Original Research Article

Epidemiology ofCommon Eye DiseasesinNorth Kordofan, Sudan

Abstract

Introduction: Eye illness epidemiology is critical because it identifies the most dangerous diseases in the community and helps decision-makers make better management decisions.This study aims to explore the epidemiology of prevalent eye diseases in north Kordofan State. **Methodology:** This retrospective descriptive study was conducted at El-Obeid Teaching Hospital's Ophthalmology Department, North Kordofan State, Sudan, and Dr. Khalil's Ophthalmology Center. Out of almost 50000 patient files, we selected 1000 files for this study using a random systemic selection of 1 in 50. The data collection sheet was created, and all data were collected. **Results:** The corneal diseases made up 19.6% of the 1000 cases in this study, followed by conjunctival 17.7%, lens 15.3%, eye surface 9.8%, uveal tract 9.1%, refractive errors 6.4%, eye lids 5.4%, orbital 5.4%, glaucoma 4.3%, retinopathy 4.6%, anterior chamber diseases 2.1%, lacrimal drainage system disorders 1.8%, and nerve palsies 0.5%. **Conclusion:** The western Sudan is heavily affected by eye diseases, with corneal diseases being the most common, closely followed by conjunctival diseases. This report delves into the eye disease situation in western Sudan.With absence of such literature from Sudan, the findings of this study presenting baseline of future research in this context.

Keywords: eye disease, conjunctival diseases, corneal diseases, Sudan

Introduction

The epidemiology of eye disorders is critical because it investigates the impact of eye diseases in the community and identifies all individuals at risk of blindness, resulting in the prevention or treatment of the majority of blindness-causing diseases. The main causes of blindness were cataracts and glaucoma. Vision loss can be avoided in 80% of cases by detecting and treating it early. So, prevention and early detection are critical techniques for minimizing illness incidence [1]. Additionally, blindness has an impact on the community's economy. This study was conducted at a secondary eye care teaching hospital (ophthalmology department and ophthalmology center). As a result, the prevalence of diseases caused by eye trauma increased dramatically, as did the incidence rate of eye injuries needing tertiary treatment. Additionally, significantly more males (79%) presented to emergency departments, with the majority of injuries involving the cornea and conjunctiva [2].
In general, the most common causes of visual loss are age-related, so health care professionals should investigate the rising prevalence of eye disease in the elderly [3]. Many people with common eye diseases that cause vision loss have increased dramatically as the population and ages have increased, so cataracts and refractive error are the leading causes of blindness and moderate or severe vision impairment in adults aged 50 and up [4]. As a result, healthcare

practitioners should focus on cataract surgery and refractive error surveys. In general, the health system should prioritize preventable diseases because they reduce the risk of blindness. Additionally, community awareness should be included in health programs. A study conducted in Papua New Guinea concluded that the detection and management of cataracts and refractive errors should be prioritized in the health system in order to reduce the rate of visual loss, as well as community awareness by hospital staff such as doctors, nurses, and other members [5]. As a result, health care services must be affordable and accessible.

Material and methods

This retrospective descriptive study was conducted in the ophthalmology department of El-Obeid teaching hospital in the north Kordofan state of Sudan, as well as at the Dr. Khalil ophthalmology center. The study involved a total of over 50,000 patient files, from which we randomly selected 1,000 using a systematic selection method with a ratio of 1/50. A data collection sheet was created, and all relevant data was gathered.

Statistical analysis: Data sets were imported into the statistical package for social sciences (SPSS Inc., Chicago, IL, version 24), and the results were derived from them.

Results

This study investigated the epidemiology of eye illnesses in Kordofan states (El-Obied, Sudan) by analyzing a sample of 1000 individuals. The age of the patients exhibited significant variation.The average age of the patients is 31.6 years, with the majority of patients falling into the age group of over 54 years. The next largest age groups are 21–32 years, 10–20 years, under 9 years, and 33–53 years, in that order. The presentation rates are as follows: 220 out of 1000 (22%), 205 out of 1000 (20.5%), 201 out of 1000 (20.1%), 196 out of 1000 (19.6%), and 178 out of 1000 (17.8%) correspondingly.
The presentation provided an overview of common eye diseases, categorized by their respective disease groups. The most prevalent group among these diseases is corneal diseases, accounting for 19.6% of the total study group. This is followed by conjunctival diseases at 17.7%, lens diseases at 15.3%, eye surface diseases at 9.8%, uveal tract diseases at 9.1%, refractive errors at 6.4%, eye lid diseases at 5.4%, orbital diseases at 5.4%, glaucoma at 4.3%, retinal diseases at 2.6%, anterior chamber diseases at 2.1%, lacrimal drainage system diseases at 1.8%, and nerve palsies at 0.5% (refer to Table 1, Figure 1).

Table 1 represents 13 categories of eye diseases in the study.

Variable	Number of cases	Proportions
Disease group		
Corneal diseases	196	19.6%
Conjunctival disease	177	17.7%

Lens diseases	153	15.3%
Eye surface diseases	98	9.8%
Uveal tract diseases	91	9.1%
Refractive errors	64	6.4%
Eye lid diseases	54	5.4%
Orbital diseases	54	5.4%
Glaucoma	43	4.3%
Retinal diseases	26	2.6%
Anterior chamber diseases	21	2.1%
Lacrimal diseases	18	1.8%
Nerve palsies	5	0.5%
Total	1000	100%

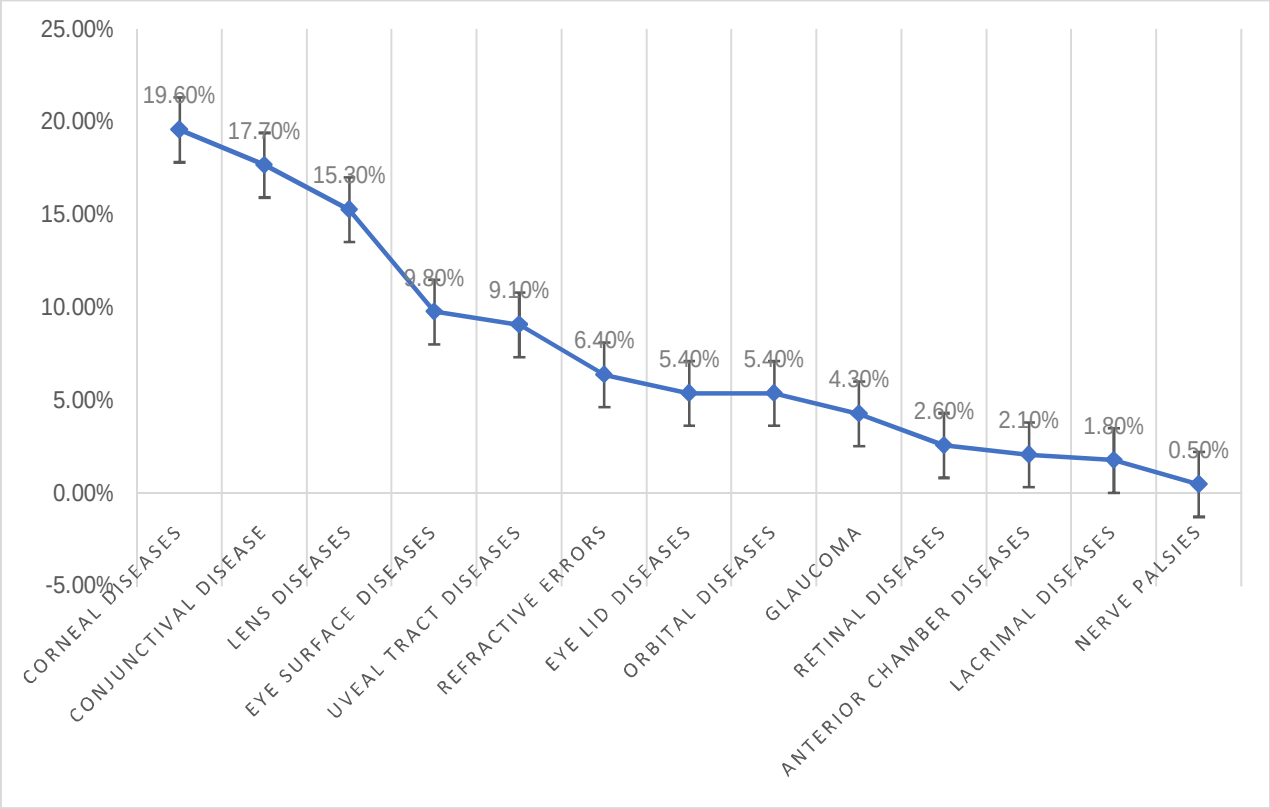

Figure 1 represents the frequency of the study's eye disease groups.

Here is a presentation of the 13 disease categories based on the gender of the patients. So, the first group was ocular disorders, in which males 113/196 (58%) outnumbered girls 83/196 (42%). The second category included conjunctival disorders, with males 96/177 (54%) outnumbering females 81/177 (46%). The third category included lens disorders, which were more common in males (86/153, 56%) than females (67/153, 44%). The fourth category was ocular surface diseases, with females scoring 54/98 (55%), and males scoring 44/98 (45%). The

fifth category included uveal tract illnesses, which affected 49/91 men (54%) and 42/91 women (46%). The sixth category was refractive errors, with 34/64 (53%) males and 30/64 (47%) females. The seventh category included eyelid problems, which affected 32/54 females (59%) and 22/54 males (41%). The eighth disease group included ocular diseases, which affected more women (28/54, 52%) than men (26/54, 46%). Glaucoma was the ninth disease category, with males accounting for 31/43 (72%) of cases compared to females 12/43 (28%). The tenth disease group included retinal diseases, which affected more males (18/26, 69%) than girls (8/26, 31%). The eleventh category of disorders was anterior chamber diseases, which affected 14 out of 21 men (67%) and 7 out of 21 females (33%). The twelfth illness group included nasolacrimal system problems, which were more prevalent in males 11/18 (61%) than females 7/18 (39%). The final disease group was nerve palsies, which affected 3/5 of males (60%) and 2/5 of females (40%). See Table 2 and Figure 2.

Table 2 shows the shows the distribution of study groups according to the sex of the patients.

Variables	Male	Female	Total
Corneal diseases	113	83	196
Conjunctival diseases	96	81	177
Lens diseases	86	67	153
Eye surface diseases	44	54	98
Uveal tract diseases	49	42	91
Refractive errors	34	30	64
Eye lid diseases	22	32	54
Orbital diseases	26	28	54
Glaucoma	31	12	43
Retinal diseases	18	8	26
Anterior chamber diseases	14	7	21
Lacrimal gland diseases	7	11	18
Nerve palsies	3	2	5
Total	543	457	1000

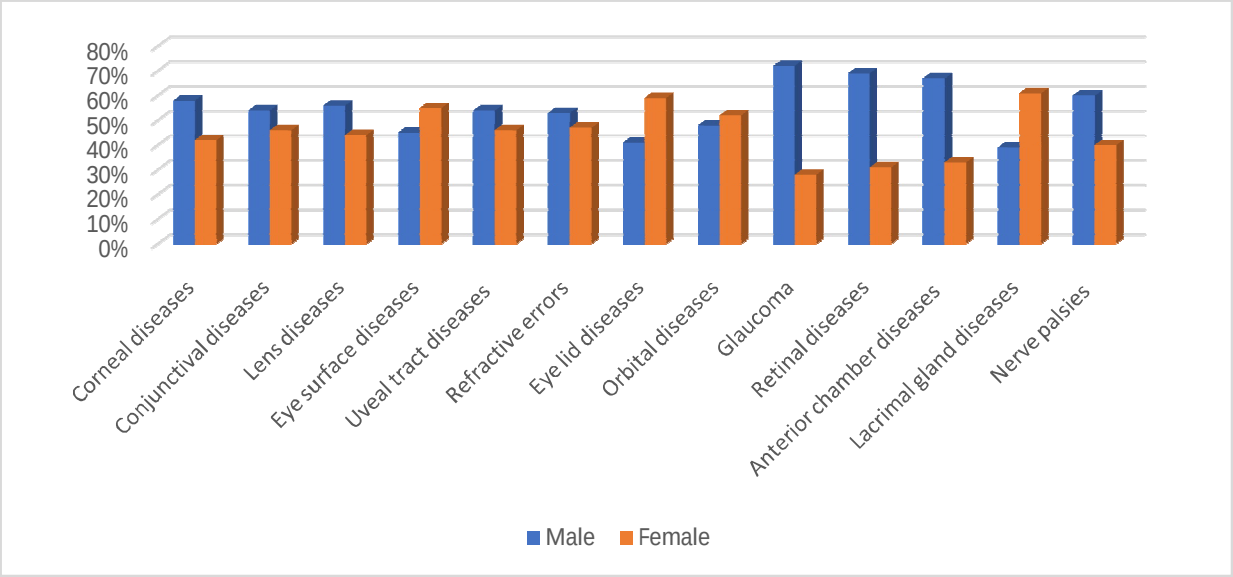

Figure 2 shows the shows the distribution of the study groups according to the sex of the patients.

The disorders were classified according to the patients' age groups, as shown below. The most affected age group was <9 years (34%), followed by 10-20 years (23%), 21-32 years (19%), 33-53 years (14%), and >54 years (10%).
In the second category of conjunctival diseases, the majority of patients are in the age group 21–32 years (65–177), followed by 33–53 years (35–177), 10–20 years (33/177), <9 years (32/177), and >54 years (21/177).
In the third category, lens diseases, the majority of patients (104/153, 68%) were over 54 years old, followed by 33-53 years (29/153, 19%). The remaining patients were in the age groups 10–20 years, 21–32 years, and <9 years, with a representation of 8/153 (5%), 7/153 (5%), and 5/153 (3%), respectively.
The fourth category was ocular surface illnesses; the patients in this group were allocated into the age ranges of 10–20 years, 30/98 (31%), 21–32 years, and 30/98 (31%). The age groups were 33–53 years (17%), <9 years (16%), and >54 years (5%).
The fifth category included uveal tract diseases, with the majority of patients falling into the age groups of 21–32 years (33%), 10–20 years (26%), <9 years (14%), and 33–53 years (15%). The age group >54 years had 10/91 (11%).
The sixth group had refractive errors. The most affected age group was 33-53 years, with 25/64 (39%), while the second age group was 10-20 years, with 16/64 (25%), followed by 21-32 years, with 14/64 (22%), then the age group >54 years, with 6/64 (9%), and finally the age group 3/64 (5%).
The seventh category included eyelid diseases, with the most affected age group being 10-20 years with 16/54 (30%), followed by two groups of <9 years and 21-32 years with 13/54 (24%) each, then 33-53 years with 7/54 (13%), and finally >54 years with 5/54 (9%).
The eighth illness category was orbital diseases, with the most affected age group being <9 years (19/54, 35%), followed by 10-20 years (13/54, 24%), >54 years (9/54, 17%), 33-53 years

(7/54, 13%), and 21-32 years (6/54, 11%).
Glaucoma was the ninth disease category, and the distribution of the disease among the age groups was as follows: the most affected age group was >54 years. 31/43 (72%), and the second age group was 33–53 years. 5/43 (12%), while the third age group, 10-20 3/43 (6%) Finally, the age categories <9 years and 21–32 years account for 2/43 (5%).
Retinal illnesses were the tenth disease category. The most affected age groups were >54 years and 33-53 years, with a comparable percentage of 8/26 (31%), followed by 21-32 years (7/26 (27%), and 10-20 years with 3/26 (11%). Age groups <9 years had no presentation.
The eleventh category of disorders was anterior chamber diseases, with the most affected group being <9 years (8/21, 38%), followed by 10-20 years (7/21, 34%), and then two groups, 21-32 years and 33-53 years (3/21, 14%).
The twelfth disease category was nasolacrimal system diseases. The most affected age group was <9 years with 16/18 (88%), followed by two groups with 1/18 (2%) each. Two age groups—10–20 years and >54 years—were not presented.
The last disease category was nerve palsies, with the most affected age groups being 10–20 years and >54 years, with 2/5 (40%) for each group and 1/5 (20%) for the age group <9 years. However, two age groups did not present: 21–32 years and 33–53 years (see Table 3, Figure 3).

Table 3 shows the shows the distribution of the study groups according to the age groups of the patients.

Variables	<9 years	10-20 years	21-32 years	33-53 years	>54 years	Total
Corneal diseases	67	46	37	27	19	196
Conjunctival diseases	32	33	56	35	21	177
Lens diseases	5	8	7	29	104	153
Eye surface diseases	16	30	30	17	5	98
Uveal tract diseases	14	24	29	14	10	91
Refractive errors	3	16	14	25	6	64

Eye lid diseases	13	16	13	7	5	54
Orbital diseases	19	13	6	7	9	54
Glaucoma	2	3	2	5	31	43
Retinal diseases	0	3	7	8	8	26
Anterior chamber diseases	8	7	3	3	0	21
Lacrimal gland diseases	16	0	1	1	0	18
Nerve palsies	1	2	0	0	2	5
Total	196	201	205	178	220	1000

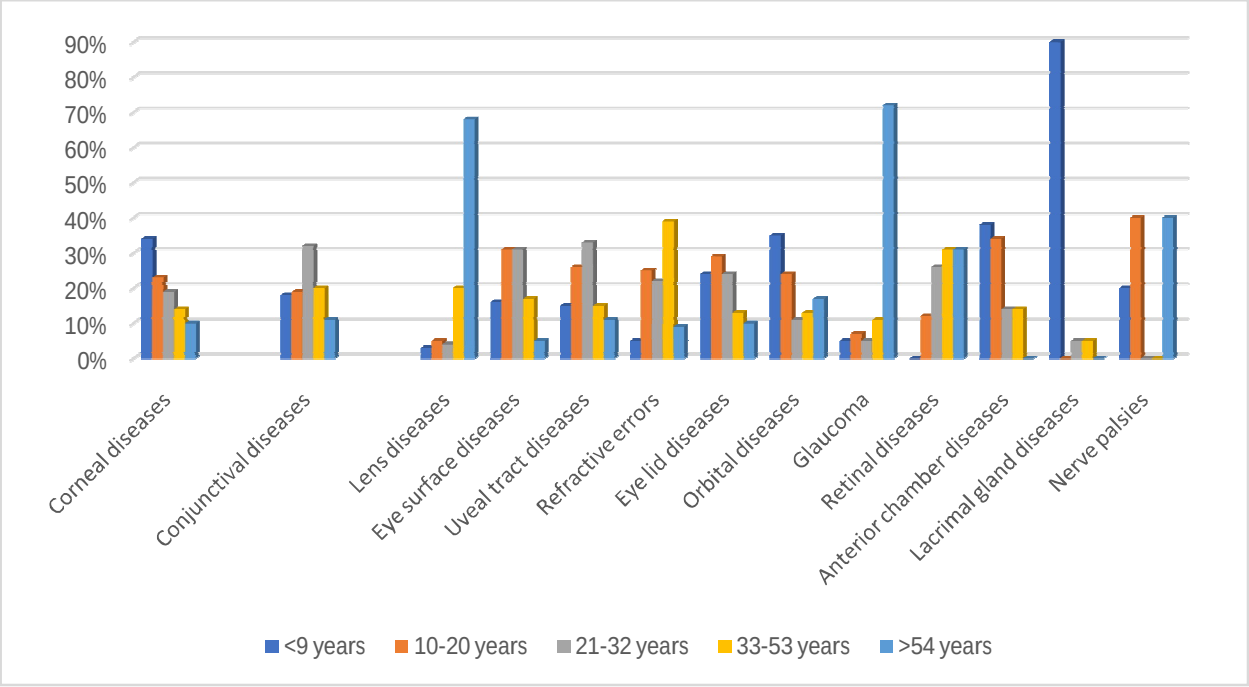

Figure 3 illustrates the distribution of the study group based on the age groups of the patients.

Discussion

This study looks at 1000 people to determine the epidemiology of prevalent eye illnesses in Kordofan states. According to the findings of this study, corneal disorders ranked first among the diseases since the study was conducted at the only secondary eye hospital in the state with a population of 5 million people, and all trauma patients arrived at this hospital, so corneal diseases accounted for 19.6%. In research conducted in an Indian rural area, patients were investigated, and the prevalence of corneal illness was 3.7%. The most common causes of corneal opacity in the study group were ocular trauma (22.3%) and infectious keratitis (14.9%) [6].

Ocular chemical injuries were also extremely harmful, causing more severe visual effects and having medical and legal ramifications. As a result, improving the prognosis requires early and critical management. Bad immediate management leads to bad outcomes [7]. Males are more affected by corneal diseases than females, with a ratio of 1.4:1 due to male vulnerability to violence and trauma. The prevalence of diseases caused by eye trauma increased dramatically, as did the incidence rate of eye injuries needing tertiary treatment. Additionally, significantly more males (79%) presented to emergency departments, with the majority of injuries involving the cornea and conjunctiva. The most affected age group was <9 years (34%) due to a lack of self-care, followed by 10-21 years (23%), accounting for 57%.

The second disease category was conjunctival disorders, which affected males (54%) more than females (46%), and the most affected age group was 21–32 years, which accounted for 32%. The third condition was lens disease, which was more prevalent in males (56%) than females (44%). The most common type was senile cataract, followed by traumatic cataract, congenital cataract, intumescent cataract, and couching. The percentages are 81%, 8%, 5%, 3%, and 2%, respectively. respectively. respectively. So, the presence of intumescent cataract or phacolytic glaucoma meansneglection. In my study, there were 5 cases (cases (cases (5/153) of total cataractous patients. In a study done by Rewri et al., they found the prevalence of intumescent cataract was 5%.5%.5%. So, the presence of lens-induced glaucoma means delay in reaching hospital for surgery [8]. The most common time for delay in our area was the autumn season, because most of the elderly are farmers that wait until the end.

In my study, the most common age group affected by cataract was >54 years (68%), while a study in central India found that the most affected age group was 60-79 years. Presenile cataract was increasing (35.7%) in age groups < 60 years, which was similar to my study's finding (32% in age groups <53) [9].

Surface eye disease is so common that females (55%) outnumber males (45%), and vernal keratoconjunctivitis, which accounts for 3.3% of total study populations, can affect children's vision and may lead to blindness if complications occur, making management of these patients difficult. As a result, prompt treatment of vernal keratoconjunctivitis is required, particularly since vision loss can be permanent in the amblyogenic age range [10]. In my study, the incidence of dry eye was 1.8% of the overall study population, while meta-analysis studies revealed dry eye incidences of 3.5% in 18-year-olds and 7.8% in 68-year-olds [11]. While ocular allergies can coexist with dry eyes, ocular allergies and dry eye disease are the most frequent ocular surface illnesses, both of which can have a serious influence on a patient's quality of life; therefore, they may coexist and share clinical features [12].

Males had a higher prevalence of uveal tract illnesses (55%) than females (45%). Traumatic uveitis was so common that it accounted for 7.6% of the total sample, and the cause was

mostly trauma. In a study conducted in the mid-Atlantic United States, traumatic uveitis patients tended to be young and male, with a presentation primarily of unilateral disease, a long duration of follow-follow-follow-up, and an increased number of visits [13visits [13visits [13].

Refractive errors are more common in men (53%) than in women (47%). Myopia is the most common disease, affecting girls (56%) more than males (44%), and the most affected age group was 10-20 years, which presented with 52%,52%, indicating that it primarily affects young females. Myopia has become more common in high-income countries, particularly in East and Southeast Asia, with over 80% of young children affected. [14] However, in Africa, it is low, as shown in my study, at 2.5% of the whole sample. Hypermetropia was shown to be less prevalent than myopia in a meta-analysis of 40 cross-sectional studies. The prevalence of hyperopia ranged from 8.4% at a young age to 1% at 15 years, indicating that hyperopia is more common in white children and in rural areas [15]. In my study, hypermetropia was determined to be 1.4%, and there were seven occurrences of malingering, with six of them being males and all resulting in ocular damage. In an Indian study, 164 (87.2%) of 188 patients were male, with ages ranging from 7 to 75 years, and malingering was observed in 13 (7%) of them [16]. Eyelid diseases are more common in females (58%) than males (42%) and affect people of young ages (<9 years (25%), 10-20 years (27%), and 21-32 years (25%). Chalazion is the most prevalent disease, accounting for 1.8% of the total sample and being more common in females (78%). In a study done at the University of Wisconsin-Madison ophthalmology department, chalazionchalazion was seen in 1.8% of non-Hispanic and 3.8% of Hispanic participants. Chalazion was found in 1.7% of white children and 4.3% of American Indians [17]. Glaucoma was more common in males (72%) than females (28%) and was most prevalent in the age group over 54 years (72%), accounting for 4.3% of the total sample. A study conducted in Sub-Saharan Africa found that glaucoma is a public health issue, particularly open-angle glaucoma. It is the second most common cause of blindness, with a high incidence rate, an early an early start, and rapid development [18]. So, in this study, 26% occur before the age of 54. Orbital diseases were slightly more common in females (51%) than boys (49%), with endophthalmitis being the most prevalent condition in this age range (46%) due to neglected penetrating injuries. As a result, the majority of the orbital diseases investigated were caused by trauma.

Concerning retinal illnesses, which were more common in males (73%) than in females (27%), the most affected groups were the senior groups, with diabetic retinopathy accounting for 36% of this group and 0.8% of the overall sample.

Hyphema, which was primarily traumatic, appeared in anterior chamber disorders. It was more common in men (67%) and affected young children under the age of 20. Nasolacrimal duct obstruction is the most common lacrimal drainage system disease, affecting 61% of males and 89% of children under the age of 9. Other diseases, such as acute and chronic dacryocystitis, are less common.

The final group in our study had nerve palsies, which affected 60% of males and 40% of females. Four nerves were damaged: the facial nerve (40%), the oculomotor nerve (20%), the trochlear nerve (20%), and the abducent nerve (20%).

However, the detection and management of cataracts and refractive errors should be prioritized in the health system in order to reduce the rate of visual loss, as well as community awareness by hospital staff such as doctors, nurses, and other members. As a result, health care services must be affordable and accessible [18].

In conclusion, in western Sudan, eye diseases are prevalent, particularly corneal diseases, which are closely followed by conjunctival diseases. This report explores the eye disease situation in western Sudan.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

Ethical Approval: We obtained written permission from the manager of El-Obeid teaching hospital and the study's proposal has been granted approval by the Human Research Ethics Committee at MRCC (Approval Number: HREC 0007/MRCC.3/24).

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