type the research report. The results were presented in tables, figures, and statements.

Ethical consideration

Introductory letter

A permission letter and an introductory letter from the Principal of the Ophthalmic Clinical Officers training school were taken to the hospital director who recommended the researcher to the in charge of the Jinja regional referral hospital eye department who then permitted them to carry out the study.

Informed consent

Verbal consent is sought from the patients after the explanation of the study topic. The patients were assured of their right to consent.

Confidentiality

Before data was collected, the principal investigator and the research assistants first assured the patients that the information to be collected was to be kept confidential and was only to be used for academic purposes and planning to promote a better social life for all patients. To further ensure this code numbers were used instead of the patient's names as an assurance that no one knew from whom the information was got.

RESULTS

Social demographic characteristics of the respondents

Table 1 Demographic characteristics of the respondents

Responses	Frequency (n=72)	Percentage (%)
Sex		
Male	32	44.4%
Female	40	55.6%
Age bracket		
5-10yrs	15	20.8%
11-20yrs	25	34.7%
20 above	32	44.5%
Level of education		
Primary	26	36.1%
Secondary	31	43.1%
Tertiary level	15	20.8%
Tribe		
Basoga	33	45.8%
Muganda	20	27.8%
Japps	8	11.1%
Banyankole	11	15.3%
Occupation		
Business person	30	41.7%
Civil servant	18	25.0%
Peasant	24	33.3%
Total	**72**	**100**

According to socio-demographic data of respondents on sex, the majority 40/72 (55.6%) of the respondents were female and the least 32/72 (44.4%) were male.

On the age of the respondents, the majority 32/72 (44.5%) were 20 years, 25/72 (34.7%) were between 11-20 years while the minority 15/72 (20.8%) were between 5-10years.

Education level of the respondents established that 31/72 (43.1%) of the respondents were secondary school students, 26/72 (36.1%), were of primary level while 15/100 (20.8%) had attained a tertiary school level of education.

On tribe, the majority 33/72 (45.8%) of the respondents were Basoga, 20/72 (27.8%) were Baganda, 11/72 (15.3%) were Banyankole and the minority 8/72 (11.1%) were Japps.

On occupation, most of the respondents 30/72 (41.7%) were business people, 24/72 (33.3%) were peasants, while 18/72 (25%) were civil servants

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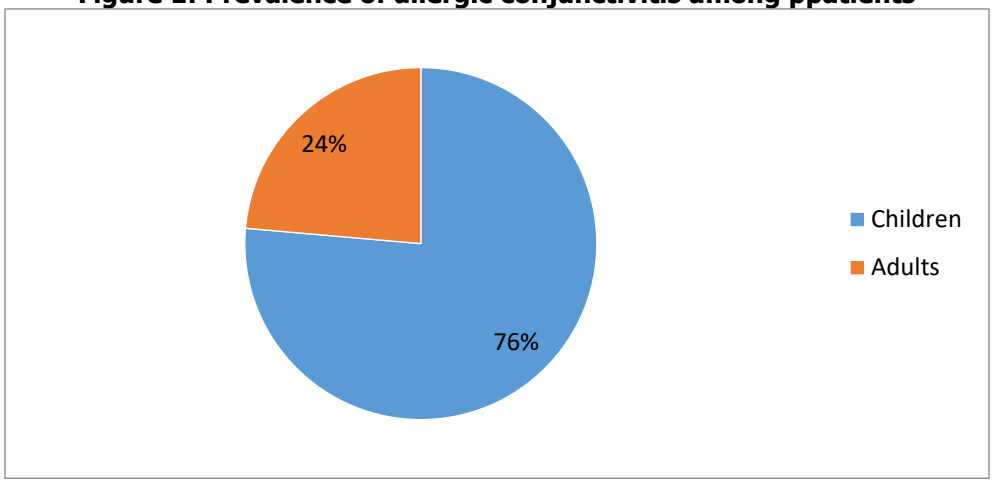
The prevalence of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital

Figure 1: Prevalence of allergic conjunctivitis among ppatients



The study revealed that in the prevalence of allergic conjunctivitis, the majority 55/72 (76%) was seen mostly in children and only 17/72 (24%) were adults.

The associated factors of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital

Table 2 Factors of allergic conjunctivitis among patients

Factors	Frequency (n=72)		Percentage (%)
Dusty places	Yes	58	80.6%
	No	14	19.4%
Environmental allergen exposure	Agreed	48	66.7%
	Disagreed	24	33.3%
Weather conditions	Agreed	53	73.6%
	Disagreed	19	26.4%
Occupational exposure	Agreed	43	59.7%
	Disagreed	29	40.3%
Airborne irritants	Agreed	52	72.2%
	Disagreed	20	27.8%

The majority 58/72 (80%) of the respondents were living in dust places while 14/72 (19.4%) were not living in a dust place.

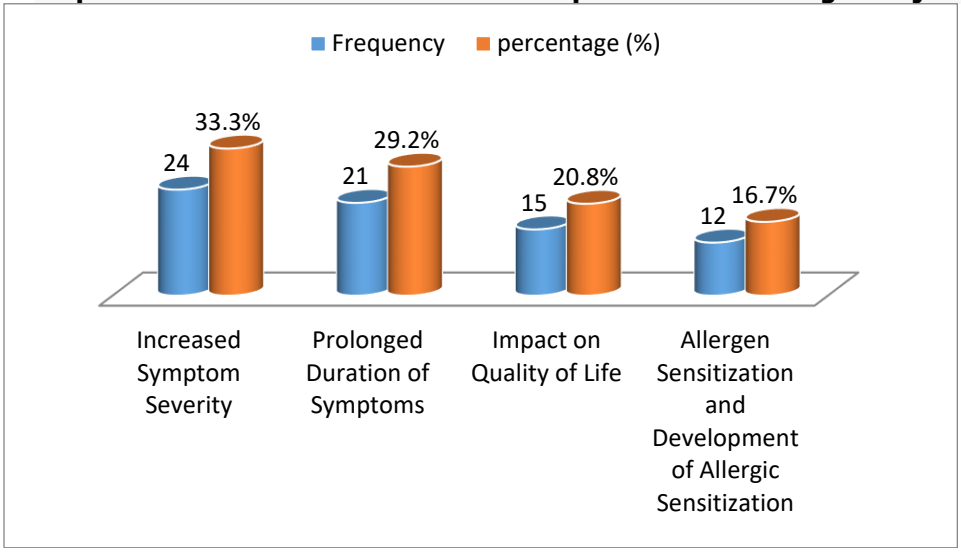
The majority 48/72 (66.7%) of the respondents agreed that environmental allergen exposure was a factor contributing to allergic conjunctivitis while the least 24/72 (33.3%) disagreed.

On the weather conditions of the respondents, the majority 53/72 (73.6%) agreed while 19/72 (26.4%) disagreed that weather conditions could not bring about allergic conjunctivitis among patients.

The majority, 43/72 (59.7%) of the respondents agreed that occupational exposure was also contributing to allergic conjunctivitis and the least 29/72 (40.3%) disagreed.

Regarding airborne irritants, the majority, 52/72 (72.2%) of respondents agreed that it is a factor that contributes to allergic conjunctivitis among patients while the least disagreed 20/72 (27.8%) disagreed.

Figure 2: impact of environmental factors on the prevalence of allergic conjunctivitis



The research findings, the majority, 24/72 (33.3%) of the respondents revealed that environmental factors lead to increased symptom severity, 21/72 (29.2%) revealed that it leads to prolonged duration of the symptoms, 15/72 (20.8%) said that it impacts on the quality of life and the least 12/72 (16.7%) revealed that environmental factors lead to allergen sensitization and development of allergic sensitization among patients.

Discussion

The prevalence of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital

The study carried out on the prevalence of allergic conjunctivitis among patients revealed that children had the greatest prevalence at 76% and the least adults at 24%. This is because it is believed that the immune system of children is more reactive and prone to developing allergic reactions, including allergic conjunctivitis. Studies have shown that children have higher levels of certain immune cells, such as eosinophils and mast cells, which are involved in allergic responses, also because children are more likely to be exposed to common allergens, such as pollen, dust mites, and pet dander, due to their active outdoor and indoor lifestyles. Early and repeated exposure to allergens can lead to sensitization, where the immune system becomes hypersensitive to specific allergens, resulting in allergic reactions including allergic conjunctivitis. These findings align with the research by Ciprandi et al. (2018) discussed the role of immune system development in children, highlighting that the immune system of children is more reactive and prone to developing allergic reactions.

The associated factors of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital

The study revealed that dusty places had the greatest percentage at 80.6% followed by weather conditions at 73.6% then environmental allergen exposure at 66.7%, then airborne irritants at 72.2%, and lastly occupational exposure at 59.7%.

This is because dusty environments contain a variety of allergens, such as dust mites, pollen, and mold spores, which can trigger allergic reactions. Exposure to these allergens in dusty places can lead to a higher prevalence of allergic conjunctivitis. This finding is supported by studies that have highlighted the role of dust mites and airborne allergens in the development of allergic conjunctivitis (Rondon et al., 2019; Abedi-Ardekani et al., 2019). This is because weather conditions, particularly high pollen levels during specific seasons, can contribute to the prevalence of allergic conjunctivitis. Pollen grains are a common allergen that can trigger allergic reactions in susceptible individuals. Studies have shown a correlation between high pollen levels and an increased prevalence of allergic conjunctivitis (Abelson et al., 2018; Takahashi et al., 2018). Exposure to environmental allergens, such as pet dander, mold, and certain plants, can provoke allergic conjunctivitis. Individuals with allergies to specific allergens may experience a higher prevalence of allergic conjunctivitis when exposed to these allergens. This finding aligns with previous research that has emphasized the role of allergen exposure in allergic conjunctivitis development (Leonardi et al., 2020; Calderón et al., 2019).

Airborne irritants, including air pollution, smoke, and chemical fumes, can exacerbate allergic conjunctivitis

symptoms and increase its prevalence. These irritants can directly irritate the eyes and exacerbate the inflammatory response. Studies have demonstrated a link between air pollution and the prevalence and severity of allergic conjunctivitis (Pérez et al., 2018; Gupta et al., 2018).

Certain occupations or work environments can involve exposure to allergens, irritants, or chemicals that contribute to the prevalence of allergic conjunctivitis. Occupational exposures to dust, chemicals, or specific allergens relevant to the job can increase the risk of developing allergic conjunctivitis. This finding is consistent with research that has explored the impact of occupational exposures on allergic conjunctivitis (El-Shazly et al., 2019; Tanaka et al., 2018).

The impact of environmental factors on the prevalence of allergic conjunctivitis among patients attending eye clinic at Jinja Regional Referral Hospital

On the impact of environmental factors, the study revealed that increased symptom severity had the highest percentage of 33.3% followed by prolonged duration of the symptoms by 29.2% then impact on the quality of life by 20.8%, and lastly leads to allergen sensitization and development of allergic sensitization among patients 16.7%. This is because Environmental factors exacerbate the symptoms of allergic conjunctivitis, leading to increased severity. Exposure to allergens, irritants, or pollutants in the environment can trigger an exaggerated immune response and inflammatory reaction in the eyes, resulting in more severe symptoms. This finding is consistent with the studies that have highlighted the impact of environmental factors on symptom severity in allergic conjunctivitis (Almalki et al., 2020; Mantelli et al., 2017).

Continuous exposure to allergens or irritants in the environment leads to chronic inflammation and ongoing allergic reactions, resulting in a longer duration of symptoms. Other studies have also shown that environmental factors play a role in the duration and persistence of allergic conjunctivitis symptoms (Leonardi et al., 2020; Singh et al., 2019).

Allergic conjunctivitis can lead to functional limitations due to the severity of symptoms and their impact on visual function. The sensitivity to light, blurred vision, and excessive tearing associated with allergic conjunctivitis can affect an individual's ability to perform daily tasks, work efficiently, and participate in social and recreational activities (Katelaris et al., 2019; Bielory et al., 2017). Environmental factors that worsen these symptoms can further contribute to functional limitations and reduced quality of life. This is because environmental factors can contribute to allergen sensitization, which is the process by which the immune system becomes hypersensitive to specific allergens. Repeated exposure to allergens in the environment can lead to the development of allergic sensitization, increasing the likelihood of allergic conjunctivitis. This finding aligns with the concept that environmental factors, such as allergen exposure, play a crucial role in the development of allergic sensitization (Calderon et al., 2018; Boonpiyathad et al., 2018).

Conclusion

The prevalence of allergic conjunctivitis is influenced by various factors, including age, gender, genetic predisposition, and environmental exposures. Children have been found to have a higher prevalence compared to adults, which can be attributed to factors such as immature immune systems, increased exposure to allergens, and higher susceptibility to environmental triggers.

Environmental factors have a substantial impact on allergic conjunctivitis. Dusty places, weather conditions (such as high pollen levels), environmental allergen exposure, airborne irritants, and occupational exposures have been identified as significant contributors to the prevalence and severity of allergic conjunctivitis. These factors can lead to increased symptom severity, prolonged duration of symptoms, allergen sensitization, and a negative impact on the quality of life.

The findings highlight the significant impact of environmental factors on the severity, duration, and development of allergic conjunctivitis. It underscores the importance of identifying and minimizing exposure to environmental triggers to alleviate symptoms, prevent sensitization, and improve the management of allergic conjunctivitis.

Recommendations

- Environmental Control Measures should be put in place to reduce exposure to environmental triggers such as dust, pollen, and airborne irritants. This should include regular cleaning and dusting of living spaces, using air purifiers, minimizing outdoor activities during high pollen seasons, and avoiding exposure to known irritants or allergens.
- Patient Education should be provided to patients about the importance of identifying and avoiding environmental triggers specific to their allergic conjunctivitis. This should include teaching proper hygiene practices, such as hand washing, and providing guidance on allergen avoidance strategies both indoors and outdoors.
- There should be personalized treatment plans that take into account the specific environmental factors affecting each patient. This should involve prescribing appropriate medications such as antihistamines, mast cell stabilizers, and topical corticosteroids, as well as recommending eye lubricants to alleviate symptoms and minimize the impact of environmental triggers.
- There should be collaboration with occupational health services for individuals whose allergic conjunctivitis is linked to occupational exposures, and collaborate with occupational health services to identify and implement appropriate preventive measures. This should involve providing protective

eyewear, improving ventilation systems, and implementing workplace policies that minimize exposure to allergens and irritants.

LIST OF ABBREVIATIONS

AKC	Atopical Keratoconjuctivitis
BMF	Burnt Material for Fuel
GPC	Giant Papillary Conjunctivitis
HMIS	Health Management Information System
IgE	Immunoglobulin E
IL	Interleukin
JRRH	Jinja Regional Referral Hospital
OCO	Ophthalmic Clinical Officer
PAC	Perennial Allergic Conjunctivitis
SAC	Seasonal Allergic Conjunctivitis
UAHEB	Uganda Allied Health Examination Board
VKC	Vernal Keratoconjuctivitis
WHO	World Health Organization.

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Conflict of interest
The authors have no competing interests to declare.

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