Acta Scientific Surgical Research

Volume 1 Issue 3 July 2022

Research Article

Prevalence of Eye Problems Amongst Under Five Children at Ophthalmology Department Mzuzu Central Hospital

Janet Chando[1] and Grace Ogbonna[2]*

[1]*Student at Mzuzu University, Malawi*

[2]*Optometry, Mzuzu University, Malawi*

***Corresponding Author:** Grace Ogbonna, Optometry, Mzuzu University, Malawi.

Received: June 26, 2022

Published: June 28, 2022

Abstract

Background: From birth there is a rapid change in visual development to the age of 3-5 years. Eye problems, congenital or acquired, occurring during this period need to be diagnosed and treated early. Eye and vision problems can cause developmental delays and the longer a vision problem goes undiagnosed, the more a child's brain learns to accommodate the vision problems.

Purpose: to determine the prevalence of eye problems amongst under five at ophthalmology department MCH.

Methods: The study was a retrospective cross-sectional study which had parameters of quantitative research methodology. Systematic sampling method was used in the study to achieve the sample size. A total of 288 cases were reviewed from records of 2015-2017. Children under 5 years of age diagnosed of any eye problem from 2015-2017 were included. Incomplete records or doubtful diagnoses were excluded. Data was collected through data summary sheet which involved recording the age, gender and diagnoses.

Results: In the study**,** 42.7% (123) were female and 52.3% (165) were male. The age was divided into developmental age groups, 24.3% (70) represented age range of <1-11months, 31.6% (91) represented age range of 1-2 years and 44.1% (127) represented the age group of 3-5 years. The results showed prevalence of 12.2% (35) on congenital eye problems and a prevalence of 87.8% (253). Allergic conjunctivitis followed by bacterial conjunctivitis. The age group of 3-5 years had a high prevalence of 45.06% in acquired eye problems and <1-11 months had a high prevalence of 51.43% in congenital eye problems. Males had high prevalence of 56.13% and 65.71% in congenital and acquired eye problems.

Conclusion: The study concluded that there is a high prevalence of acquired eye problems in under five children and recommended early and specialized treatment to minimize socio-economic burden.

Keywords: Eye Problems; Acquired; Congenital; Prevalence

Abbreviations

WHO: World Health Organization; MCH: Mzuzu Central Hospital; OCO: Ophthalmic Clinical Officer; QUECH: Queen Elizabeth Central Hospital; VKC: Vernal Keratoconjunctivitis; U5: Under 5 (According to WHO)

Introduction

Globally, 19 million children under the age of 15 years are estimated to have one or more vision problems both congenital and acquired [1]. According to a study done in Ghana 60% of congenital anomalies accounts for childhood blindness [2] and 93% of hospital visits account for acquired eye problems [3].

Children vision abilities are not fully grown at birth, their brain learn to see as the child is growing. They are born with quite poor levels of vision, as assessed by both electrophysiological and functional tests [4]. During infancy there is a rapid change in visual development and by the age of 3-5 years they will be fine tuning the visual abilities which have been gained during infancy [5]. Eye problems occurring during this period need to be diagnosed and

treated early, these may be congenital or acquired eye problems. Eye and vision problems can cause developmental delays and the longer a vision problem goes undiagnosed, the more a child's brain learns to accommodate the vision problem [5].

The most common eye problems among children are strabismus, amblyopia and optical problems which impairs the visual acuity and depth perception [1]. Some of the manifestations are abnormal sized eyeball or absent eyeball, white pupil, nystagmus and strabismus [6]. Parents may observe a tilt in the head, turning of an eye, sensitivity to light, squinting, frequent rubbing of the eyes, difficulty with eye-hand coordination, avoiding colouring or detailed activities and sitting up close to a television or holding a book too close [5].

In the diagnosis of the eye problems, a detailed case history and careful eye examination is important. Ophthalmoscope is used to differentiate most of serious causes i.e. checking the red reflex, penlight torches to check the symmetry of the corneal reflexes to rule out squint and also dilating the child using cyclopentolate 0.5% in children below one year and 1% for those above a year to be sure of the red reflex characteristics as well as for performing refraction [4].

Therefore it is important that children should undergo a careful eye examination but according to Castenes (2003), 80% of preschool children never get any eye examination or vision screening and 7-10% of the children are estimated to have eye problems.

The prevalence of eye problems in children 5 years of age and under five years is between 7% and 8% respectively while 3% of the entire population within that age bracket has amblyopia in the United States. For instance, Jonas [1] indicates a prevalence estimates in amblyopia, strabismus and anisometropia of 1% to 6% in children younger than 6 years [1].

Early detection of eye problems is important because it aids in early treatment and intervention and also lifelong visual impairment is avoided [7]. Untreated eye problems can interfere with most of the life experiences therefore failure to detect visual impairment early may have a permanent effect on long term vision outcomes, education achievement, and self-esteem [8]. The impact of eye diseases and visual impairments in children also extend beyond the children themselves to the family and society-some studies have shown that having a disabled child can increase stress and depression among parents and can lead to an increase in divorce [3].

Therefore it is the aim of this study is to determine the prevalence of eye problems in under five (U5) children at Mzuzu Central Hospital in Malawi.

Methodology

A retrospective cross-sectional study which had parameters of quantitative research methodology was conducted.

The data that was used was the records that are already existed at ophthalmology department at Mzuzu Central Hospital (MCH), Mzuzu city Malawi. The records were for any child that had been diagnosed of any eye problem.

The research used systematic sampling method. The researcher selected every n^{th} number that is to say every 4^{th} number from the list of the sample.

Inclusion criteria and exclusion criteria

All data of U5 children who at the time presented to the hospital with any visual problems and their diagnosis and management were recorded were included.

All U5 children with incomplete records or doubtful diagnoses were excluded from the study.

Data collection method

Data was collected through the use of a data summary sheet. This involved checking the hospital records and recording the patient's age, gender, the diagnosis whether it's an acquired eye problem or congenital eye problem. To identify any potential differences in terms of age, the patients were divided in developmental stages as follows; infants <1-11 months, toddlers 1-2 years, preschool children 3-5 years.

The data collection was achieved in a period of one week in the month of June.

Data analysis

The gathered data was scrutinized manually to check for missing, inaccurate, irrelevant data and put into manageable and meaningful form. The data collected was patient's gender, age, diagnosis and type of eye problem. For categorical data such as gender and age was presented using medians, the eye problems will be presented using percentages. The data was processed and

analysed by statistical calculations with the aid of Microsoft Excel package and Statistical Package for Social Scientists (SPSS Version 22). The analysed data was presented quantitatively using graphs and table.

Ethical consideration

Permission was obtained from the Mzuzu University Faculty of Health Sciences research committee and Mzuzu Central Hospital management to conduct the study.

Study limitations

Delay in receiving permission letter from the hospital which led in delay in proceeding with data collection hence affected the plan of the research.

The data was not a representation of the whole population in Malawi.

Results Presentation

Below is a presentation of an analysis of the results of the study conducted at ophthalmology department MCH. The demographics are presented in table 1 below.

Category	Description	Frequency	Percent (%)
Gender	Female	123	42.7
	Male	165	52.3
Age group	<1-11 months	70	24.3
	1-2 years	91	31.6
	3-5 years	127	44.1

Table 1: Demographic information.

The table above presents the demographic information. In total, 288 records from 2015-2017 were seen of which 42.7% (123) were female and 52.3% (165) were male. Since the age was divided into groups, 24.3% (70) were for the age range of <1-11months, 31.6% (91) were for the age range of 1-2 years and 44.1% (127) represented the age group of 3-5 years.

Prevalence of acquired and congenital eye problems

Type of anomaly	Frequency (n)	Percent (%)
Congenital	35	12.2
Acquired	253	87.8

Table 2: Frequency of acquired and congenital eye problems.

As shown in the table above, out of the sampled 288 records, 35 children had congenital eye problems representing a prevalence of 12.2% and 253 children had acquired eye problems representing a prevalence of 87.8%.

Below is a pie chart showing the distribution of congenital and acquired eye problems.

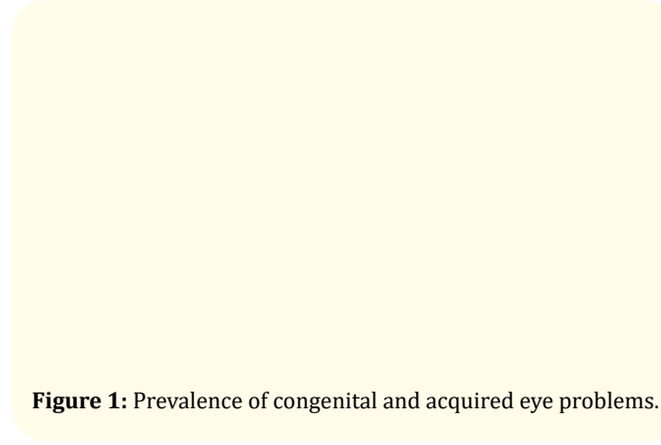

Figure 1: Prevalence of congenital and acquired eye problems.

Eye problems	Frequency	Percent
Retinoblastoma	6	2.1
Corneal foreign body	6	2.1
Hordeolum	5	1.7
Vernal keratoconjunctivitis	29	10.1
Congenital cataract	12	4.2
Congenital glaucoma	4	1.4
Blepharitis	19	6.6
Ophthalmia neonaturum	15	5.2
Corneal ulcer	17	5.9
Lid laceration	7	2.4
Infantile esotropia	3	1.0
Corneal scar	4	1.4
Infectious conjunctivitis	8	2.8
Iris heterochromia	1	.3
Herpes simplex	1	.3
Traumatic uveitis	1	.3
Traumatic cataract	2	.7
Orbital cellulitis	3	1.0
Preseptal cellulitis	5	1.7
Chemical injury	1	.3
Moluscum contagiosum	1	.3
Dacrocystitis	4	1.4
Dermoid cyst	1	.3
Chalazion	4	1.4
Simple hyperopia	2	.7
Blunt trauma	1	.3
Glanuloma	2	.7
Myopia	1	.3
Mixed astigmatism	2	.7
Sub-conjunctival haemorhage	3	1.0
Cortical blindness	1	.3
Convergent esotropia	1	.3
Congenital ptosis	2	.7
Allergic conjunctivitis	59	20.5
Bacterial conjunctivitis	55	19.1
Total	288	100.0

Table 3: Frequency of eye problems.

The table above shows the eye problems that were found in the study. For congenital eye problems out of the 12.2% (35) cases, congenital cataract was more prevalent with 4.2% (12) of the cases which was followed by retinoblastoma 2.1% (6) of the cases seen. For acquired eye problems, out of 87.8% (253), 20.5% (59) had allergic conjunctivitis making it to be prevalent followed by 19.1% (55) bacterial conjunctivitis.

Distribution of eye problems according to developmental age group

The graph above shows that in the age group of <1-11 months the prevalence of congenital 51.43% which reported to be the highest as compared to the prevalence of acquired which was 20.5%. While in the age group of 1-2 years, the prevalence of congenital eye problems was found to be low with 11.43% amongst all the age groups, and acquired eye problems was prevalent with 34.39%. In 3-5 years, acquired eye problems was more prevalent amongst all the age groups with 45.06% and congenital eye problems had 37.14%.

Figure 2: Distribution of eye problems among developmental age groups.

Below is a table showing the prevalence of each eye problem according to age group.

Acquired eye problems	<1-11 months n (%)	1-2 years n (%)	3-5 years n (%)
Allergic conjunctivitis	9 (12.9)	23 (9)	23 (45.8)
Bacterial conjunctivitis	17 (30.9)	23 (41.8)	15 (27.3)
Vernal keratoconjunctivitis	0	8 (27.6)	21 (72.4)
Corneal foreign body	2 (33.3)	2 (33.3)	2 (33.3)
Hordeolum	0	1 (20)	4 (80)
Blepharitis	1 (5.3)	7 (36.8)	11 (57.9)
Corneal ulcer	3(17.6)	5 (29.4)	9 (52.9)
Lid laceration	0	1 (14.3)	6 (85.7)
Corneal scar	0	1 (25)	3 (75)
Infectious conjunctivitis	1 (12.5)	5 (62.5)	2 (25)
Orbital cellulitis	0	3 (100)	0
Preseptal cellulits	0	2 (40)	3 (60)
Chemical injury	0	0	1 (100)
Opthalmia neonaturum	15 (100)	0	0
Corneal foreign body	3 (33.3)	3 (33.3)	3 (33.3)
Lid laceration	0	1(14.3)	6 (85.7)
Refractive error	0	2 (33.7)	3 (66.3)
Congenital eye problems			
Congenital cataract	6 (50)	2 (16.7)	4 (33.3)

Retinoblastoma	3 (50)	0	3 (50)
Congenital glaucoma	1 (25)	0	3 (75)
Infantile esotropia	3(100)	0	0
Iris heterochromia	1 (100)	0	0
Moluscum contagiosum	1 (100)	0	0
Demoid cyst	0	1 (100)	0
Dacrocystitis	3 (75)	0	1 (25)

Table 4: Distribution of eye problems among age groups.

The table shows the eye problems and there percent of case according to each group. It shows that allergic conjunctivitis was leading in preschool age group (3-5 years), bacterial conjunctivitis was leading in the toddlers (1-2 years) while congenital cataract was leading on the infants (<1-11 months). P<0.05 was considered statistically significant. The association between age and eye problems was found to be p = 0.000, (x^2 = 17.313, df = 2).

Distribution of acquired and congenital eye problems amongst males and females

Figure 3: Distribution of acquired and congenital eye problems amongst males and females.

The graph above shows that males had more prevalence of congenital eye problems representing 65.71% followed by acquired eye problems which had a prevalence of 56.13%. While in females as compared to males the prevalence was found to be low with 43.87% in acquired eye problems and 34.29% in congenital eye problems.

Acquired eye problems	Female n (%)	Male n (%)
Allergic conjunctivitis	28 (47.5)	31 (52.5)
Bacterial conjunctivitis	26 (47.3)	29 (51.7)
Vernal keratoconjunctivitis	10 (34.5)	19 (65.5)
Corneal foreign body	0	6 (100)
Hordeolum	2 (40)	3 (60)
Blepharitis	8 (42.1)	11 (36.8)
Corneal ulcer	3(47.1)	5 (52.9)
Lid laceration	3 (42.9)	4 (57.1)
Corneal scar	2 (50)	2 (50)
Infectious conjunctivitis	0	8 (100)
Orbital cellulitis	2(66.7)	1 (33.3)
Preseptal cellulits	4 (20)	1 (80)
Chemical injury	1	0
Opthalmia neonaturum	7(46.7)	8 (53.3)
Corneal foreign body	0	6 (100)
Lid laceration	0	1(14.3)
Refractive error	3 (66.3)	2 (33.7)
Congenital eye problems		
Congenital cataract	5 (41.7)	7 (58.3)
Retinoblastoma	1 (16.7)	5 (83.3)
Congenital glaucoma	1 (25)	3 (75)
Infantile esotropia	3 (100)	0
Iris heterochromia	0	1 (100)
Moluscum contagiosum	1(100)	0
Demoid cyst	1 (100)	0
Dacrocystitis	2 (50)	2 (50)

Table 5: Distribution of eye problems in gender.

The table above shows the prevalence of individual eye problems in males and females, whereby males have 31 case of allergic conjunctivitis, followed by bacterial conjunctivitis with 29 cases.

Testing for association between eye problems and gender, p = 0.284 (x^2 = 38.206, df = 34).

Figure 4: Distribution of congenital and acquired eye problems according to year of visit.

The records were from 2015-2017. In the year 2017, 37.5% (108) cases were seen and 54.29% had congenital eye problems and 35.18% had acquired eye problems. 34.7% (100) records were sampled were sampled in 2016, 35.97% had acquired eye problems and 25.71% had congenital eye problems. And 27.8% (80) records were sampled in 2015, 28.85% had acquired eye problems and 20.0% had congenital eye problems.

Discussion, Conclusion and Recommendations

Discussion

Distribution of prevalence of congenital and acquired eye problems

The results of this study shows that there is a 12.2% prevalence of congenital eye problems amongst all the cases seen in the study population at MCH from 2015-2017. These results when compared to the study conducted in Ghana (52% of congenital anomalies) by Ilechie [2], has a low prevalence possibly due to the larger sample size used by Illeche. But agrees with 8.2% prevalence seen in Nigeria [9]. However, the prevalence reported in this study can be regarded as an underestimation of the actual cases that could be seen in Malawi due to the fact that though MCH is a major referral hospital in the northern region, more congenital cases are referred to QECH because of the presence of a paediatric ophthalmologist.

Topping the list of congenital anomalies seen are; cataract which had a prevalence of 4.2% followed by retinoblastoma (2.1%) and glaucoma (1.4%) as well as dacrocystitis (1.4%). These results are in agreement with the studies conducted in Ghana and Nigeria which had more prevalence in congenital cataract with 16.8% [2] and 3.6% [9] respectively. As suggested by Achigbu., *et al.* [9], congenital cataract and glaucoma are the highest causes of childhood blindness worldwide especially in low-income countries, while retinoblastoma remains the most fatal, especially when diagnosed late.

However, in acquired eye problems, the prevalence was found to be 87.8% which is similar to what was reportedly found in Ethiopian (40%) and Nigeria, 78.48% [9] respectively. Allergic conjunctivitis was found to have the highest prevalence 20.5%, followed by bacterial conjunctivitis 19.5%, vernal keratoconjunctivitis (10.1%), corneal ulcer (5.9%) and opthalmia neonaturum (5.2%). Similar pattern were noticed in a Nigerian study by Achigbu., *et al.* [9] and Ethiopian studies by Demissie and Demissie [3].

Distribution of eye problems according to age

The study results shows that the age group of 3-5 years that is to say 44.1% (127) had more cases of eye problems followed by 1-2 years which had 31.6% (91) cases and <1-11 months which had 24.3% (70) cases. The 3-5 years age group had more cases because this is the likely group that is able to report to their parents any unusual feeling. The study found that association of age and eye problems was statistically significant (p = .000), the results agrees with Achigbu., *et al.* [9] who also found that age and eye problems were statistically significant.

The study results have shown that among the age groups, congenital eye problems were found to be prevalent in <1-11 months (51.43%) followed by 3-5 years which had 11.43 % and 1-2 years had the lowest with 11.43 %. Whereby congenital cataract was leading in the infants while congenital glaucoma was the lead in the other two age groups. These results collaborates with Iliche

[2] who also found a high prevalence of congenital eye problems more in infants because the study site was a major tertiary hospital receiving most congenital conditions from the whole country. In contrast is the study in India which found dacrocystitis to be leading in the congenital eye problems [10].

While acquired eye problems were more in the age group of 3-5 years (45.06 %) followed by 1-2 years with 34.39% prevalence and finally <1-11 months with a prevalence of 20.5%. It is noteworthy to state that the leading causes of eye problem among the different age groups were allergies in the 3-5 years age group followed by vernal keratoconjunctivitis while bacterial conjunctivitis was leading in the age group of 1-2 years and opthalmia neonaturum was topping the least amongst the <1-11 months. The 3-5 years (preschool) had more cases on allergies and VKC this may be because this group usually plays without proper observation by parents or teachers in our setting therefore they are likely to face the predisposing factors for example dust. These results agrees also with the study in Nigeria by Achigbu [9] which a 40.72% allergies in the preschool age group. The similarity of the results may be likely due to the dusty local environment (largely farming communities), the study season (which favors vernal catarrh), and the climate itself.

Distribution of eye problems among males and females

According to the results as seen in table 1, there were more cases of eye problems amongst males than female patients. The male patients had a higher prevalence in both acquired (65.71%) and congenital (56.13%) eye problems compared to their female counterparts who had 43.87% and 34.29% for acquired and congenital eye problems respectively. Males were predominantly affected in some similar studies for example Achigbu., *et al.* in Nigeria which reported a 54.4% prevalence of acquired eye problems in males. In males, topping the list was allergies which had 31 cases, followed by bacterial conjunctivitis and VKC, congenital cataract were seen to be on top of the list of congenital eye problems with 7 cases. In females preseptal cellulitis was the lead with 4 cases.

However, the results has shown that there was no statistically significant association between eye problems and gender i.e. p = 0.284. This is similar to a study by Achigbu., *et al.* [9] and also Chaudhri and Tupe [10] which also found there was no statistical significant relationship of gender with eye problems. As such one can infer that congenital and acquired eye problems can happen to a baby irrespective of the gender [11-14].

Conclusion

The main aim of this study was to determine the prevalence of eye problems amongst under five children at ophthalmology department Mzuzu central hospital. This study concluded that there is high prevalence of acquired eye problems and low prevalence of congenital eye problems among 3-5 years age group and 1-2 years age group from 2015 to 2017, at MCH.

Recommendations

The following recommendations has been made based on findings of the study.

- Early and specialized treatment is required to minimize the socioeconomic burden of these causes of blindness especially as the affected children require lifelong management.
- More studies can be conducted to know if there are associated factors towards the development of some of these diseases and efforts made towards its prevention
- Efforts should be put by hospitals and patients towards conducting well baby's screening so as to detect both acquired and congenital eye problems on time therefore prevent possible progression and further damages.
- Advocating early presentation to hospitals for timely intervention
- Parents and caregivers should be educated on safe play among children while paying focus on allergic eye problem.

Declarations

Funding there is no conflict of interest as the authors received no funding for this work.

Acknowledgement

Professor Rochelle Holm and members of Optometry Department, Mzuzu University for their support during the writing and reviewing of this journal article.

Bibliography

1. Jonas DE. "Vision screening in children aged 6 months to 5 years". *JAMA Journals* 9 (2017): 845-858.

2. Ilechie A., *et al*. "Prevalence of congenital anomalies in a paediatric clinic in Ghana". *Eastern Mediterranean Health Journal* 19.3 (2013): 76-80.

3. Demissie BS and Demissie ES. "Patterns of eye diseases in children visiting a tertiary Teaching Hospital: south-Western Ethiopia". *Ethiopian Journal of Health Science* 24.1 (2014): 69-74.

4. Bates A. "Common eye problems among children". *London Journal of Primary Eye Care* 3.1 (2010): 27-30.

5. Turbert D. "Preschool vision: 3 to 5 years of age". *American Optometric Association* (2017).

6. Khandekar R., *et al*. "Eye and vision defects in under-five-year old children in Oman: A public health intervention study". *Oman Journal of Ophthalmology* (2010): 13-17.

7. Lowth M. "Eye problems in babies". Health articles (2016).

8. Castenes M. "Major review: the underutilization of vision screening (for ambylopia, strabsmus and optical anomalies) among preschool children". *Binocular Vision and Strabismus Quarterly* 18.4 (2003): 217-232.

9. Achigbu EO., *et al*. "Spectrum of Eye Disorders Seen in a Pediatric Eye Clinic South East Nigeria". *Nigerian Journal of Surgery* 23.2 (2017): 125-129.

10. Chaudhari S and Parag T N. "A study on the prevalence of congenital ocular anomalies in paediatric age group". 4.4 (2015).

11. Boyd K. "Baby's vision development: what to expect the first year". *American Academy of Ophthalmology* (2017).

12. Neuman LW. "Basics of social research: qualitative and quantitative approaches (2 ed.)". Boston: Pearson (2007).

13. Saunders LM and Thornhill A. "Research Methods for Business Students". Harlow: Pearson Education Limited (2003).

14. Singh AS and Masuku MB. "Sampling techniques and determination of sample size in applied statistics: an overview". *International Journal of Economics, Commerce and Management* 2.11 (2014): 1-21.