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## Clinical Presentation And Seasonal Variations In Vernal Keratoconjunctivitis.

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### ABSTRACT

Vernal keratoconjunctivitis (VKC) is a chronic, allergic inflammation of the conjunctiva, primarily affecting children and young adults. It presents seasonally with symptoms exacerbating in warmer months, particularly in regions with high allergen exposure. Our study aimed to evaluate the clinical presentation and seasonal variations in VKC and assess the correlation between environmental factors and symptom exacerbation. A prospective observational study was conducted at a tertiary care center. A total of 30 patients, aged 5-20 years, were included. Clinical assessments were performed using slit-lamp biomicroscopy, and data were collected on symptom severity and environmental factors during different seasons. Statistical analysis was performed using chi-square and ANOVA tests, with a significance level set at  $p < 0.05$ . The majority of patients were aged 5-10 years (40%) with a male predominance (60%). Itching (100%) and redness (93.3%) were the most common symptoms. Symptom severity peaked in spring (50% severe cases) and correlated with high pollen counts (60% symptom exacerbation). A mild form of VKC persisted in autumn and winter. VKC symptoms are highly seasonal, with spring and summer exacerbations linked to environmental allergens. Preventive management during these periods is essential for improving patient outcomes.

**Keywords:** Vernal keratoconjunctivitis, seasonal variation, environmental factors

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## INTRODUCTION

Vernal keratoconjunctivitis (VKC) is a chronic, allergic inflammation of the conjunctiva, primarily affecting children and young adults [1]. It is more prevalent in warmer climates, particularly in tropical and subtropical regions, where environmental allergens are more abundant [2]. The disease is characterized by its seasonal exacerbations, typically worsening during the spring and summer months due to heightened exposure to pollen, dust, and other allergens [3]. VKC manifests with symptoms such as intense itching, redness, tearing, photophobia, and a stringy mucous discharge. Patients may also present with large papillae on the upper tarsal conjunctiva, limbal hypertrophy, and superficial keratitis, which can significantly affect vision and quality of life [4, 5].

The seasonal variation in VKC is strongly associated with the increased presence of airborne allergens, making spring and early summer peak periods for symptom onset and exacerbation. However, in perennial forms of VKC, patients may experience symptoms year-round, albeit less severe outside the peak seasons. Understanding the seasonal patterns of VKC and its clinical presentation is crucial for effective diagnosis, management, and prevention of complications such as corneal involvement, which can lead to visual impairment if untreated. Early recognition and appropriate treatment can help improve patient outcomes and quality of life [6, 7].

## METHODOLOGY

The present study was conducted to evaluate the clinical presentation and seasonal variations of vernal keratoconjunctivitis (VKC) in patients attending the ophthalmology outpatient department at a tertiary care center.

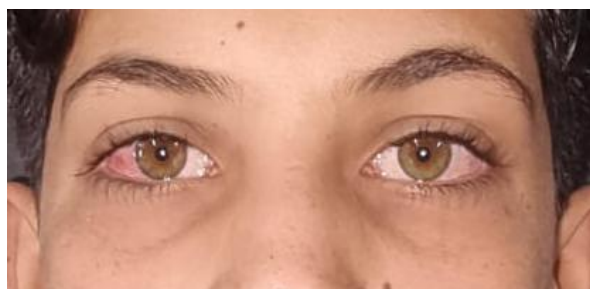
The study followed a prospective observational design, with data collected over a 12-month period to account for seasonal changes.

A sample size of 30 patients diagnosed with VKC based on clinical criteria was included in the study.

Patients aged 5 to 20 years, presenting with symptoms such as itching, redness, tearing, and photophobia, were evaluated for the study. Detailed clinical histories were obtained, focusing on symptom onset, duration, exacerbating factors, and previous treatments. Each patient underwent a comprehensive ocular examination, including slit-lamp biomicroscopy, to assess conjunctival inflammation, presence of papillae, limbal thickening, and corneal involvement. The severity of VKC was graded based on a standardized scoring system.

To assess the seasonal variations, the occurrence and severity of symptoms were recorded throughout the year, with follow-up visits scheduled during different seasons. Data on environmental factors such as pollen levels, temperature, and humidity were also collected from local meteorological reports to correlate with patient symptoms. Clinical parameters were compared across seasons to determine if significant variations in VKC symptoms and severity were observed.

Statistical analysis was performed using SPSS software. Descriptive statistics, including means and standard deviations, were used to summarize the demographic characteristics of the study population. Seasonal differences in symptom severity and clinical findings were analyzed using appropriate tests, such as the chi-square test for categorical data and ANOVA for continuous variables. A p-value of less than 0.05 was considered statistically significant.



## RESULTS

**Table 1: Demographic Characteristics of Patients (n=30)**

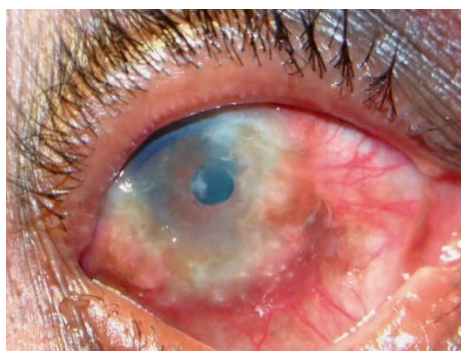
| Characteristic    | Number of Patients (n) | Percentage (%) |
|-------------------|------------------------|----------------|
| Age Group (years) |                        |                |
| 5-10              | 12                     | 40%            |
| 11-15             | 10                     | 33.3%          |
| 16-20             | 8                      | 26.7%          |
| Gender            |                        |                |
| Male              | 18                     | 60%            |
| Female            | 12                     | 40%            |
| Residence         |                        |                |
| Rural             | 22                     | 73.3%          |
| Urban             | 8                      | 26.7%          |

**Table 2: Clinical Presentation of VKC (n=30)**

| Symptom                         | Number of Patients (n) | Percentage (%) |
|---------------------------------|------------------------|----------------|
| Itching                         | 30                     | 100%           |
| Redness                         | 28                     | 93.3%          |
| Tearing                         | 25                     | 83.3%          |
| Photophobia                     | 18                     | 60%            |
| Mucous Discharge                | 15                     | 50%            |
| Papillae                        | 22                     | 73.3%          |
| Limbal involvement              | 10                     | 33.3%          |
| 1. Horner tranta spots          | 8                      |                |
| 2. Psuedogerentoxon             | 2                      |                |
| Corneal Involvement             | 8                      | 26.7%          |
| 1. Superficial Corneal Erosions | 6                      |                |
| 2. Keratitis                    | 1                      |                |
| 3. Shield Ulcer                 | 1                      |                |



**Picture 1: Clinical presentation - vernal keratoconjunctivitis**



**Table 3: Seasonal Variation in Symptom Severity (n=30)**

| Month wise         | Mild Cases (n) | Moderate Cases (n) | Severe Cases (n) |
|--------------------|----------------|--------------------|------------------|
| March-May          | 5              | 10                 | 15               |
| June-August        | 8              | 12                 | 10               |
| September-November | 12             | 10                 | 8                |
| December-February  | 15             | 12                 | 3                |

**Table 4: Correlation Between Environmental Factors and Symptom Exacerbation (n=30)**

| Factor              | Average Level             | Percentage of Symptom Exacerbation (%) |
|---------------------|---------------------------|--|
| Pollen Count (High) | 200 grains/m <sup>3</sup> | 60%                                    |
| Temperature (>30°C) | 32°C                      | 50%                                    |
| Humidity (>70%)     | 75%                       | 40%                                    |

## DISCUSSION

The results of our study provide valuable insights into the clinical presentation and seasonal variations in vernal keratoconjunctivitis (VKC), a chronic allergic condition affecting the eyes. With a sample size of 30 patients, this study aimed to evaluate the demographic characteristics, common clinical manifestations, seasonal exacerbations, and the relationship between environmental factors and the severity of VKC symptoms. The findings not only corroborate existing literature but also highlight some region-specific patterns that can inform clinical practice in managing VKC [7-9].

The demographic data from Table 1 show that VKC predominantly affects younger patients, with the majority falling in the 5–10-year age group (40%). This finding is consistent with previous studies indicating that VKC primarily affects children and adolescents, with a peak incidence between 5 and 15 years of age. The study also found a male predominance (60%), which aligns with the existing body of literature suggesting that VKC is more common in males during the early years but tends to equalize between genders as patients age. It was found that it is more predominant in rural population (73.3%) than urban population (26.7%).

As shown in Table 2, the most common symptom reported by all 30 patients (100%) was itching, a hallmark feature of VKC. Redness (93.3%) and tearing (83.3%) were also highly prevalent, reflecting the inflammatory nature of the disease. Photophobia, another common symptom, was reported by 60% of patients, which is consistent with the literature that emphasizes the photosensitivity caused by corneal involvement in VKC. The relatively high incidence of mucous discharge (50%) may indicate a more advanced or severe disease state in many patients, as mucous discharge often correlates with larger papillae and corneal involvement.

The presence of papillae on the tarsal conjunctiva (73.3%) is a significant finding, as it is a clinical hallmark of VKC, particularly the palpebral form of the disease. Limbal thickening was observed in 33.3% of patients, indicating that some patients were experiencing the limbal form of VKC, which is more common in warmer climates and typically occurs in younger patients. Corneal involvement, seen in 26.7% of patients, is an important aspect of VKC as it can lead to vision-threatening complications such as keratitis and corneal ulcers if not managed appropriately [10].

Table 3 illustrates the clear seasonal pattern in VKC symptom severity. This is consistent with existing research that shows VKC symptoms tend to flare up during summer months, corresponding to higher pollen counts and warmer temperatures. These findings emphasize the need for targeted management during peak allergy seasons to mitigate the impact on patient quality of life.

Interestingly, the study found a notable number of mild cases in winter (50%). This suggests that while VKC is predominantly a seasonal condition, some patients may experience milder symptoms throughout the year. This could be attributed to perennial exposure to allergens, such as dust mites, or other environmental irritants. In perennial VKC, symptoms tend to persist year-round, although with less intensity during the non-peak seasons.

The results in Table 4 highlight the significant role of environmental factors, particularly pollen count, temperature, and humidity, in the exacerbation of VKC symptoms. A high pollen count (200 grains/m<sup>3</sup>) was associated with symptom exacerbation in 60% of cases. This finding underscores the well-documented link between pollen exposure and VKC exacerbations, as pollen acts as a potent allergen that triggers the inflammatory response in susceptible individuals.

Temperature also played a role, with 50% of patients experiencing worsened symptoms when temperatures exceeded 30°C. Warmer temperatures are known to increase airborne allergen levels and exacerbate the inflammatory response in VKC patients. Humidity levels above 70% were linked to exacerbations in 40% of cases. While high humidity alone may not directly worsen VKC, it can contribute to increased mold growth and the persistence of airborne allergens, which can aggravate symptoms in sensitive individuals.

The findings of this study are consistent with previous research on VKC, particularly in terms of the clinical presentation and seasonal variations. Studies conducted in other tropical and subtropical regions have similarly reported high incidences of itching, redness, and papillae, along with seasonal peaks during spring and summer. The male predominance observed in this study has also been widely documented, although some studies suggest that this gender difference diminishes with age [7-10].

The seasonal pattern of VKC symptoms observed in this study has important implications for clinical management. Patients with VKC should be educated about the seasonal nature of the disease and advised to take preventive measures, such as using antihistamine eye drops and maintaining a low-allergen environment during the peak pollen seasons. Corticosteroid eye drops may be necessary for more severe cases, particularly during spring and summer, to prevent corneal complications.

In addition, environmental control measures such as using air purifiers and avoiding outdoor activities during high-pollen days can help reduce symptom severity. The role of temperature and humidity in symptom exacerbation suggests that patients should also be advised to avoid hot, humid environments whenever possible. Long-term management may also involve the use of immunomodulatory agents like cyclosporine A for patients with chronic or severe VKC that does not respond adequately to conventional treatment.

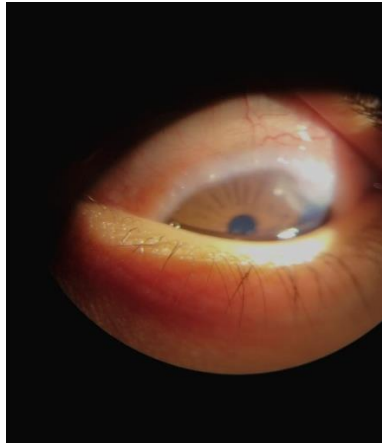


## CONCLUSION

Our study provides a comprehensive overview of the clinical presentation and seasonal variations in VKC, confirming that spring and summer are the peak seasons for symptom exacerbation. Environmental factors, particularly pollen count, temperature, and humidity, play a significant role in the severity of VKC symptoms. Clinicians should consider these factors when devising management strategies for VKC patients, emphasizing preventive measures during high-risk seasons to improve patient outcomes. Further research is warranted to explore the role of perennial allergens and to develop region-specific management guidelines for VKC in different climates.







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