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A Retrospective Study of the Prevalence and Patterns of Ocular Morbidities among Adults in Rivers State

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ABSTRACT

Background: Eye diseases in adults encompass a range of conditions that significantly affect visual function and overall quality of life. This study was aimed at assessing the prevalence and pattern of occurrence of adult ocular morbidities in Rivers State from 2019 to 2023.

Methods: This was a retrospective study involving all cases of eye disorders recorded at the Rumuokwurusi Model Primary Health Centre (MPHC) and Obio Cottage Hospital in Obio/Akpor Local Government Area (LGA) of Rivers State. Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 23.

Results: This study revealed that the prevalence of adult ocular morbidities was 442 (97.6%). Common adult ocular morbidities included eye irritation (60%), refractive errors (49%), far vision (36%), near vision (34%), and red eye (32%). Significant associations existed between the age of the adults and the occurrence of certain ocular morbidities including cataract ($p < 0.001$), loss of vision ($p = 0.009$), glaucoma ($p = 0.026$), blurry vision ($p = 0.005$) and red eye ($p = 0.003$). Significant association was only found to exist between sex and cataract ($p = 0.047$).

Conclusion: This high prevalence and these significant associations are major public health concerns and therefore requires concerted efforts to tackle them including creating public awareness, and scaling-up of primary eye care services.

Keywords: Ocular morbidities, adults, prevalence, patterns, Rivers State



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INTRODUCTION

In general, ocular morbidity refers to any eye condition that can have a detrimental impact on both an individual's quality of life, and the cognitive, neurological, and emotional well-being of affected individuals [1,2]. Significant functional and social restrictions arise from visual impairment and blindness, making their prevention a key goal in the health care system. Vision impairment (VI) and blindness reduce the quality of life of the affected population and correlate with poverty, among other socioeconomic issues. As people age, they become more susceptible to various illnesses, particularly degenerative conditions. It has been observed that the prevalence of eye diseases tends to rise starting at around 40 years old, with a more pronounced increase occurring after the age of 60 years. In 2020, approximately 295 million people globally were affected by visual impairments, and approximately 43 million persons were confirmed blind [3]. Moreover, majority of individuals with visual impairments reside in low- and middle-income countries, where sub-Saharan Africa is noted for having the most significant inadequate PEC services.[3]. The World Health Organization's Right to Sight global initiative aims to eradicate preventable blindness by focusing on eye diseases that cause blindness, such as cataracts, trachoma, glaucoma, and retinal diseases. These conditions predominantly affect low-income countries, which account for 90% of cases, and have spurred significant partnerships and efforts to combat blindness.[4].

A survey reported that over 950,000 adults are blind, 2,900,000 have visual impairment, and for adults, 40 years and above, 42 out of every 1000 of them are blind [5]. Overall, two-thirds of Nigerians suffer from preventable blindness, with cataract being the leading cause, followed closely by glaucoma [4, 6].

Ocular diseases may be congenital or acquired [7,8], and their occurrence may be associated with systemic disorders including endocrine and/or metabolic diseases, inflammatory and immune response processes, infections, among other diseases [8].

Ocular morbidities are of various forms and they include the following: uncorrected refractive errors, cataracts, glaucoma [3, 9], allergic conjunctivitis, pingueculae [9], conjunctival diseases, allergic/vernal/infective conjunctivitis, lid disorders, squint, corneal scarring [7], color vision defects, suspected glaucomatous disc, among others. These eye conditions can lead to visual impairment and blindness, which in turn may adversely

impact the educational attainment, socio-economic status and general quality of life of those affected [10,11]. Globally, there are different patterns of eye diseases across various communities [12]. These differing patterns of eye disorders are influenced by race, geography, socio-economic, and socio-cultural factors [13]. Khan and colleagues, at an ophthalmic clinic in Saudi Arabia, observed that refractive error and inflammation of the conjunctiva were the most common eye disorders [14]. A study in Addis Ababa, Ethiopia, reported that the common causes of ocular morbidity in a tertiary hospital included cataract and glaucoma [15]. A retrospective study conducted in India found that conjunctivitis was the most prevalent eye condition, accounting for 21.94%. Other conditions included cataract at 9.0%, refractive error at 15.1%, inflammation of the lacrimal sac at 6.5%, and inflammation of the eyelids at 3.0%. [16]. In western Nepal, refractive error was the most prevalent eye condition, with a prevalence of 27%, then inflammation of the conjunctiva at 20.6%, cataract at 11.8%, pterygium at 6%, chalazion/stye at 4%, ectropion/entropion at 3.9%, keratitis at 3.8%, dry eye syndrome at 2.8%, and corneal opacities at 2.3%. [17].

In Ghana, findings revealed that the commonest eye disorders seen in descending order were inflammation of the conjunctiva (40.0%), cataract (24.0%), glaucoma (10.0%) and refractive error (8.90%) [18]. The most common ocular morbidities in Southeast Nigeria were refractive error, glaucoma, and allergic eye diseases [12], while in the Niger Delta, Nigeria, they were glaucoma, refractive error, and cataract [13]. Adult cataract has been identified as the leading cause of blindness [11].

In Nigeria, specifically Rivers State, eye diseases are still a major source of public health concern [19]. Tackling these challenges require concerted efforts from all stakeholders concerned including healthcare infrastructure improvement, adequate workforce, health education and promotion, outreaches and screening services, early identification, treatment, and prompt referral to reduce the prevalence of eye diseases [20,8].

Despite the improvement in the health care service delivery, there still lies much to be done to improve the primary eye care services. There is a paucity of evidence-based data showing the prevalence of eye diseases among adults in primary health care facilities in Rivers State. There is therefore need to carry out this study in the State, to provide stakeholders and policymakers with

evidence-based data to make informed decisions on improving PEC services that will strengthen and move the state closer to achieving the UEHC [11].

METHODS

Study setting: This was a retrospective study involving a five-year review of medical records from the records departments, to assess the prevalence and patterns of ocular morbidities among adults in Rumuokwursi MPHC and Obio Cottage Hospital both in Obio Akpor LGAs in Rivers State.

All cases of adult ocular morbidities recorded between the years 2019 and 2023 were retrieved from the Medical Records of aforementioned facilities.

Study design: This was a retrospective study design involving a five-year review of medical records from the records departments.

Study population: The study population comprised adult patients whose ocular health records were documented in the medical records systems of Rumuokwursi MPHC and Obio Cottage Hospital.

Eligibility Criteria

Inclusion Criteria: All records within the stipulated period and all properly documented ocular health records of adult patients were included in the study.

Exclusion Criteria: Ocular health records of children, and incompletely filled ocular health records were excluded from the study.

Sample size determination: The study used all eligible adult ocular morbidity records retrieved from the two facilities within the specified five-year period (2019–2023). Therefore, no separate sample size calculation was performed; the effective sample size was determined by the number of eligible records available during the study period.

Sampling Method: A consecutive retrospective sampling approach was applied. All eligible ocular morbidity records documented between 2019 and 2023 in the medical records of the two facilities were retrieved and included. No random sampling was performed.

Study Variables

- **Outcome variable:** Presence of ocular morbidity/disorder and the specific ocular morbidity
- **Independent variables:** Sociodemographic characteristics, specifically:
 - Age category of adult patients
 - Sex (male/female)

Study Instrument: Data were extracted using a data abstraction tool. The tool was used to capture relevant information from eligible patient records, including sociodemographic variables and documented ocular morbidity diagnoses/disorders.

Data collection: These data were extracted using a data abstraction tool. The identified eye disorders from the records were aggregated to obtain the absolute and relative cumulative frequency and appropriately presented using horizontal bar chart.

Data extraction was conducted with the assistance of two trained research assistants. These research assistants were trained for three hours on the required data to be extracted, and how to peruse the documents to identify the ocular morbidities that had been treated at the two facilities in the last five years under review. The required data was extracted from the medical records of the adult patients.

Data Analysis: Data were collected and stored in an electronic platform (KoBoToolbox open-source mobile data collection platform). Data were exported and analysed using SPSS (SPSS 23.0, IBM, Armonk, NY). Data was expressed as frequency and percentages, and presented on charts and tables. The chi-squared and logistic regression tests were used to test for association between sociodemographic characteristics (age and sex) of adults and the presence of eye disorders, which was reported with 95% confidence interval and p-values.

Ethics: Ethics approval for this research was obtained from the Rivers State Hospital Management Board, (approval number: RSHMB/RSHREC/2024/014), which provided access to the medical records of the selected health facilities. Permission was then obtained from all concerned PHC authorities including the Medical Officers of Health and facility heads of the two assessed PHC facilities. Also, the data collection tools were anonymised to ensure protection of privacy and confidentiality.

RESULTS

Sociodemographic characteristics of cases

Table 1: Socio-demographic characteristics of adult cases

Variables	Category	Frequency (n=453) n (%)
Age	17- 50	339 (74.8)
	51 and above	114 (25.2)
Sex	Male	161 (35.5)
	Female	292 (64.5)
Educational Status	None	229 (50.6)
	Primary	3 (0.6)
	Secondary	10 (2.3)
	Tertiary	185 (40.9)
Employment Status	Vocational/Technical	26 (5.7)
	Unemployed	3 (0.6)
	Self-Employed	291 (64.2)
	Employed by others	159 (35.2)

Out of 453 cases, 35.5% were males and 64.5% were females. About 74.8% were aged 17-50 years, and 25.2% were within 51years of age and above. About 64.2% were self-employed, and about 51% had no formal education as shown in Table 1.

Adult Eye Diseases

In the study, out of 453 cases reviewed, 442 (97.6%) documented eye disorders, as shown below in Figure 1.

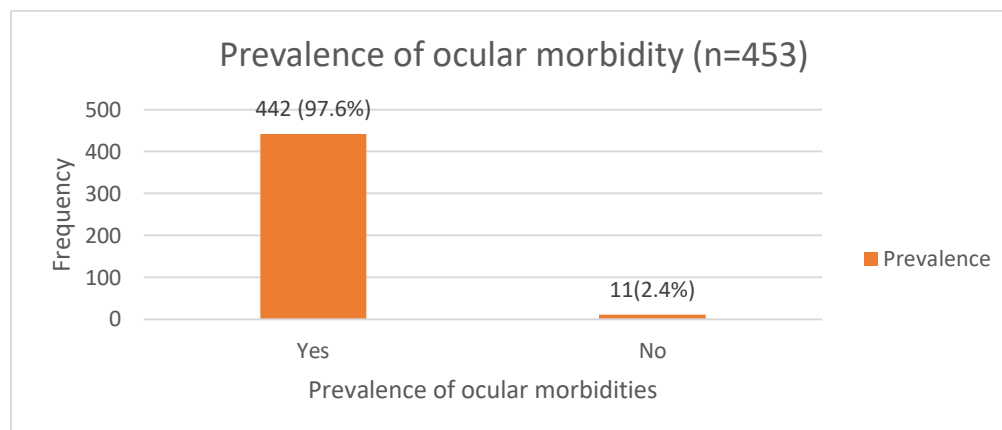


Figure 1: Prevalence of eye diseases among adults in Rivers State

Pattern of adult ocular morbidities

Also as shown in Figure 2, among the cases of ocular morbidities assessed, the most common morbidities were Eye irritation: 271/453 (59.8%), Refractive errors: 222/453 (49.0%), and Distance vision impairment: 162/453 (36.0%), near vision impairment 153/453 (33.7%), red eye 143/453 (32%), conjunctivitis 116/453 (26%), squint/strabismus 115/453 (25%) and eye trauma 115/453 (25%) as shown in Figure 2.

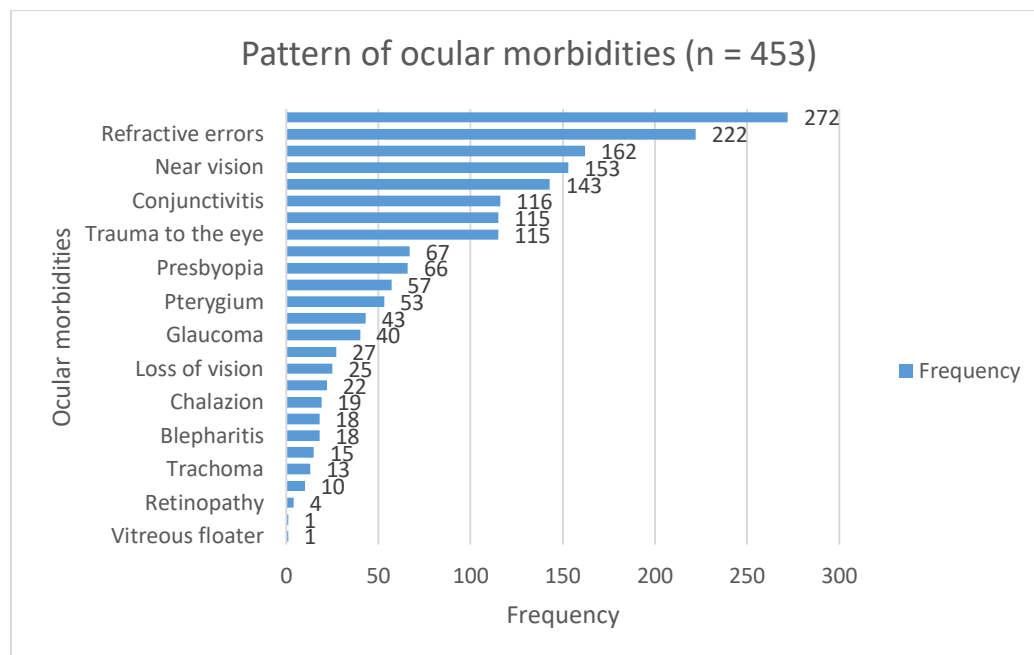


Figure 2: Pattern of eye disorders among adults in Rivers State

3.4 Age and Eye Disorders in Adults

Overall, the distribution of ocular morbidities varied across different age groups. Several morbidities showed statistically significant associations including cataract ($p < 0.0001$), glaucoma ($OR = 2.14$, $p = 0.026$), blurry vision (0.005) and loss of vision ($OR = 2.95$, $p = 0.009$). These results suggest that older adults (aged 51 and above) were more likely to have cataracts, blurry vision and loss of vision compared to younger adults (aged 17 to 50 years). Additionally, the presence of red-eye showed a statistically significant association with age, with a lower prevalence observed among older adults ($OR = 0.461$, $p = 0.003$).

Table 2: Association between age and adult eye disorders

Eye Disorders	17 – 50 n (%) n= 339	≥51 n (%) n= 114	χ^2	p-value	OR (95% CI)	p-value
Amblyopia	14 (4.1)	8 (7.0)	1.540	0.215	1.752 (0.72, 4.29)	0.220
Astigmatism	36 (10.6)	7 (6.1)	1.992	0.158	0.55 (0.24, 1.28)	0.167
Blepharitis	12 (3.5)	6 (5.3)	0.664	0.451	1.51 (0.56, 4.13)	0.411
Blurry vision	8 (2.4)	10 (8.8)	9.193	0.002	3.98 (1.53, 10.34)	0.005*
Cataract	25 (7.4)	42 (36.8)	58.780	<.001	7.33 (4.20, 12.80)	<0.0001*
Chalazion	15 (4.4)	4 (3.4)	0.178	0.673	0.786 (0.26, 2.42)	0.674
Congenital disorders	6 (1.8)	4 (3.4)	1.195	0.274	2.02 (0.56, 7.28)	0.284
Conjunctivitis	92 (27.1)	24 (21.1)	1.659	0.198	0.72 (0.43, 1.19)	0.199
Diabetes-related eye issues	16 (4.7)	11 (9.6)	3.698	0.054	2.16 (0.97, 4.79)	0.060
Dry eyes	41 (12.1)	16 (14.0)	0.292	0.589	1.186 (0.64, 2.21)	0.589
Eye irritation	210 (61.9)	61 (53.5)	2.527	0.112	0.71 (0.46, 1.09)	0.115
Far vision	118 (34.8)	44 (38.6)	0.533	0.465	1.18 (0.76, 1.83)	0.466
Glaucoma	24 (7.1)	16 (14.0)	5.127	0.024	2.14 (1.09, 4.20)	0.026*
Loss of vision	13 (3.8)	12 (10.5)	7.326	0.007	2.95 (1.31, 6.67)	0.009*

Near vision	121 (35.7)	32 (28.1)	2.216	0.137	0.703 (0.44, 1.12)	0.138
Presbyopia	49 (14.5)	17 (14.9)	0.014	0.905	1.038 (0.57, 1.89)	0.905
Pterygium	40 (11.8)	13 (11.4)	0.013	0.909	0.96 (0.50, 1.87)	0.909
Red eye	120 (35.4)	23 (20.2)	9.152	0.002	0.461 (0.28, 0.77)	0.003*
Refractive errors	167 (49.3)	55 (48.2)	0.035	0.851	0.960 (0.63, 1.47)	0.851
Retinopathy	3 (0.9)	1 (0.9)	0.000	0.994	0.991 (0.10, 9.62)	0.994
Squint/Strabismus	81 (23.9)	34 (29.8)	1.584	0.208	1.354 (0.84, 2.17)	0.209
Trachoma	8 (2.4)	5 (4.4)	1.256	0.262	1.90 (0.61, 5.92)	0.270
Trauma to the eye	87 (25.7)	28 (24.6)	0.055	0.815	0.943 (0.58, 1.54)	0.815
Vitamin A Deficiency	10 (2.9)	5 (4.4)	0.550	0.458	1.51(0.51, 4.51)	0.461

*Significant findings ($p \leq 0.05$)

Sex and Adult Eye Disorders

The chi-square test examined the associations between sex and various adult ocular morbidities in Rivers State. Overall, the distribution of ocular morbidities varied across sex. Two morbidities showed statistically significant associations ($p < 0.05$) with sex (cataract, and vitamin A deficiency), while the rest did not. The binary logistic regression test further indicated a statistically significant association between sex and the presence of cataract ($OR = 0.590$, $p = 0.047$). This suggests that males were more likely to have cataracts compared to females. These can be seen in Table 3.

Table 3: Association of sex and adult eye disorders

Type of Eye Disorders	Male n (%) n = 161	Female n (%) n = 292	χ^2	p- value	OR (95% CI)	p- value
Amblyopia	9 (5.6)	13 (4.5)	0.291	0.590	0.787 (0.33, 1.88)	0.590
Astigmatism	13 (8.1)	30 (10.3)	0.584	0.445	1.303 (0.66, 2.58)	0.446
Blepharitis	10 (6.2)	8 (2.7)	3.278	0.070	0.425 (0.16, 1.10)	0.078
Blurry vision	6 (3.7)	12 (4.1)	0.040	0.842	1.11 (0.41, 3.01)	0.842
Cataract	31 (19.3)	36 (12.3)	3.950	0.047	0.590 (0.35, 0.99)	0.047*
Chalazion	9 (5.6)	10 (3.4)	1.211	0.271	0.60 (0.24, 1.51)	0.274
Congenital disorders	5 (3.1)	5 (1.7)	0.933	0.334	0.543 (0.16, 1.91)	0.341
Conjunctivitis	39 (24.2)	77 (26.4)	0.251	0.616	1.121 (0.72, 1.75)	0.617
Diabetes-related eye issues	13 (8.1)	14 (4.8)	1.992	0.158	0.573 (0.26, 1.25)	0.163
Dry eyes	14 (8.7)	43 (14.7)	3.431	0.064	1.813 (0.96, 3.43)	0.067
Eye irritation	97 (60.2)	174 (59.6)	0.019	0.891	0.973 (0.66, 1.44)	0.891
Far vision impairment	60 (37.3)	102 (34.9)	0.246	0.620	0.904 (0.61, 1.35)	0.620
Glaucoma	17 (10.6)	23 (7.9)	0.927	0.336	0.724 (0.38, 1.40)	0.332
Loss of vision	13 (8.1)	12 (4.1)	3.129	0.077	0.49 (0.22, 1.20)	0.097
Near vision impairment	58 (36.0)	95 (32.5)	0.565	0.452	0.86(0.57, 1.28)	0.452
Presbyopia	23 (14.3)	43 (14.7)	0.016	0.899	1.037 (0.60, 1.79)	0.899
Pterygium	21 (13.0)	32 (11.0)	0.437	0.509	0.820 (0.46, 1.48)	0.509
Red eye	51 (31.7)	92 (31.5)	0.001	0.970	0.992 (0.66, 1.50)	0.970
Refractive errors	83 (51.6)	139 (47.6)	0.648	0.421	0.854 (0.58, 1.26)	0.425
Squint/Strabismus	39 (24.2)	76 (26.0)	0.178	0.673	1.10 (0.71, 1.72)	0.673
Trachoma	7 (4.3)	6 (2.1)	1.958	0.162	0.462 (0.15, 1.40)	0.171
Trauma to the eye	41 (25.5)	74 (25.3)	0.001	0.977	0.993 (0.64, 1.55)	0.987
Vitamin A Deficiency	9 (5.6)	6 (2.1)	4.051	0.044	0.354 (0.12, 1.01)	0.053

*Significant findings ($p \leq 0.05$)

DISCUSSION

In this study, the overall prevalence of ocular morbidities among adults residing in Rivers State was very high, suggesting that many of the conditions may be preventable or treatable if detected and managed early. This, therefore calls for massive sensitization and public awareness campaigns. This finding corroborates findings from a study conducted in Nepal, with revealed a high prevalence of ocular morbidity [21].

In this study, eye irritation (allergic conjunctivitis) had the highest prevalence, while photophobia and vitreous floater had the least prevalence. Environmental pollution may be a contributing factor, though this study did not directly assess exposure. Rivers State experiences recurrent oil spillages, and illegal bunkering of crude oil. This results in the release of chemicals and pollutants into the air, which may contribute majorly to these eye symptoms. This finding aligns with findings from a study conducted by Adenuga and colleagues [22] who revealed allergic conjunctivitis to be the most prevalent. Another study in Ghana, revealed conjunctivitis to be the most prevalent [18]. Eye irritation was the most prevalent, followed by refractive errors, far vision and near vision impairments respectively in this study. Similar findings were made in a study conducted in Jos, Nigeria, where allergic conjunctivitis was the most prevalent, followed by refractive errors [22]. Eye irritations and conjunctivitis were found to be predominant ocular morbidities in this study, and this is also in agreement with the findings of other studies that reported similar ocular morbidities as being predominant [23,11]. The findings of this study contrast with findings from Ogwurike and colleagues [24], which revealed senile cataract as the most prevalent ocular morbidity. Another study also in Kathmandu, revealed cataract as the most prevalent and leading cause of visual impairment [21].

The pattern of ocular morbidities vary based on sex, age and other factors. In this study, there were significant associations between age and ocular morbidities. Age was significantly associated with Glaucoma, loss of vision, blurred vision and cataract. The older adults were more likely to have eye conditions like cataract. Loss of vision and blurred vision as compared to the younger adults. This is consistent with findings by Dev and colleagues [21]. As age increased, the rate of visual impairment and blindness also increased, which was similar to the studies conducted by Elliott and colleagues [25], and Waked and colleagues [26].

In this study, sex was also significantly associated with ocular morbidities. Males were more likely to have ocular

morbidities (cataract) as compared to females. This finding contradicts findings by Tielsch and colleagues [27], which revealed higher rates of ocular morbidities in females (visual impairment and blindness). It also contradicts findings by Duru and colleagues; and Korpole and colleagues [28, 29], which revealed that there was a high prevalence of cataract among females than in males. There was no gender difference in a study conducted by Dev and colleagues [21].

The results of the present study show that ocular health issues are significant public health issues and the commonest eye disorders identified in this study are largely diseases that are either preventable or treatable, and is a pointer for the need for improved public awareness and improved primary eye care services for regular eye screenings and eye examination, early detection, prompt treatment and management of these morbidities, in order to safeguard ocular health.

Limitations

While this study has a significant public health implication, it has some limitations. Firstly, the findings from this study may not be generalized to the entire Rivers State population because data was only collected from two facilities in a particular LGA. This may introduce selection bias. Secondly, data was gotten from medical records which may also introduce information and documentation bias. This was therefore handled by training the research assistants on how to accurately collect the necessary data, and also the use of a structured abstraction tool.

Implications of the findings of the study

The study points to a high burden of both reversible and irreversible eye conditions. Targeted and regular eye health education and promotion will therefore aid in creating awareness and reducing the incidence of ocular morbidities in the populace. There is a need for health interventions by government and non-governmental organizations to be directed at improving the ocular health indices in Rivers State by improving eye health service delivery channels where the populace can utilize the needed healthcare for their eyes. Scaling up PEC services in the PHC system in Rivers State, will contribute to improving these indices. Future studies should consider longitudinal studies and the use of population-based sampling to ensure generalizability of findings.

CONCLUSION

The burden of ocular morbidities among adults is quite high, and this suggests that inadequate eye-care services

and limited awareness may contribute to the burden observed. Awareness of personal visual status among residents, and availability of PEC services may be limited. The results of our study strongly advocate a need for routine comprehensive eye care examination among adults because ocular morbidities can result in devastating effects to vision and quality of life when unattended to.

Declarations

Authors' contribution: J.T.W. wrote the first draft of the manuscript and contributed to data collection, study design, and interpretation of the results. S.B.D. contributed to the interpretation of the results. P.I.D.A. also contributed to the formal analyses and interpretation of results. A.C.O. coordinated the study, contributing to the study design, data collection, and interpretation of the results. All authors contributed to reading and commenting on the manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

Disclosure in AI use: The authors declare non-usage of generative Ai in the development, conduct and reporting of the manuscript

Abbreviations:

MPHC	Model Primary Health Centre
OR	Odds Ratio
PEC	Primary Eye Care
PHC	Primary Health Centre
RSHMB	Rivers State Hospital Management Board
RSHREC	Rivers State Health Research Ethics Committee
SPSS	Statistical Package for Social Sciences
UEHC	Universal Eye Health Coverage

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