

REFRACTIVE ERRORS IN CHILDREN ATTENDING OUT-PATIENT DEPARTMENT OF OPHTHALMOLOGY, KHYBER TEACHING HOSPITAL, PESHAWAR

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ABSTRACT

Objectives: The objectives of the study were to estimate the occurrence of refractive errors in children age up to 15 years, attending outpatient department of Ophthalmology Khyber Teaching Hospital Peshawar, identify their types and provide them with glasses.

Study design: A repetitive hospital based study.

Place and duration of study: Eye Department, Khyber Teaching Hospital, Peshawar, where study was conducted from 1st October 2006 to 31st March 2007.

Patients and Methods: All children age upto 15 years with refractive errors coming to Outpatient Eye Department Khyber Teaching Hospital from 1st October 2006 to 31st March 2007 were included in this repetitive study. Detailed ocular examination was performed on each patient. It consisted of visual acuity testing, pupillary reaction, ocular motility examination, anterior segment examination and direct ophthalmoscopy. The refractive error was noted with type and the patients who needed glasses were provided free glasses.

Results: Out of 2340 children 300 (12.8%) had refractive error. Mean age of children was 6 years. Forty five (15%) children were below 3 years, 180 (60%) were between 3-10 years and 75 (25%) were between 11-15 years. One hundred thirty five (45%) were male and 165 (55%) were female. Myopia occurred in 85 (28.33%) Hypermetropia occurred in 75 (25%) and astigmatism in 140 (46.67%) children. Myopic astigmatism occurred in 19 (6.3%), hypermetropic astigmatism in 38 (12.7%) and mixed astigmatism in 83 (27.7%) children. Free glasses were provided to all the children. Anisometropia occurred in 19 (6.3%) patients. Bilateral amblyopia occurred in 10 (3.3%) patients. Unilateral amblyopia occurred in 10 (3.3%).

Conclusion: This study showed that the uncorrected refractive error was a major problem among children. Females were almost equally affected as males. Astigmatism was the most common problem. Treatment for refractive errors is perhaps the simplest and most effective form of eye care.

Keywords: Astigmatism, Refractive error, Myopia, Hypermetropia.

INTRODUCTION

The World Health Organization introduced the global initiative for elimination of avoidable blindness by the year 2020 known as "Vision 2020 initiative". Refractive errors are one of the priority areas for vision 2020 initiative as they are common

and because corrective spectacles provide a remedy that is cheap, effective and associated with huge functional improvement. Refractive errors which account mostly for low vision and visual handicap are the third largest cause of preventable/curable blindness in Pakistan [1]. In one study it was found that the refractive errors account for 8% cases of unocular blindness in NWFP [2]. School children are considered to be high risk group because uncorrected refractive errors can seriously affect their learning abilities [3], their physical and mental development [4].

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Receive 11 October 2007; Accepted 4 February 2008

The objectives of the study were to estimate the occurrence of various refractive errors in children, identify their types and provide them with glasses.

PATIENTS AND METHODS

This descriptive study was conducted at eye department Khyber Teaching Hospital Peshawar three hundred children up to 15 year of age were included in the study. Over a period of six months from 1st October 2006 to 31st March 2007 were included in the study. Children who had previous ocular surgery were excluded from the study. The ocular examination included visual acuity measurement, ocular motility, squint detection, pupillary reaction, direct ophthalmoscopy and examination of anterior segment with binomag and slit lamp. Visual acuity was measured with Snellen's chart and Lea charts. For every child visual acuity was tested without correction and with correction and if possible with their spectacles. Objective refraction was determined using a Topcon autorefractometer and ocular motility was evaluated with cover test for near and at distance. For children upto 8 years cycloplegic refraction was done using cyclopentolate 1% drop three times with 10 minutes interval. All children with uncorrected visual acuity (UCVA) worse than 6/6 underwent subjective refraction. Children whose visual acuity did not improve were referred to consultant ophthalmologist for complete ophthalmic examination to determine the cause of low vision. Appropriate spectacles were provided by the study for those lacking them.

RESULTS

Out of 2340 children attending out patient department of ophthalmology, Khyber Teaching Hospital Peshawar from 1st October 2006 to 31st March 2007 300 (12.8%) children had refractive errors. Mean age of children was 6 years. 45 (15%) children were below 3 years, 180 (60%) were between 3-10 years and 75 (25%) were between 11-15 years. There were 135 (45%) males and 165 (55%) females with refractive errors (table-1).. Astigmatism occurred in 140 (46.67%),

Myopia in 85 (28.33%) and Hypermetropia in 75 (25%) (table-2).

Myopia of 1-5 dioptres was present in 48 (16%), Myopia of 6-10 dioptres in 35 (11.67%) and more than 10 dioptres occurred in 2 (0.67%) patients. Hypermetropia of 1-5 dioptres occurred in 51 (17%), 6-10 dioptres in 11 (3.67%) and more than 10 dioptres in 13 (4.33%). Astigmatism of 1-5 dioptres occurred in 140 (46.67%) children. No child had higher degree of Astigmatism. Myopic astigmatism occurred in 19 (6.3%), hypermetropic astigmatism in 38 (12.7%) and mixed astigmatism in 83 (27.6%) children.

Anisometropia occurred in 19 (6.3%). Bilateral Amblyopia occurred in 10 (3.3%). Unilateral amblyopia occurred in 10 (3.3%). Esotropia was present in 48 (16%) while exotropia in 12 (4%). In 158 (52.7%) patients uncorrected visual acuity was 6/6 to 6/12, in 125 (41.7%) patients uncorrected visual acuity was 6/18 to 6/36, in 17 (5.7%) patients uncorrected visual acuity was less than 6/60 (table-3).

In 23 (7.7%) patients visual acuity did not improve after refraction because they had associated ocular pathologies like corneal opacities in 5 cataract 1, strabismic amblyopia 12, traumatic maculopathy 2, optic atrophy 2 and retinitis pigmentosa 1.

Table-1: Gender wise distribution of refractive errors

Sex	No of Patients	Percentage
Males	135	45%
Females	165	55%

Table-2: Types of refractive errors

Disease	No of Patients	Percentage
Astigmatism	140	46.67%
Myopia	85	28.33%
Hypermetropia	75	25%

Table-3: Uncorrected visual acuity in refractive errors

Uncorrected Visual Acuity	No of Patients	Percentage
6/6 to 6/12	158	52.67%
6/18 to 6/36	125	41.67%
6/60 to less than 6/60	17	5.66%

DISCUSSION

This study was designed to find out the frequency of various refractive errors among children with visual impairment. The reason for not conducting population based survey were limited resources, time requires to reduce adequate cycloplegia, and non-availability of hand held auto-refractor. Problem in school screening is that the sample is not a true representative of target population because most of our children do not go to schools and children of preschool age are not included in such studies.

Refractive errors are among the leading causes of visual impairment worldwide and are responsible for high rates of low vision and blindness in certain areas [5]. The refractive error study in children in China [6], Chile [7] and Nepal [8] is the first multicountry population based assessment of refractive errors in children. The data reveals that there are significant and large geographic differences in the prevalence of refractive errors and that uncorrected refractive errors are very common. The prevalence of refractive error of 12.8% in our study is higher than the percentage of refractive error in China [6] 11.3%, in Chile [7] 9.8%, in Southern Ethiopia [9] 11.8%, in Tanzania [10] 6.1%, in Turkey [11] 11% and Baltimore [12] 8.2%.

In our study the prevalence of myopia was 28.6%, hypermetropia 25% and astigmatism 46.6%. The study done among school children in Dezful Iran revealed overall rate of myopia in students 15 years of age and younger as 3.4%, hyperopia 16.6% and astigmatism 18.7% [13]. The study done by Mingguaing et al showed prevalence of myopia was 3.3% in 5 year old with retinoscopy and 5.7% with auto-refraction. Hyperopia measured with retinoscopy was present in 16.7% of 5 years olds, 17.0% with auto-refraction. Astigmatism was present in 33.6% of children with retinoscopy and 42.7% with autorefraction [14]. According to Tehran eye study the age and gender-standardized prevalence of myopia based on manifest refraction was 21.8% (95% confidence interval (CI), 20.1 to 23.5) and that for hyperopia was

26.0% (95% CI, 24.5 to 27.6). The prevalences based on cycloplegic refraction were 17.2% (95% CI, 15.6 to 18.8) and 56.6% (95% CI, 54.7 to 58.6), respectively. Prevalences of myopia and hyperopia differed significantly among the age and gender groups ($P < 0.001$). Astigmatism of 0.75 dioptre cylinder or greater was present in 29.6% (95% CI, 28.5 to 31.1) of right eyes with manifest refraction and in 30.3% (95% CI, 28.5 to 32.1) with cycloplegic refraction. Among the study population, 6.1% (95% CI, 5.3 to 6.8%) had anisometropia of 1 dioptre or more [15]. In a study done by Afghani et al in school children found that myopia was three times more common (3.26%) than hypermetropia (0.99%). The overall prevalence of astigmatism was found to be 1.78%. 62% of all refractive errors were upto 2 dioptres majority of the simple myopic children (63%) were found to have refractive error upto 2 dioptre while majority of simple hypermetropic children (55%) had refractive error greater than 2 dioptres. Larger majority of astigmatic error (71%) did not exceed 2 dioptres. Refractive errors are significant cause of visual disability in school children. While primary vision screening by teachers tremendously decreases the workload of ophthalmic staff. Teachers can effectively identify those children with poor vision for refraction and corrective spectacles. Experience of Tayab Afghani study of Al-Shifa in school screening and recommendation by WHO provide standard guide lines for carrying out such programmes at national level [16].

In our study it was found that 135 (45%) patients were male while 165 (55%) were female. This is different to multicountry survey of refractive error in children in China [6], Chile [7] and Nepal [8] where both myopia and hyperopia were significantly higher in females than males.

In a study conducted in China [6] it was found that the myopia of -0.5D or less in either eye was essentially absent in 5 years old children, but increased to 36.7% in male and 55% in females by age 15. Over the same age range, hypermetropia of 2 dioptres or

greater was from 8.8% in males and 19.6% in females to less than 2% in both sexes. Similar results were found in refractive error study in children from La Florida Chile [7].

In our study Hypermetropia of 1-5 dioptres occurred in 51 (17%), 6-10 dioptres in 11 (3.67%) and more than 10 dioptres in 13 (4.33%). Myopia of 1-5 dioptre was present in 48 (16%), Myopia of 6-10 dioptres in 35 (11.67%) and more than 10 dioptres occurred in 2 (0.67%) patients. The probable reason for increased prevalence of high refractive error was that children with high refractive error are referred for specialist care to tertiary Hospitals.

No fundus pathology was found in any patient mainly because of the fact that retinal degeneration are common in pathological myopia and in this study only 2.3% children had myopia more than 10 dioptres. In study conducted in China [6] optic disc and retinal abnormalities were observed in 153 eyes of 87 patients. In the study done at Mayo Hospital Lahore showed errors of refraction were the third common disorders, affecting 494 children, of which the majority, (63%) were above the age of five, 30% in the one to five age group and only 7% were under the age of one. In the gender distribution major bulk of the cases was males. The cases in this category comprised of hypermetropia (82%), Myopia (13%) and astigmatism (5%). The majorities of the children, (54%) were males between the ages of five and fifteen and were affected by hypermetropia [17]. In a study done at Department of Ophthalmology, Jinnah Postgraduate Medical Centre Karachi, Pakistan showed that refractive error of 2% was found to be the cause of primary ocular morbidity in children 5-15 years of age [18].

Studies carried out in schools for blind have also reported blindness due to refractive error. For example uncorrected myopia and aphakia were responsible for 3% of blindness among blind school children in Zimbabwe [19]. While uncorrected aphakia and amblyopia were responsible for 5.1% of blindness among blind school children in India [20].

Blindness due to refractive error in any population suggests that eye care services in general in that population are inadequate since treatment of refractive error is perhaps simplest and most effective form of eye care. Strategies such as vision screening programmes need to be implemented on a large scale to detect individuals suffering from refractive error blindness. Sufficient numbers of personnel to perform reasonable quality of refraction need to be trained in developing countries. Also adequate infrastructure has to be developed in underserved areas of the world to facilitate the logistics of providing affordable reasonable-quality spectacles to individuals suffering from refractive error blindness. Long-term success in reducing refractive error blindness worldwide will require attention to these issues within the context of comprehensive approaches to reduce all causes of avoidable blindness.

CONCLUSION

This study showed that the uncorrected refractive error is a problem among children accounting for major portion of eye diseases. Females were almost equally affected as males. Astigmatism was the most common problem. Different types of astigmatism were found in children. Some children had other ocular pathologies in association with refractive errors resulting in failure of improvement in vision. There was difference in refractive errors in two eyes in some children resulting in anisometropia. Treatment for refractive errors is perhaps the simplest and most effective form of eye care.

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