ORIGINAL ARTICLE

PATTERNS OF EYE DISEASES IN CHILDREN VISITING A TERTIARY TEACHING HOSPITAL: SOUTH-WESTERN ETHIOPIA

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ABSTRACT

BACKGROUND: About 19 million children worldwide live with visual impairments resulting from different ocular morbidities. This study aimed to identify the different causes of eye diseases in children visiting a tertiary eye centre at Jimma University Hospital.
METHODS: We conducted a retrospective review of charts of patients of <16 years of age who presented to Jimma University, Department of Ophthalmology (JUDO,) between January 1, 2010 and December 31, 2010. Data on age, sex, final diagnosis and treatments were collected and analyzed using SPSS version 16.0. Ratios, percentages and associations were calculated, interpreted and discussed. P-values below 0.05 were considered statistically significant.
RESULTS: Three-hundred-eighty children were seen at JUDO in the year 2010, most of them repeatedly. We evaluated the reports of 341 children (53% males). Children aged 11–15 years constituted the largest group (37%). The commonest childhood ocular diseases diagnosed in 2010 were ocular surface and eyelid infections (30.5%), ocular allergies (28.1%), ocular traumas and injuries (15.5%) and refractive errors (5.8%). Avoidable eye diseases accounted for about 97% of ocular morbidities.
CONCLUSION: Infectious causes of childhood ocular diseases are the major reasons of visits of children seen at the Eye Department. Most of the ocular morbidities in children during the study year were either treatable or preventable. Further study on childhood eye diseases at community level is required to design proper preventive and curative strategies for childhood eye diseases in the region.
KEYWORDS: Childhood eye diseases, visual impairment, Jimma, Ethiopia

DOI: http://dx.doi.org/10.4314/ejhs.v24i1.9

INTRODUCTION

Vision is very important for a child's development during infancy and early childhood and later on for learning and communications. Almost three-forth of a child's early learning is acquired through vision. Hence, visual impairment in early life has a major negative impact on children's growth and development leading to, for instance, delays in crawling and walking (1). Therefore, preventing visual loss or allowing a visually impaired child to have the correct treatment and restoration of vision at the right time will have paramount importance on the child's growth and development. 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 (2).

There are an estimated 19 million children worldwide with visual impairment of whom1.26 million are bilaterally blind. The causes of childhood eye diseases resulting in visual impairments in developing countries differ from those in developed countries. In general, infections

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and malnutrition are the common causes of visual impairment in children in developing countries whereas optic nerve lesions, retinal disorders and hereditary factors are the main causes in developed countries. Retinopathy of prematurity (ROP) is an important cause of visual impairment in children in middle-income countries. Of those who are blind, two-third live in developing countries and about half of them die within 1-2 years of becoming blind (3-5).

Vitamin A deficiency (VAD) with its ocular consequences is the single most common cause of visual impairment and blindness in children in the developing world. Studies showed that about 140 million children have VAD disorders and are at increased risk of blindness and mortality (6, 7).

Cataract in children can be congenital or acquired. Children with congenital cataract may present with whitish pupillary reflex, loss of fixation and inattentiveness to visual stimuli, squinting or/and nystagmus. Surgical removal of visually significant lens opacity in children as soon as possible is mandatory as the risk of amblyopia is high. Recent community-based study using key informant method showed that cataract is replacing xerophthalmia as the leading cause of blindness in children of <16 years of age in the study area (8).

It is difficult to get wider community-based studies done on ocular morbidities in children alone as more emphasis is usually given to adult counterparts. In the nationwide blindness survey done in Ethiopia in 2006 (both on adults and children), the prevalence of childhood blindness was 0.1% accounting for 6% of overall blindness in the country. The leading causes identified in the survey were xerophthalmia, ocular infections and cataract (9). A community-based study on common eye diseases in children of rural communities in Central Ethiopia identified active trachoma as the leading cause of ocular morbidity accounting for 37.7% of the children followed by refractive errors (6.3%) and non-trachomatous conjunctivitis (5.9%) (10). Another school-based screening for ocular abnormalities and low vision in children of Butajira Town revealed trachoma as the main cause of ocular morbidity accounting for 54%. The study also showed refractive errors as the leading causes of low vision and there were one or more ocular abnormalities in 62% of the students (11).

Knowledge on patterns of eye diseases in children provides useful baseline data for planning child eye care services in a given region or the whole of a country. Understanding the specific causes of visual reduction also helps in proper and efficient allocation and investment of resources for preventive and control measures as well as treatments of childhood eye diseases. Furthermore, it helps to prioritize and use resources proficiently where scarcity of resources is a concern. Therefore, this study, besides being the first of its kind in the region, aimed at identifying the types and common causes of ocular morbidities in children attending the Eye Department of a tertiary specialized hospital which gives comprehensive healthcare services to the whole South-western Ethiopia.

MATERIALS AND METHODS

This retrospective cross-sectional study was done at Jimma University Specialized Hospital (JUSH) Ophthalmology Department located in Jimma Town, 355km southwest of Addis Ababa in February 2011. JUDO gives eye care services to people coming from all of the South-western part of Ethiopia as this Eye Department is the only tertiary eye care centre in the south-west of the country.

Convenience sampling was used and all obtainable charts of children of <16 years old who were seen at JUDO from January 1, 2010 to December 31st, 2010 were included in the study. Card numbers of all children seen in 2010 were obtained from the Departments' card room daily registration books. Cards were sought in the card-room using the card numbers obtained and all available cards were collected for data recording. Relevant data which included sociodemographic characteristics, presenting visual acuity, final diagnosis and treatments provided were collected and recorded on pre-prepared data collecting formats for each chart separately. Data from cards of all children who were on follow-ups and seen repeatedly in the study year were recorded only once unless there were new diagnoses documented on follow-ups.

All data were checked for completeness using checklists on each format and then coded, entered into SPSS for windows version 16.0 and analyzed. Ratios and percentages were calculated and

tabulated. Possible associations with respect to age and gender were sought using p-values. The results were described, summarized and presented in tables. These were followed by interpretations of the results, discussions, conclusions and recommendations.

Ethical approval and permission to conduct the study was obtained from Jimma University Research and Publication Committee and JUSH. Confidentiality of the study was maintained by concealing the name of each patient on the data format sheets.

The following operational definitions were used;
Children: Those under 16 years of age
Normal Vision: Presenting visual acuity in one eye which is 6/18 or better
Low Vision: Presenting visual acuity in the better eye of <6/18 but equal or better than 3/60
Blindness: Presenting visual acuity in the better eye of less than 3/60
Visual impairment (low vision + blindness): Presenting visual acuity of <6/18 in the better eye
Severe visual impairment (SVI): Presenting visual acuity in the better eye of <6/60 but ≥3/60
Avoidable causes of blindness*:* Eye diseases which are either entirely preventable or treatable causes of blindness

RESULTS

Of the 380 children who were seen at JUDO from January 2010 to December 2010, charts of 341 children were obtained from the chartroom. The records on the charts revealed that 299 (88%) of the children came from Jimma Zone including Jimma Town and the rest 42 (12%) of them came from South Nations Nationalities and Peoples Region, Illubabor Zone or Gambela Regional State.

One hundred and eighty-two (53%) children were males while 159 (47%) were females (male to female ratio=1.14:1). Of the total, 126 children (37%) were between 11 and 15 years old and constituted the largest age-group (Table 1).

Table 1: Age group and sex distribution of children attending JUDO, Jimma, Ethiopia, 2010

Age in years	Sex		Total (%)	p-*value*
	Male	Female		
0-5	59	50	109 (32%)	>0.05
6-10	60	46	106 (31%)	>0.05
11-15	63	63	126 (37%)	>0.05
Total	**182**	**159**	**341 (100%)**	

Bilateral eye involvements in disease processes were seen in 132 (38.7%) children. Out of a total of 433 eyes involved in disease processes, the commonest ocular structure or anatomic site involved in different disease processes was the conjunctival tissue which was affected in 201 (46.4%) eyes followed by cornea in 70 (16.0%) eyes, eyelids in 56 (13.0%) eyes and refractive errors in 37 (8.5%) eyes. Other ocular structures involved included the lens in 20 (4.6%) eyes, lacrimal drainage apparatus in 11 (2.5%) eyes, uvea in 11 (2.5%) eyes and retina in 8 (1.8%) eyes. The remaining 19 (4.4%) eyes were from involvement of other ocular and adnexial structures in different disease processes (Table 2).

Table 2:Frequency distribution of the anatomic sites of abnormality leading to ocular diseases in children in JUSH at JUDO, Jimma, Ethiopia, 2010

Anatomic site of abnormality	Number of eyes (N=433)	Percent
Conjunctiva	201	46.4
Cornea	70	16.0
Eyelids	56	13.0
Refractive error	37	8.5
Lens	20	4.6
Lacrimal apparatus	11	2.5
Uvea	11	2.5
Retina	8	1.8
Other structures	19	4.4
Total	**433**	**100**

There were 15 (4.4%) children who had low vision and another 15 (4.4%) children who were blind. The remaining 311 (91.2%) had normal vision with VA ≥ 6/18 (Table 3).

Table 3: Visual acuity categories of children seen in JUSH, at JUDO, Jimma, Ethiopia, 2010

WHO category	Level of vision	Number	Percent
Normal Vision	≥ 6/18	311	91.2%
Low Vision	<6/18 – 3/60	15	4.4%
Blind	<3/60 – NLP	15	4.4%
Total		**341**	**100%**

Avoidable (either curable or preventable) causes of childhood ocular illnesses constituted to about 97% of the diseases. Infectious eye diseases were the commonest eye diseases identified accounting for 30.5% of the cases. Ocular allergies stand second accounting for about 28.1% of the cases. Ocular traumas accounted for about 15.5% of the cases, refractive error 5.8%, cataract 5.6%, VAD 5.3%. Other 9% of eye diseases diagnosed in the studied year included strabismus (8 cases), congenital glaucoma (6 cases), chalazion (4 cases), retinoblastoma (4 cases), phthisis bulbi (3 cases), microcornea (2 cases) and albinism, primary acquired melanocytosis, scleral ectasia and hereditary macular dystrophy (1 case each) (Table 4).

Table 4: Specific causes of childhood eye morbidities in JUSH at JUDO, Jimma, Ethiopia, 2010

Category	Diagnosis	Number (%)
Infectious	Bacterial conjunctivitis	59 (17.3)
	Keratitis and post-infectious corneal opacity	16 (4.7)
	Blepharoconjunctivitis	11 (3.2)
	Trachoma	18 (5.3)
Ocular allergies	Allergic conjunctivitis	63 (18.5)
	Vernal keratoconjunctivitis	25 (7.3)
	Atopic blepharoconjunctivitis	8 (2.3)
Trauma	Ocular traumas/injuries	53 (15.5)
Refractive Errors	Refractive Errors	20 (5.8)
Cataract	Cataract	19 (5.6)
Nutritional	Vitamin A deficiency disorders	18 (5.3)
Others*	See footnote	31 (9.0)
Total		**341 (100%)**

** Strabismus (8), glaucoma (6), chalazion (4), retinoblastoma (4), phthisis bulbi (3), microcornea (2), albinism (1), primary acquired melanocytosis (1), scleral ectasia (1), hereditary macular dystrophy (1)*

Most children (91%) in the year 2010 treated at JUDO had normal vision in the diseased eye on their first presentation. However, there were 15 (4.4%) children who were blind on presentation and were treated accordingly. Of these, six children had congenital cataract as a cause of blindness, five were blinded from corneal opacity secondary to VAD, two were diagnosed with post-infectious corneal opacity, one blinded from congenital glaucoma and another one was blinded from bilateral retinoblastoma. There were also other 15 children who had low vision on presentation to whom appropriate treatments were given. Those with VAD had keratoconjunctival xerosis and corneal scars.

About 263 (77%) children were managed and treated medically with different antibiotic eye medications, anti-allergies, anti-glaucomas and anti-inflammatory drugs based on their diagnoses. Fifty-six (16.4%) children were managed with different surgical procedures for their ocular conditions. Corrective eye glasses were prescribed for 17 (5.0%) children with refractive errors. Another 5(1.5%) children were referred to Menilik II Hospital Ophthalmology Department for further evaluation and management.

DISCUSSION

Children, unlike adults, have unique problems in terms of ocular morbidities not only due to their inability to articulate their eye problems but also because of the potential to develop amblyopia ('lazy-eye') in the event of visual impairment which will be irreversible unless appropriate measure is taken within specific periods of time during childhood.

There were no statistically significant differences in the distribution of eye diseases between male and female patients in all age groups ($p > 0.05$) (Table 1). In this study, the three most common eye conditions diagnosed in children at JUDO in the year 2010 were related to infections, allergies and injuries (Table 4). Different infectious causes of eye diseases were the leading causes of ocular morbidity in our set up accounting for 30.5% of all cases. In a similar hospital-based study done at Karachi, infectious causes of eye diseases accounted for about 40% of the children who visited the Eye Department (12).

Different forms of ocular allergies were the second commonest groups of eye diseases diagnosed (28.1%) followed by eye traumas and injuries (15.5%). In another similar hospital-based study, VKC was the commonest eye disorder diagnosed in 35.6% of the children (13). In the Karachi study allergy in the form of vernal catarrh was the third commonest disease seen in 12.1% of the children (12). Eye injuries in children can be minimized with public health education to parents and care-takers which includes preventing children from coming in contact or playing with sharp objects and potentially eye damaging instruments or household utensils.

In our study, eye diseases acquired in the postnatal period were the reasons for the visit of 93% of new children to JUDO. Among these, VAD disorders need considerations as VAD is preventable with measures that include dietary advices on vitamin A rich-foods like vegetables, milk and milk products, prevention of malnutrition, early treatment of gastroenteritis (especially diarrhoea and vomiting), immunization against measles and with distribution of vitamin A which is available free of charge in all health care centres. Since the launch of Vitamin A Global Initiative in1998, supplements are combined with immunization, and between 1998 and 2000, not only ocular morbidities but it was also possible to prevent about a million child deaths (7). A community-based study in Ethiopia showed that VAD was second to cataract as a cause of blindness in the studied community (8) though a study done in schools for the blind in Ethiopia ten years back put VAD as the leading cause of blindness (14).

Most of the newly diagnosed eye diseases in the study year were avoidable (97% of the cases); they were either preventable (17%) through proper eye health education to the community or treatable medically and/or surgically (80%). Conjunctival diseases in the form of infections and/or inflammations were the most prevalent ocular disorders seen in our study (46.4% of the eyes). This finding is similar to another hospital-based study in Nigeria (15) where allergic conjunctivitis and infections of the eye and its adnexa constituted about 33.2% of the cases seen, but another recent hospital-based study in Nigeria showed that refractive error was the most diagnosed eye problem while conjunctivitis is the second commonest (16).

Most children (91%) in the study year were seen and treated for minor ocular problems. This suggests that it is much helpful that ophthalmic services in zonal/district hospitals be established and run by mid-level eye professionals that can handle such simpler cases and reduce the burden on the referral hospital so that it can give more attention and focus on the serious child eye problems.

The total number of children seen daily within the studied year was actually much higher than the total number of diseases diagnosed. That was because many of the children were having follow ups and repeated visits (some four to five times) in the studied year to the Eye Department for single disease which is recorded only once in this study.

Our study was not without limitations particularly as it was retrospective study design. These limitations included the following. Not all charts of patients who were registered on the daily registration books were found from the card room for documentation; 39 charts (11%) were missing. In some charts, patient characteristics, evaluations, results and diagnoses were documented incompletely. Standard investigative and diagnostic methods including scanning and

imaging tools were also lacking and all these might have affected the final diagnoses and assessments. However, the strength of our study include that it is the first study at JUSH giving a general view of patterns of eye diseases in children thus indicating which areas of childhood ocular morbidities need further emphasis and worth paying more attention in order to use the available scarce resources economically and efficiently.

In conclusion, the most common causes of childhood ocular morbidities identified in children presenting to JUSH Eye Department in the studied year were ocular surface and eyelid infections, ocular allergies, eye injuries and refractive errors in decreasing frequency. As the majority of the ocular diseases were avoidable, a separate complete childhood eye unit/clinic within the department would have addressed these conditions more satisfactorily and without imposing any further burden to parents and families of these children. Low vision centre is also another area to consider establishing within the department as some of the children with permanently impaired vision will benefit a lot from the low vision services and rehabilitations.

ACKNOWLEDGEMENTS

We, the authors, are so grateful to all the chart room workers who were very cooperative in searching the cards of the children seen in the studied year. We would also like to extend our thanks to Jimma University for permitting us to do this study and for the fund provided. We are also so grateful to dearest Dr Selamawit Amare for her immeasurable support while doing this study.

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