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PREVALENCE AND GENDER DISPARITY OF VERNAL KERATO-CONJUNCTIVITIS IN PAKISTANI CHILDREN: A TERTIARY CARE STUDY

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Abstract

Purpose: To determine the prevalence and gender-wise persisting rate of Vernal Kerato-conjunctivitis among children attending outpatient Eye departments at two tertiary care hospitals in Karachi. Material and Methods: This was a cross-sectional study design conducted in the outpatient Ophthalmology department at two tertiary care hospitals in Karachi, from 15th May to 15th June 2025. Informed consent was obtained from all participants before entry into the study through a structured questionnaire. The participants were selected randomly from the age of 1 day to 10 years. Results: This study included 100 patients in the outpatient Eye department at two tertiary care hospitals in Karachi. Out of 100 patients, 14 were found with Vernal Kerato-conjunctivitis. Out of 100, all-age group children, 28% belonged to the age group of 0-5 years, 50% belonged to the age group of 6-10 years and 22% belonged to the age of above 10 years. Recommendations: Effective VKC prevention in children requires allergen avoidance, eye hygiene maintenance, early diagnosis through awareness programs, and improved healthcare access, particularly for high-risk groups like boys aged 6-10 years with greater outdoor exposure. Conclusion: Vernal Kerato-conjunctivitis is an allergic disorder affecting children. It is fairly a more common disease in males than females. It has a lot of complications, which need to be diagnosed and managed properly in time to avoid marked visual impairment.

INTRODUCTION

One of the most frequent and ideal locations for allergic reactions is the eyes in the human body. Vernal Kerato-conjunctivitis is a chronic and recurrent inflammation of the conjunctiva and cornea and affects both eyes. Three-quarters of VKC patients have atopy, and among them, two-thirds have a family history. VKC usually starts after the age of 5 years and resolves around puberty, but in a minimal number of patients, it persists beyond the age of 25 years. It is more common in summer, dry, subtropical climates such as the Mediterranean, the Middle East, central and West Africa, South Africa, and Asian countries such as Japan, Thailand, and India. Boys are usually affected twice as often as girls. The chief symptoms of this disease include severe itching, photophobia, redness, and tenacious discharge. The clinical signs develop in the conjunctiva and cornea and include cobblestone papillae in the upper tarsal conjunctiva, limbal conjunctival thickening with gelatinous nodules and tranta's dots in the conjunctiva, and superficial punctate keratopathy, shield ulcer, and vascularization known as pannus formation in the cornea (Ali et al.,2024).

The burden of allergic conjunctivitis and related allergic diseases has been increasing worldwide. Environmental factors are essentially responsible for this increase. 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 (Mahmood et al.,2024).

Estimates of the 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. A nationwide survey of a sample of 38,955 children in Korea showed a prevalence of about 10% for rhinoconjunctivitis.

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. A small hospital-based case-control study conducted in Nigeria identified living close to major commercial centers as a risk factor for chronic allergic conjunctivitis, as it increases the risk of exposure to smoke and other air pollutants.

In Pakistan, some studies have been done on the topic of prevalence in the paediatric population. The primary focus of our study was to assess the prevalence of allergic conjunctivitis in school children in Pakistan's metropolis Karachi, which is amongst the most significant urban centers 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 (Ahmed, Irfan & Islam, 2024).

VKC was first described over 150 years ago under various names, including conjunctival lymphatica, spring catarrh, and recurrent vegetative conjunctivitis. This disease has a global distribution with widely varying incidence. It is less common in Northern Europe and North America and is more frequently seen in the African continent, Mediterranean countries, Central and South America and the Indian sub-continent. In the Mediterranean area and other temperate regions, the intensity of the disease increases in spring and summer and decreases in fall and winter. A large number of patients have been reported from subtropical countries like Pakistan. VKC primarily affects boys more than girls in the first decade of life, around the age of 7 years. The male to female ratio observed is 2.3:1.3. The onset of the disease is usually after the age of 5 years and resolves around puberty, only rarely persisting beyond the age of 25 years. There is a hereditary predisposition to atopy in about 75% of VKC patients, such as asthma, allergic rhinitis, and eczema. Clinical types of

disease are palpebral, limbal and mixed types. Signs of VKC are chemosis or oedema of eyelids, ropy mucous discharge, and giant papillae that give a cobblestone appearance. These papillae are present either at the upper conjunctiva or at the limbus, which are visible by slit-lamp examination after averting the upper lid. Cobblestone papillae are the hallmark of the disease.

LITERATURE REVIEW

Vernal kerato-conjunctivitis VKC is a disease of warm climates and warm weather months (Khairil-Ridzwan,2024). It is more common in the tropics than in northern climates. However, it is not unusual to see occasional vernal conjunctivitis patients throughout the United States and Canada (Baab et al.,2024). The prevalence of VKC in Europe ranges from 1.2 to 10.6 cases per 10,000 populations, although the prevalence of associated corneal complications is much lower (0.3-2.3 per 10,000 population). Young people are typically affected. In this form, a nonspecific hyperreactivity occurs that explains the ocular symptoms induced by nonspecific stimuli, such as wind, dust, and sunlight, as well as their variability, which is not related to allergen levels in the environment. Indeed, skin tests and/or serum IgE antibody tests to common allergens are often negative (Özdemiral, Ş ahiner, & M, 2025).

VKC is a chronic allergic inflammation of the ocular surface, primarily mediated by Th2-lymphocytes. Its complex pathogenesis involves the over-expression of mast cells, eosinophils, neutrophils, Th2-derived cytokines, chemokines, adhesion molecules, growth factors, fibroblasts, and lymphocytes. IL-4 and IL-13 are involved in the formation of giant papillae by inducing the production of extracellular matrix and the proliferation of conjunctival fibroblasts. VKC has three clinical forms: palpebral, limbal, and mixed, with an overall preponderance in males (Kaur et al., 2024).

Symptoms include ocular itching, redness, swelling and discharge. Itching may be quite severe, and even incapacitating. Patients often have photophobia, sometimes very severe. The most characteristic sign is giant

papillae on the upper tarsal conjunctivae. These 'cobblestone-like' swellings may be several millimeters in diameter. Usually, 10–20 are found on the tarsal conjunctivae, and they can be seen easily by 'flipping' the upper eyelid (Kim et al., 2022).

There may be a tenacious mucous discharge between the giant papillae. As one might expect, the giant papillae are filled with inflammatory cells and edema. Neutrophils, plasma cells, mononuclear cells, and eosinophils are found in abundance. There is also a great deal of mast cell activity within the giant papillae. Mast cells may also be found in the conjunctival epithelium, a location in which they are generally not present. The tears of VKC patients contain high levels of IgE and mast cell mediators. Histamine, leukotrienes, prostaglandins, and kinases may be found in the tears of VKC patients. The cornea may be affected in VKC.

A punctate keratitis, known as keratitis epithelialisvernalis of El Tobgy, may begin in the central cornea. The dots may coalesce to form syncytial opacity. This often leads to a whitish or grayish plaque beneath the epithelium. These vernal plaques may interfere with vision and lead to central scarring of the cornea. Plaque scans can be removed by superficial keratectomy, but they rarely resolve without surgical intervention. Histologically, plaques consist of mucin and epithelial cells, which are ground into the central cornea. Tranta's dots consist of clumps of necrotic eosinophils, neutrophils, and epithelial cells. The dots represent almost pure collections of eosinophils. These cells collect in crypts, which are formed by invaginations at the junction of the cornea and conjunctiva. Trantas dots tend to appear when VKC is active and disappear when symptoms abate. Shield ulcers can occur in the superior sectors of the cornea; these are noninfectious, oval-shaped, circumscribed epithelial ulcers with underlying stromal opacification. After the ulcer heals, an anterior stromal opacity can persist.

The massive eosinophil infiltration and activation in the conjunctiva are responsible for the corneal complications. Corneal epithelial punctate keratitis may evolve to macroerosion, ulcers, and plaques, which are all expressions of epithelial toxicity extricated by epitheliotoxic factors released by activated eosinophils. (Rosa et al., 2013).

METHODOLOGY

SAMPLE DESCRIPTION

The sample consisted of 200 eyes from 100 patients, divided into two groups: 100 patients from the outpatient Eye department at two tertiary care hospitals. 50 participants from each hospital, selected using a random sample technique.

RESEARCH DESIGN

This study employed a hospital-based cross-sectional design, utilizing quantitative methods, to investigate the prevalence of Vernal Keratoconjunctivitis and gender persistence among children attending the outpatient eye department at two tertiary care hospitals in Karachi.

DATA COLLECTION TOOLS

Data were collected through personal visits as the primary source, following the inclusion criteria, with the assistance of a questionnaire. Informed written consent was taken.

STATISTICAL ANALYSIS

The software used for data analysis was IBM SPSS version 25.

STUDY TIMELINE & SCHEDULE

The study was conducted over 30 days, from 15 May to 15 June 2025, at the outpatient eye departments of the tertiary care hospitals.

FINDINGS

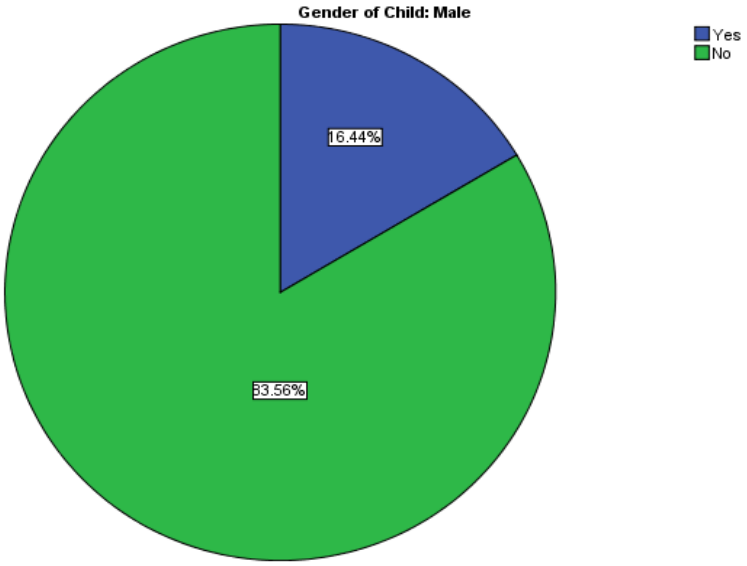
In this research, vernal kerato-conjunctivitis is a disease that occurs in children more often in males than in females. Patients from various areas of Karachi visited the Ophthalmic Outpatient Department of two tertiary care hospitals in Karachi over 30 days, from 15 May to 15 June 2025. In this cross-sectional study,

200 eyes of 100 children aged from 1 day to above 10 years were examined for the presence of vernal kerato-conjunctivitis. Overall, in 100 children, 14 had vernal kerato-conjunctivitis. In Out of 100%, 16.44% males were having disease and 7.41% females were having disease, 10.96% males were having secretions from eyes and females were not have any secretions from eyes, 16.44% males were rub their eyes and 3.70% females were rub their eyes, 24.66% males were having vision disturbance and 48.15% females were having vision disturbance, 21.92% males were having reduction in eyesight and 51.85% females were having eyesight reduction. The total numbers of patients were divided into three groups according to age. In age group I (0-5 years), 28% of patients were included. In age group II (6-10 years), 50% of patients were included, and in group III (above 10 years), 22% of patients were included.

TABLE 1: HAVE DISEASE

Gender of Child			Frequency	Percent	Valid Percent	Cumulative Percent
Male	Valid	Yes	12	16.4	16.4	16.4
		No	61	83.6	83.6	100.0
		Total	73	100.0	100.0	
Female	Valid	Yes	2	7.4	7.4	7.4
		No	25	92.6	92.6	100.0
		Total	27	100.0	100.0	

Have Disease



Have Disease

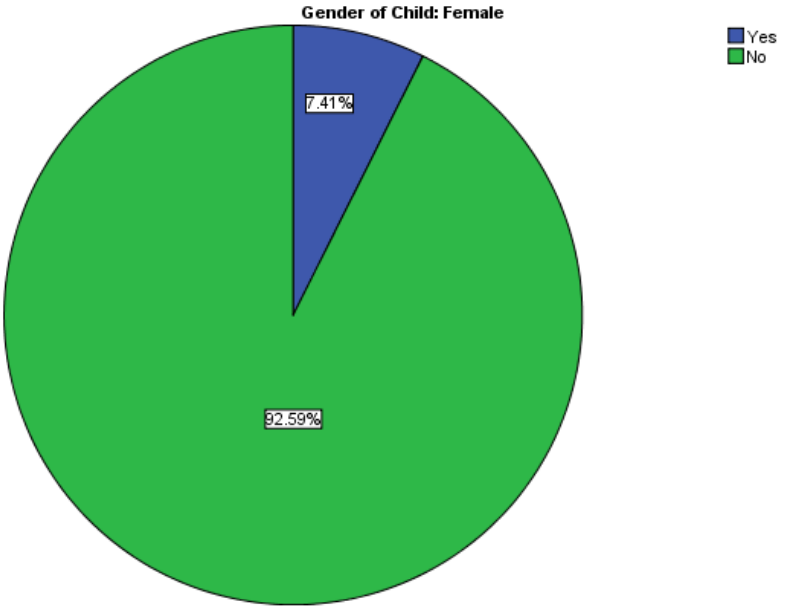
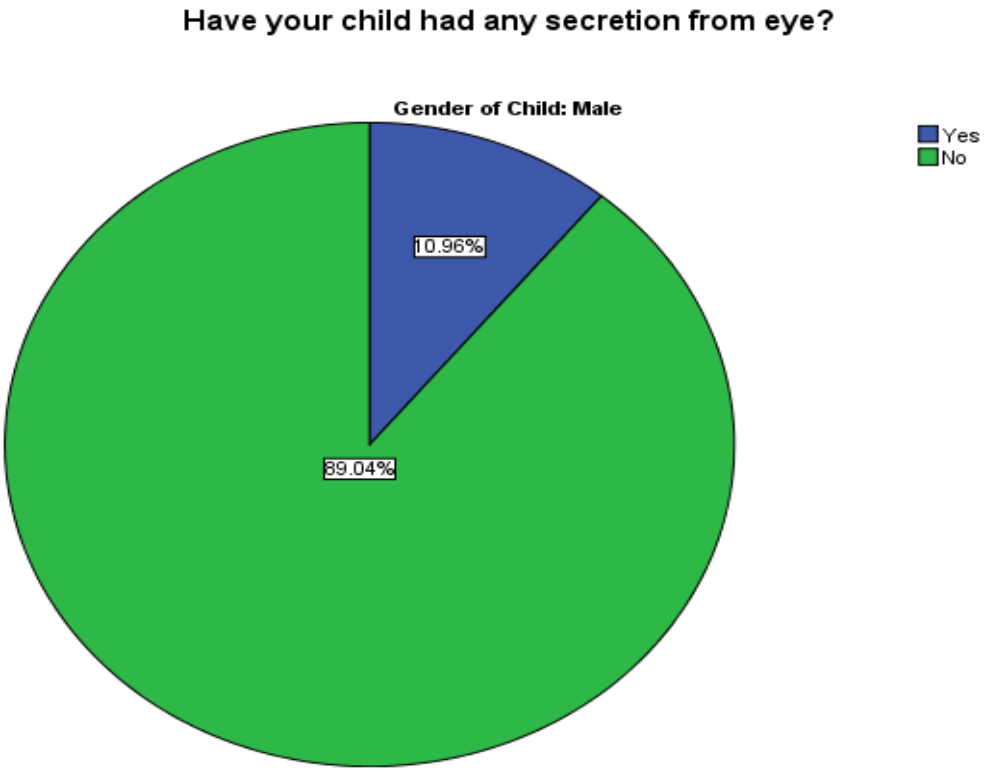


TABLE 2: HAVE YOUR CHILD HAD ANY SECRETION FROM EYE?

Gender of Child			Frequency	Percent	Valid Percent	Cumulative Percent
Male	Valid	Yes	8	11.0	11.0	11.0
		No	65	89.0	89.0	100.0
		Total	73	100.0	100.0	
Female	Valid	No	27	100.0	100.0	100.0



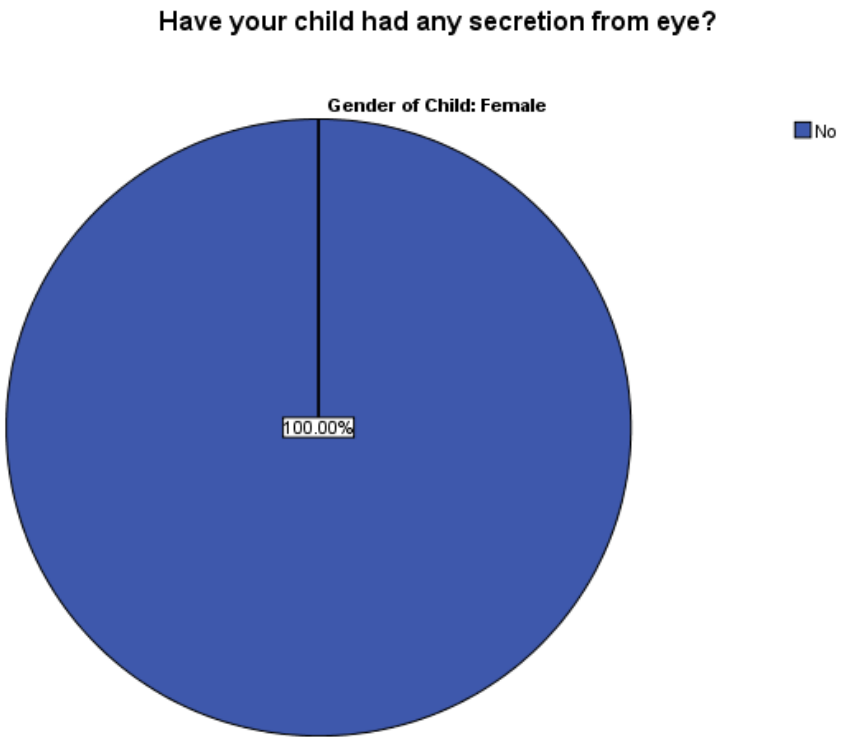
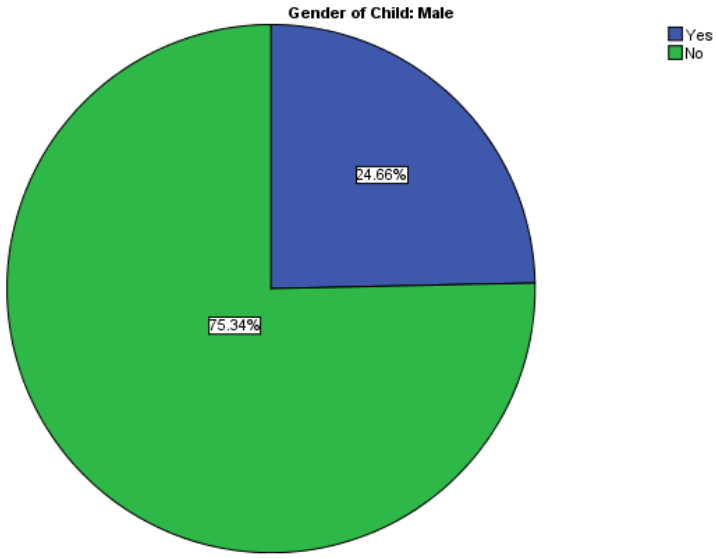


TABLE 3: HAVE YOUR CHILD HAD ANY VISION DISTURBANCE?

Gender of Child			Frequency	Percent	Valid Percent	Cumulative Percent
Male	Valid	Yes	18	24.7	24.7	24.7
		No	55	75.3	75.3	100.0
		Total	73	100.0	100.0	
Female	Valid	Yes	13	48.1	48.1	48.1
		No	14	51.9	51.9	100.0
		Total	27	100.0	100.0	

Have your child had any Vision disturbance?



Have your child had any Vision disturbance?

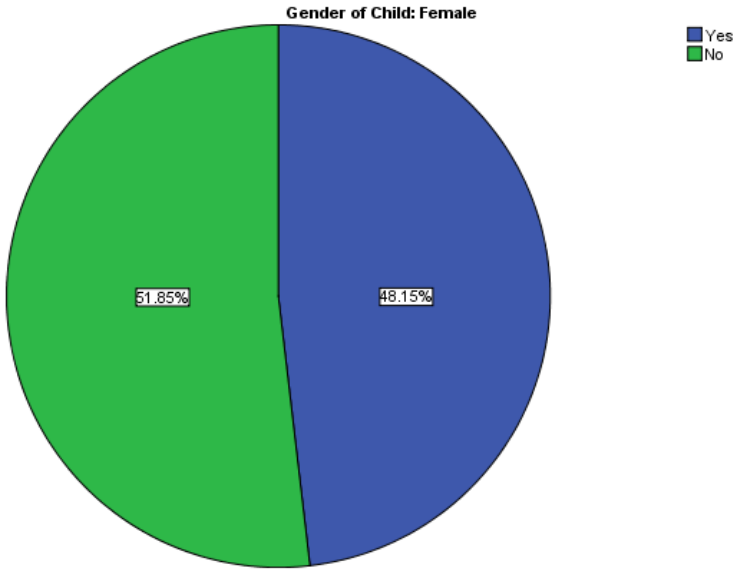
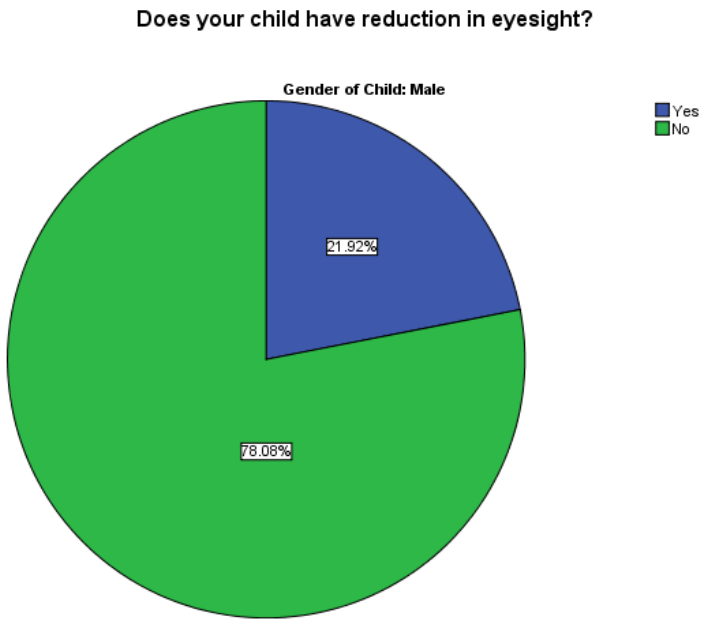


TABLE:4 DOES YOUR CHILD HAVE REDUCTION IN EYESIGHT?

Gender of Child			Frequency	Percent	Valid Percent	Cumulative Percent
Male	Valid	Yes	16	21.9	21.9	21.9
		No	57	78.1	78.1	100.0
		Total	73	100.0	100.0	
Female	Valid	Yes	14	51.9	51.9	51.9
		No	13	48.1	48.1	100.0
		Total	27	100.0	100.0	



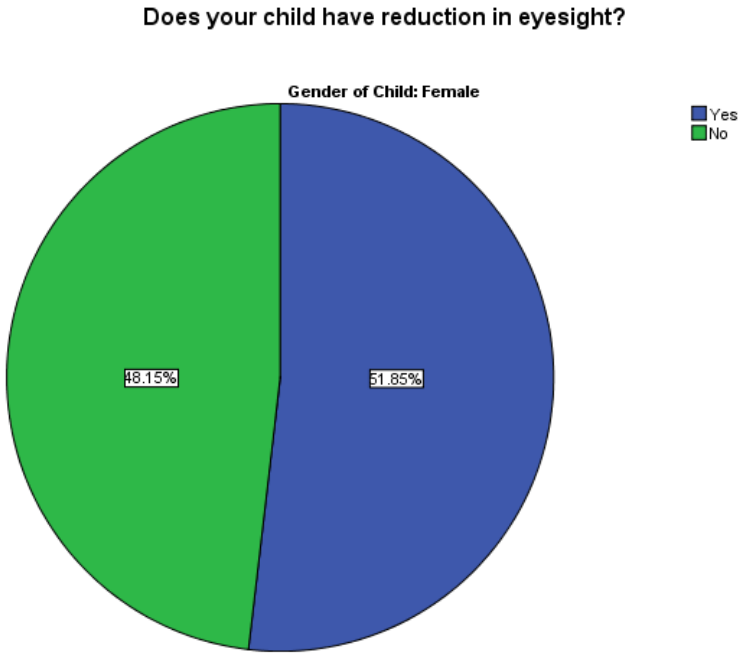
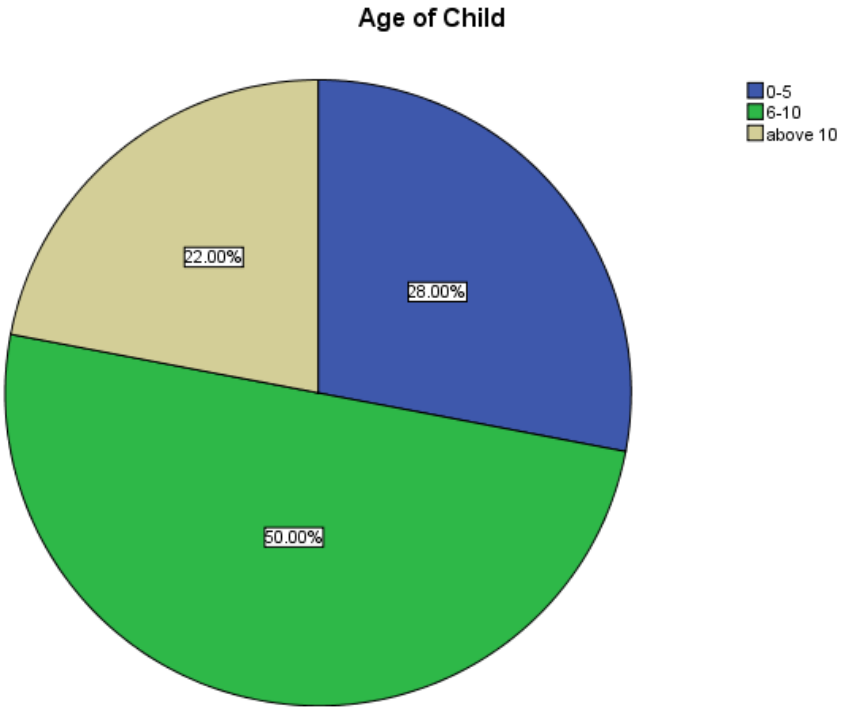


TABLE 5: AGE OF CHILD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	28	28.0	28.0	28.0
	6-10	50	50.0	50.0	78.0
	above 10	22	22.0	22.0	100.0
	Total	100	100.0	100.0	



DISCUSSION

This study is the best I am aware of, as it is the first to report on the significant burden of prevalence and gender persistence of vernal kerato-conjunctivitis among children attending the outpatient Eye department at two tertiary care hospitals in Karachi, Pakistan. This was a cross-sectional study in which data were collected in order to determine the prevalence of vernal kerato-conjunctivitis patients who came to the Ophthalmic Outpatient Department at two tertiary care hospitals in Karachi. The study's data showed that out of 100 patients, 14 had the disease. Most of the patients were in the age group of 6-10 years, which Kanski also reports. Vernal kerato-conjunctivitis affected the children in a male predominance. In this study, the male gender is predominant over the female gender. Out of 100%, 16.44% of males and 7.41% of females have the disease. It could be because males (boys) are more exposed to environmental pollutants as they spend most of their time outdoors in playing games, etc, as compared to females (girls) who stay indoors due to their cultural, social, and religious aspects. The pattern of ocular symptoms we found was

similar to that described in previous studies, with itching being the most common symptom. The patients presented with typical signs and symptoms, including itching, photophobia, sticky mucus discharge, and a foreign body sensation, which render the diagnosis of vernal kerato-conjunctivitis fairly straightforward. In the study, there were the most frequently reported sustained symptoms observed rub eye (itching) is the common symptom, secretion from eyes, exposure of pets and dust, onset of manner sudden or acute, vision disturbance, eyesight reduction and do not know about the allergy of something due to lack of knowledge to their family members.

PREVENTIVE MEASURES FOR VERNAL KERATO-CONJUNCTIVITIS (VKC) IN CHILDREN

Vernal kerato-conjunctivitis (VKC) is a chronic allergic eye disease that predominantly affects children, particularly boys aged 6–10 years, as highlighted in this study conducted at two tertiary care hospitals in Karachi, Pakistan. The findings revealed a higher prevalence among males (16.44%) compared to females (7.41%), likely due to greater outdoor exposure to environmental allergens such as dust, pollen, and pollution. Since VKC causes significant discomfort—itching, redness, photophobia, and even vision disturbances—preventive strategies are crucial to reduce its occurrence and severity in susceptible children.

MINIMIZING EXPOSURE TO ALLERGENS

Since environmental triggers play a significant role in VKC, parents and caregivers should take steps to reduce exposure:

LIMIT OUTDOOR ACTIVITIES DURING HIGH-POLLEN SEASONS

Boys, who tend to play outside more frequently, should avoid prolonged exposure during peak allergy times (e.g., dry, windy days).

USE PROTECTIVE EYEWEAR

Wearing sunglasses or goggles can shield the eyes from dust, wind, and UV rays, which may exacerbate symptoms.

MAINTAIN CLEAN INDOOR ENVIRONMENTS

Since girls in this study were less affected—possibly due to staying indoors—ensuring a dust-free home by regular cleaning, using air purifiers, and keeping windows closed during high-pollution days can help.

AVOID CONTACT WITH PETS IF ALLERGIC

Pet dander is a common allergen; children with VKC symptoms should minimize exposure to cats, dogs, or other furry animals.

PROMOTING EYE HYGIENE AND AVOIDING EYE RUBBING

Itching is the most common symptom, and frequent rubbing worsens inflammation and can lead to corneal damage (keratoconus in severe cases). Parents should educate their children on:

USING COLD COMPRESSES: Applying a clean, cold cloth to closed eyelids can relieve itching without rubbing.

HANDWASHING FREQUENTLY

Reduces the risk of transferring allergens and bacteria to the eyes.

ARTIFICIAL TEARS

Preservative-free lubricating eye drops can help flush out irritants and soothe mild symptoms.

INCREASING AWARENESS AND EARLY MEDICAL INTERVENTION

The study noted that many families lacked awareness about VKC, leading to delayed treatment. To address this:

EDUCATE PARENTS AND TEACHERS

Schools and community health workers should provide information on recognizing early symptoms (itching, redness, discharge) and seeking prompt medical care.

REGULAR EYE CHECK-UPS

Children with a history of allergies should have routine ophthalmologic exams to detect and manage VKC early.

AVOID SELF-MEDICATION: Many families may use over-the-counter steroid drops without supervision, risking side effects like glaucoma. Medical guidance is essential.

DIETARY AND LIFESTYLE MODIFICATIONS

Although not a primary treatment, specific dietary changes may help reduce allergic responses:

ANTI-INFLAMMATORY FOODS: Omega-3-rich foods (fish, flaxseeds) and vitamin C (citrus fruits, bell peppers) may help modulate immune responses.

HYDRATION: Drinking plenty of water prevents dry eyes, which can worsen irritation.

ADDRESSING SOCIOECONOMIC BARRIERS

Poverty and lack of access to healthcare were noted as potential factors in delayed treatment. Possible solutions include:

COMMUNITY HEALTH PROGRAMS: Free eye camps and awareness sessions in low-income areas.

SUBSIDIZED ALLERGY MEDICATIONS: Government or NGO support for affordable antihistamines and immunomodulatory drops (e.g., cyclosporine).

CONCLUSION

Since VKC disproportionately affects young boys due to outdoor exposure and is often underrecognized by caregivers, prevention relies on a combination of environmental control, education, and early medical care. By reducing allergen exposure, discouraging eye rubbing, and improving health literacy, the burden

of VKC in children can be significantly decreased. Public health initiatives targeting schools and parents—especially in high-risk urban areas like Karachi—are essential to prevent long-term complications like corneal scarring and vision loss.

REFERENCES

Ahmed, A., Irfan, H., & Islam, M. A. (2024). Unraveling the conjunctivitis crisis: understanding the spiking incidence in Karachi and Lahore-Pakistan. Annals of Medicine and Surgery, 86(2), 920-922.

Khairil-Ridzwan, K. K., Lai, Y. S., Fiona, C. L. M., & Shatriah, I. (2024). Health-related Quality of Life in Children with Vernal Keratoconjunctivitis in Malaysia. Korean Journal of Ophthalmology: KJO, 38(5), 364.

Ali, A., Bielory, L., Dotchin, S., Hamel, P., Strube, Y. N. J., & Koo, E. B. (2024). Management of vernal keratoconjunctivitis: Navigating a changing treatment landscape. Survey of Ophthalmology, 69(2), 265-278.

Baab, S., Le, P. H., Gurnani, B., & Kinzer, E. E. (2024). Allergic conjunctivitis. In StatPearls [Internet]. StatPearls Publishing.

Dahal P, Bhattarai S. Clinical presentation of vernal keratoconjunctivitis in College of Medical Sciences, Bharatpur. JCMS Nepal. 2015;11(2):17-19.

Gurjar BR, Butler TM, Lawrence MG, Lelieveld J. Evaluation emissions and air quality in megacities. Atmospheric Environment 2007.

Hussain A, Awan H, Khan MD. Prevalence of non-vision-impairing conditions in a village in Chakwal district, Punjab, Pakistan. Ophthalmic Epidemiol 2004; 11: 413-26.

Kabir ML, Rahman F, Hassan MQ, Ahamed F, Mridha MA. Asthma, atopic eczema and allergic rhino-conjunctivitis in school children. Mymensingh Med J 2005; 14: 41-5.

Kanski JJ. Disorders of the conjuctiva .In KanskiJJ ,editorClinical ophthalmology: a system approach. 4th edition. Oxford:Butterworth- Heinemann; 1999.55-93.

Kaur, M., Sharma, M., & Sharma, N. (2024). Clinicodemographic profile of VKC patients in tertiary care centre of North India: A prospective study. tnoa Journal of Ophthalmic Science and Research, 62(4), 447-449.

Kim, G., Kim, T. K., & Carlson, L. (2022). The Red Eye. In Family Medicine: Principles and Practice (pp. 967-982). Cham: Springer International Publishing.

Mahmood, A., Shama, S., & Zhang, W. (2024). The Rising Challenge: Addressing the Pink Eye (Acute Conjunctivitis) Outbreak in Pakistan. Archives of Iranian Medicine, 27(7), 347.

Özdemiral, C., & Şahiner, Ü. M. (2025). Allergen Testing: Purpose, Procedure, Interpretation. In Pediatric Airway Diseases (pp. 215-235). Cham: Springer Nature Switzerland.

Qadir NF. Air Quality in Urban areas in Pakistan Vs Transport Planning: Issues and Management tools. Cited 2010 March 29. Available from URL:http://cleanairinitiative.org/portal/system/files/37336_tp_16B.

Rosa, M. L., Lionetti, E., Reibaldi, M., Russo, A., longo, A., Leonaedi, S., et al. (2013). Allergic conjuctivitis a comprehencive review of thelitature. Italian Journal of pediatric , 1-8.

Sharjeel Sultan, UzmaTaqi, SafdarZamir Rizvi, Tahir AhmedPak J Surg 2011; 27(2):125-130. Singh AJ, Loh RS, Bradbury JA. Demographic study of paediatric allergic

APPENDIX

Question 1: How long have you noticed the problem in your child? 1 Day □ 3 Days □ 7 Days □ Others, specify □
Question 2: What was the manner of onset? Sudden □ Acute □
Question 1: How long have you noticed the problem in your child? 1 Day □ 3 Days □ 7 Days □ Others, specify □
Question 4: Have you been putting any drops, ointments in or around the eyes of your child? Yes □ No □
Question 5: Have your child had any Vision disturbance? Yes □ No □
Question 6: Have your child had any secretion from eye? Yes □ No □
Question 7: Does your child rub eyes? Yes □ No □
Question 8: Does your child have exposure to pets, dust? Yes □ No □
Question 9: Does your child have difficulties in reading? Yes □ No □
Question 10: Does your child have problems playing video games or computer? Yes □ No □
Question 11: Does your child have reduction in eyesight? Yes □ No □
Question 12: Does your other child have same problem?

Yes □	No □
Please add any other comments or suggestions that you would like to make below:	