

## Vernal keratoconjunctivitis-A hospital-based study

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### ABSTRACT

**Background:** vernal keratoconjunctivitis(VKC) is a chronic, periodic seasonal incidence, bilateral,recurrent, interstitial, allergic external ocular inflammation of the conjunctiva response to allergens.it is more prevalent in the hot and dry tropics and subtropical climates of Africa, Middle East, Asia(Indian sub-continent,kota,rajasthan(Hadoti region).VKC is a self-limiting disorder with spontaneous.purpose of study is to determine the prevalence and clinical presentation of VKC in a government medical college and attached Maharao Bhimsingh Hospital,Kota ,Rajasthan,India.

**Materials and methods:** This is hospital-based study.this is carried out 70 patients(47 males and 23 females)aged from 03 to 22 years seen with clinical diagnosis of VKC are 23 from May 2022 to july 2022 at Maharao Bhimsingh Hospital,Kota ,Rajasthan,India.

**Results:** The mean age of presentation was (12.89±5.44) 67.14%(47) were male and 32.85% (23)were female.most of patients had Itching ,burning sensation most prominent symptoms, whereas hyperemia the most prominent sign. The prevalence of the limbal(34.78%) and mixed(52.17%) subtypes of VKC are almost equal. keratopathy present in 8.69% patients. systemic allergic association 4.34% are rare.

**Conclusion:** clinical pattern of VKC seen in the tropical climate of india is essentially similar to that seen in other tropical countries. few distinct features that we noted represent chronic perennial disease, low association with atopy and systemic disease and higher propensity for disease.

**Keywords:** vernal keratoconjunctivitis,prevalence,pattern of disease

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### I. Introduction

Vernal keratoconjunctivitis (VKC) is a chronic, seasonally recurrent bilateral external ocular allergic inflammatory condition in response to allergens. It is more prevalent in the warm and dry tropical and subtropical climates of Africa, The Middle East, Latin America, and Asia (Indian Sub-Continent) than in Western Europe and North America.<sup>[17]</sup> It is an important cause of hospital attendance in these regions, but rarer in Western Europe and North America.<sup>[8]</sup> Vernal keratoconjunctivitis is associated with symptoms of severe itching, watering or mucoid discharge, photophobia, foreign body sensation, burning and redness or brownness of the eyes. Common signs include bilateral palpebral (upper tarsal) conjunctival giant papillae (cobblestone appearance) and/or bulbar conjunctival limbal giant papillary infiltration with a gelatinous hypertrophy of eosinophils and epithelial debris (Horner-Trantas Dots), conjunctival hyperpigmentation and hyperaemia, corneal keratopathy (superficial keratitis, and/or corneal shield ulcers) and pigmentary eyelid changes.

Patients with VKC usually present with a personal or family history of other atopic diseases, including allergic dermatitis, rhinitis, and asthma. It mainly affects children between the age of 3 and 16 years. It is a self-limiting disorder with spontaneous resolution after puberty or early adult life. Before puberty more boys are affected than girls. There is hardly any gender difference after puberty.

In VKC both type I IgE-mediated and type II hypersensitivity reactions are active with cell-mediated Th-2 involvement of mast cells, lymphocytes and eosinophils. Several risk factors including genetics, socioeconomic, environmental factors have been implicated. Although VKC is a self-limiting disease a few patients end up with sight-threatening complications.<sup>10</sup> In Africa, population based studies showed prevalence rates of 4-5% in children, while 33-90% of children and adolescents attending hospital has VKC. <sup>(5-7)</sup>

Studies in Asia and Europe showed that boys are affected more significantly than girls, but in African case studies the sex pattern is varied. Gender differences in VKC usually becomes less with aging. <sup>[1,11-13]</sup> The limbal (bulbar) and mixed forms of VKC are seen more commonly in Africans and Asians, whereas the palpebral form occur more among the Europeans and the Americas <sup>(1,10-17)</sup>

In Europe and Asia, VKC tends to get worse during winter, <sup>(12,15)</sup> but in Africa patients with VKC are seen all year round. <sup>[1,11,13]</sup> Studies on VKC in Nigeria were mainly in the southern part of the country and showed varying results of presentations. <sup>[13, 18-20]</sup> There are no data on VKC from the Middle Belt area of the country.

## II. Materials And Methods

This is a Cross section hospital-based study of patients with clinical diagnosis of VKC, prevalence and risk factors of VKC among children aged 05 to 20 years seen from May 2022 to July 2022 in a government medical college and attached Maharao Bhimsingh Hospital, Kota, Rajasthan, India.

The patients' demographic information and duration of disease, medical history of atopy and other allergic disorders such as asthma, rhinitis/sinusitis, visual acuity (VA) and associated ocular and systemic disorders were extracted from the patient's.

The VA was determined using the Snellen's lettered chart and the tumbling "E" chart for the literate and illiterate patients, respectively. A pen torch and slit lamp bio-microscope were used for assessing the anterior segment while direct and indirect ophthalmoscopes were used for the posterior segment. The definition of VKC was based on the presence both typical VKC-symptoms and signs, including bilateral upper giant palpebral conjunctival papillae and/or bulbar conjunctival limbal papillae infiltration, and corneal keratopathy (i.e., superficial punctate keratitis).

The data collected were analyzed using SPSS, version 22 (SPSS Inc., Released 2015, IBM SPSS statistics for Windows, version 23.0; IBM Corp., Armonk, New York, USA). Simple frequencies or cross-tabulations were used to present the data. Chi-squared test was used to compare variables and a  $P < 0.05$  was considered to be statistically significant.

## III. Results

Records of 23 out of 70 patients with clinical diagnosis of vernal keratoconjunctivitis. Their ages ranged from 05 to 20 years. The mean age was  $11.30 \pm 5.35$  years.

- VKC is fairly common among children and adolescent age in Kota (Hadoti region) Rajasthan, India.
- Exposure to dust and family history were the major risk factors.
- VKC was associated with other types of allergy like asthma and other allergic condition.
- Most of patients had Itching, burning sensation as most prominent symptoms, whereas hyperemia the most prominent sign.
- Keratopathy present in 8.69% patients.
- Among the different varieties of allergic conjunctivitis, VKC is the most troublesome type.
- In this study, the prevalence VKC represented 32.85% of eye allergies in children aged 03–20 years.
- In the present study, itching and eye rubbing were the most frequent complaints. They were observed in all cases of VKC
- In the present study, approximately one-half (86.95%) of the included group showed hyperemia and red eye and approximately two-thirds (78.26%) had burning sensation.
- A close percentage in Nigeria (62.5%) had hyperemia, whereas a higher percentage was observed in Nepal (76.5%). Burning sensation was almost similar to Rwanda (77%) and Italy (90%) but very different to Karachi.
- This study observed that mixed type of the disease was the commonest type (47.82%) followed by pure limbal (bulbar) type (39.13%) and pure palpebral disease, which was the least observed type (13.04%).

**Table 1: Prevalence of different types of allergy among the studied group (N=70)**

Allergies	n (%)
<b>Types of allergy (% of total)</b>	
All allergies	70 (100)
VKC	23 (32.85)
<b>Types of allergies (% of allergies patients, N=70)</b>	
Seasonal (simple allergies) and other types (GPC and phylectimulosis)	47 (67.14)

VKC (spring catarrh)	23 (32.85)
<b>Types of VKC (% of VKC patients, N=23)</b>	
Mixed	11 (47.82)
Limbal (bulbar)	09 (39.13)
Palpebral (tarsal)	03 (13.04)

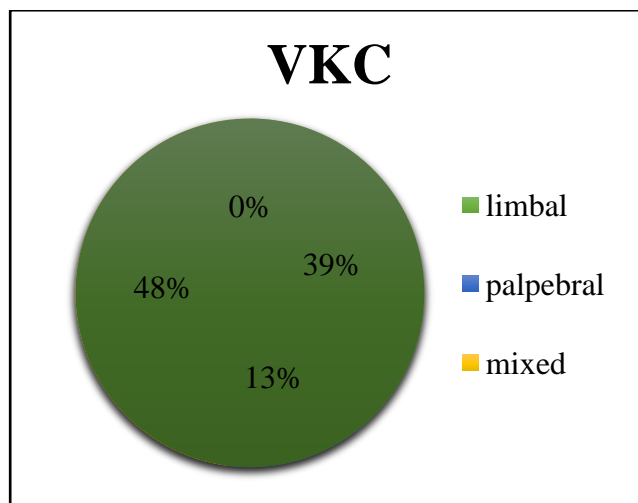


Figure: 1 Percentage of different types of VKC

Table 2: Risk factors and other allergies associated with VKC (N=70)

Risk factors	Normal (N=70) [n (%)]	VKC cases (N=23) [n (%)]
Age(mean±SD)	12.37±5.42	11.30±5.35
<b>SEX</b>		
MALE	47 (67.14)	17 (73.91)
FEMALE	23 (32.85)	6 (26.08)
<b>RESIDENCE</b>		
Rural	48 (68.57)	16 (69.56)
Urban	22 (31.42)	7 (30.43)
Exposure to dust	50 (71.42)	18 (78.26)
Family history	3 (4.2)	1 (4.3)
Asthma	2 (2.85)	1 (4.3)

Table 3: Symptoms, signs, and complications of vernal keratoconjunctivitis

Symptoms, signs and complications of VKC	VKC cases (N=23) [n (%)]
Itching and rubbing	23 (100)
Burning	18 (78.26)
Redness	14 (60.86)
Photophobia	4 (17.39)
Palpebral papillae	15 (65.21)

Hyperemia	20 (86.95)
Keratitis	2 (8.69)
Horner-tranta's spots	6 (26.08)

#### IV. Discussion

Vernal keratoconjunctivitis is one of the leading allergic conjunctivitis in the ophthalmological outpatient consultation in most developing part of the world. <sup>(5-7)</sup>the mean age of presentation of VKC in the current report was  $11.30 \pm 5.35$  years with significant male predominance. Present study findings support previous reports which showed that ocular presentation occurred mainly during the first decade of life. <sup>(1,2,5-14,17,18,21)</sup> The sex distribution of VKC is not uniform; whereas in European and Asiatic populations the male to female ratios are as high as 3:1 with sex predilection decreasing with age.<sup>9</sup> in most African studies there is a less marked male sex predominance. Male predominance is thought to be due to ultraviolet exposure since male children tend to spend more time outdoors (playing with their friends) compared to girls in these countries. In Africa girls also spend a lot of time outside the house running errands, hence the difference in ultraviolet exposure may be less marked.<sup>11</sup>

Itching was the most frequent complaint. Allergy causes disruption of normal functioning and activities of individuals as a result of the severe allergic symptoms of itching, conjunctival hyperaemia, chemosis and mucous discharge, which are consequences of leukotriene activities on the conjunctiva. <sup>(22-25)</sup>

The presentation was perennial with seasonal exacerbation. The hospital prevalence rose steadily from January, peaked in June and declined thereafter. This is consistent with onset of the rains from about April and consequent steady increase in the amount of pollens from grass and flowering plants in the air this reaches a peak in June-July-August and declines thereafter during the drier months of December. In most of West Africa from about the end of November a north-easterly trade wind from north of Africa passes over the Sahara Desert parking with it a lot of dust particles. This produces hazy atmospheric conditions, low visibility, low humidity, lower temperatures, and a lot of dust. This is called summer season and may contribute allergens in the environment leading to the perennial presentation of patients with VKC. Majokudonmi,<sup>18</sup> in Ibadan, also observed increased presentation of patients during the wet season. Akinsola et al.<sup>1201</sup> in Lagos University Teaching Hospital however recorded a tri-modal peak pattern (January-February, April-July and September-October).

Although vernal keratoconjunctivitis is a seasonal allergic condition, perennial presentation is not unusual, with seasonal exacerbations during high pollen season in patients living in desert or sub-tropical and tropical climates.<sup>26</sup> The persistent form of the disease also develops in some patients after about 3 years from onset.<sup>12</sup> Patients also exhibit conjunctival hyper-reactivity reaction on exposure to dust, wind, sun and non-specific stimuli, hence the occurrence during the summer season.<sup>27</sup>

Most patients seen with VKC had hyperpigmentation of the conjunctiva. Various sub-types of VKC were present. The most prevalent was the limbal (bulbar) form closely followed by mixed sub-type. Isolated tarsal sub-type was the least commonly seen. Typical cobble stones papillae was seen in only five (1.9%) patients. This bulbar predominance agrees with the reports of Sayegh et al. in the Middle East,<sup>28</sup> Kawuma in Uganda,<sup>5</sup> Dahan et al. in South Africa and Sandford-Smith<sup>1</sup> in Northern Nigeria, but contrasts Ukpomwan<sup>21</sup> in Benin-Nigeria, Majekudomi<sup>18</sup> in Lagos-Nigeria and Chenge et al.<sup>1</sup> in Congo who reported predominant tarsal sub-type. Dahan et al.<sup>11</sup> in their study among the black children of South Africa observed papillary reaction but without the typical cobble-stone papillae on the tarsal conjunctiva.

The limbal form of the disease has been recognized by various studies. Burnett noted it among the black Americans in 1881.<sup>11</sup> the predominance of limbal disease among the black population including Black Americans suggests a genetic risk factor of VKC. European subjects with VKC develop mainly the palpebral sub-type and Asians develop both <sup>(16,29,30)</sup> Sandford-Smith [13] in Northern Nigeria noted. Co-existence of the bulbar and tarsal form of the disease. The predominant bulbar disease was more prevalent among the younger children and the palpebral form in the older patients.

Only a few of our patients had associated ocular condition, the most frequent ones being refractive error followed by eyelid disorders. Due to their high mast cells content with immunoglobulins, other ocular surfaces such as the eyelids, tear film, cornea with the conjunctiva are involved in VKC allergic reaction. Mechanisms of allergic ocular responses has been partially attributed to release of cytokines, chemical mediators and adhesion molecules and complex information exchange among ocular tissues.

Corneal involvement in the present study was seen in 8.69 % of the subjects. Previous reports demonstrated cornea involvement including keratopathy, or corneal shield ulcers and neovascularization in 3-11% of patients with a superficial <sup>(30,31)</sup>

The use of sensitive instruments such as videokeratography and keratometry has been observed to help in early detection of keratoconus.<sup>[32]</sup> Refractive error has been found in co-existence with allergic conjunctivitis and is thought to be a risk factor.<sup>(33)</sup>

Systemic allergic associations were rare in the current report. History of body atopy was observed in 3 patients, bronchial asthma in 1 patient. Family history of atopic diseases such as asthma (4.3%) has been reported in the European patients with VKC [9]. In African subjects such history is rare. However, a higher association was recorded by Ajayioba<sup>[20]</sup> in Ibadan- Nigeria where careful history and detailed systemic examination found VKC patients had atopy (19.8%) - asthma (6%), allergic rhinitis (5%) and eczema (4.3%). Majekodunmi<sup>[18]</sup> in Lagos recorded 10% and Ukponmwa<sup>21</sup> in Benin 4.5% of systemic associations. Detailed history and examination of patients with VKC may improve detection of associated atopy.

## V. Conclusion

- The study showed that VKC presents largely in early childhood with male predominant.
- The disease occurrence was perennial with seasonal accentuation during the hot and dry climate.
- Some ocular associations were noted but rarely little systemic associations.

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