Original Article

A Survey of Pediatric Eye Diseases in a Tertiary Hospital in Osogbo, South-west Nigeria

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Abstract

Background: Identifying common eye diseases in childhood is a Step towards the prevention of visual impairment and preservation of vision in children who still have many productive years ahead. **Aim:** The aim is to determine the spectrum of eye disorders in children attending a tertiary health institution to plan preventive and curative strategies**. Methodology:** This was a 4-year retrospective study of children 0–16 years who presented to a tertiary institution. Through retrieval and study of case notes, information on age, sex, duration before the presentation, month of presentation, and diagnosis were obtained and analyzed using descriptive statistics. **Results:** Of 1120 case notes, studied, (53.8%) were male and (46.2%) female in a ratio of 1.6:1. The mean age was 8.54 years ± 5.03 and the modal age group was 11–16 years ± 0.85. About 51% (51.2%) had normal vision while (13.4%) were blind. The commonest eye disorders were conjunctivitis 488 (43.3%), refractive errors 292 (26.1%), and cornea-related problems 94 (8.4%). The less frequent disorders found were trauma 65 (5.8%), cataract 63 (5.6%), glaucoma 14 (4.3%), uveitis 7 (0.6%), and strabismus/others 67 (6.0%). Cataract 36/150 (24.0%) and refractive error 107/198 (54.0%) were the most common causes of blindness and visual impairment. Most children presented after 2–3 weeks of the onset of symptoms. Refractive error was more prevalent in females 176/518 (34.0%), while trauma was more prevalent in males 42/602 (7.0%). **Conclusion:** The common causes of ocular diseases in children in this study are avoidable. There should be an unrelenting effort toward the prevention of visual impairment or amblyopia by the provision of adequate treatment through subsidized eye care services. A follow-up study to ascertain the causes of delay in presentation would be helpful.

Keywords: Children, eye care services, eye diseases, hospital, prevention

Introduction

Pediatric ocular problems are one of the major causes of attending eye clinics, therefore, leading to absenteeism in schools.[1,2] Children aged 0–14 years have been found to constitute about 42.54% of the population in Nigeria.[3] This proportion is significant so they, therefore, need to be properly taken care of since they are the future of our nation. Early identification and treatment of ocular problems or diseases is a step toward the preservation of healthy ocular status and vision as well as prevention of visual impairment in children who still have many productive years ahead. This is even more important as the number of "blind person-years" resulting from blindness in childhood is second only to cataract.[4] It is also known that the majority of the causes and burden of visual impairment occur in developing countries particularly in sub-Saharan Africa.[4]

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In a hospital-based study in 2010, in Ethiopia, the order of frequency of ocular problems from the most common was external eye infection (30.5%), allergies (28.1%), and ocular injuries (15.5%).[5] A previous study from southwestern Nigeria in 2009 reported the most prevalent pediatric eye problems to be ocular trauma (21.7%), followed by ocular allergy (17.8%) and infections (15.4%).[2] A similar study in the southeastern part of the country showed allergic conjunctivitis 40.72% as the most prevalent cause of childhood presentation followed

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by refractive error (22.16%) and trauma (7.98%).[1] In a collaborative, prospective study conducted in Punjab, among children visiting a Tertiary Teaching Hospital, the most common ocular problems in order of frequency were refractive error, ocular injury, and optic atrophy.[6] According to the 2006–2011 World Health Organization bulletin on vision 2020 Action plan, the most common causes of pediatric blindness were optic nerve and retinal pathologies in the developed world while in developing countries; cornea opacity still remained the leading cause of blindness, especially in Africans, but the rate had reduced.[7] In a revised 2018 report from the fact sheet on causes of childhood vision impairment, cataract was the commonest cause of treatable blindness in developing countries like Africa, while retinopathy of prematurity was becoming a problem in the middle-income countries like Brazil.[8] Childhood visual impairment could affect the academic and social development of the child. Consequently, such a child may have difficulty fulfilling his or her life ambition with attendant economic and emotional implications.[9] Treating or correcting impaired vision in childhood is important since any resulting poor vision from amblyopia cannot be corrected in adulthood. This is one of the reasons eye care in children is very important. Timely detection and intervention is paramount in preventing childhood blindness and salvaging many blind years.

The aim of this study was to highlight the common pediatric ocular disorders seen at a tertiary eye clinic in Osogbo, South Western Nigeria. It also aims to generate data for advocacy towards better planning for the prevention and treatment of these conditions in the institution, Osun State and the neighboring states.

Advocacy would be made for a plan of prevention and treatment of these common conditions to be put in place by the hospital management. It is hoped that this would help to reduce common childhood eye disorders within the hospital catchment areas and community.

Methodology

A retrospective, cross-sectional study of children aged 16 years and below who visited the eye clinic of Ladoke Akintola University of Technology Teaching Hospital, Osogbo, Osun State, Nigeria, for the first time from January 2015 to December 2018 was conducted. Case notes were retrieved and reviewed. Children whose case notes could be retrieved and had complete information were included in the study. Information obtained were biodata, history of the presenting complaints, the duration of the complaints, time of the year patient presented, past ocular history, previous treatment obtained, ocular findings after examination without or under anesthesia. These were recorded in a preformed pro forma. Visual acuity (VA) was classified according to the new form for the recording of visual impairment in children.[10]

Data management

The information obtained was analyzed using the IBM SPSS (Statistical Package for the Social Sciences) Inc., Chicago, IL, USA version 20.0 through descriptive analysis for categorical variables. Frequencies, mean, standard deviations, and bivariate analysis were carried out. Value of $P < 0.05$ was taken as the level of significance.

Ethics

Ethical approval was obtained from the Health Research and Ethics Committee, College of Health Sciences of Osun State University.

Results

Of a total of 1120 children's cases studied, 602 (53.8%) were male and 518 (46.2%) were female with a male-to-female ratio (M: F) of 1.16:1. Their ages ranged from 1 month to 16 years with a mean of 8.54 ± 5.03 years. The modal age group was 11–16 years ± 0.85. Table 1 shows the age and sex distribution.

The 11–16 years age group had the highest subjects 442 (39.5%) with more males in the 0–5 and 6–10 years groups and more females in the 11–16 years group in an association that was statistically significant $P = 0.001$ [Table 1].

The VA showed that over half presented with normal vision while 13.4% presented with blindness. Normal vision was defined as 6/6–6/18, 6/24–6/60 as moderate visual impairment, <6/60–3/60 as severe visual impairment, while blindness was <3/60-no light perception [Table 2].

Figure 1 shows that the longest duration of symptoms was between 2 and 3 weeks before presentation with 370 (33.0%) as the frequency of complaints while the least period of the presentation was within 24 hours with 56 (5.0%) as the frequency of complaints. The mean duration of symptoms before presentation was 3.6 weeks while the modal period was 4 weeks ± 0.6.

Table 1: Distribution of age group in years by sex

Sex	Age group in years			Total
	0-5	6-10	11-16	
Male	218 (36.2)	177 (29.4)	207 (34.4)	602 (53.7)
Female	158 (30.5)	125 (24.1)	235 (45.4)	518 (46.3)
Total	376 (33.6)	302 (27.0)	442 (39.5)	1120 (100.00)

Table 2: Classification of blindness and visual impairment in childhood 10

Visual acuity categories	Frequency (%)
6/4-6/18 (normal vision)	574 (51.3)
6/24-6/60 (moderate visual impairment)	154 (14.6)
<6/60-3/60 (severe visual impairment)	34 (3.0)
<3/60-NPL (blindness)	150 (13.4)
Believed sighted/follows light	197 (17.6)
Believed not sighted	1 (0.1)
Total	1120 (100)

NPL: No Perception of Light

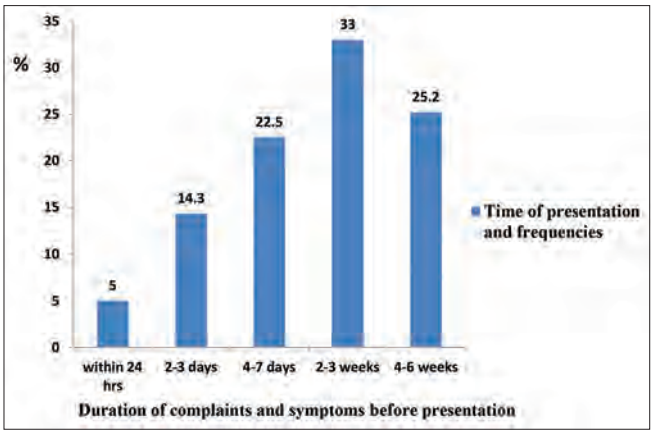

Figure 1: Frequency distribution of duration of complaints and symptoms before presentation

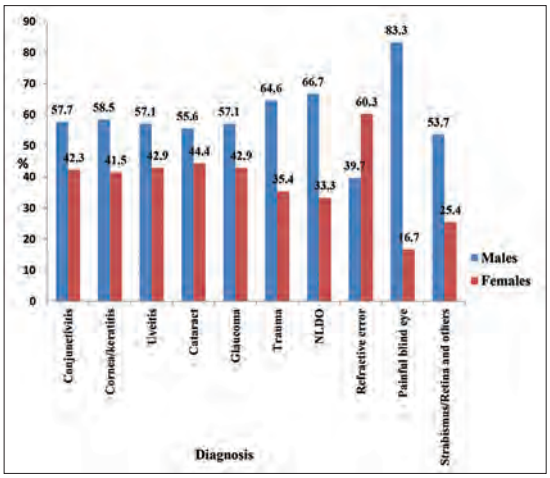

Figure 2: Distribution of diagnosis by gender

Four main types of diseases occurred throughout the year. The distribution of the conditions shows the highest being conjunctivitis 488 (43.3%) and uveitis 7 (0.6%) being the lowest as shown in Table 3. Among the types of conjunctivitis, allergic/vernal conjunctivitis constituted 390 (80.0%) while infective conjunctivitis and others constituted 98 (20.0%). Most of the conjunctivitis occurred between October and April $P = 0.000$.

In the 0–5-year-old group, conjunctivitis, cornea pathologies, nasolacrimal duct obstruction (NLDO), and retinal disorders were prominent; cataract was more common among the 6–10–year–old group, while trauma and a painful blind eye was prevalent in the 11–16–year–old group [Table 4].

Certain diseases were more common in a particular gender and age group as shown in Figure 2 and Table 5, $P = 0.000$.

The common causes of blindness are cataract 36 (24.0%), trauma 34 (22.7%), and cornea related problems 29 (19.3%). Severe visual impairment was caused by cataract, refractive error, and cornea-related problems with 8 (23.5%) each, while moderate visual impairment was caused by refractive error 99 (60.4%), conjunctivitis 30 (18.3%), and cornea-related problems 7 (4.3%) [Table 6].

Discussion

This study has demonstrated the distribution of childhood eye diseases in a tertiary institution, which is a large hospital data to be used for planning and advocacy.

The modal age group was the oldest age group of 11–16 years. The children in this group constituted the largest because they are probably more mature, less timid, and better able to express their needs. Similar findings were reported in Nigeria, Tikrit, and Palestine[1,11,12] [Table 1]. In a study that was undertaken in Palestine however, the 0–5 year age group was the modal age group as compared to this study.[12]

The male preponderance of this population is similar to previous reports in Enugu[1] and Ilesha[2] in Nigeria, Jimma in Ethiopia,[5] and Riyahd in Saudi Arabia.[13] It was however different from the report of another study carried out by researchers in Osogbo which recorded a female preponderance.[14] Reasons for these are not easily known. However, it could be due to geographical location and the people's attitude to the uptake of health care services.

Majority of the children presented with normal vision**.** This was expected considering the high prevalence of conjunctivitis and few cases of refractive error [Table 2].

Likewise, in a similar study conducted in Riyadh, Saudi Arabia, up to 91.2% had normal vision.[13]

Most of the patients presented at 2–3 weeks of the onset of the complaints. Many parents may have tried some other means of management of the conditions, for example, getting over-the-counter drugs from drug stores or pharmacy,[14] trying suggestions from friends and well-wishers, especially for cases they do not consider as emergencies, before taking the eye problems to the specialist. Some are also referred by the general medical practitioners who may be at the first port of call while others may not have the financial back up for immediate medical attention. This was in comparison with the Enugu study in which 42.09% of the children (almost half of them) presented >1 year after the onset of the eye problems.[1] This could have to do with the distance required to get to the hospital.

In various regions, there have been varying causes of eye diseases in children reported. In our study, conjunctivitis from varying causes such as allergic-type followed by infective was the most recurring visual disorder similar to findings by other workers.[1,6,11,13] Comparatively, the percentage of allergic conjunctivitis was higher (80%) in our study than was seen in Ethiopia while the infective conjunctivitis was higher (40%) in Ethiopia than in our study (20%). This was most likely due to the occurrence of trachoma conjunctivitis in Ethiopia which was absent in our population. Conjunctivitis was also the second commonest disorder from a study in a neighboring institution and in the study carried out by Banayout *et al.* in Palestine

Table 3: Months of presentation versus diagnosis

Months of presentation	Diagnosis										
	Conjunctivitis	Cornea/Keratitis	Uveitis	Cataract	Glaucoma	Trauma	NLDO	Reference error	Painful blind eye	Strabismus/retina and other	Total
January	47 (48.0)	12 (12.2)	1 (1.0)	7 (7.1)	0 (0.0)	3 (3.1)	0 (0.0)	19 (19.4)	3 (3.1)	6 (6.1)	98 (8.8)
February	50 (39.7)	13 (10.3)	1 (0.8)	1 (0.8)	1 (0.8)	5 (4.0)	1 (0.8)	40 (31.7)	6 (4.8)	8 (6.3)	126 (11.3)
March	58 (56.3)	8 (7.8)	1 (1.0)	10 (9.7)	0 (0.0)	5 (4.9)	0 (0.0)	15 (14.6)	3 (2.9)	3 (2.9)	103 (9.2)
April	66 (56.9)	4 (3.4)	1 (0.9)	3 (2.6)	1 (0.9)	4 (3.4)	2 (1.7)	28 (24.1)	2 (1.7)	5 (4.3)	116 (10.4)
May	37 (43.0)	7 (8.1)	0 (0.0)	5 (5.8)	4 (4.7)	4 (4.7)	1 (1.2)	24 (27.9)	0 (0.0)	4 (4.7)	86 (7.7)
June	23 (29.5)	8 (10.3)	0 (0.0)	5 (6.4)	1 (1.3)	8 (10.3)	1 (1.3)	23 (29.5)	2 (2.6)	7 (9.0)	78 (7.0)
July	39 (41.9)	9 (9.7)	0 (0.0)	5 (5.4)	2 (2.2)	10 (1.0.8)	1 (1.1)	18 (19.4)	1 (1.1)	8 (8.6)	93 (8.3)
August	32 (38.6)	8 (9.6)	1 (1.2)	4 (4.8)	0 (0.0)	7 (8.4)	2 (2.4)	26 (31.3)	0 (0.0)	3 (3.6)	83 (7.4)
September	27 (44.3)	3 (4.9)	1 (1.6)	3 (4.9)	1 (1.6)	3 (4.9)	1 (1.6)	20 (32.8)	0 (0.0)	2 (3.3)	61 (5.4)
October	28 (35.9)	7 (9.0)	0 (0.0)	6 (7.7)	0 (0.0)	2 (2.6)	1 (1.3)	26 (33.3)	1 (1.3)	7 (9.0)	78 (7.0)
November	38 (36.2)	9 (8.6)	1 (1.0)	8 (7.6)	1 (1.0)	6 (5.7)	1 (1.0)	33 (31.4)	0 (0.0)	8 (7.6)	105 (9.4)
December	40 (43.0)	6 (6.5)	0 (0.0)	6 (6.5)	3 (3.2)	8 (8.6)	4 (4.3)	20 (21.5)	0 (0.0)	6 (6.5)	93 (8.3)
Total	488 (43.3)	94 (8.4)	7 (0.6)	63 (5.0)	14 (1.3)	66 (5.8)	15 (1.3)	292 (26.1)	18 (1.6)	67 (6.0)	1120 (100.0)

NLDO: Nasolacrimal duct obstruction

Conjunctivitis has been known to cause absenteeism from school so it is important to treat it adequately and give proper counseling to reduce the frequency of hospital visits, thereby making the children attend school more regularly. Poor performance in school has also been attributed to conjunctivitis.[1] Refractive error was commoner in females compared to males. This could be explained by improved cosmetic appearance cherished by young girls who believe this can be achieved with the wearing of spectacles. They would therefore not hesitate to present to the hospital for possible spectacle correction for blurred distant vision. A study of school children aged 7–15 years in Bangalore documented that girls were more likely to wear glasses than boys and were also more compliant in wearing glasses.[15]

Refractive errors occurring in the oldest age group of 11–16 years could also be a reflection of the expression of interest and boldness to complain about disturbing problems. The prevalence of refractive error in this study (26.1%) was comparatively lower than that found in Onitsha, South-eastern Nigeria (86.6%). This is not surprising because theirs was a community-based cross-sectional study of 5–15–year–old school children.[16]

In our study, conjunctivitis, keratitis, cataract, and NLDO were common in the under 6 years age group. These diseases in this age group occur in the earlier ages especially as toddlers. For example, cataract and NLD could be congenital while others could set in right from early infancy. Trauma in the 6–10 years age group supports the very active, school-age and playful age group when injuries normally occur due to unsupervised play. Researchers in Egypt, eastern Nigeria, and India also found that males older than 5 years and who were not supervised at play were the group that most commonly sustained ocular injuries.[17-19]

The months of presentation were predominantly October to April which are the months that fall within the dry season during which allergy, which is a common cause of conjunctivitis is usually on the increase. Some studies conducted on allergic conjunctivitis found that the months of July,[20] August, and October[21] were the predominant months.

In this study, apart from refractive errors, all the ocular disorders were found to occur more in the males most likely because they outnumbered the females in frequency.

The common causes of blindness and visual impairment were avoidable. The treatable ones are the cataract, glaucoma, and strabismus while the preventable ones are the trauma and cornea-related diseases and some strabismus. The corneal related cases were definitely not associated with trachoma keratitis as no diagnosis of such was recorded as compared with other causes of keratitis seen in Ethiopia.[5]

Refractive error was still the most common cause of visual impairment in our study as it constituted (60.4%) and (23.5%) of the causes of moderate and severe visual impairment respectively. This is similar to the results in Eastern Nigeria.[16] Refractive error is easily treatable by prescribing glasses. The best way to do this is to provide free low-cost spectacles

Table 4: Diagnosis versus age group

Diagnosis	Age group in years			Total
	0-5	6-10	11-16	
Conjunctivitis	213 (43.9)	124 (25.6)	148 (30.5)	485 (43.3)
Cornea/keratitis	40 (42.6)	24 (25.5)	30 (31.9)	94 (8.4)
Uveitis	1 (14.3)	3 (42.9)	3 (42.9)	7 (0.6)
Cataract	26 (41.3)	23 (36.5)	14 (22.2)	63 (5.6)
Glaucoma	6 (42.9)	2 (14.3)	6 (42.9)	14 (4.3)
Trauma	13 (20.0)	23 (35.4)	29 (44.6)	65 (5.8)
NLDO	11 (2.9)	3 (1.0)	1 (6.7)	15 (1.3)
Refractive error	23 (7.9)	83 (28.4)	186 (63.7)	292 (26.1)
Painful blind eye	7 (38.9)	3 (16.7)	8 (44.4)	18 (1.6)
Strabismus/retina and others	36 (53.7)	14 (20.9)	17 (25.4)	67 (6.0)
Total	376 (33.3)	302 (27.0)	442 (39.5)	1120 (100.0)

NLDO: Nasolacrimal duct obstruction

Table 5: The diagnosis versus age-group versus gender

Gender	Diagnosis	Age group in years			Total
		0-5	6-10	11-16	
Male	Conjunctivitis	126 (57.8)	77 (43.5)	77 (37.2)	280 (46.5)
	Cornea/keratitis	21 (9.6)	16 (9.0)	18 (8.7)	55 (9.1)
	Uveitis	0 (0.0)	2 (1.1)	2 (1.0)	4 (0.7)
	Cataract	14 (6.4)	11 (6.2)	10 (4.8)	35 (5.8)
	Glaucoma	3 (1.4)	1 (0.6)	4 (1.9)	8 (1.3)
	Trauma	8 (3.7)	15 (8.5)	19 (9.2)	42 (7.0)
	NLDO	7 (3.2)	2 (1.1)	1 (0.5)	10 (1.7)
	Refractive error	13 (6.0)	43 (24.3)	60 (29.0)	116 (19.3)
	Painful blind eye	5 (2.3)	2 (1.1)	8 (3.9)	15 (2.5)
	Strabismus/retina and others	21 (3.5)	8 (1.3)	8 (1.3)	37 (6.1)
	Total	218	177	207	602 (100)
Female	Conjunctivitis	87 (55.1)	47 (37.6)	71 (30.2)	205 (39.6)
	Cornea/keratitis	19 (12.0)	8 (6.4)	12 (5.1)	39 (7.5)
	Uveitis	1 (0.6)	1 (0.8)	1 (0.4)	3 (0.6)
	Cataract	12 (7.6)	12 (9.6)	4 (1.7)	28 (5.4)
	Glaucoma	3 (1.9)	1 (0.8)	2 (0.9)	6 (1.2)
	Trauma	5 (3.2)	8 (6.4)	10 (4.3)	23 (4.4)
	NLDO	4 (2.5)	1 (0.8)	0 (0.0)	5 (1.0)
	Refractive error	10 (6.3)	40 (32.0)	126 (53.6)	176 (34.0)
	Painful blind eye	2 (1.3)	1 (0.8)	0 (0.0)	3 (0.6)
	Strabismus/retina and others	15 (9.5)	6 (4.8)	9 (3.8)	30 (5.8)
	Total	158	125	235	518 (100)

NLDO: Nasolacrimal duct obstruction

but this is usually not practicable in a hospital situation since services have to be paid for, except if there are sponsored programs once in a while by Non-governmental organizations. Free spectacles distribution has not been very common among children as compared to among adults in our community. The reason may not be far-fetched as presbyopic glasses are easier to dispense than children's prescriptions. However, some school-based and community-sponsored studies have been able to dispense free or subsidized spectacles to children which are different from a hospital-based setup where services have to be paid for.[22,23] It would be best to give out free or subsidized spectacles to children in our hospitals through the dispensing unit as previously advocated by the same author.[24] For the treatable causes of blindness such as cataract and glaucoma, Specialists who are trained pediatric ophthalmologists are needed for managing these conditions. These will give the children the best visual results and also prevent complications that can render the children blind leading to many blind years. The hospital also needs to equip the pediatric ophthalmology unit adequately in order to give the best results. Referrals to other hospitals will also be reduced.

These will assist in the reduction of blindness and visual impairment in children in the hospital catchment area.

Table 6: Diagnosis versus presenting visual acuity

Diagnosis	Presenting visual acuity							Total (%)
	6/4-6/18	6/24-6/60	<6/60-3/60	<3/60-NPL	Believed sighted	Follows light	Believed not sighted	
Conjunctivitis	306 (53.3)	30 (18.3)	3 (8.8)	14 (9.3)	111 (70.3)	21 (53.8)	0 (0.0)	485 (43.3)
Cornea/keratitis	34 (5.9)	7 (4.3)	8 (23.5)	29 (19.3)	9 (5.7)	7 (17.9)	0 (0.0)	94 (84.4)
Uveitis	2 (0.3)	3 (1.8)	0 (0.0)	2 (1.3)	0 (0.0)	0 (0.0)	0 (0.0)	7 (0.6)
Cataract	9 (1.6)	5 (3.0)	8 (23.5)	36 (24.0)	2 (1.3)	3 (7.7)	0 (0.0)	63 (5.6)
Glaucoma	3 (0.5)	2 (1.2)	0 (0.0)	3 (2.0)	6 (3.8)	0 (0.0)	0 (0.0)	14 (1.2)
Trauma	18 (3.1)	5 (3.0)	5 (14.7)	34 (22.7)	2 (1.3)	1 (2.6)	0 (0.0)	65 (5.8)
NLDO	7 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)	8 (5.1)	0 (0.0)	0 (0.0)	15 (1.3)
Refractive error	168 (29.3)	99 (60.4)	8 (23.5)	5 (3.3)	9 (5.7)	3 (7.7)	0 (0.0)	292 (26.1)
Painful blind eye	8 (1.4)	3 (1.8)	0 (0.0)	4 (2.7)	1 (0.6)	2 (5.1)	0 (0.0)	18 (1.6)
Strabismus/retina and others	19 (3.3)	10 (6.1)	2 (5.9)	23 (15.3)	10 (6.3)	2 (5.1)	1 (100.0)	67 (6.0)
Total	574 (51.2)	164 (14.6)	34 (3.0)	150 (13.4)	158 (14.1)	39 (3.5)	1 (0.1)	1120 (100.0)

NLDO: Nasolacrimal duct obstruction

Conclusion

The common causes of ocular diseases in children in this study are avoidable. There should be unrelenting effort towards the prevention of visual impairment or amblyopia by the provision of adequate treatment through subsidized eye care services. A follow-up study to ascertain causes of delay in presentation is advocated.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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