

The Pattern of Corneal Diseases in North Kordofan State

Khalil Ali Ibraheim^{1,2,3,4*}¹Dr. Khalil Ophthalmology Center²Department of Surgery, Faculty of Medicine, University of Kordofan, El-Obeid, Sudan³El-Obeid Teaching Hospital, Ophthalmology Department El-Obeid, Sudan⁴Sheikan College, El-Obeid, SudanDOI: <https://doi.org/10.36348/sijtc.2024.v07i07.003>

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*Corresponding author: Khalil Ali Ibraheim

Department of Surgery, Faculty of Medicine, University of Kordofan, El-Obeid, Sudan

Abstract

Background: All corneal diseases cause ocular morbidity and decrease vision, or even blindness, so early management intervention is critical. This study sought to evaluate several corneal disorders, including corneal foreign bodies, corneal tears, and ruptured globes. **Methodology:** This retrospective descriptive study was undertaken in El-Obeid Teaching Hospital's Ophthalmology Emergency Department in North Kordofan State, Sudan, as well as Dr. Khalil's Ophthalmology Center. This study sample, which represents the entire corneal illness, was obtained from 1000 patient files for various eye conditions. **Results:** This study examines 205 patients with corneal disorders to assess the prevalence of corneal diseases in North Kordofan State. The study found that the disease is more common in males, with 48 out of 78 patients (62%) being male and 38% being female. The male-to-female ratio is 1.6:1. The age group that is most affected is the group of individuals younger than 9 years, accounting for 34% of the affected population. This is followed by the age groups of 10–20 years, 21–32 years, 33–53 years, and >54 years, which account for 24%, 18%, 14%, and 9%, respectively. Regarding the classification of corneal disorders, the most prevalent form is foreign body corneal disease, accounting for 38% of cases. This is followed by corneal tear (16%), corneal opacity (15%), corneal tear with iris prolapses (10%), bacterial corneal ulcer (7%), and rupture globe (6%). The incidence rates of viral corneal ulcers, chemical trauma, burn trauma, and keratoconus are 3%, 3%, 1%, and 1%, respectively. **Conclusion:** Eye trauma is prevalent in north Kordofan, leading to an upsurge in corneal illnesses including foreign body cornea, corneal tear, and ruptured globe.

Keywords: Eye trauma, corneal disease, corneal opacity, corneal ulcer, Sudan.

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INTRODUCTION

As with keratitis and keratoconus [1], most corneal disorders are caused by injuries in the cornea, which transmit light to the retina and can cause vision loss or blindness. Artificial intelligence has rapidly developed powerful tools to help diagnose and manage eye diseases, especially corneal conditions, as demonstrated in my study, which was done in a secondary hospital that received all trauma patients from the state and was the only ophthalmology department to perform surgery under general anesthesia. Research has identified corneal foreign bodies as the second most prevalent kind of ocular damage [2]. Traumatic corneal tears and lacerations can cause major vision problems, as shown in a northeastern Nigerian study [3]. We suggest community leaders and health managers create an education program in primary eye care centers and other public places. Many corneal trauma cases, such as iris prolapse and corneal scleral tear (rupture globe),

necessitate careful therapy and observation after admission. Iris trauma includes sphincter tear, iris chaffing, and iris root tear (iridodialysis) [4]. Corneal ulcers are common and cause corneal layer involvement. Bacterial, viral, fungal, pythium, and protozoal infections can cause it [5]. The following study found that 3% of emergency department visits are due to ocular trauma, most of which involves corneal injury. A corneal injury can cause visual loss. Traumatic and exposure-related ocular damage includes corneal abrasions, foreign bodies, burns, and chemicals [6]. Keratoconus is bilateral and non-symmetrical, causing corneal thinning and bulging, uneven astigmatism, and reduced vision [7].

MATERIALS AND METHODS

This study was conducted at the Ophthalmology Emergency Department of El-Obeid Teaching Hospital and Dr. Khalil's Ophthalmology Center in North Kordofan State, Sudan. It was a retrospective, descriptive study. The study sample, which represents the overall

corneal illness, was derived from the medical records' of 1000 patients with various eye conditions.

Ethical approval: The study's proposal has received permission from the Human Research Ethics Committee at MRCC (Approval Number: HREC 0007/MRCC.3/24). Approval from an ethics committee: We obtained official authorization from the El-Obeid teaching hospital's manager.

Statistical analysis: We imported the data sets into the statistical software for social sciences (SPSS Inc., Chicago, IL, version 24) and obtained the results from it.

RESULTS

This study examines 205 people with corneal disorders in order to assess the prevalence of these

diseases in the North Kordofan state. The findings indicate that corneal diseases are more common in males, with 48 out of 78 cases (62%) being male and 38% being female. The male-to-female ratio is 1.6:1. The age group that is most affected is the group under 9 years old, with a percentage of 34%. This is followed by the age groups of 10–20 years, 21–32 years, 33–53 years, and beyond 54 years, with percentages of 24%, 18%, 14%, and 9%, respectively. Regarding the classification of corneal disorders, the most prevalent form is foreign body corneal disease, accounting for 38% of cases. This is followed by corneal tear (16%), corneal opacity (15%), corneal tear with iris prolapses (10%), bacterial corneal ulcer (7%), and rupture globe (6%). The incidence rates of viral corneal ulcers, chemical trauma, burn trauma, and keratoconus are 3%, 3%, 1%, and 1%, respectively. Refer to Table 1 and Figure 1 displayed below.

Table 1: Displays the proportion of corneal disorders observed in the study

Disease	Number of cases	Proportion
Foreign body cornea	78	38%
Corneal tear	32	16%
Corneal opacity	30	15%
Corneal tear with iris prolapses	21	10%
Bacterial corneal ulcer	16	7%
Rupture globe	12	6%
Viral corneal ulcer	6	3%
Chemical trauma	6	3%
Burn trauma	2	1%
Keratoconus	2	1%
Total	205	100%

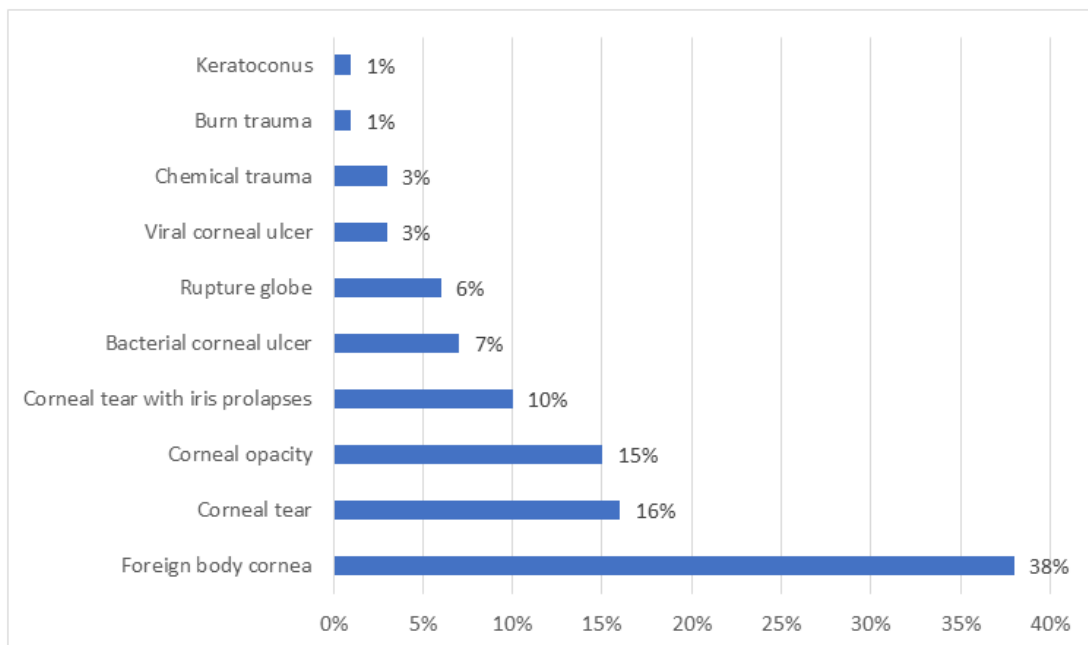


Figure 1: Shows the percentage of corneal disorders in the study

Here is the distribution of corneal disorders based on the gender of the patient. So, the most prevalent condition is foreign body cornea, which is more common

in males. Corneal tears were 21/32 (66%) in males and 11/32 (34%) in females. Corneal opacity was 19/30 (63%) more common in males than in females. 11/30

(37%), whereas in corneal tear with iris prolapse, it was more prevalent in males 13/21 (62%) than females that represent 8/21 (38%); in bacterial corneal ulcer, the proportion was more common in females 10/16 (63%) than in males 6/16 (37%); and in rupture globe, males were more affected. 8/12 (67%) than females 4/12

(33%); in viral corneal ulcers, males were 2/6 (33%) and females 4/6 (67%); in chemical trauma, more females were injured. 4/6 (67%) than males 2/6 (33%); in burn trauma, only two males were affected 2/2 (100%); and finally, keratoconus affects both males and females equally, with 50% each See Table 2 and Figure 2.

Table 2: Displays the distribution of corneal disorders based on the gender of the patient

Variables	Males	Females	Total
Foreign body cornea	48	30	78
Corneal tear	21	11	32
Corneal opacity	19	11	30
Corneal tear with iris prolapses	13	8	21
Bacterial corneal ulcer	6	10	16
Rupture globe	8	4	12
Viral corneal ulcer	2	4	6
Chemical trauma	2	4	6
Burn trauma	2	0	2
Keratoconus	1	1	2
Total	122	83	205

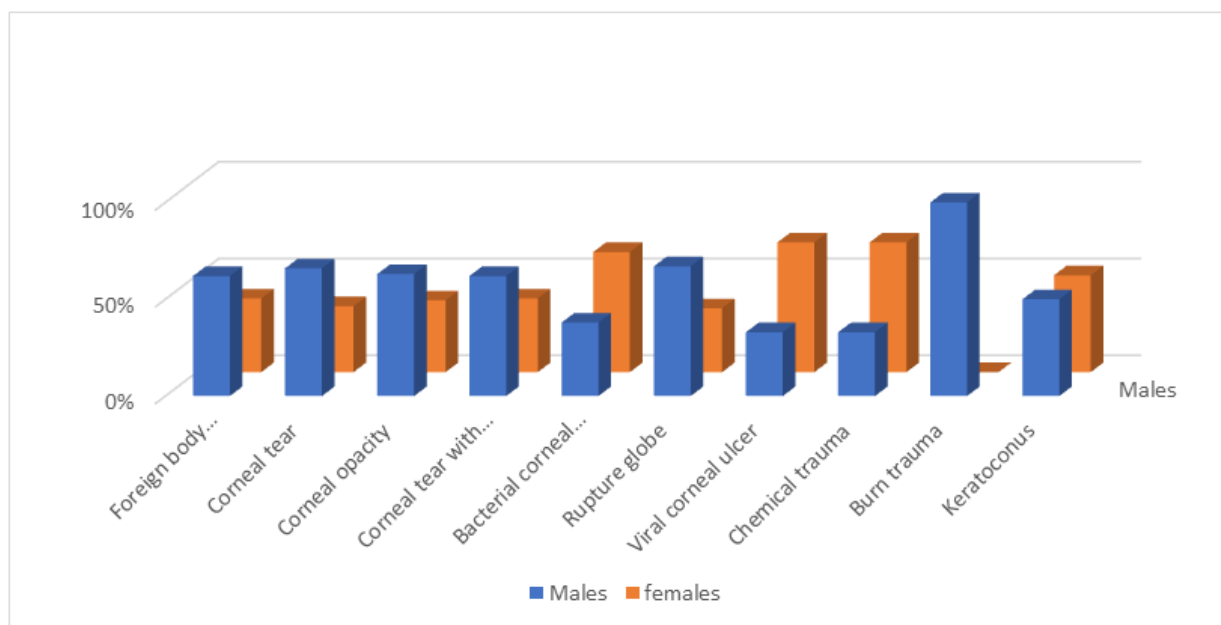


Figure 2: Shows the distribution of corneal disorders based on the gender of the patient

The chart shows the distribution of corneal disorders based on the patients' age groups. The frequency of ocular foreign bodies was highest in the age group <9 years (23/78), followed by the age group 33–53 years (16/78), the age groups 10–20 years and 21–32 years (15/78), and the age group >54 years (9/78). The percentage of corneal tears was highest in the age group <9 years, with 20/32 (62%), followed by 10–20 years with 7/32 (22%), 21–32 years with 4/32 (13%), and 33–53 years with 1/32 (3%). The age group >54 years did not present any symptoms. The prevalence of corneal opacity was higher in the age groups 21–33 years (33%), 10–20 years (27%), <9 years (20%), 33–53 years (13%), and over 54 years (7%). The prevalence of corneal tears with iris prolapse was highest in the age group <9 years

(52%), followed by 10–20 years (24%), 21–33 years, >54 years (10%), and 33–53 years (4%). The prevalence of bacterial corneal ulcers was highest in the age group 10–20 (31%), followed by three age groups (<9 years, 21–32 years, and 33–53 years) with 3/16 (19%) each, and the age group >54 years with 1/16 (12%). The rupture globe rate was higher in the age group <9 years (5/12, 42%), followed by the age group 10–20 years (4/12, 33%), the age group 33–53 years (2/12, 17%), and the age group >54 years (1/12, 8%). The age group of 21–31 years did not exhibit any symptoms. Viral corneal ulcers occur in three age groups: 10–20 years, <9 years, and 21–31 years, with 3/6 (50%), 2/6 (33%), and 1/6 (17%), respectively. In chemical trauma, the most afflicted age groups were 10–20 years and >54 years, with 2/6 (33%)

for each, followed by 21–32 years and 33–53 years, with 1/6 (17%) for each. The report did not include the age group under 9 years. Only two groups, those over nine and those aged 21 to 32, experience burn trauma,

accounting for half (50%) each. Finally, keratoconus affects two groups. The age range of 10–20 years and >54 years accounts for half (50%) of each group See Table 2 and Figure 2.

Table 3: Shows the distribution of corneal disorders based on the age groups of the patients

Variable	<9 years	10-20 years	21-32 years	33-53 years	>54 years	Total
Foreign body cornea	23	15	15	16	9	78
Corneal tear	20	7	4	1	0	32
Corneal opacity	6	8	10	4	2	30
Corneal tear with iris Prolapses	11	5	2	1	2	21
Bacterial corneal ulcer	3	5	3	3	2	16
Rupture globe	5	4	0	2	1	12
Viral corneal ulcer	2	3	1	0	0	6
Chemical trauma	0	2	1	1	2	6
Burn trauma	1	0	1	0	0	2
Keratoconus	0	1	0	0	1	2
Total	71	50	37	28	19	205

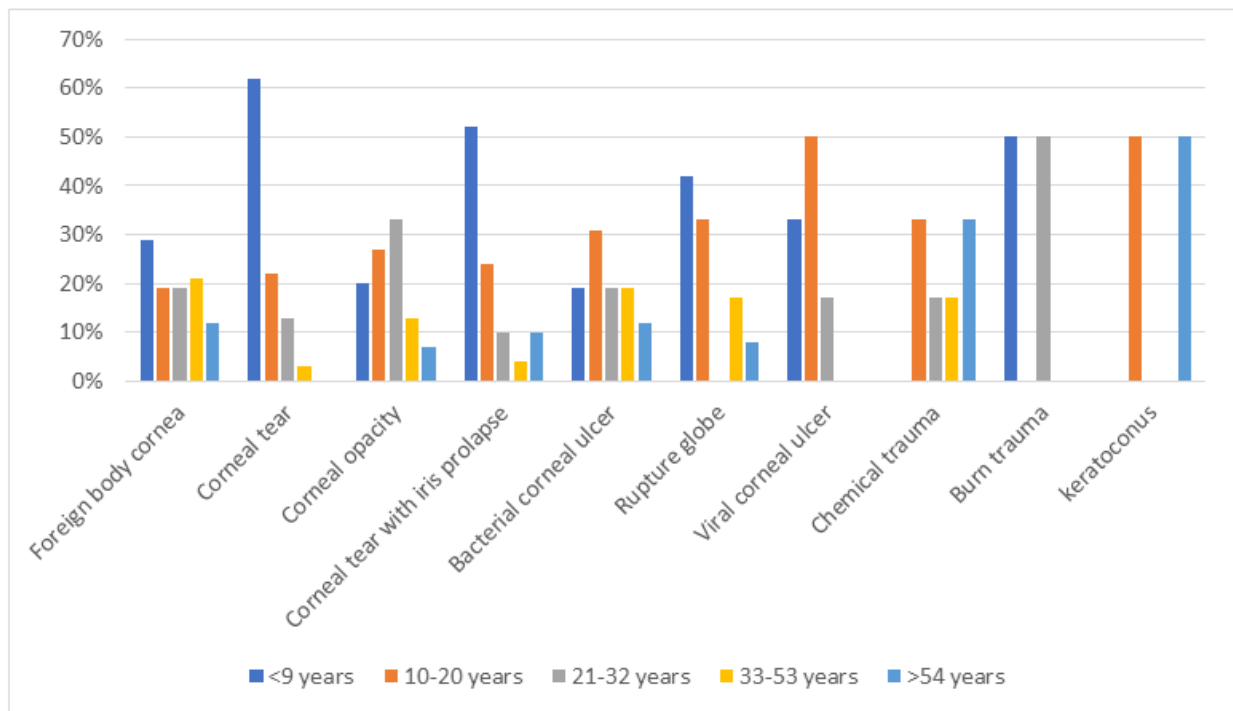


Figure 3: Illustrates the distribution of corneal diseases based on the age groups of the patients

DISCUSSION

This study investigates the incidence of corneal disease in north Kordofan State. It reveals that corneal foreign bodies are highly prevalent due to the severe pain experienced by patients, leading them to seek medical advice. The study retrospectively examines emergency department visits at a combat support hospital, which is one of four hospitals supporting 150,000 troops during Operations Desert Shield and Desert Storm. I identified 108 cases (14%) out of a total of 767 ocular injuries. Among these, 18 cases (17%) involved corneal foreign bodies, and 14 cases (13%) involved burns [8]. Comparatively, in my study, I found that 38% of the patients had ocular foreign bodies and 1 had burns. My

study took place in a public emergency hospital, whereas the previous study took place in a soldier's emergency department. Full-thickness laceration of the cornea. Ocular damage is a prevalent occurrence, with an estimated 24 million cases in the United States. These injuries can range in severity, from minor corneal abrasions to more severe cases such as a ruptured globe, which can happen in different sections of the eye [9]. The term "rupture globe" refers to a corneoscleral tear with or without iris prolapse, according to my research. The study observed this condition in 10% of participants. A globe rupture is a very serious type of eye injury, as demonstrated in a specific study. A retrospective single-center study recorded a total of 167 patients,

representing 173 eyes. The analysis revealed that males constituted the majority, accounting for 82% of the participants [10]. My study also revealed that 67% of the participants were male, making them the predominant group. This trend is particularly prominent among young age groups, as 75% of the patients were aged 20 years or younger. We can attribute the rise in incidence among young male children to their heightened activity levels at this stage of life. Regarding keratoconus, a study reported that the estimated prevalence and incidence of this condition range from 0.2 to 1.5 per person, with the highest rates occurring between the ages of 20 and 30 [11]. The prevalence of keratoconus in my study was 1%, with a distribution of 50% in the age group of 10–20 years and 50% in the age group over 54 years. Corneal injury primarily causes corneal opacity, which can vary in intensity based on the affected specific layer and the molecular responses to the injury [12]. Furthermore, it can result in a reduction in eyesight, depending on the specific layer affected. A study in China revealed that 0.3% of 10,384 participants had corneal blindness. The primary cause of the condition was corneal opacity (keratitis) during childhood, which accounted for 40.0% of cases. Ocular trauma accounted for 33.3% of cases, while corneal opacity (keratitis) during maturity accounted for 20.0% of cases. Age and illiteracy are significant determinants. My study revealed a 10% prevalence of corneal opacity. Males accounted for 62% of cases, while females accounted for 38%. Furthermore, the prevalence of corneal opacity was higher in younger individuals compared to the elderly.

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Conflict of Interest: Author declares no conflict of interest

Data Availability: Data concerning this study are available from the corresponding author.

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