

Original Research Article

**PATTERN OF OCULAR DISEASES  
AMONG CHILDREN UNDER FIVE YEARS OF AGE IN SOUTHEAST,  
NIGERIA.**

**ABSTRACT**

**BACKGROUND:**

Children under 5 years are prone to ocular disorders which could be congenital or acquired. Early recognition of these conditions and timely intervention enhances optimum results. There is paucity of data on the pattern of ocular disorders among these children in Nigeria and this makes it difficult for policy makers to plan health systems that will target this very important group of the population.

**AIM:**

To determine the pattern of ocular diseases among children less than 5 years of age in Onitsha, Anambra state Nigeria.

**METHODS:**

This was a retrospective study of children under 5 years of age that presented to City of Refuge Specialist Eye Clinic Onitsha, Nigeria between January 1<sup>st</sup>, 2016 to December 31<sup>st</sup>, 2020. Their case files were retrieved and relevant

information extracted. Sociodemographics, month of presentation to the eye clinic and diagnoses were analyzed.

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## RESULTS

A total of 133 children were studied. The patients comprised 85 (63.9%) males and 48 (36.1%) females, with an approximate male to female ratio of 1.8:1. Eye diseases seen were both congenital 32(24.1%) and acquired 101 (75.9%). Of the congenital type, 20 (62.5%) were males, while 12 (37.5%) were females. Most common ocular morbidities recorded were allergic conjunctivitis 41(30.8%) and infective conjunctivitis 34(25.6%).

## CONCLUSION

Most of the causes of ocular morbidity in this study were preventable or treatable. Therefore, early detection and management of eye diseases in children will reduce complications in later life.

## INTRODUCTION

Childhood blindness is a public health burden especially because of the number of blind person years involved.<sup>1</sup> Early recognition and timely intervention for ocular diseases of childhood are quite challenging and these become even more difficult among the preschool age group because of their inability to articulate their problems.<sup>2</sup> Moreover,<sup>3,4</sup> early childhood is a rather sensitive period for development of the visual system and the development of the child's visual capacity is complexly linked to development of behavioral, cognitive, psycho-emotional sensory and neuromotor functions—.

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diseases may be congenital or acquired and early diagnoses and effective intervention influence optimization of treatment.<sup>2,5</sup>

Studies have reported socioeconomic factors to influence detection and treatment of childhood ocular diseases.<sup>6,7</sup> Thus, delay in recognition and timely treatment of childhood ocular morbidities may not only result in problems with the child's general wellbeing but may result to difficulty in learning, poor educational attainment, limited job opportunities, reduced quality of life, psychosocial consequences and may even lead to death, but however, most of these childhood ocular morbidities are treatable and preventable.<sup>3,7-10</sup>

Globally, about 1.4 million children aged 0-14 years are blind, with over 75% of them living in Africa and Asia and this prevalence also varies between and within countries.<sup>1</sup> While the prevalence of childhood blindness is between 0.3 to 0.4 per 1000 children in economically developed regions and countries, the prevalence reaches up to 1.2 per 1000 children in developing countries. Socioeconomic factors have been attributed to be responsible for this huge difference in prevalence largely because of limited access to quality healthcare services.<sup>6,11</sup>

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In Nigeria, Okoye et al<sup>12</sup> reported prevalence of 6.1% and 0.2% for childhood ocular morbidity and monocular blindness respectively among children aged 6-16 years. In Uganda, a hospital based study<sup>13</sup> among children aged 18 years and below reported blindness prevalence of 12.6% with most of the causes of blindness being preventable but however, a population based study<sup>1</sup> in Bangladesh reported blindness prevalence of 6.3 per 10,000 among children aged 15 years and less. Mehari<sup>14</sup> reported a prevalence of 16.2% for visual impairment in Ethiopia among children aged 15 years and less.

**Comment [U4]:** Insert 'Globally, about 1.4 million...' here

Though Nigeria has a projected population of about 200 million, there is paucity of data on pattern of ocular diseases among children under 5 years of age to enable developing guidelines for eye care services for this target population. This study is aimed to determine pattern of ocular diseases among children under five years of age in south east Nigeria.

## 2. Methods

### 2.1 Study design

This is a retrospective cross-sectional study.

## 2.2 Study site

This study was conducted at City of Refuge Specialist Eye Clinic, Onitsha, Nigeria. The clinic is located in the commercial city of Onitsha in Anambra state Nigeria and attends to patients from all the states in the South-eastern part of Nigeria and beyond. The hospital provides emergency, comprehensive in-patient and outpatient eye care services. It is also a major referral center for medical and surgical treatment of eye diseases.

## 2.3 Study period

The study period was between 1<sup>st</sup> January 2016 and 31<sup>st</sup> December 2020.

## 2.4 Study population

All the children aged less than 5 years who presented to City of Refuge Specialist Eye Clinic within the study period.

## 2.5 Inclusion criteria

Patients who were less than five years of age at the time of presentation.

## 2.6 Exclusion criteria

Patients who were 5 years old or more at the time of presentation to City of Refuge Specialist Eye Clinic.

## 2.7 Outcome measure

The primary outcome measure was the pattern of childhood eye diseases among children less than 5 years of age. The secondary outcome measure included the prevalence of ocular morbidity.

## 2.8 Procedures

Archived data of all patients aged less than 5 years seen within the study period were retrieved and information on age at presentation, sex, diagnoses, and date of presentation were obtained.

## Data Management

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 23.

## 2.9 Ethical consideration

Ethical clearance for this study was obtained from the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Amaku, Awka, Nigeria.

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**Comment [U6]:** The section on Data Management is missing. Beneath this, you need to give a brief description of the statistical methods used. Talk about entering of data, validity, etc

**Comment [U7]:** Add make; place or city of manufacture of SPSS

#### 4.0 RESULTS

A total of 133 patients were retrospectively reviewed. The patients comprised 85 (63.9%) males and 48 (36.1%) females, with an approximate male to female ratio of 1.8:1. The sociodemographics are shown in Table 1.

**Table 1: Sociodemographics characteristics of the patients**

| Variable                  | Number     | Percentage (%) |
|---------------------------|------------|----------------|
| <b>Age (Months)</b>       |            |                |
| ≤12                       | 16         | 12.0           |
| >12 to 24                 | 44         | 33.1           |
| >24 to 36                 | 27         | 20.3           |
| > 36 to 48                | 25         | 18.8           |
| >48 to <72                | 21         | 15.8           |
| <b>Sex</b>                |            |                |
| Male                      | 85         | 63.9           |
| Female                    | 48         | 36.1           |
| <b>Place of residence</b> |            |                |
| Urban                     | 75         | 56.4           |
| Rural                     | 58         | 43.6           |
| <b>Total</b>              | <b>133</b> | <b>100.0</b>   |

The patients were brought to the clinic in different months of the years studied. Half (50%) of them were seen in the second quarter of the years studied. The distribution of the patient's first presentation across the quarters of the years studied are shown in Figure 1.

Distribution through the quarters of the year

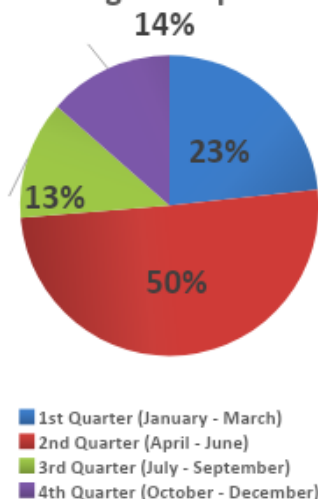


Figure 1: Distribution of the patients' first presentation through the quarters of the years studied.

Eye diseases seen were both congenital 32(24.1%) and acquired 101 (75.9%). Of the congenital type, 20 (62.5%) were males, while 12 (37.5%) were females. The types of eye diseases seen are shown in Table 2.

Table 2: Eye diseases seen in the patients

| Eye diseases          | Number | Percentage (%) |
|-----------------------|--------|----------------|
| <b>Congenital</b>     |        |                |
| Congenital cataract   | 9      | 6.77           |
| Congenital strabismus | 9      | 6.77           |

|  |            |              |
|--|------------|--------------|
| Congenital cyst                          | 4          | 3.00         |
| Congenital glaucoma                      | 3          | 2.26         |
| Congenital Nasolacrimal duct obstruction | 2          | 1.50         |
| Congenital rubella                       | 2          | 1.50         |
| Congenital nystagmus                     | 1          | 0.75         |
| Anophthalmia                             | 1          | 0.75         |
| Microphthalmia                           | 1          | 0.75         |
| <b>Acquired</b>                          |            |              |
| Allergic conjunctivitis                  | 41         | 30.82        |
| Infective conjunctivitis                 | 34         | 25.56        |
| Ametropia                                | 4          | 3.00         |
| Retinoblastoma                           | 4          | 3.00         |
| Corneal ulcer                            | 4          | 3.00         |
| Corneoscleral laceration                 | 3          | 2.26         |
| Corneal scar                             | 3          | 2.26         |
| Traumatic anterior uveitis               | 2          | 1.50         |
| Ophthalmia neonatorum                    | 2          | 1.50         |
| Traumatic cataract                       | 1          | 0.75         |
| Capillary hemangioma                     | 1          | 0.75         |
| Anterior staphyloma                      | 1          | 0.75         |
| Optic atrophy                            | 1          | 0.75         |
| <b>Total</b>                             | <b>133</b> | <b>100.0</b> |

**Comment [U9]:** Congenital cyst of where? Or types of cysts?

**Comment [U10]:** Or Rubella syndrome? Or was the presentation without cataract? If presentation was with cataract, it means that congenital cataract will be 11 and 2 out of these are associated with congenital rubella syndrome

## 5.0 DISCUSSION

The patterns of childhood eye diseases are different in various hospital settings and locations. The index study revealed congenital cataract and strabismus to be the commonest congenital eye diseases seen in children  $\leq 5$  years of age. Badgeri in a tertiary eye hospital in rural India reported congenital eye diseases to account for 27.9% of all eye diseases seen in children 0-5 years, with

**Comment [U11]:** Please discuss and comment on corneal pathology and tumours  
Corneal pathology here consists of corneal ulcer, corneoscleral laceration, and corneal scar. This is of great impact on childhood vision pathology especially in the developing countries and on the world's proportion of blindness.  
Tumours should be mentioned also e.g RB

congenital cataract (24.1%) as the commonest type of congenital eye disease seen in the age group.<sup>15</sup> In surveys in southwestern Ethiopia and Pakistan amongst children less than 16 years, where children  $\leq 5$  years constituted over a quarter of the population, congenital cataract was reported the commonest congenital eye diseases seen in the area and it accounted for 5.7% and 5.6% of all cases seen within the study period respectively.<sup>16,17</sup> Demissie and Demissie stated that congenital cataract accounted for 40% of all cases of blindness at presentation to the clinic among children  $< 16$  years of age.<sup>16</sup> Similar to our study, Onakpoya in south-western Nigeria found congenital cataract and strabismus, which accounted for 24.1% and 13.8% to be the commonest congenital eye diseases in children 0-5 years of age.<sup>18</sup> On the contrary, Singh et al reported nasolacrimal duct obstruction as the commonest type of eye diseases seen in persons less than 5 years of age.<sup>19</sup>

On acquired ocular diseases seen in children, allergic conjunctivitis was the commonest eye disease recorded, and the commonest of all types of eye diseases in this study. Similarly, studies in Pakistan and Nigeria reported allergic conjunctivitis as the commonest eye diseases recorded in the children surveyed.

<sup>20,12,</sup> Although these surveys included older age groups, however, children 0-5 years constituted over a quarter of the studied population. Isawumi and Ubah in south-western Nigeria found conjunctivitis, which accounted for 56.7% of all

eye diseases in children 0-5 years, to be the commonest ocular disorder in the age group and in both sexes.<sup>21</sup> Banayot in Palestine found ~~and~~ refractive error to be the commonest ocular disorder in the age group studied ( $\leq 15$  years) while Darraj et al reported refractive error as the commonest ocular morbidity among children aged less than 18 years in Saudi Arabia.<sup>22,23</sup> Other common eye diseases noted in other studies were refractive error and ocular trauma.<sup>16,22</sup> These diseases ranked very low in the index study. This could be because other studies incorporated older children who are known to be more playful and can describe their ocular symptoms better than the pre-school aged children.

It is known that appropriate visual stimulation is needed for normal visual development in children below 8 years of age. This is the sensitive period of visual development in life. Therefore, inappropriate visual stimulation in preschool aged children could result to amblyopia. Amblyopia which is the functional reduction of vision due to abnormal visual image procession by the brain, affects the psychosocial development of a child.<sup>3,4,24</sup> Amblyopia can be reversed if still within the sensitive period of visual development.<sup>5</sup> Cataract and strabismus, the most common congenital eye diseases in the index study are known to be amblyogenic.<sup>24</sup> Amblyopia and its risk factors are among the most common causes of vision problems in children.<sup>24</sup> Therefore, early detection and

prompt treatment of these ocular conditions in pre-school aged children reduces the risk of amblyopia later in life and improves the quality of life.<sup>25</sup>

## 5. Conclusion

Childhood ocular morbidity is common and the impact on the child's wellbeing and development is enormous if not recognized early and treated effectively. There is need to commence ocular screening of children as early as from birth to enhance timely detection of childhood ocular morbidities.

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### Disclosure statement for publication

All authors have made substantial contributions to conception and design of the study or acquisition of data, or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content; and final approval of the version submitted. This manuscript has not been submitted for publication in another journal.

### Ethics approval and consent to participate

Ethical approval was obtained from Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Amaku, Awka, Nigeria.

### Consent for publication

Not applicable

### Data availability

The data used to support the findings of this study are available from the site publicly.

## References

1. Hussain AHME, Ferdoush J, Mashreky SR, Rahman AKMF, Ferdousi N, Dalal K. Epidemiology of childhood blindness: A community-based study in Bangladesh. *PLoS One*. 2019;14(6):1–10.
2. Simon JW, Kaw P. Commonly missed diagnoses in the childhood eye examination. *Am Fam Physician*. 2001;64(4):623–8.
3. Zimmermann A, de Carvalho KMM, Atiye C, Zimmermann SMV, Ribeiro VL de M. Visual development in children aged 0 to 6 years. *Arq Bras Oftalmol*. 2019;82(3):173–5.
4. Johnson SP. Development of the Visual System. *Neural Circuit Dev Funct Healthy Dis Brain*. 2013;3:249–69.
5. Robaei D, Rose KA, Ojaimi E, Kifley A, Martin FJ, Mitchell P. Causes and associations of amblyopia in a population-based sample of 6-year-old Australian children. *Arch Ophthalmol*. 2006;124(6):878–84.
6. Stein JD, Andrews C, Musch DC, Green C, Lee PP. Sight-threatening ocular diseases remain underdiagnosed among children of less affluent families. *Health Aff*. 2016;35(8):1359–66.
7. Adhikari S, Shrestha MK, Adhikari K, Maharjan N, Shrestha UD. Causes of visual impairment and blindness in children in three ecological regions of Nepal: Nepal Pediatric Ocular Diseases Study. *Clin Ophthalmol*. 2015;9:1543–7.
8. Zaba JN. VISION PROBLEMS. 2001;12(3):66–70.
9. Ibrahim MKM, Wolvaardt JE, Elnimeiri MKM. Risk factors of ocular morbidity among under-five years old children in Khartoum State- Sudan- 2020. *Heal Sci Reports*. 2021;4(2):1–7.
10. Bowman R, Bowman R. Community Eye Health Journal rare and deadly blinding disease. 2018;31(101):1–4.
11. Kong L, Fry M, Al-Samarraie M, Gilbert C, Steinkuller PG. An update on progress and the changing epidemiology of causes of childhood blindness worldwide. *J AAPOS* [Internet]. 2012;16(6):501–7. Available from: <http://dx.doi.org/10.1016/j.jaapos.2012.09.004>
12. Okoye O, Umeh RE, Ezepue FU. Prevalence of eye diseases among school children in a rural south-eastern Nigerian community. *Rural Remote Health*. 2013;13(3):2357.
13. Kinengyere P, Kizito S, Kiggundu JB, Ampaire A, Wabulembo G. Burden, etiology and predictors of visual impairment among children attending Mulago National Referral Hospital eye clinic, Uganda. *Afr Health Sci*. 2017;17(3):877–85.

**Comment [U13]:** You need more of your local studies for comparisons

**Comment [U14]:** Improper and incomplete citation

**Comment [U15]:** Improper and incomplete citation. Please cite properly

14. Mehari ZA. Pattern of childhood ocular morbidity in rural eye hospital, Central Ethiopia. *BMC Ophthalmol* [Internet]. 2014;14(1):1–6. Available from: *BMC Ophthalmology*
15. Badageri S. Study of spectrum of childhood eye diseases in a tertiary care hospital at rural Bangalore. *Indian J Basic Appl Med Res*. 2014;3(2):624–33.
16. Demissie BS, Demissie E. Patterns of Eye Diseases in Children Visiting a Tertiary Teaching Hospital : Ethiopia. *Ethiop J Heal Sci*. 2014;24(1):69–73.
17. Fasih U, Rahman A, Shaikh A, Fahmi MS, Rais M. Pattern of Common Paediatric Diseases at. 2014;30(1):10–4.
18. Onakpoya OH, Adeoye AO. Childhood eye diseases in southwestern Nigeria: A tertiary hospital study. *Clinics*. 2009;64(10):947–51.
19. Singh H, Kaur R, Sidhu H, Kaur M. Spectrum Of Ocular Disorders In Children Visiting A Tertiary Teaching Hospital. *J Dent Med Sci*. 2018;17(12):41–3
20. Salman M. Pediatric eye diseases among children attending outpatient eye department of Tikrit Teaching Hospital. *Tikrit J Pharm Sci*. 2010;7(1):95–103.
21. Isawumi M, Ubah J. A survey of pediatric eye diseases in a tertiary hospital in Osogbo, South-west Nigeria. *Niger J Med*. 2021;30(2):149.
22. Banayot RG. A retrospective analysis of eye conditions among children attending St. John Eye Hospital, Hebron, Palestine. *BMC Res Notes*. 2016;9(1):1–5.
23. Darraj A, Barakat W, Kenani M, Shajry R, Khawaji A, Bakri S, et al. Common Eye Diseases in Children in Saudi Arabia (Jazan). *Ophthalmol Eye Dis*. 2016;8:OED.S39055.
24. Grossman DC, Curry SJ, Owens DK, Barry MJ, Davidson KW, Doubeni CA, et al. Vision screening in children aged 6 months to 5 years: US preventive services task force recommendation statement. *JAMA - J Am Med Assoc*. 2017;318(9):836–44.
25. Lee EY, Sivachandran N, Isaza G. Five steps to: Paediatric vision screening. *Paediatr Child Heal*. 2019;24(1):39–41.