

Pattern of vernal keratoconjunctivitis and its complications amongst school pupils in Jos East local government area of Plateau State, North-Central Nigeria

Panshak E Tenmang, Alice V Ramyil, Naomi Saleh, Fatima H Umar, Salome Z Wabare, Patricia D Wade

Abstract

Background: A common chronic allergic eye condition affecting children and young adults worldwide is vernal keratoconjunctivitis (VKC). It is mostly seasonal, and can affect the quality of life of affected children and their parents. This study aimed to determine the pattern of VKC and its possible complications among school pupils in Jos East Local Government Area (LGA) of Plateau State.

Methods: A school-based cross-sectional descriptive study using a multistage sampling technique was carried out. A 2X magnifying loupe was used to examine the eyes of the pupils. Statistical analysis was done using Statistical Package for Social Sciences (SPSS version 20), and frequency, simple percentages, and chi-square were used to compare proportions.

Results: A total of 400 participants were seen during the study. All types of VKC were seen, however, the limbal form was the commonest contributing 45.2% followed by the tarsal form (34.5%), and then the mixed type (20.0%). The pattern of VKC was found not to be significant when compared with age-group

and gender of participants. The major complications associated with VKC were keratoconus and cornea scar, while the effect of VKC in the pupils was seen to cause difficulty in reading, difficulty concentrating on homework and other activities, feeling embarrassed, and difficulty playing with friends as effects of VKC on the quality of life of pupils.

Conclusion: The limbal form of VKC was found to be the commonest, while keratoconus and corneal scar were the commonest complications.

Recommendation: Parents need to be educated on this disease condition and the need to reduce its negative impact on a child's quality of life so as to improve school attendance and performance.

Key words: Vernal keratoconjunctivitis, pattern, complications, school pupils.

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Introduction

Vernal keratoconjunctivitis (VKC) is a lingering, periodic inflammation of the conjunctiva and cornea that tends to occur in children and young adults.¹ In Nigeria the age group of 5 -19 years constitutes about 39.6% of the total population.² Thus, this age group is important since it forms the growing population, and whose potential dictates the country's future economy therefore cannot be neglected. A study on the pattern of VKC in school children is very important because while some eye conditions are just causes of ocular morbidity, VKC comes with intense itching, swollen eyelid, tearing, red eye, foreign body sensation, mucous discharge, photophobia and other complications which may lead to blindness.³ The most common signs of VKC are lid edema, chemosis, tarsal papillae, Horner-Trantas dots, limbal infiltrates (limbitis), giant papillae, and corneal epitheliopathy.^{4,5}

VKC is divided into two main types depending on the part of the conjunctiva involved: tarsal or limbal. Tarsal VKC is characterized by the presence of giant papillae > 1mm in diameter while the limbal type by the presence of papillae, limbal infiltrates, and Horner-Trantas dots. A combination of both signs is classified as

mixed. The limbal form is more common in tropical climates and it typically involves both eyes while unilateral cases tend to be the tarsal form of VKC.^{3,6-8}

Pattern of VKC varies with gender. In a retrospective non-comparative case series,³ the tarsal type was found to be more predominant in boys, while the limbal type was common in females.

There is a dearth of data on pattern of VKC and its complications among school pupils in Plateau State. The earlier studies done on VKC in Plateau State were hospital based studies. Hence, this study was designed to determine the relationship between the pattern of VKC across age groups and gender, and also to identify the complications of VKC among school pupils in Jos East LGA of Plateau state.

Methodology

This was a school-based cross-sectional descriptive study conducted over a four month period from October 2019 to January 2020 (4 months) in Jos East Local Government Area (LGA) of Plateau State. The population for the study constituted all primary schools within the LGA with a total of 113 primary schools of which 76 were public and 37 private. The total enrolment was 22,812 out of which 19,698 were enrolled in the public primary schools while 3114 were enrolled in the private primary schools. These schools are divided into 5 educational districts namely Maigemu, Fobur, Shere, Fursum, and Federe. The list of grouped schools was obtained from the Education Authority. From each

Department of Ophthalmology, Jos University Teaching Hospital, P.M.B 2076, Jos Plateau State Nigeria.

All correspondences to:

Panshak E Tenmang

Email: panshak_tenmang@yahoo.com

district, five schools were chosen randomly by balloting from the list of schools. In each school, a class was chosen randomly by balloting from each arm running through primary one to primary six. A total of 400 participants were selected using the systematic random sampling method with 16 students recruited from each class.

Permission for the study was obtained from the Ethical and Research committee of the Jos University Teaching Hospital, and Plateau State Ministry of Education through the Area inspectorate of Education in Jos East LGA. Signed consent was obtained from the pupils' parents/guardian.

A self-developed semi-structured, interviewer-administered questionnaire with sections on demographic data of the pupil, clinical, medical and family history was used as the instrument for the study. Other instruments used included non-illuminated Snellen chart, non-illuminated tumbling E chart, pen torch, 2% fluorescein strip, direct ophthalmoscope, magnifying loupe 2X, Jackson cross cylinder, stationery, 0.5% amethocaine, cotton wool, pen torch with blue filter, and six (6) meter rope. Pupils with visual acuity of > 6/18 were considered to have normal vision.

Statistical analysis was done using Statistical Package for Social Science (SPSS) version 20 (IBM Corporation, Chicago, Illinois, USA). Frequencies and simple percentages were used to analyse the pattern and complications of VKC.

RESULTS

A total of 400 children participated in this study representing a response rate of 100%. The mean age of the pupils was 8.8±2.9 years and 8.7±3.1 years for males and females respectively. Males were more in this study with a male to female ratio of 1.3:1. VKC was seen in 84 out of the 400 children, resulting in a prevalence of 21.0% (Figure 1).

Table 1: Pattern of VKC in relation to Age and Gender group of pupils (n=84)

Variable	Pattern of VKC			χ ²	p
	Tarsal n (%)	Limbal n (%)	Mixed n (%)		
Age group (years)				3.177	0.204
5-10	24(38.7)	28(45.2)	10(16.1)		
11-15	5(22.7)	10(45.5)	7(31.8)		
Total	29(34.5)	38(45.2)	17(20.2)		
Gender				0.327	0.849
Male	21(35.6)	27(45.8)	11(18.6)		
Female	8(32.0)	11(44.0)	6(24.0)		
Total	29(34.5)	38(45.2)	17(20.2)		

All the three types of VKC were seen in the study. The

commonest sub-type was limbal 45.2%. (Table 1) All the three types of VKC were seen in both males and females. However, there was no statistically significant difference in the pattern of VKC distribution compared with gender (P = 0.849). (Table 1)

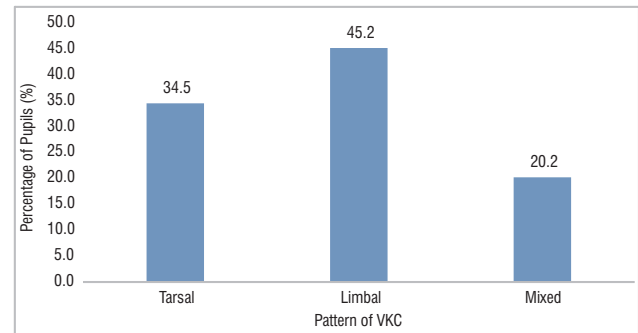


Figure 1: Pattern of VKC among school pupils in the study population.

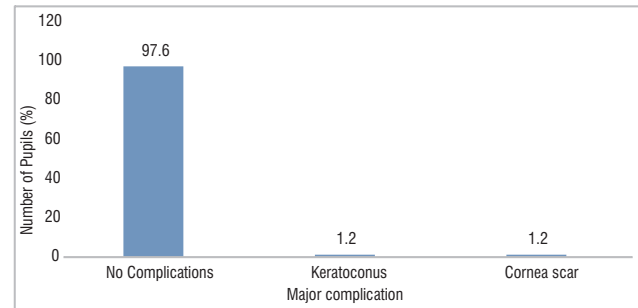


Figure 2: Complications associated with VKC (n=84)

The major complications associated with VKC were keratoconus and cornea scar (Figure 2). The major effects of VKC on the quality of life of pupils were difficulty in reading, 20.2%, difficulty in concentrating on homework and other activities, 19.0%, and feeling embarrassed and difficulty playing with friends, 19.0%, (Figure 3)

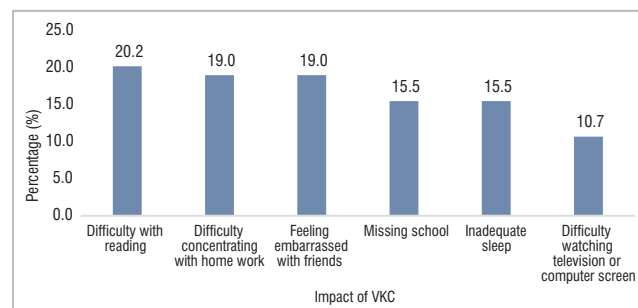


Figure 3: Effect of VKC on pupils' quality of life (n=84)

Out of 84 pupils with VKC, the majority (86.9%) had normal vision (>6/18) (Figure 4)

The most frequently encountered symptoms in the study were tearing and eye itching (43.1%), then foreign body sensation (15.3%) (Figure 5).

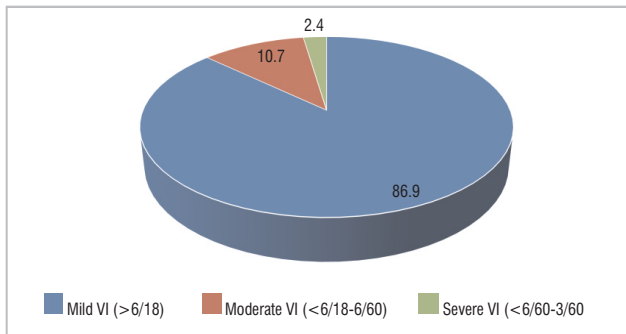


Figure 4: Presenting visual acuity (n = 84)

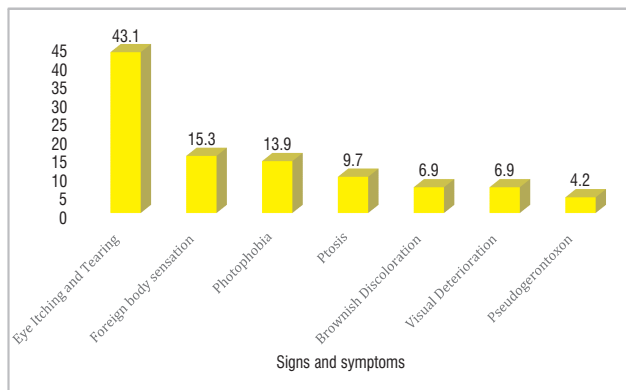


Figure 5: Clinical features of VKC in affected pupils

DISCUSSION

All three patterns of VKC were seen in this study. About half of the children seen in this study had the limbal sub-type of VKC, this picture was seen in both genders. The predominance of the limbal form of the disease was also reported by Fekadu, et al⁹ in Ethopia, and Malu KN in Jos.¹² Our finding, however, contradicts the reports by Sethi, et al¹⁸ in India who reported a predominance of mixed VKC and Duke et al¹⁰ in southeast Nigeria who reported predominance of the tarsal form of VKC. It has been suggested that differences in environmental factors can lead to the predominance of a particular sub-type as can be seen in our study and the one by Malu et al¹² conducted in Northern Nigeria where the weather is dusty and dry, having more of the limbal subtype. It has also been suggested that progressive increase in environmental temperature in a hot and dry climate may be one of the factors that encourages exacerbation of disease especially the limbal type.¹⁰ These discrepancies might also probably be due to different hormonal and hereditary.¹ Difference in study designs and study population might also contribute to specific type of VKC

seen.

The commonest complaints in the children with VKC in this study were eye itching and tearing. A similar pattern was reported in other population-based studies, and the hospital-based study in Jos.^{10,11,12,16,18,20} This contradicts the report of Alemayehu et al¹ who noticed intense itching to be the commonest presentation seen in all participants. Itching and tearing also contributed to non-school attendance by the pupils in this study, similar to finding by Duke et. al.¹⁰

Most of the pupils 86.9% had normal vision in this study irrespective of the severity of their VKC. This agrees with the study done by Duke et al¹⁷ in South-Eastern Nigeria that also found normal vision in most of the children seen with VKC. It also agrees with the study done by Surekha et al²² where normal vision was seen in 82% of cases. Less than 1% of the pupils in this report had visual disturbance and this was due to the corneal complications of VKC. The corneal complications were keratoconus and corneal scar presenting separately in each of those pupils. The Yemen study also recorded cases of corneal scars and keratoconus.¹⁵ as well as study done by Sureka et.al²² None of the pupils in this study had other major complications like corneal ulcer, steroid induced cataract or glaucoma, and none was blind as a result of the disease process which contradicts with finding from study done by Cameron et al¹⁵ and Surekha et al²² who discovered these other complications associated with VKC in their studies. This low occurrence of corneal complications in this study is similar to findings in Jos,¹² Yemen,¹⁹ and Italy.²⁰ It, however, contradicts the report by Surekha et al²² who found a high cornea complications (21%) with corneal scarring from chronic itching and rubbing of the eye being the most common, and keratoconus being the least common.²² Corneal involvement is associated with more severe disease. Corneal ulcer is reported to occur in 3–11% of patients with VKC and permanent reduction in visual acuity as a result of corneal changes in 6% of patients.¹⁴ Prompt recognition of corneal involvement is vital in order to prevent visual loss from VKC.

Acquired ptosis was found to be quite common in this study, occurring more frequently with tarsal VKC. This is in agreement with the findings of Duke et al.¹⁷ It was also a common complication seen by Surekha et al.²² Ptosis in VKC could be as a result of frequent rubbing or chronic inflammatory insult to the levator palpebrae superioris muscles with subsequent dis-insertion, and also giant papillae.

Pseudogerontoxon was seen in 4.2% of the children in our study which is similar to the low rate of 3% that was reported in the study done by Surekha et. al.²² It is often the only clinical evidence of previous allergic eye disease.¹⁷ This lesion looks like a small segment of arcus

senilis.¹⁷ The effect of VKC on pupils quality of life translates to poor school attendance, this was seen to have contributed to 22.9% of absenteeism in this current study. The disease condition had an effect on the self-esteem, emotional well-being, and concentration/performance of the children with VKC seen in this study. This agrees with reports by De Smedt, et al²² in Rwanda who also found an increase in non-school attendance in this group of students.

Conclusion

All the three types of VKC namely limbal, tarsal and mixed were found in the sample participants of this study. The pattern of VKC was not statistically significant in the distribution within gender and age group variables. Irrespective of the prevalence of VKC, less than 1% of the students seen had visual disturbance and this was as a result of corneal complications. Proper recognition of the corneal complications of VKC is crucial as most of these can be managed or prevented by a combination of medical and surgical measures. Parents need to be educated on the burden of VKC and its negative impact on the child so as to encourage early presentation to the hospital for treatment.

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