

# Spectrum of Corneal Disorders in a Tertiary Facility in Sokoto, North-West Nigeria

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## ABSTRACT

**Objective:** To describe the pattern and causes of corneal disorders in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Sokoto state.

**Materials and Methods:** A retrospective hospital-based study involving the review of the medical records of all patients that were diagnosed with any corneal disease between January 2017 and December 2019 in Usmanu Danfodiyo University Teaching Hospital, Sokoto was undertaken. The patients' demographic data, place of residence, presenting visual acuity, final diagnosis, type of corneal lesion, and predisposing factors were recorded.

**Results:** There were a total of 8641 patients seen in the eye clinic during this period, of which 352 subjects (4.1%) had different forms of corneal disorders. The mean age of the participants was 39 ( $\pm 17$ ) years. Infectious keratitis was the commonest diagnosed aetiology of corneal disorders followed by trauma while bullous keratopathy was the least.

**Conclusion:** Most of the causes of corneal disorders in this study are avoidable, public health prevention programmes will appear to be the most cost-effective means of decreasing these disorders.

**Key words:** Cornea, Disorders, Keratitis, Keratopathy

## INTRODUCTION

The cornea is a transparent, avascular, watch-glass like structure. It forms anterior one-sixth of the outer fibrous coat of the eyeball<sup>[1, 2]</sup> and accounts for approximately two-thirds of the optical power of the human eye.<sup>[3]</sup> It also protects the intraocular contents. These corneal functions are enabled by its unique histology and

metabolism. The cornea, because of its exposure to the external atmosphere, is prone to trauma, infections and inflammations any of which may lead to corneal opacity and reduction in vision, especially if it involves the central cornea. Globally, corneal diseases are a major cause of blindness and visual impairment<sup>[4-7]</sup> and also



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constitute leading cause of ocular morbidity in developing countries.<sup>[6,8]</sup> The causes and pattern of corneal disorders are highly diverse varying from one region of the world to another; there is also variation within the same country<sup>[9,10]</sup> being highly dependent on endemic ocular diseases in the region. Traditionally, the common causes of corneal disorders include; trachoma, onchocerciasis, leprosy, xerophthalmia, and ophthalmia neonatorum.<sup>[4]</sup> However, with improvement in public health control programmes, there is a decline in most of these<sup>[4]</sup>; there is however renewed interest in other aetiologies such as microbial keratitis, trauma, traditional eye medication (TEM) complications, corneal dystrophy and degenerations.<sup>[4]</sup> The Ophthalmology Department of the Usmanu Danfodiyo University Teaching Hospital is located in the Sokoto metropolis and provide all levels of eye care services for the neighboring communities of Kebbi, Zamfara, and Niger States, including Niger Republic. There has not been any reported study on pattern of corneal disorders in Sokoto state. This study aims to describe the pattern and causes of corneal disorders in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Sokoto state.

## MATERIALS AND METHODS

A retrospective review of all patients that were diagnosed with any corneal disease between January 2017 and December 2019 was undertaken. The case files of all patients with the diagnosis of any corneal disorder within this period were retrieved. Information retrieved included patients' demographic data, place of residence, presenting visual acuity, final diagnosis, type of corneal lesion, and predisposing factors. Presenting visual

acuity was categorized as : 6/6 to 6/18 as normal vision, <6/18 to 6/60 visual impairment , <6/60 to 3/60 as severe visual impairment and <3/60 to NPL (No perception of light) as blind. Data obtained were entered into the Statistical Package for the Social Sciences (SPSS) version 20 (Armonk NY: IBM Corp). Data analysis was carried out for continuous and noncontinuous variables. Descriptive statistics was used to summarize the characteristics of the subjects. Statistical significance was inferred when  $P < 0.05$  was obtained. Approval for this study was obtained from the Ethics and Research Committee of the Usmanu Danfodiyo University Teaching Hospital, Sokoto.

## RESULTS

There were a total of 8641 patients seen in the eye clinic during this period, of which 352 subjects (4.1%) had different forms of corneal disorders. The mean age of the participants was 39 ( $\pm 17$ ) years, and their age range was between 0.25 to 89 years. There was a slightly higher number of males 208 (59.1%) compared with females 144 (40.9%) giving a male: female ratio of 1.4:1.

The presenting visual acuity of patients with corneal disorders seen during this period was : 6/6--6/18-120(34.1%), <6/186/6057(16.2%),

**Table 1 : Age and sex distribution of the study patients**

Age (years)	Total		Males		Females	
	N	%	N	%	N	%
0—10	28	7.9	17	8.2	11	7.6
11—20	43	12.2	24	11.5	19	13.2
21—30	67	19.1	34	16.3	33	22.9
31—40	70	19.9	48	23.1	22	15.3
41—50	60	17.0	34	16.3	26	18.1
51—60	53	15.1	32	15.4	21	14.6
>60	31	8.8	19	9.1	12	8.3
<b>Total</b>	<b>352</b>	<b>100</b>	<b>208</b>	<b>59.1</b>	<b>144</b>	<b>40.9</b>

The age range 21-40 years accounted for 39% of the patients in the study; while males outnumbered females in all the age groups.

**Table 2 : Occupational distribution of study participants**

Occupation	Total		Males		Females	
	N	%	N	%	N	%
Artisan	42	11.9	34	16.3	8	5.6
Civil servant	45	12.8	30	14.4	15	10.4
Farmer	68	19.3	67	32.2	1	0.7
Student	67	19.0	5	2.4	62	43.0
Trader	58	16.5	33	15.9	25	17.4
Others	72	20.5	39	18.8	33	22.9
<b>Total</b>	<b>352</b>	<b>100</b>	<b>208</b>	<b>100</b>	<b>144</b>	<b>100</b>

The occupational distribution of the study group is shown in Table 2. The Farmer and Student groups ;together with the Others(unemployed, housewives, infants etc) occupational group constituted more than half of the study population.

Infectious keratitis was the commonest diagnosed aetiology of corneal disorders while bullous keratopathy was the least (Table 3, Figure2)

**Table 3 : Aetiology of corneal disorders in UDUTH Sokoto , 2017 -19**

Cause	N	%
infectious keratitis	104	30
corneal foreign body	53	15
Corneal opacity	63	18
open globe injury	49	13
bullous keratopathy	5	1
Peripheral ulcerative keratitis	24	7
Anterior Staphyloma	21	6
others	33	9

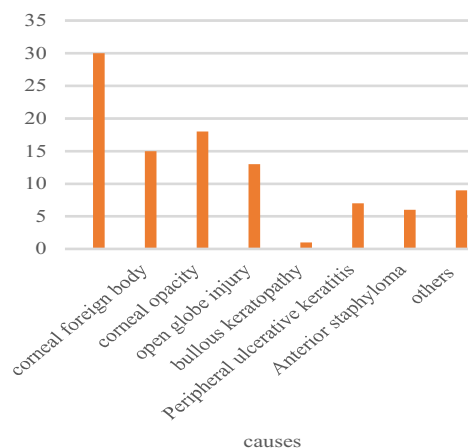


Figure 1 : Aetiology of corneal disorders in UDUTH, Sokoto

<6/603/6023(6.5%), <3/60NPL--132(37.5%), Believed not blind 20(5.7%).

## DISCUSSION

Corneal disorders are among the common causes of blindness and visual impairment especially in developing countriesit is reported to be the third most common cause<sup>[4]</sup>. In this study, 4.1% of the patients seen during the study period had corneal disorders. This finding is similar to what was reported in Ekiti where 3.3% of patients had corneal pathologies<sup>[11]</sup> but varies greatly from 18.9% reported in Ibadan.<sup>[8]</sup> There were more males with corneal disorders and this agrees with what was found in several studies.<sup>[12-15]</sup> The higher proportion of corneal disorders noted among the males in this study may be related to the fact that they may be more exposed to the studied aetiological factors. In terms of occupational distribution, farmers and students constituted the single largest groupthis is similar to what was reported in Ilorin<sup>[14]</sup> and may be explained by the increased risk to ocular trauma during farming activities and increased awareness

of eye health by students. The most common cause of corneal disorder in this study is infectious keratitis (30%) followed by corneal opacity and foreign body (18% and 15% respectively). This is similar to findings reported in Nigeria and other developing countries.<sup>[16-19]</sup> This finding may be explained by the occupational distribution of the patients in the study; farmers and students form about 40% of the patients; farmers are at risk of contracting infectious keratitis and corneal opacity especially during field activities; while students are at risk of having foreign body and injuries. There were 13% of patients that presented with open globe injuries. This was seen mostly among artisans and was mostly addressed through corneal or sclero-corneal repairs. If the frequency of occurrence of open globe injuries (13%) and that of foreign body (15%) were merged aetiologically as trauma, this will make trauma to be the second common cause of corneal disorders in this study. It would be quite helpful to promote preventive safety measures at work places as this will go a long way in preventing corneal disorder from this cause. There was a child that had intracorneal foreign body that necessitated removal under general anaesthesia. In this study, only 34.1% of the patients had good vision while 6.5% had severe visual impairment and 37.5% were blind. This highlights the important role cornea plays in vision and reveals that corneal disorders can greatly hamper vision; this is consistent with several studies.<sup>[4, 6, 8]</sup> Even though all age groups were affected, the economically productive age group of 31 to 60 years constituted 52% of the patients in this study. This is similar to what was reported in other studies.<sup>[11, 16]</sup> This is quite worrisome as the impact on the economy and larger society could be enormous. In terms of total blind-person years, the socio-economic impact of blindness from corneal disorders is said to be greater than that of

cataract.<sup>[17, 20]</sup> As most of the causes of corneal disorders in this study are avoidable, public health prevention programmes will appear to be the most cost-effective means of decreasing these disorders.

## CONCLUSION

Corneal pathologies form a significant cause of blindness and visual impairment in this study with a higher proportion amongst the males and the economically productive age group. Most of the causes of corneal disorders are avoidable; eye health prevention and promotion programmes will help in decreasing these disorders.

## Limitations

The study has its limitation in the lack of microbiology reports in patients with the diagnosis of microbial keratitis (whether it is bacterial, viral or fungal). This is because most patients are commenced on empirical treatment on presentation and later investigations don't prove to be very useful. Additionally, some patients' case folders had missing notes.

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## Conflicts of interest

There are no conflicts of interest

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