# Profile of vernal keratoconjuctivitis in paediatric age group in central India

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## ABSTRACT

**Objective**: *To study the profile of the VKC patients in central India*

**Method**: *Prospective cross sectional study includes 186 cases of paediatric age group (age less than 16 years) suffering from Vernal Keratoconjunctivitis. Both male and female children were included. The things assessed includes clinical features and course of disease like recurrence or increase in severity even after starting treatment.*

**Results:** *The total number of 186 cases of vernal keratoconjunctivitis were studied. Mean age of the patients was 10.40 ± 5.78 years. Out of these 123 (66.13%) were male and 63 were female, with a male: female ratio of around 2. Male children presented at earlier age than female may be because of more care of male child in rural India than female child. All patients in the present study had bilateral involvement. Most of the children were from age of 11-15 years ( 120 patients, 64.52%), followed by 6-10 years (54 patients, 29.03%) and only 12 patients (6.45%) of age less than 5 years. The most common presenting complain was itching (160 patients, 86.02%), followed by redness (128 patients, 68.81%), watering (120 patients, 64.52%), ropy discharge (67 patients, 36.02%) and photophobia 963 patients, 33.87%). On clinical examination most common sign was papillae (140 patients, 75.27%), followed by muddy sclera(83 patients,44.62%), gelatinous limbal opacification with thickening( 60 patients, 32.25%), shield ulcer( 11 patients, 5.91%), and advanced glaucomatous optic atrophy (4 patients, 2.15%). The systematic comparison of present study with the study done by Stafeno Bonini et al in 2000.*

**Conclusions:** *Vernal Keratoconjunctivitis (VKC) is chronic ocular surface inflammatory condition mediated by type I Hypersensitivity reaction. The inflammation is mediated by Eosinophils, Ig E antibody, non- Ig E mechanisms, mixed mechanisms, genetic mechanisms and age-sex related effects. The VKC has a good prognosis in early stages but in chronic recurrent disease blinding complications can occur due to corneal scarring and advanced steroid induced glaucoma. So, by knowing the regional natural history of the disease will help in early intervention and will help in preventing blinding complications. It is necessary to create awareness for proper management of VKC patients of central India.*

**Key words:** *Allergic conjunctivitis, central India, childhood allergic eye disease, VKC.*

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|---|---|
| **Quick Response Code**: | **Website:** www.innovativepublication.com |
| | **DOI:** 10.5958/2395-1451.2015.00019.0 |

## INTRODUCTION

Vernal Keratoconjunctivitis (VKC) is chronic ocular surface inflammatory condition mediated by type I Hypersensitivity reaction. The inflammation is mediated by Eosinophils, Ig E antibody, non- Ig E mechanisms, mixed mechanisms, genetic mechanisms and age-sex related effects. The VKC has a good prognosis in early stages but in chronic recurrent disease blinding complications can occur due to corneal scarring and advanced steroid induced glaucoma.

Allergic eye disease is the most common eye disorder in paediatric eye OPD(Outpatient department)[1]. Vernal Keratoconjunctivitis (VKC) is the most common allergic eye disease of childhood. Typical vernal keratoconjunctivitis is a chronic, recurrent and seasonal allergic disorder but in severe cases it becomes perennial. VKC affects bulbar, palpebral conjunctiva and cornea of both eyes. Around 75% (3/4$^{th}$) patients give history of atopy and out of these 2/3$^{rd}$ patients give family history of allergic disorder.[2] VKC is a childhood allergic eye disease which is mostly seen from 5 years of age to prepuberty, but in small percentage of patients it can become persistent even after puberty[3]. It is more commonly seen in tropical, sub-tropical climate like India, Middle East, west and central Africa, South Africa [4]. Male children are more commonly affected than female children as in our country male children do more outdoor activity and games than female children , so are more exposed to allergens and allergic eye disease.

The main complaints of VKC patients are itching, watering, redness, phtophobia, and ropy discharge. The typically VKC children have involvement of bulbar conjunctiva, palpebral conjunctiva and cornea. The main signs of VKC are cobble stone papillae in the upper tarsal conjunctiva, limbal conjunctival gelatinous thickening, superficial punctate keratopathy,trantas dots in conjunctiva, shield ulcer and pannus like vascularisation of cornea[5].

Vernal Keratoconjunctivitis (VKC) is chronic ocular surface inflammatory condition mediated by type I Hypersensitivity reaction primarily but has many other components. The inflammation is mediated by Eosinophils, Ig E antibody ,non- Ig E mechanisms, mixed mechanisms, genetic mechanisms and age-sex related effects[6].Immunoglobulin E (IgE) mediated mechanism can not explain the severity and natural history of disease[7]. The clinical course and natural history can be most likely explained with T- cell inflammatory response, eosinophil's chemo taxis and activation of non specific inflammatory hypersensitivity, mediated by complex interactions of wide range of cytokines, chemokine, proteases, and growth related factors[8]. The management options for VKC includes mast cell stabilisers, topical corticosteroids, antihistamines and immunosuppressive agents[8]. Immunosuppressive drug Cyclosporine for topical use have been found to show good results for treatment of VKC and can be used as an alternative to corticosteroids or as a steroid sparing drug[9,10,11].

In refractory cases of VKC new drugs like topical non-steroidal anti-inflammatory agents (Suprofen), topical mast cell stabilisers (Nedocromil, Olopatadine), topical immunosuppressive (Cyclosporine), ganglioside derivatives (Miprogoside) and antihistamine (topical Levocabastine)[9-11]. Most of the treatment if given alone may not be of much effectiveness, combination therapy most of the time works better than monotherapy. High dose systemic steroids may relieve signs and symptoms but not effective in management of shield ulcer and cobble stone giant tarsal papillae. Supratarsal injection of triamcinolone have shown very good results in patients of palpebral VKC in a study done by Sahu et al [5]. Another study conducted by Sadiq MN, et al, showed 50% reduction of symptoms[12].

## MATERIALS AND METHODS

Prospective cross sectional study conducted in patients presented between January 2015 to June 2015 in ophthalmology out patient department(OPD) of UPRIMS AND R (Uttar Pradesh Rural Institute of Medical Sciences and Research, Etawah ,UP).

**Inclusion criteria** patients of age less than 15 years age and clinical diagnosis of Vernal Keratocojun-ctivitis(VKC) were included in the present study. The written informed consent was taken before enrolment.

**Exclusion criteria** patients not willing for enrolment or not found to be fit on inclusion criteria are excluded.

The patient particular were noted in enrolment form. Refraction was done by the Optometrist. If required cycloplegia was done by homatropine(1%) or cyclopentolate. Pupil examined with torch light and anterior segment examination was done by slit lamp. Posterior segment examination was performed after dilating the pupil using 90diopter lens with slit lamp and indirect ophthalmoscope by any of the author or co-author. The diagnosis and patient particular noted in the enrolment proforma. The diagnosis is made according to the involvement in eye like Palpebral VKC, Bulbar and mixed VKC.

The things assessed includes clinical features and course of disease like recurrence or increase in severity even after starting treatment.

## RESULTS

The total number of 186 cases of vernal keratoconjunctivitis were studied. Mean age of the patients was 10.40 ± 5.78 years. Out of these 123 (66.13%) were male and 63 were female, with a male: female ratio of around 2: 1[**Table 1**]. Male children presented at earlier age than female may be because of more care of male child in rural India than female child and more outdoor games by male child. All patients in the present study had bilateral involvement. Most of the children were from age of 11-15 years ( 120 patients, 64.52%), followed by 6-10 years (54 patients, 29.03%) and only 12 patients (6.45%) of age less than 5 years [**Table 2**]. The most common presenting complain was itching (160 patients, 86.02%), followed by redness (128 patients, 68.81%), watering (120 patients, 64.52%), ropy discharge (67 patients, 36.02%) and photophobia 963 patients, 33.87%) [**Table 3**]. On clinical examination most common sign was papillae (140 patients, 75.27%), followed by muddy sclera(83 patients,44.62%), gelatinous limbal opacification with thickening( 60 patients, 32.25%), shield ulcer( 11 patients, 5.91%), and advanced glaucomatous optic atrophy (4 patients, 2.15%) [**Table 4**] [**Fig 1-3**].

The systematic comparison of present study with the study done by Stafeno Bonini et al in 2000 is done in the Table 5 [22].

**Table 1**: **Showing distribution of patients into different sex**

| | Male | Female | Total |
|---|---|---|---|
| VKC patients | 123 | 63 | 186 |
| Percentage of total patients | 66.13 | 33.87 | 100 |

**Table 2: VKC patients in different age groups**

| Age group | <5 years | 5-10 years | 11-15 years | Total |
|---|---|---|---|---|
| No of children | 12 | 54 | 120 | 186 |
| Percentage of cases | 6.45 | 29.03 | 64.52 | 100 |

**Table 3: Important complains of patients**

| | Itching | Watering | Redness | Photophobia | Ropy discharge |
|---|---|---|---|---|---|
| No of VKC patients | 160 | 120 | 128 | 63 | 67 |
| Percentage of Total patients | 86.02 | 64.51 | 68.81 | 33.87 | 36.02 |

**Table 4: VKC major signs**

| | Papillae (mild or moderate) | Giant Pappillae | Limbal thickening | Shield Ulcer | Muddy conjunctiva | Advanced glaucoma |
|---|---|---|---|---|---|---|
| Total no of children with these signs | 100 | 40 | 60 | 11 | 83 | 4 |
| Percentage of total cases | 53.76 | 21.51 | 32.25 | 5.91 | 44.62 | 2.15 |

**Table 5: Comparison with other study**

| Features | In present study ( n= 186) | Stafeno Bonini et [22]al Ophthalmology June 2000(A case series of 195 patients with long-term follow up) |
|---|---|---|
| Mean age(yrs ) | 10.40 ± 5.78 | 11± 5.8 |
| Males | 123 | 144 |
| Females | 63 | 51 |
| M/F < 20 yrs | 123/63 | 133/44 |
| M/F > 20 yrs | 0 | 11/10 |
| Seasonal | 70% | 77.4% |
| Bilateral | 100% | 98% |
| Age < 20 years | 100% | 89.2% |
| Papillae | 75.27% | 100% |
| Conjunctival hyperemia | 68.81 | 90.3% |
| Shield Ulcer | 5.91% | 9.7% |
| Itching | 86.02% | 96.1% |
| Tearing | 64.52% | 39.5% |
| Discharge | 36.02 | 53.3% |

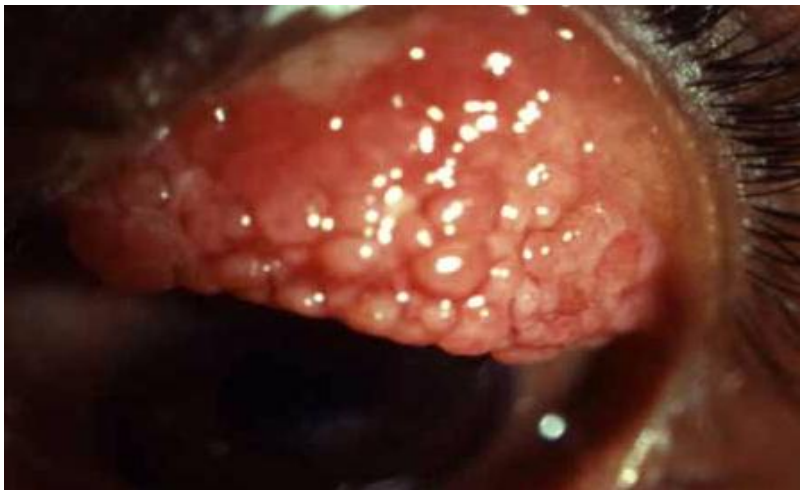

**Fig. 1: Showing giant pappilae in palpebral VKC**

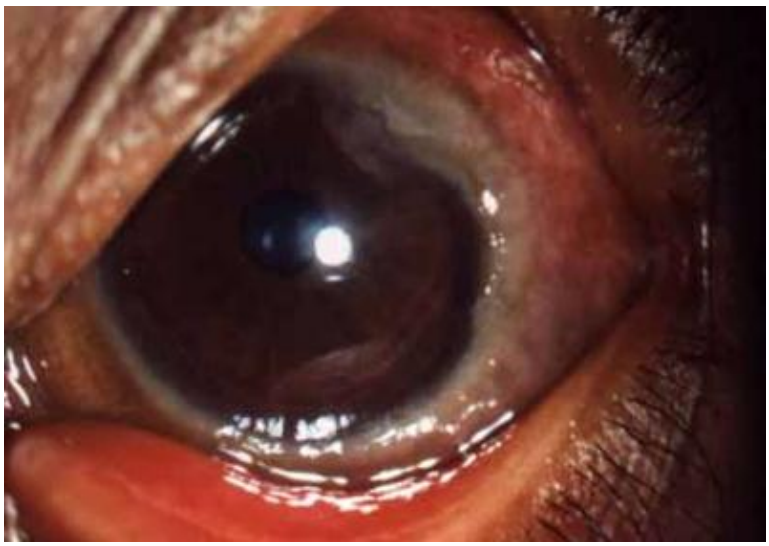

**Fig. 2: Showing gelatinous limbal opacification and thickening in bulbar VKC**

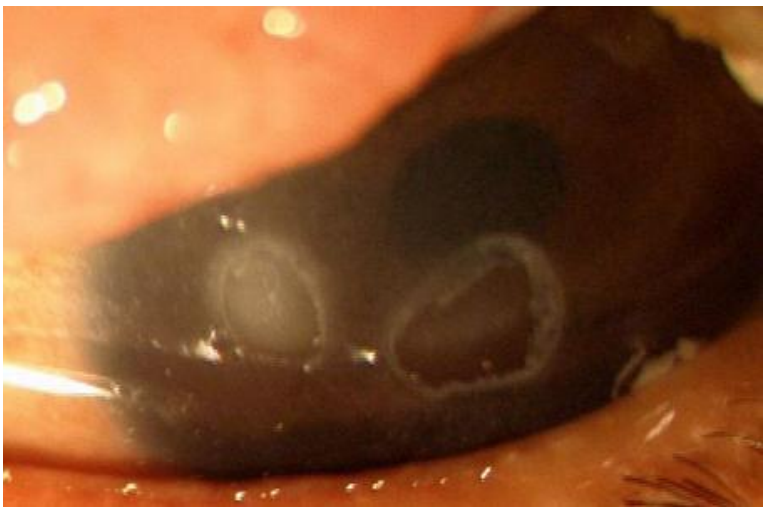

**Fig. 3(a): Grade 1 shield ulcer showing ulcer with transparent base**

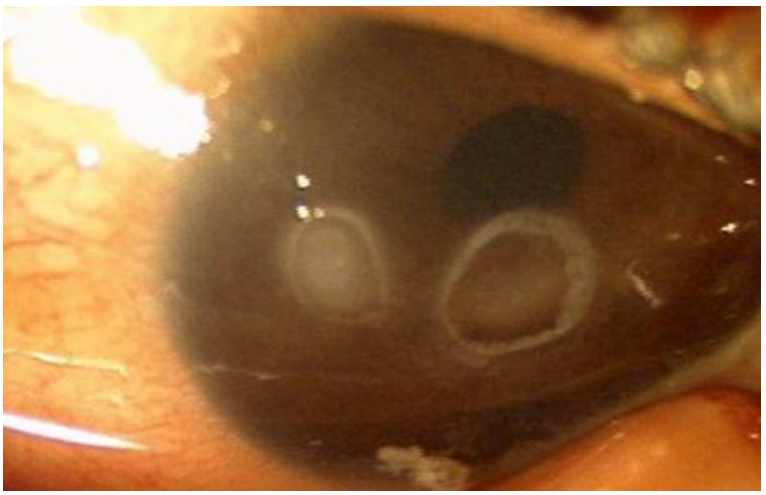

**Fig. 3(b): grade II shield ulcer showing ulcer with translucent base or with opaque white / yellow deposits**

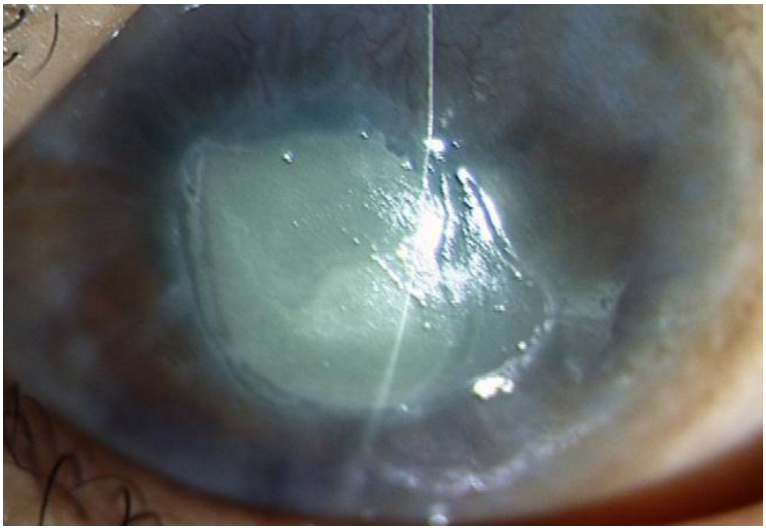

**Fig. 3(c): grade III shield ulcer showing elevated plaque above the level of the adjacent normal epithelium with surrounding vascularisation**

## DISCUSSION

VKC forms important pediatric ocular morbidity. In a study done by Ojha et al VKC forms around 32.66% cases of pediatric ocular morbidity[23]. Vernal Keratoconjunctivitis (VKC) is most commonly seen in males of paediatric age group. However, it may be seen in female of paediatric age group. In present study done on children of VKC patients the male: female ratio was around 2:1 (123 males, 63 females). This ratio is similar to note by different studies which ranges from 4:1 to 2:1 [13]. Hence, there is a very different clinical spectrum of VKC in male and females. The disappearance of VKC at puberty also point towards the hormonal role in VKC[14]. The confirmatory role of these factors still needs to be proven.

The positive family history of atopy and positive confirmation of allergic tests prove that an Ig E mediated mechanism may be involved in 50% to 75% of cases. In a study done by Ballow M et al [15] proved that specific IgE levels were increased in the tears of patients of VKC, shows that it's a local hypersensitivity reaction from conjunctiva and leading to increase in tear Ig E. This is further supported by histopathological examination of conjunctiva showing IgE positive cells[16]. However lack of positivity in ¼ th to ½ of cases for Ig E tests or allergic provocation point towards non Ig E mediated Immunopathogenesis also to be involved in pathogenesis.[17-18]

In a study done in Nigeria, VKC was found to be most common external eye disease in paediatric OPD[19]. In this study only 5% children had positive family history.

Vernal keratoconjunctivitis (VKC) was found to be leading cause of paediatric ocular morbidity in Palestinians in East Jerusale, Israel a[20]. In a study done in North Europe, have shown that prevalence of VKC was augmented by immigration of children from Asia or Africa [21]. This suggests that both environmental and genetic factors are implicated in the prevalence and incidence of the VKC. However, till date relationship between VKC and particular gene is not yet established.

## CONCLUSIONS

Vernal Keratoconjunctivitis (VKC) is chronic ocular surface inflammatory condition mediated by type I Hypersensitivity reaction. The inflammation is mediated by Eosinophils, Ig E antibody, non- Ig E mechanisms, mixed mechanisms, genetic mechanisms and age-sex related effects. The VKC has a good prognosis in early stages but in chronic recurrent disease blinding complications can occur due to corneal scarring and advanced steroid induced glaucoma. So, by knowing the regional natural history of the disease will help in early intervention and will help in preventing blinding complications. It is necessary to create awareness for proper management of VKC patients of central India.

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