



Prevalence of Ocular Disorders among Residents of Bunkure Local Government, Kano State, Nigeria

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Abstract

Background: The eye is an important organ of sight that needs utmost care and protection. Visual screening and regular eye checkup are very important because it helps in the early detection of eye diseases, thereby preventing avoidable blindness. **Aim:** A prospective cross-sectional study was carried out to investigate the prevalence of ocular disorders among patients seeking care at the primary healthcare centre of Bunkure Local Government Area of Kano State. **Materials/Method.** Snellen's illiterate/semi-literate (Far and near) visual acuity charts, pinhole acuity, pen touch examination and direct ophthalmoscopy were performed on all patients to determine the presence or otherwise of any ocular disorder. Data collected was analysed using SPSS version 23.0. **Result:** A total of 283 persons (566 eye), comprising 171 (60.4%) males and 112(36.9%) females, aged between 0-90 years, mean age, 35±18,80 were examined in this study. Allergic conjunctivitis is the commonest ocular disorder in 41(14.5%) participants, followed by Cataract, 28(9.9%), pterygium, 27(9.5%), presbyopia, 27(9.5%), refractive error, 17(6.0%), conjunctivitis, 17(6.0%) while 47(16.5%) participants presented with more than one disorder and 24(8.5%) has no abnormality detected in their eyes. Inferential statistics using chi-square shows that there is a statistically significant relationship between gender, educational status, occupation, age and ocular disorders ($p<0.05$). **Conclusion:** The prevalence of ocular disorders was found to be high (91.6%), with males having more disorders.

Keywords: Occupation, Ocular disorder, Allergic conjunctivitis, Prevalence

Introduction

Ocular disorders refers to any condition or disease that interferes with the ability of the eye to function properly and/or that negatively affects the visual clarity of the eye (Onakpoya & Adebayo, 2009). It can also be defined as any deviation from the normal structure or physiology of the visual system or any

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physiological or pathological anomaly of the eye or visual system (Grosvenor, 2007). These disorders usually result from visual impairment, which is a measurable loss or departure of functional capability relative to the normal variation in a healthy eye or a psychological measurement that is outside these normal range (Grosvenor, 2007).

Blindness and visual impairment/disorder remain a major problem in the world today and of an estimated 37 million people worldwide who suffer from blindness, around 80% of these are avoidable, with the number of blind children in the world is approximating 1.4 million (Rushood *et al.*, 2019), and three-quarters of these living in the poorest regions of Africa and Asia million (Rushood *et al.*, 2019).

The most common causes of visual impairment/ ocular disorder and blindness among adults are cataract, corneal and retinal diseases. While cataract accounts for half of cases alone, women accounted for approximately 60% of the blind (Thylefors, 1998; Pararajasegaram, 1999) Other major causes of ocular disorder and blindness globally are Age-related macular degeneration (AMD), Glaucoma, Diabetic retinopathy (DR), and Degenerative myopia which are becoming the most important causes in developed countries (Pascolini & Mariotti, 2012). The most recent data published by the World Health Organisation (WHO) showed that the total number of persons with visual impairment/disorder worldwide in 2010 was estimated to be 285 million, including 39 million blind people, of whom around 80 per cent are above the age of 50, with most of the causes being preventable (Scheiman *et al.*, 2002).

Childhood blindness is estimated to be the second leading cause of burden due to blindness and the American Optometric Association estimates that 80% of a child's learning relies on his VA, and for this reason, early detection and treatment of eye and vision related problems are needed while controlling childhood blindness is one of the priorities of the WHO through its Programme "VISION 2020: the Right to Sight" (Gilbert & Foster, 2001).

One of the ways to detect ocular disorders that may lead to preventable blindness is through screening, which is a strategy used to look for as-yet-unrecognised conditions or risk markers (Walker, 2009). Visual screening and regular eye checkup helps in taking interventional steps because disorders will be detected early, and eye surveys have the potential to promote normal vision, preserve healthy eyes and prevent blindness (Henry *et al.*, 2019).

This study was aimed at investigating the distribution of ocular disorders among residents of Bunkure Local Government Area of Kano State, Nigeria.

Materials and Methods

This was a cross-sectional prospective study carried out on 283(566 eye) patients who came to seek healthcare at the primary healthcare centre, Bunkure local government area of Kano State, between March and May 2021. Sample size was determined using the Cochran formula (Nass & Noble, 2019). Data collection form was administered to all the participants who met the selection criteria, which includes included being residents and the specific ward of residence in Bunkure, as indicated in their forms. This is to ensure a fair representation of all the residents in the local government in the study. Also, those who consented to the study after the contents were clearly explained to them in their local language were recruited. For the children and under-age, the consent of their parents or guardians were sought and obtained. Those whose forms indicated that they are not permanent residents in the area were excluded. Case history was carefully taken to see if the patient has any known existing visual problems. Visual acuity was tested at (6) meters and 40cm using Snelling's distance and reduced charts, respectively, and the tumbling "E" charts for those who are semi-literate. Those with visual acuity of 6/12 or less and whose visual acuity improved with the pinhole without obvious pathological conditions are considered to have a refractive error. The ocular surface structures and adnexa were examined using penlight. Cover/ uncover test was done to confirm the presence of strabismus, while posterior segment examination was done using a direct ophthalmoscope under standard procedure. Data collected and observations made were carefully recorded in the data collection form.

Data Analysis

Data were analysed using SPSS version 23.0(SPSS Inc., Chicago, IL, USA). Basic descriptive statistics were performed on collected data and output was presented using figures, charts, frequencies and percentages. Chi-square was used to determine if there was any statistically significant relationship between ocular disorder and gender, ocular disorder and educational status and ocular disorder and occupation ($p < 0.05$). Age grouping at the interval of 9 was used (Wokoma & Ichenwo, 2011).

Ethical Approval

Ethical approval was obtained from the health research ethics committee of Ministry of Health, Kano State with Ref. MOH/OFF/797/T.1/2139 and dated, 5th February, 2021. The study adhered to the tenets of Helsinki Declaration.

Results

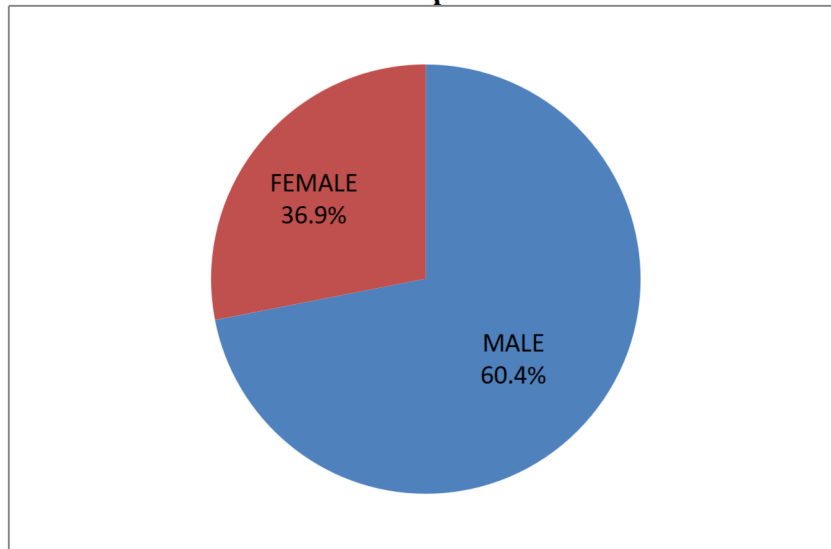
The distribution of ocular disorders among residents of Bunkure Local Government Area was carried out in this study. A total of 283 persons (566 eye) comprising 171 (60.4%) males and 112(36.9%) females, aged between 0-90 years, mean age is 35 ± 18.8 were used for this study. The results obtained were given below.

Table 1: Showing Age Range and Frequency Distribution of the participants

AGE (Years)	MALE N (%)	FEMALE N (%)
0-9	7(2.5%)	17(6%)
10-19	27(9.5%)	19(6.7%)
20-29	28(9.9%)	27(9.5%)
30-39	23(8.1%)	24(8.5%)
40-49	35(12.4%)	9(3.2%)
50-59	27(9.5%)	8(2.8%)
60-69	17(6.0%)	4(1.4%)
70-79	5(1.8%)	4(1.4%)
>80	2(0.7%)	0 (0%)
TOTAL	171(60.4%)	112(39.6%)

The Table shows that majority of the participants are males who were 171(60.4%) in number, with 35(12.4%) of them falling within the age range of 40- 49 years of age while there are 112(39.6%) female participants and 27(9.5%) who fall 20 – 29 years of age are the majority.

Gender Distribution of the Participants

**Figure 1:** Showing Gender Distribution of the Participants

The Gender Distribution of Participants shows that more males (171 or 60.4%) participated in the study compare to females (112 or 39.6%). As shown in figure 1 above.

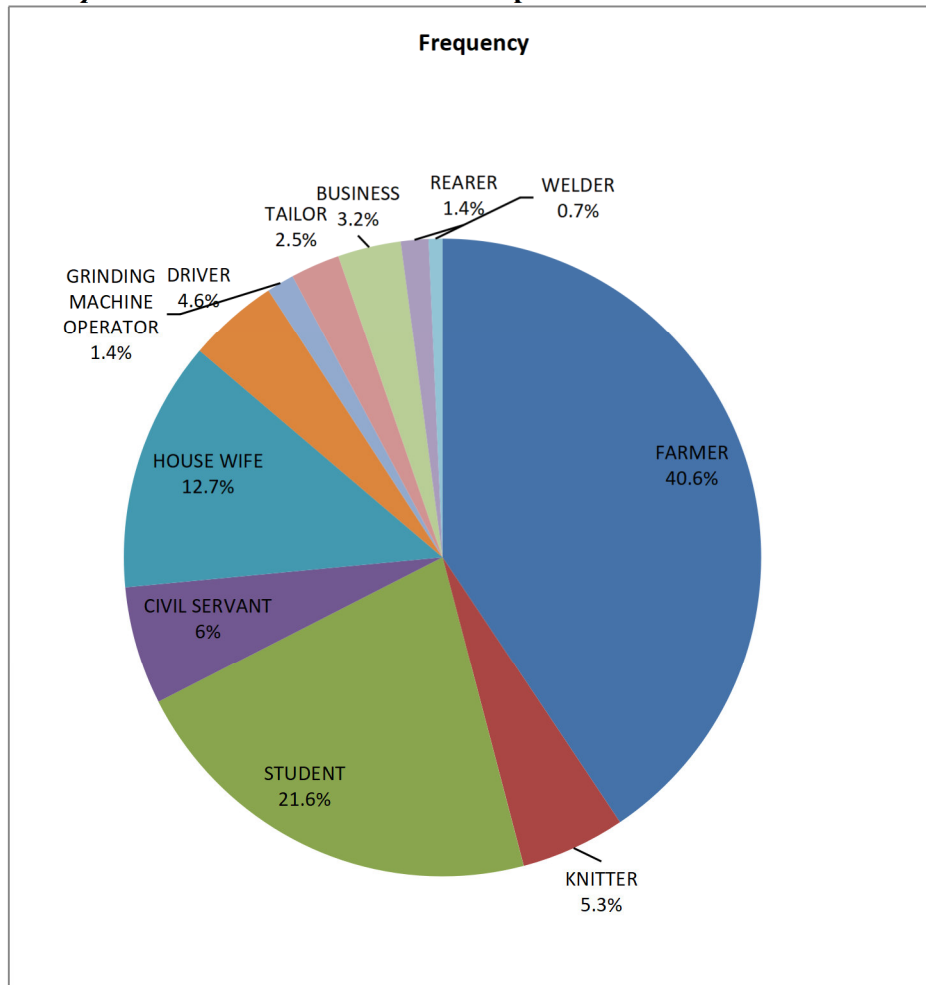
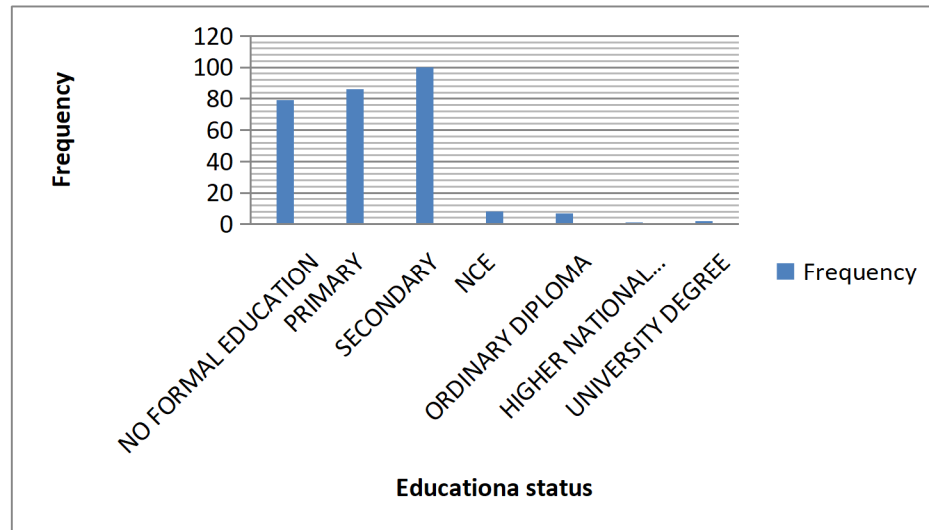
Occupational Distribution of the Participants

Figure 2: Showing Occupation of the Participants.

Analysis of the occupation of the participants showed that 115(40.6%) of them are farmers, which makes it the predominant occupation of residents, while there are 2(0.7%) welders in the area, who are the least. As shown in figure 2 above.

Educational Status**Figure 3:** Showing the Educational Status of the Participants

Analysis of the level of education showed that 100(35.3%) participants completed secondary education and were in the majority, while the highest level attained was a University degree by 2 (0.7%), and 79(27.9%) has no formal education.

Table 2: Showing the Distribution of Ocular Disorders Seen among Participants

DISORDERS	FREQUENCY(N)	(%)
Allergic conjunctivitis	41.0	14.5
Refractive error	17.0	6.0
Conjunctivitis	17.0	6.0
Glaucoma suspect	10.0	3.5
Pterygium	27.0	9.5
Phthisis bulbi	2.0	0.7
Cataract	28.0	9.9
Presbyopia	27.0	9.5
Pingueculum	15.0	5.3
Corneal opacity	4.0	1.4
Dry eye syndrome	5.0	1.8
Ptosis	3.0	1.1
Chalazion	5.0	1.8
Hordeolum	1.0	0.4
Optic atrophy	1.0	0.4
Squint	3.0	1.1
Cataract + pterygium	14.0	4.9
Cataract + conjunctivitis	2.0	0.7
Refractive error + allergic conjunctivitis	25.0	8.8
Presbyopia + pterygium	6.0	2.1
No abnormality detected	24.0	8.5
Total	283	100

A total of 259 participants presented with different types of ocular disorders, giving a prevalence of 91.6%. Allergic conjunctivitis was the commonest single ocular disorder seen among 41(14.5%) patients, followed by cataract 28(9.9%), then pterygium and presbyopia with 27 (9.5%) patients each, while 47(16.5%) presented with more than one disorder, while only 24 (8.4%) participants have no ocular disorder.

Table 3: Showing Gender Distribution of Ocular Disorders.

DISORDERS	MALE	FEMALE	TOTAL (%)
Allergic conjunctivitis	20(7.1)	21(7.4%)	41(14.5%)
Refractive error	8(2.8%)	9(3.2%)	17(6.0%)
Conjunctivitis	9(3.2%)	8(2.8%)	17(6.0%)
Glaucoma suspect	3(1.1%)	7(2.5%)	10(3.5%)
Pterygium	16(5.7%)	11(3.9%)	27(9.5%)
Phthisis bulbi	2(0.7%)	0(0.0%)	2(0.7%)
Cataract	20(7.1%)	8(2.8%)	28(9.9%)
Presbyopia	20(7.1%)	7(2.5%)	27(9.5%)
Pingueculum	8(2.8%)	7(2.5%)	15(5.3%)
Corneal opacity	3(1.1%)	1(0.4%)	4(1.4%)
Dry eye syndrome	3(1.1%)	2(0.7%)	5(1.8%)
Ptosis	3(1.1%)	0(0.0%)	3(1.1%)
Chalazion	0(0.0%)	5(1.8%)	5(1.8%)
Hordeolum	0(0.0%)	1(0.4%)	1(0.4%)
Optic atrophy	0(0.0%)	1(0.4%*)	1(0.4%)
Refractive error/Pterygium	6(2.1%)	0(0.0%)	6(2.1%)
Cataract/Pterygium	14(4.9%)	0(0.0%)	14(4.9%)
Cataract/Conjunctivitis	2(0.7%)	0(0.0%)	2(0.7%)
Refractive error/Allergic conjunctivitis	19(6.7%)	6(2.1%)	25(8.8%)
Presbyopia/Pterygium	0(0.0%)	6(2.1%)	6(2.1%)
Squint	2(0.7%)	1(0.4%)	3(1.1%)
Total	158(61.0)	101(39.0)	259(100)
	61.0%	39.0%	100.0%

The prevalence of ocular disorders was higher in males, 158(61.0%), than in females (39.0%), as shown in Table 2 above

Table 4: Relationship between Ocular Disorders and Gender Distribution

Clinical Variables	X ²	P
Ocular Disorders	53.706	0.000
Gender		

Key: X² = Chi-square, P = level of significance.

There is significant relationship between ocular disorders and gender distribution (p=0.000).

Table 5: Educational Status and Ocular Disorders.

DISORDER	PS	SS	OND	DEG	NCE	HND	NFE	TOTAL
Allergic conjunctivitis	29(10.2%)	9(3.2%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	3(1.1%)	41(14.5%)
Refractive error	4(1.4%)	9(3.2%)	1(0.4%)	1(0.4%)	1(0.4%)	0(0.0%)	1(0.4%)	17(6.0%)
Conjunctivitis	3(1.1%)	7(2.5%)	2(0.7%)	0(0.0%)	1(0.4%)	0(0.0%)	4(1.4%)	17(6.0%)
Glaucoma suspect	0(0.0%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	8(2.8%)	10(3.5%)
Pterygium	7(2.5%)	14(4.9%)	0(0.0%)	0(0.0%)	2(0.7%)	0(0.0%)	4(1.4%)	27(9.5%)
Phthisis bulbi	0(0.0%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	2(0.7%)
Cataract	9(3.2%)	3(1.1%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	16(5.7%)	28(9.9%)
Presbyopia	4(1.4%)	15(5.3%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	7(2.5%)	27(9.5%)
Pingueculum	1(0.4%)	8(2.8%)	0(0.0%)	1(0.4%)	0(0.0%)	0(0.0%)	5(1.8%)	15(5.3%)
Corneal opacity	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	4(1.4%)	4(1.4%)
Dry eye syndrome	0(0.0%)	1(0.4%)	0(0.0%)	0(0.0%)	3(1.1%)	1(0.4%)	0(0.0%)	5(1.8%)
Ptosis	3(1.1%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	3(1.1%)
Chalazion	0(0.0%)	5(1.8%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.05)	0(0.0%)	5(1.8%)
Hordeolum	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)	1(0.4%)
Optic atrophy	0(0.0%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)
Refractive error/ Pterygium	2(0.7%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	3(1.1%)	6(2.1%)
Cataract/ Pterygium	2(0.7%)	4(1.4%)	0(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	8(2.8%)	14(4.9%)
Cataract/ Conjunctivitis	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	2(0.7%)
Refractive error /Allergic conjunctivitis	7(2.5%)	5(1.8%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	11(3.9%)	25(8.8%)
Presbyopia/ Pterygium	4(1.4%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	6(2.1%)
Squint	0(0.0%)	1(0.4%)	1(0.4%)	0(0.0%)	1(0.4%)	0(0.0%)	0(0.0%)	3(1.1%)
NAD	9(3.2%)	11(3.9%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	4(1.4%)	24(8.5%)
TOTAL	86 (30.4%)	100 (35.3%)	7 (2.5%)	2 (0.7%)	8 (2.8%)	1 (0.4%)	79 (27.9%)	283 (100.0%)

Key: PS; Primary School, SS; Secondary School, **OND**; Ordinary National Diploma, **DEG**; University Degree, **NCE**; National Certificate of Education, **HND**; Higher National Diploma, **NFE**; No Formal Education, **NAD**; No Abnormality Detected. The highest number of ocular disorders was seen in 100(35.3%) who had secondary school education, while HND 1(0.4%) holders were the least, as shown in Table 4 above

Table 6: Relationship between Ocular Disorders and Educational Status

Clinical Variables	X ²	P
Ocular Disorders	315.296	0.000
Educational Status		

Key: X² = Chi-square, P = level of significance.

There is a significant relationship between ocular disorders and educational status (p=0.000).

Table 7: Ocular Disorder and Occupation

Disorders	Occupation											TOTAL (%)
	FAM	KNT	STD	CST	HWF	DRV	GRD	TLR	BIZ	CTR	WLD	
Allergic conjunctivitis	8	4	25	0	2	0	0	2	0	0	0	41(14.4)
Refractive error	1	2	9	2	1	0	1	0	1	0	0	17(6.0)
Conjunctivitis	9	0	3	3	2	0	0	0	0	0	0	17(6.0)
Glaucoma suspect	3	0	0	0	7	0	0	0	0	0	0	10(3.5)
Pterygium	11	3	0	1	6	4	0	0	0	2	0	27(9.5)
Phthisis bulbi	0	0	0	0	0	2	0	0	0	0	0	2(0.7)
Cataract	22	0	0	0	3	0	0	0	3	0	0	28(9.9)
Presbyopia	12	1	0	2	4	2	0	5	0	0	1	27(9.5)
Pingueculum	3	1	1	1	6	1	0	0	2	0	0	15(5.3)
Corneal opacity	2	0	0	0	0	0	0	0	0	2	0	4(1.4)
Dry eye	0	0	1	4	0	0	0	0	0	0	0	5(1.8)
Ptosis	3	0	0	0	0	0	0	0	0	0	0	3(1.1)
Hordeolum	1	0	0	0	0	0	0	0	0	0	0	1(0.4)
Chalazion	0	0	3	0	2	0	0	0	0	0	0	5(1.8)
Optic atrophy	0	0	0	0	1	0	0	0	0	0	0	1(0.4)
Strabismus	0	0	0	2	0	0	0	0	1	0	0	3(1.1)
Refractive error + Pterygium	4	1	0	0	0	0	1	0	0	0	0	6(2.1)
Cataract + Pterygium	11	0	0	0	0	2	1	0	0	0	0	14(4.9)
Cataract + Conjunctivitis	2	0	0	0	0	0	0	0	0	0	0	2(0.7)
Refractive error + Allergic conjunctivitis	0	1	4	0	1	0	0	0	0	0	0	6(2.1)
Presbyopia + Pterygium	16	0	2	2	1	2	1	0	0	0	1	25(8.8)
No Abnormality Detected	7	2	13	0	0	0	0	0	2	0	0	24(8.5)
Total	115	15	61	17	36	13	4	7	9	4	2	283(100)

Key: FAM; Farmer, KNT; Cloth Knitter, STD; Student, CST; Civil servant, HWF; Housewife, DRV; Driver, GRD; Grinding machine operator, TLR; Tailor, BIZ; Business, CTR; Cattle rearer, WLD; Welder

With 40(14.4%) occurrences, allergic conjunctivitis was the commonest ocular disorders seen across all occupation while Hordeolum and Optic atrophy, with 1(0.4%) occurrence each was the least. Also, ocular disorders was found in 115(40.6%) of farmers, making them the greatest harbourers of ocular disorders while only 2(0.71%) of welders has one form of ocular disorder or another, making them the least

Table 8: Relationship between Ocular Disorders and Occupation

Clinical Variables	X ²	P
Ocular Disorders	53.706	0.000
Occupation		

Key: X² = Chi-square, P = level of significance.

There is significant relationship between ocular disorders and occupation (p=0.000).

DISORDER	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	>80	TOTAL
Allergic conjunctivitis	13(4.6%)	15(5.3%)	8(2.8%)	5(1.8%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	41(14.5%)
Refractive error	0(0.0%)	7(2.5%)	6(2.1%)	3(1.1%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	17(6.0%)
Conjunctivitis	1(0.4%)	4(1.4%)	5(1.8%)	6(2.1%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	17(6.0%)
Glaucoma suspect	0(0.0%)	0(0.0%)	2(0.7%)	0(0.0%)	2(0.7%)	1(0.4%)	2(0.7%)	3(1.1%)	0(0.0%)	10(3.5%)
Pterygium	0(0.0%)	0(0.0%)	13(4.6%)	12(4.2%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	27(9.5%)
Phthisis bulbi	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	2(0.7%)
Cataract	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)	5(1.8%)	9(3.2%)	9(3.2%)	2(0.7%)	2(0.7%)	28(9.9%)
Presbyopia	0(0.0%)	0(0.0%)	0(0.0%)	2(0.7%)	17(6.0%)	3(1.1%)	2(0.7%)	3(1.1%)	0(0.0%)	27(9.5%)
Pingueculum	0(0.0%)	1(0.4%)	10(3.5%)	4(1.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	15(5.3%)
Corneal opacity	0(0.0%)	0(0.0%)	0(0.0%)	2(0.7%)	0(0.0%)	1(0.4%)	1(0.4%)	0(0.0%)	0(0.0%)	4(1.4%)
Dry eye syndrome	0(0.0%)	0(0.0%)	5(1.8%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	5(1.8%)
Ptosis	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	3(1.1%)	0(0.0%)	0(0.0%)	0(0.0%)	3(1.1%)
Chalazion	0(0.0%)	2(0.7%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	5(1.8%)
Hordeolum	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)
Optic atrophy	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)
Refractive error/	0(0.0%)	0(0.0%)	0(0.0%)	6(2.1%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	6(2.1%)
Pterygium										
Cataract/	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	5(1.8%)	5(1.8%)	4(1.4%)	0(0.0%)	0(0.0%)	14(4.9%)
Pterygium										
Cataract/Conj	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)	1(0.4%)	0(0.0%)	0(0.0%)	2(0.7%)
unctivitis										
Refractive	0(0.0%)	4(1.4%)	2(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	6(2.1%)
error/										
Allergic										
conjunctivitis										
Presbyopia/Pt	1(0.4%)	1(0.4%)	0(0.0%)	2(0.7%)	9(3.2%)	9(3.2%)	2(0.7%)	1(0.4%)	0(0.0%)	25(8.8%)
erygium										
Squint	0(0.0%)	1(0.4%)	1(0.4%)	1(0.4%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	3(1.1%)

Table 9: Ocular Disorder and Age

Ocular disorder findings was greatest among participants between ages 20 – 29 (55 or 19.4%), followed closely by those between ages 30 – 39 (47 or 16.6%) and finally those between ages 10 – 19(46 or 16.3%). The least findings was among those greater than 80 years of age represented by 2(0.79%) participants as shown in table 9 above

Table 10: Result of test for Relationship between Ocular Disorders and Age

Clinical variables	X ²	P
Ocular disorders	535.354	0.000
Age		

Key: X² = Chi square, P = level of significant

There is a significant relationship between Age and ocular disorder

Discussion

More males participated in the study than females. This pattern is consistent with the findings in a similar research conducted in Iraq (Salman, 2011). In

contrast however, the opposite was recorded in a similar research carried out in southern Nigeria (Rita & Ebele, 2015). These variations could be due to socio-cultural differences or religious barriers that exists in these regions of the country. While there are wider freedom of association for females in the southern part, culture and religion placed some restriction on such freedom on women in the northern part.

Farming is the predominant occupation of the residents of the communities and there are more male farmers than females as seen in similar studies (Eziechila *et al.*, 2019). This may be attributable to the culture of the people since men holds the economic power in the homes and females are restricted to domestic activities as the culture is in this part of the country. Sending their children to school is not popular among parents as they see it as a time wasting and men take more wife to raise more kids who should help in farm work. This may explain why the prevalence of ocular disorder is higher in males than females and the nature of ocular disorders present among them due to constant outdoor activities they perform. It is evident from the study that most of the participants are not educated or poorly educated. This high level of illiteracy may also be a factor in the nature of disorders seen as there may be high likelihood of self-medication and drug abuse due to ignorance and negligence (Nwosu, 1999; Ajaiyeoba *et al.*, 2007; Ayanniyi *et al.*, 2010).

Overall, the prevalence of ocular disorder and other ophthalmic disorders was very high. The likely reason for this may be due to the harsh climatic conditions occurring for the greater part of the year in the Northern part of the country, absence of any form of eye care service, distance to reach the nearest hospital, logistics and cost. These are similar factors mentioned in an outcome of a previous study (Henry *et al.*, 2019). And when intervention is eventually sought, they usually present late. Eye disorders that would have been detected earlier and intervention given, continue to persist and deteriorate, eventually progressing to loss of vision. The greater majority remain in the community with their problem until blindness occurs since they cannot afford the cost of a hospital visit.

Allergic conjunctivitis was found to be the most prevalent ocular disorders. Similar results obtained by other researchers corroborated our findings in this study (Bekibele, & Olusanya, 2006; Wokoma & Ichenwo, 2011; Eziechila *et al.*, 2018). The distribution showed almost equal prevalence between male and females. In agreement as mentioned by previous authors (Ajaiyeoba *et al.* 2007; Abah *et al.*, 2011), it may be that the reason for the high prevalence of this disorder is that the majority of the residents are farmers and may be constantly exposed to allergens in their farming environment. There may be other risk factors such as the dusty and high environmental temperatures seen more in this part of the country (Abah *et al.*, 2011). Some participants were also noted to present with multiple ocular disorders which was seen more in males than in

females and the reason for this is also traceable to ignorance and negligence (Ajaiyeoba *et al* 2007; Abah *et al.*,2011).

There was a relationship between gender and prevalence of ocular disorder. Prevalence of disorders was seen more in male participants and this may be because they are exposed for a longer time to outdoor activities, especially farming and other activities meant to provide for the home. But this result differs from similar study (Okonkwo & Nkanga, 2020), conducted elsewhere. This may be because the study population here comprises mainly of adults while the former are mainly school children.

The association between prevalence of ocular disorder and educational was also statistically significant. This is in agreement with the outcome from previous a study (Deshpande & Malathi, 2011). Occurrence of disorders was seen more among those with lesser or non-educated. This may be attributed to the fact that participants of this age grade contributed mostly to the bulk of the labour force needed in the farming activities of the rural dwellers. Very often, most of them resorts to self-medication, especially instillation of traditional herbs in cases of injury or infection, thereby worsening the eye situation. At least, 3 out of the 4 participants having corneal opacity had history of instilling traditional medicine. There is no doubt that being educated helps to reduce the tendency to involve in high risk health behaviour in individuals.

The reason for the high number of individuals with no formal education might be due to negligence to education or lack of interest to it by parents. Many individuals stay ignorant since rural community farming might not require formal education, and hence ocular conditions are handled inappropriately. This may account for the high number of participants that presented severe visual impairment resulting from failed cataract surgery cases which was done by someone who is not trained and licensed to do such surgeries as orally testified by the participants.

There is a significant relationship between occupation and ocular disorders. Allergic conjunctivitis was the commonest ocular disorders seen across all occupation while Hordeolum and Optic atrophy was the least recorded and ocular disorders of different types was found mostly in farmers while of welders has the least occurrence of ocular disorders. The reason for observation may not be unconnected to the fact that majority of the inhabitants are mostly farmers, when compared to other participants whose occupation may not involve daily lengthy outdoor activities. Crude farming methods still subsists and the use of basic personal protection devices like goggles and hats may not be observed, leading to exposure to harmful UV radiations and allergens particularly in their farming environment which is one of the risk factors for the development of allergic conjunctivitis

The importance of regular visual screening /outreaches and regular eye check-up have been reported from previous studies (Wokoma & Ichenwo, 2011; Abah *et al.*, 2011; Rita & Ebele, 2015). This is because it helps in taking interventional steps because disorders will be detected early. Eye surveys have the potential to promote normal vision, preserve healthy eyes and prevent blindness (Bodunde & Onabolu, 2004; Henry *et al.*, 2019) and achieve the goals of Vision 2020 (Rushood *et al.*, 2019). A study in the past have found that with climatic conditions, malnutrition, and lack of treatment facilities play an important role in incidence of ocular disorders and varies from place to place (Mehta *et al.*, 2015). Visual screening outreaches creates an avenue for interaction between healthcare providers and parents/ individuals, thereby making health education available which is important in prevention of eye injuries and early treatment of eye disorders (Salman, 2011) and improve quality of eyesight (Deshpande & Malathi 2011). Our findings are in total agreement with all the conclusions made in these studies.

Analysis of the relationship between ocular disorder and age showed that a statistically significant relationship exists. Ocular disorder was greatest among participants between ages 20 – 29 (55 or 19.4%), followed closely by those between ages 30 – 39 (47 or 16.6%) and finally those between ages 10 – 19(46 or 16.3%). The least findings was among those greater than 80 years of age represented by 2(0.79%) participants. Though none of the previous literatures reviewed in this study considered this demographic variable, this particular finding may not surprising after all. This is because in our opinion, people between ages 20 – 29 and 10 to 19 years may be considered to in their very active years in human development. This population are likely to be made up of pupils and students (*table 7*) who may be involved in all kinds of physically challenging activities that may pose a risk to their ocular health in the form of traumas and the presence of refractive errors and exposure to environmental allergens etc. Also, people between ages 30 39 years may be engaged in all forms labour to provide to provide for their family and dependents. And as a rural community, farming is the most common form of occupation among the participants which may expose them to all of forms of ocular injuries.

Conclusion

The prevalence of ocular disorder in the study area is very high. Allergic conjunctivitis is the predominant ocular disorder among rural dwellers, with males being affected more than females. Other disorders include cataract, pterygium, presbyopia, refractive error and conjunctivitis. Occupation and educational status were found to have a relationship with the occurrence of ocular disorder among the presenting participants, though there may be other factors that were not investigated in the study. There is need for quality education to be introduced to residents of the area, and parents should be made to understand and appreciate the importance of proper education for their wards while still pursuing their farming occupation. Government should reach out and

provide modern farming equipment to the rural dwellers in order to reduce the incidence of ocular disorders and visual impairment among them. Provision of good roads to reduce environmental pollution, functional primary healthcare centres with eye care services at a closer distance, regular visual screening outreaches and health education through the mass media will go a long way too. These will help in reducing the economic burden placed by blindness on families and government and improve their overall quality of life.

Study limitation

This is a cross sectional study as such may lack wider representation of the population even though effort was made to capture participants from all the wards. There may be a misinterpretation of patient responses or a loss in translation or understanding between patient and examiner because data collection form was administered. Only those that presented to the primary health care were included in the study which may lead to misrepresentation of the actual prevalence.

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