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Vernal Keratoconjunctivitis in Sudan and Its Impact on Visual Acuity

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Abstract

Purpose: Despite being a self-limiting allergy disorder, vernal keratoconjunctivitis (VKC) can potentially cause severe problems, including blindness, if not properly treated. Therefore, the objective of this study is to determine the effect of VKC on the visual acuity of patients.

Materials and Methods: We conducted this prospective descriptive study between January 1, 2023, and April 20, 2024.So, all children with spring catarrh symptoms and signs were examined at Dr. Khalil's ophthalmology center (240 patients), including the cornea, bulbar, and palpebral conjunctiva, visual acuity was measured, visual impairment was classified by WHO, and structured questionnaires were completed. The study excludes children under the age of four years and those over the age of eighteen years.

Findings: A total of 240 patients participated in this assessment, with an average age of 10 years. The male to female ratio for the age of disease beginning was 2.10:100. The mean age of onset was 5 years. The occurrence of this phenomenon is more prevalent in the younger age group compared to the older age group, with a ratio of 1.40 to 1.00. We have observed that a condition recurs in 85% of patients. The illness affects both eyes in 97% of the individuals. Regarding visual acuity, the majority of patients exhibit normal or reduced visual acuity, accounting for 81.6%, while the remaining 15% experience substantial visual impairment. 2.1% of patients were found to have severe visual impairment, while 1.3% were diagnosed

Implications to Theory, Practice and Policy: VKC, is a prevalent disease in Sudan. It often affects both eyes and is more common in males than females. VKC tends to occur at a young age and often recurs in patients. Additionally, it can lead to severe consequences that result in a decline in visual acuity in over 18% of patients. Children with VKD should undergo continuous screening for their visual acuity.

Keywords: *Keratoconjunctivitis, Visual Acuity, Spring Catarrh, Corneal Opacity, Pseudojerontoxon, Shield Ulcers, Keratoconus, I – Health*

1.0 INTRODUCTION

Vernal keratoconjunctivitis (VKC) is a condition that affects both eyes and specifically targets the surface of the eye, including the cornea and conjunctiva. This can result in serious problems that have the potential to cause blindness. Examples of eye conditions include keratoconus, shield ulcers, and corneal opacity [1]. The phenomenon is primarily seasonal, but it also exhibits periodic recurrences throughout the years. Allergic conjunctivitis is a seasonal condition that reaches its highest levels throughout the summer and winter months [2]. The condition primarily manifests in youngsters and exhibits a higher prevalence among boys compared to females. It is prevalent in regions with warm weather and high humidity. Untreated VKC can result in significant problems and potentially cause a decline in visual acuity or complete loss of vision [3]. The diagnosis of VKC relies on the evaluation of clinical presentations, symptoms, and indicators. The condition mostly manifested by intense pruritus, erythema, sensitivity to light, and the secretion of mucus. Upon examination, the observed indications primarily included Pseudojerontoxon, tarsal papillae, and ocular findings such as opacity and ulceration [4]. The majority of patients experiencing visual impairment exhibited corneal problems, specifically keratoconus [5]. Keratoconus is a degenerative corneal disease that occurs as a result of frequent and intense rubbing of the eye, often caused by exposure to allergens. This rubbing leads to thinning of the corneal stroma, which can result in a decline in vision. Keratoconus is a common and significant complication of VKC [6]. While VKC is a disease that typically resolves on its own, it often recurs and can result in visual impairment or even complete loss of vision. This is mostly due to corneal complications such as shield ulcers and corneal opacities. Fortunately, shield ulcers can usually be successfully treated with appropriate medical therapy [7].

Vernal keratoconjunctivitis (VKC) can lead to persistent vision impairment as a result of continuous recurring inflammation, which can produce various corneal problems such as shield ulcers, infectious keratitis, keratoconus, corneal opacities, and limbal stem cell shortage [8].

2.0 MATERIAL AND METHODS

From January 1, 2023, to April 20, 2024, we undertook this descriptive prospective study. The research included around 240 children. We examined the cornea, bulbar conjunctiva, and palpebral conjunctiva in all the children who came to Dr. Khalil's Ophthalmology Center with symptoms of spring catarrh. We also measured their visual acuity and classified their visual impairment according to the World Health Organization's standards. Finally, we had them fill out structured questionnaires. Persons who were 18 years old or older and children younger than 4 years old were not included in the study.

Statistical analysis: We created a well-organized questionnaire and inputted the data into the computer software called Statistical Package for Social Science (SPSS) version 24, developed in Chicago, USA. Calculations were performed for frequencies, percentages, cross tabulation, and chi-square test. Given a 95% confidence interval (95% CI). A p-value was computed. A p-value of 0.05 was deemed to be statistically significant.

Informed consent: the parents of the child patients were approved a verbal consent.

Ethical approval: the proposal of this study was approved by human research ethics committee **(**Prof MRCC).

3.0 FINDINGS

This study analyzed a sample of 240 patients, ranging in age from 4 to 17 years old. The average age of the patients was 10.49 years. The majority of the patients fell into the age category of under 7 years, followed by the age groups of 11-13, over 14, and 8-10. These age groups accounted for 30% (72/240), 25% (59/240), 24% (58/240), and 21% (51/240) of the total sample, respectively.

Out of the total of 240 patients, 163 (68%) are males and 77 (32%) are females.Regarding the age at which the disease begins, the average age is 5.72 years. In the first group, consisting of children aged 6 years and younger, there were 139 patients. Among them, 102 were males (73%) and 37 were females (27%). In the second group, consisting of individuals older than 6 years, there were 61 male patients (60%) and 40 female patients (40%).

Regarding disease recurrence, it happened frequently in 205 cases, making up 85% of the total. Out of the total number of patients, 143 (68%) were males and 62 (32%) were females. The remaining 35 patients (15%) included 20 males (56%) and 15 females (44%), all of whom were diagnosed with VKC for the first time. Regarding the impacted eye, 232 patients (or 232 out of 240, or 97%) are affected by the disease in both eyes. The remaining eight patients are impaired in either their left or right eyes. 159 bilateral cases were evaluated, with 153 (69%) males and 73 (31%) females.

Table 1: Distribution of the Cases by Sex, Age, Age of Onset, Recurrence and the Affected Eye

Variable	Males	Females	Total
<7 years	53	19	72
8-10years	34	17	51
11-13years	44	15	59
14+ years	32	26	58
Total	**163**	**77**	**240**
Age of on set			
1-6 years	102	37	139
>6 years	61	40	101
Total	**163**	**77**	**240**
Recurrence			
First time	20	15	35
Recurrent	143	62	205
Total	**163**	**77**	**240**
The affected eye			
Right	2	3	5
Left	2	1	3
Both	159	73	232
Total	**163**	**77**	**240**

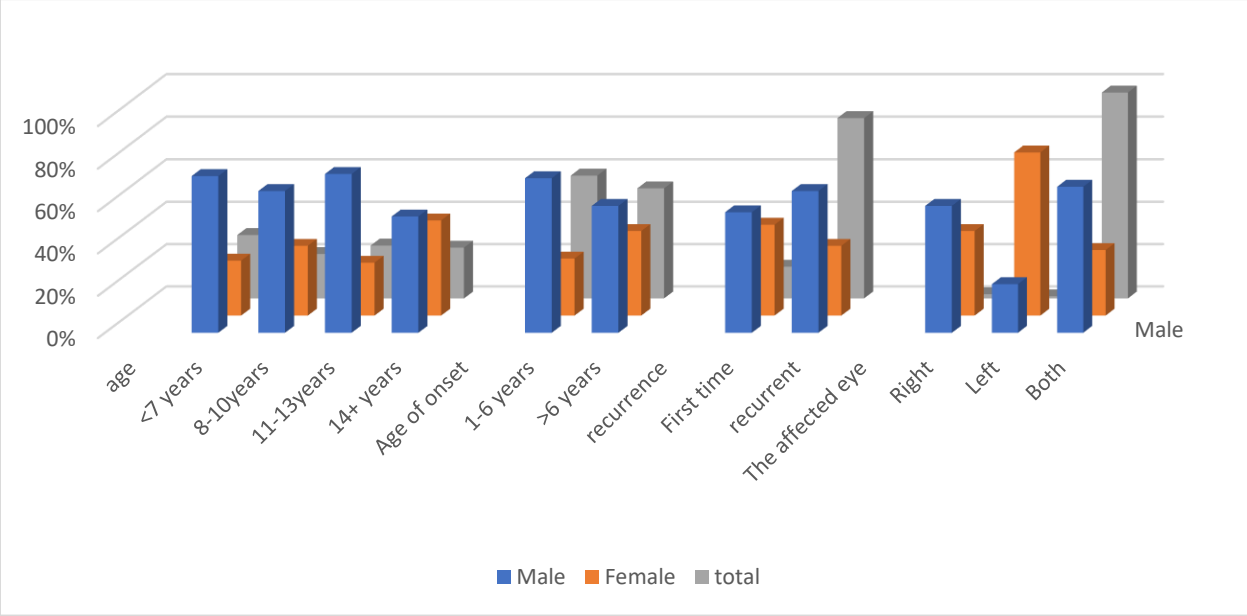

Figure 1: Descriptions of the Cases According to the Troubled Eye, Recurrence, Age and Sexes

According to clinical presentations, 196 individuals (81.6%) have normal or mild impairments, while the remainder have moderate visual impairment 36/240 (15%), severe visual impairment 5/240 (2.1%), and blindness 3/240 (1.3). Most patients who are discharged have normal or low impairments.140/166 (84%). The remainder consisted of fellows with moderate impairments (12%), severe impairments (2%), and blindness. Only one patient has discharge in the right eye and has normal visual acuity. In the left eye, there are two patients with discharge, one has normal visual acuity and the other has significant impairment. 76% have normal visual acuity. While 21% have moderate impairment, 3% have severe vision impairment.

In cases of discoloration, all patients without discolorations (6) have normal visual acuity, while in the right eye, there are two individuals, one (50%) with normal visual acuity and the other with considerable impairment, but the majority of the patients have discolorations in both eyes. 76% normal visual acuity, 21% with significant visual acuity impairment. 2% have severe visual acuity impairment, and 2% are blind. Regarding Pseudojerontoxon, 94% of patients without Pseudojerontoxon have normal or low impaired eyesight, while individuals with Pseudojerontoxon in the right eye 75% of patients have normal or low vision, 25% have substantial impairment, and all have normal or poor vision in their left eye (6). However, people with pseudojerontoxon in both eyes had 78% normal or poor vision, 8% moderate impairment, 2% severe impairment, and 2% blindness. Regarding corneal opacity, 92% of persons without it have normal or poor vision, 7% have substantial impairment, and 1% are blind. Patients with corneal opacities in the eye 60% have normal or low impaired vision, 10% have severe impairments, and 10% have blindness in the left eye. 30% normal or low impairment; 50% moderate impairment; 10% severe impairment; and 10% blindness. With corneal opacity in both eyes, 41% have normal or poor vision, 52% have moderate impairment, and 7% have severe blindness. Concerning shield ulcers, 83% of people without shield ulcers have normal or slightly reduced vision. Shield ulcer on the right represented in three cases, all with normal or low vision 100%.

In the left eye, there are two patients who have 100% mildly impaired vision. However, 67% of patients with shield ulcers in both eyes have moderate impairment, whereas 33% have severe impairment. Patients without keratoconus have 84% normal or poor vision, 14% moderately reduced vision, and 1% severely damaged vision. 40% of patients with right keratoconus have normal or poor vision, whereas 60% have moderately impaired vision. Keratoconus in the left eye. 30% have normal or impaired visual acuity; 20% have moderately impaired visual acuity; 20% have significantly impaired visual acuity; and 30% are blind.

Table 2: Visual Acuity Dispersion in Relation to Patients' Clinical Presentations

Variables	Normal/low (N=196)	Moderate (n=36)	Severe (n=5)	Blindness (n=3)	Total (n=240)
Discharge					
No Discharge	140	20	3	3	166
RT	1	0	0	0	1
LT	1	1	0	0	2
Both Eyes	54	15	2	0	71
Discolorations					
No	6	0	0	0	6
Right	1	1	0	0	2
Left	3	1	0	0	4
Both	186	34	5	3	228
Pseudojerontoxon					
No	35	1	1	0	37
Right	6	2	0	0	8
Left	9	0	0	0	9
Both	146	33	4	3	186
Corneal opacity					
No	175	14	1	1	191
Right	6	2	1	1	10
Left	3	5	1	1	10
Both	12	15	2	0	29
Shield ulcer					
No	193	33	4	3	233
Right	3	0	0	0	3
Left	0	1	0	0	1
Both	0	2	1	0	3
Keratoconus					
No	192	31	3	0	226
Right	2	3	0	0	5
Left	2	1	1	2	6
Both	0	1	1	1	3

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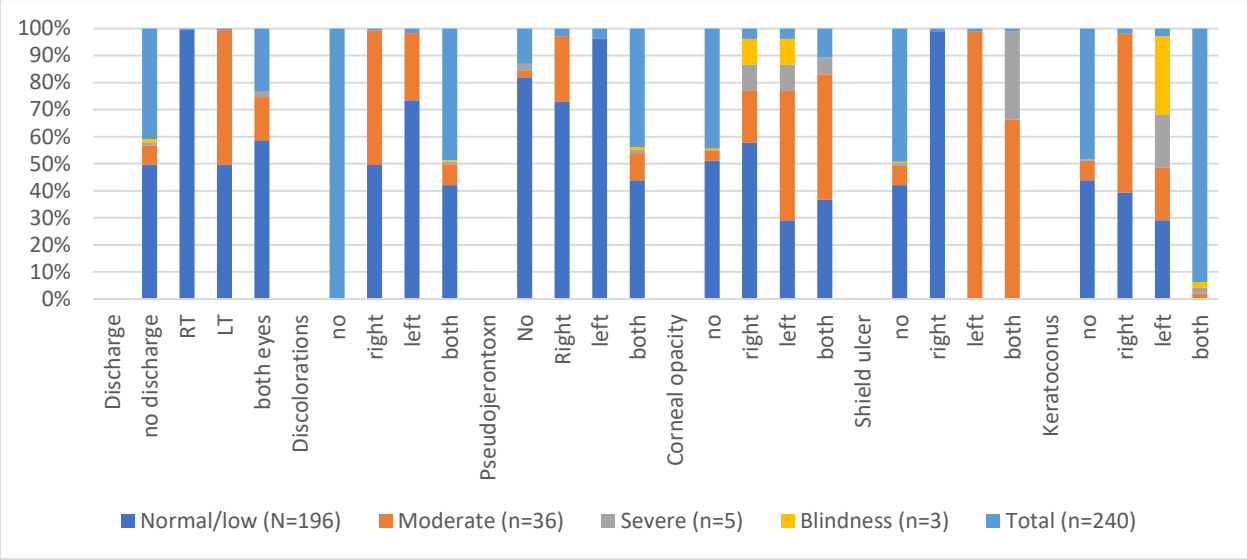

Figure 2: Description of Visual Acuity with Clinical Presentation of the Patients

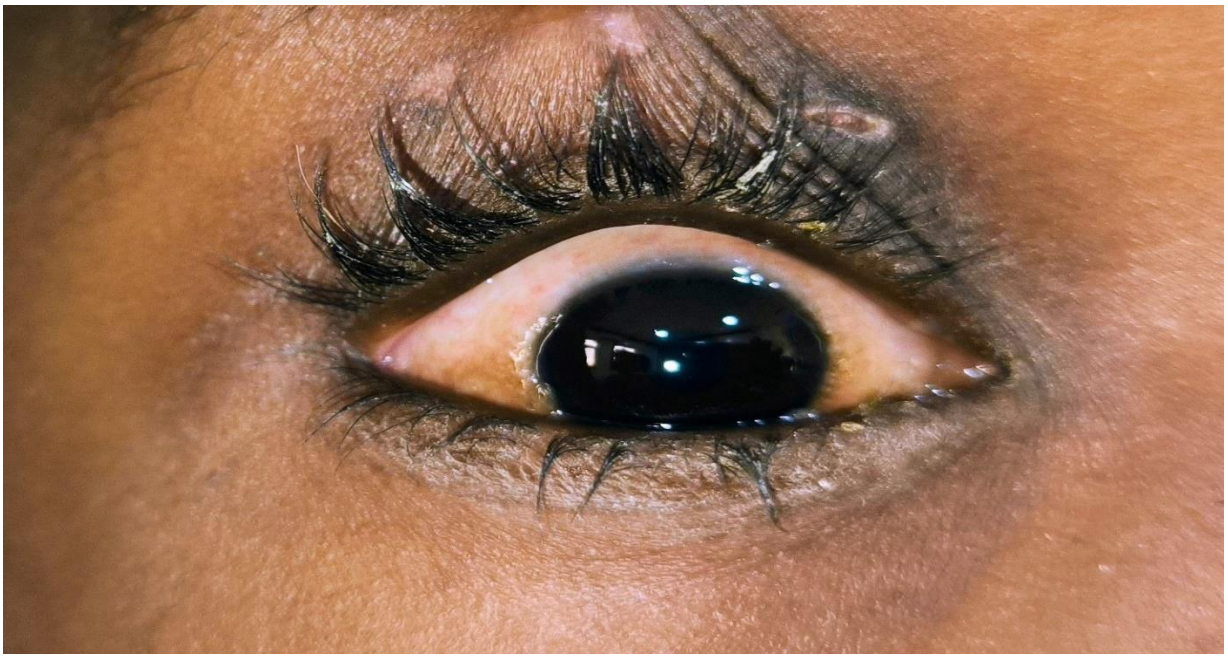

Image 1: Patient with Pseudojerontoxon, Conjunctival Edema, Discharge and Lid Laceration Caused by Excessive Eye Rubbing

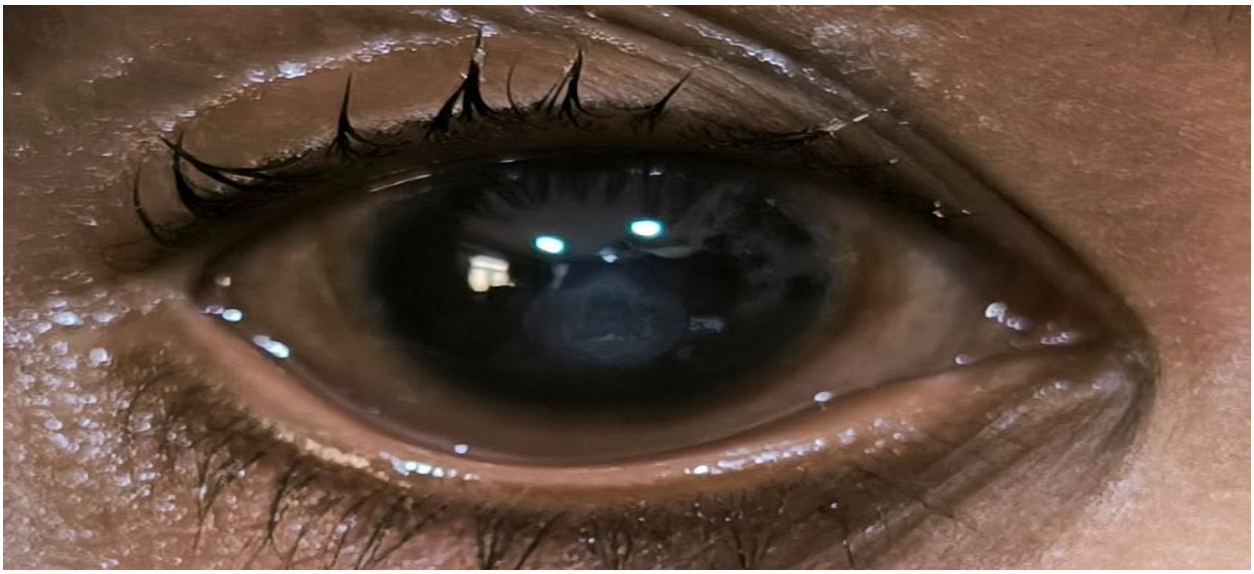

Image 2: A Patient with Shield Ulcer

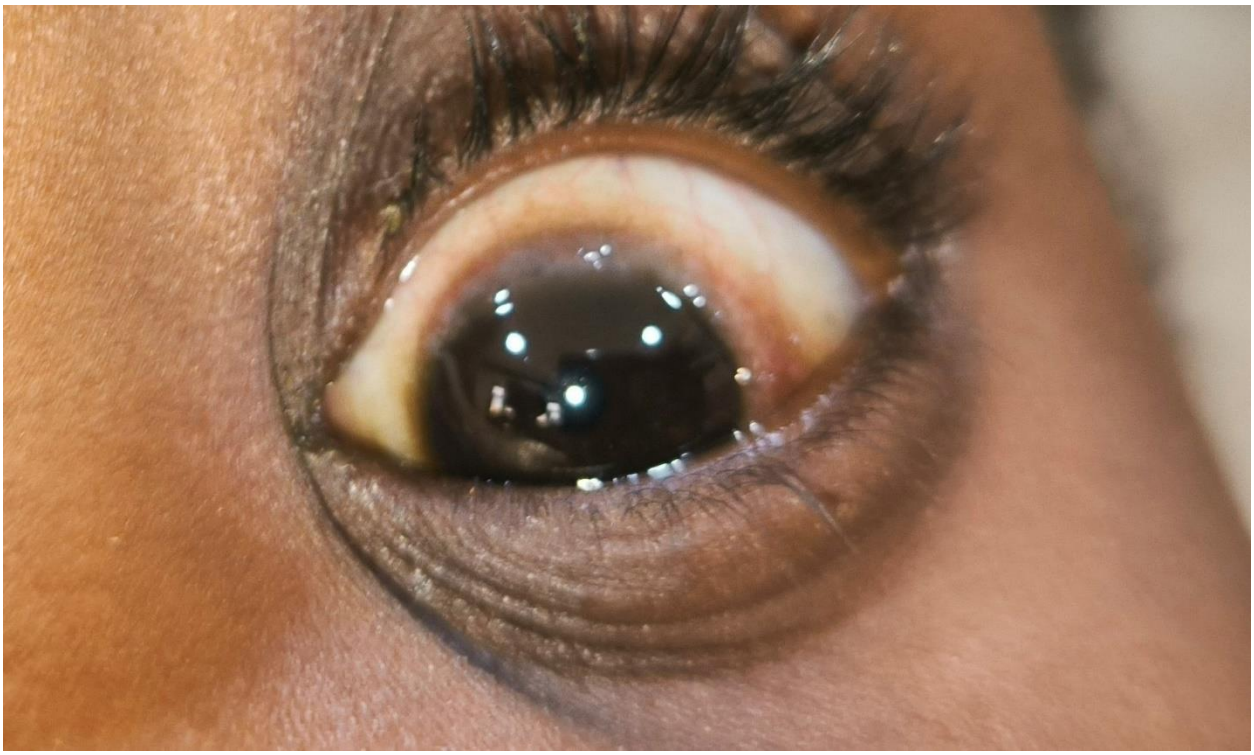

Image 3: Pseudojerontoxon with Conjunctival Redness

Discussion

This study focused on the effect of VKC on the visual acuity of children who came to the Doctor Khalil Ophthalmology Center in North Kordofan state. So, according to this study, the majority of patients have normal visual acuity (81.6%), whereas 17.4% have moderate to severe vision impairment. However, in one study, we discovered that 12% had moderate to severe vision loss, which is similar to our findings. And the VKC-related complications in that study appear to be

similar to our study, so the shield ulcer is similar to our study, keratoconus is slightly higher than in our study, and corneal opacity is 11%, which is lower than our study; the increase in corneal opacity is due to an increase in the percentage of patients with recurrent disease [9]. We discovered that corneal complications of VKC cause significant vision degradation. Keratoconus is substantially more common in people with VKC than in the general population, with more instances having moderate to severe visual impairment due to recurrence and excessive rubbing [10]. Additionally, corneal opacity and ulceration contributed to decreased visual acuity as part of the vicious cycle. A study conducted in the general population concluded that VKC is common among youngsters and is frequently related with atopic comorbidities [11]. As a result of our country's limited resources and disastrous war, most patients are unable to access health-care facilities.

In the next study, the authors pick patients with severe VKC 15.7% of the entire sample, and they find the male to female ratio 3.1:1, which is larger than in our study. The authors report the causes of severe visual impairments as it fellows, keratoconus was 10%; in our study, keratoconus patients with severe impaired vision were less; they discovered that the central corneal scar was 7%, which was the same as our study in patients with corneal opacity and severe impaired vision [12]. In this study, the methods of diagnosis are the same as ours, relying on history and examination to select cases for investigation, and the sample size is similar to ours. The same technique is utilized, and WHO classifications are picked. Visual acuity was measured using Snellen's chart, and visual impairment was diagnosed using the World Health Organization's categorization for visual disabilities. The average age of presentation was 11 years, which is the same as our mean age. They discovered that the male and female percentages were (71.4%) and (28.6%), respectively. Which is close to our study. In their investigation, corneal opacity was represented by (20.3%), which is consistent with our findings. Keratoconus was determined to be (5.8%) in their study, which was consistent with ours. However, Shield ulcers were reported to be ranging from 3% to 11% [13].

In this investigation, the authors discovered that the limbal type of VKC was the most prevalent. However, in our analysis, we discovered that the presence of Pseudojerontoxon is highly common, accounting for 85%. In all investigations, the most common problems were keratoconus and corneal opacity [14]. It is important to regularly check the visual acuity of children with VKD in order to detect and prevent complications such corneal opacity and shield ulcers.

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Author's Contribution

Ibraheim KA: Conception, data collection, analysis, drafting, approval for final revision.

Ahmed HG: Conception, consultation and critical revision

Conflict of Interest

Authors declare no conflict of interest

Data availability: data about this paper can be requested from the corresponding authors.

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