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Original Research Paper

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A STUDY OF REFRACTIVE ERRORS IN CHILDREN AND UNMET NEED OF SPECTACLES IN THEM

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ABSTRACT **AIM**– to study causes of vision impairment in school going children, with focus on refractive errors and to study the unmet need of spectacles in them. **METHOD**– Prospective analysis of 500 children (up to 14 years of age) visiting a tertiary care teaching Institute in Ahmedabad who were willing to comply with the procedure of the study were enrolled in the study. **RESULTS**– Refractive error was the main cause in 58.6% of eyes with vision impairment, amblyopia in 15.2% while other causes in 4.3%. Out of which, maximum number of children had astigmatism (200), followed by Myopia (160) and Hypermetropia (70). In the performed study, more than half of those in need of corrective spectacles were without them. Among different types of refractive error, the greatest likelihood for an unmet need was found with myopia followed by hyperopia, while the association with astigmatism, although significant, was the weakest. **CONCLUSION**– There was a benefit of spectacles in 70% (unmet need) of those who had visual acuity 6/12 or worse in the better eye at the initial examination. Only 18.6% of the children having refractive error were wearing appropriate glasses.

KEYWORDS : refractive error, unmet need of spectacles, myopia, hypermetropia, astigmatism

INTRODUCTION

Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness with cataract standing first. [1-3]

Blindness at any stage of life is a concern to public health; however its health burden is significantly aggravated when it occurs at an early stage in life. Childhood blindness limits the child's development, affects quality of life, education, and socioeconomic development of the child. According to many studies on refractive error, uncorrected refractive error is one of main cause of visual impairment in children. Failure to treatment of refractive errors in children may lead to amblyopia which turns into blindness of the children.

In light of its burden on the society and the remedy, refractive errors are one of the five priorities of the global initiative for elimination of avoidable blindness, vision 2020, launched by the World Health Organization (WHO) and the International Agency for Prevention of Blindness.

Reliable data on prevalence and distribution of refractive error from population-based surveys are needed to plan cost-effective programs for reduction of visual impairment and blindness. Data obtained only from children going to school cannot be reliably used to plan eye-care services, however, because they are not representative of the population at large, particularly in India, where a significant proportion of school-aged children do not attend school.

Considering the role of refractive errors in visual impairment despite their simple cure, we present in this study the prevalence of uncorrected refractive errors in children visiting a tertiary eye care teaching Institute in Ahmedabad, the unmet need of spectacles and their associated factors such as age, gender and education.

AIMS AND OBJECTIVES OF THE STUDY:

- To study the characteristics of the refractive state of the children presenting at the Institute.
- To determine the prevalence of the met and unmet need for spectacles in them.
- To study the factors associated with unmet need of spectacles in children.
- In those children not wearing spectacles at all / not wearing correct spectacles, to explain the correct use of spectacles.
- To compare causes of unmet need of spectacles with other published articles.

METHOD:

Prospective analysis of 500 children (up to 14 years of age) visiting the Institute who were willing to comply with the procedure of the study were enrolled in the study. During a study period spanning 2 years from September 2014 to September 2016, a total 500 children were recruited into the study.

All participants underwent complete ophthalmic examinations including,

- visual acuity assessment including best corrected acuity,
- ocular motility evaluation,
- retinoscopy under proper cycloplegia,
- examination of the anterior segment ,
- media and fundus evaluation.

"Met Need" for spectacles was defined as the number of subjects who wore spectacles and had visual acuity worse than 6/12 in the better eye without correction, but achieved 6/12 or better with their present spectacles.

"Unmet need" was defined as the number of subjects who had a visual acuity worse than 6/12 in better eye without correction and could achieve 6/12 or better in the better eye with correction, but either went without spectacles or did not achieve such correction with their present spectacles.

RESULTS:

Of the total children considered for the study, 230 were male whereas 270 were female.

Distribution of Uncorrected Visual Acuity:

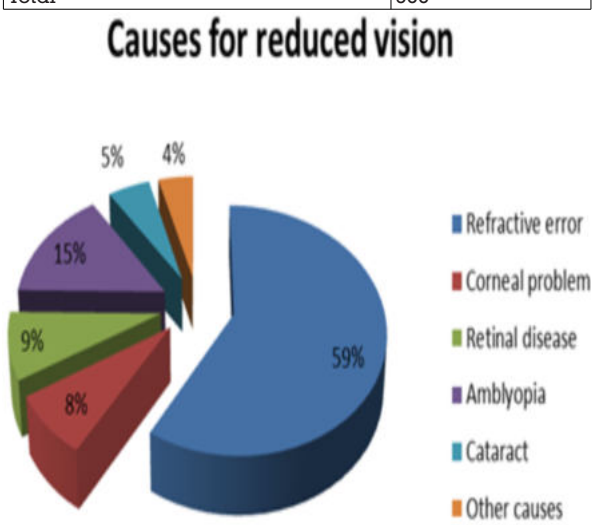
Uncorrected Visual acuity category	Number of children
>=6/9 in both eyes	130
>=6/9 in one eye	40
<=6/12 to >=6/18 in better eye	230
<=6/24 to >=6/36 in better eye	52
<=6/60 in better eye	48
Total	500

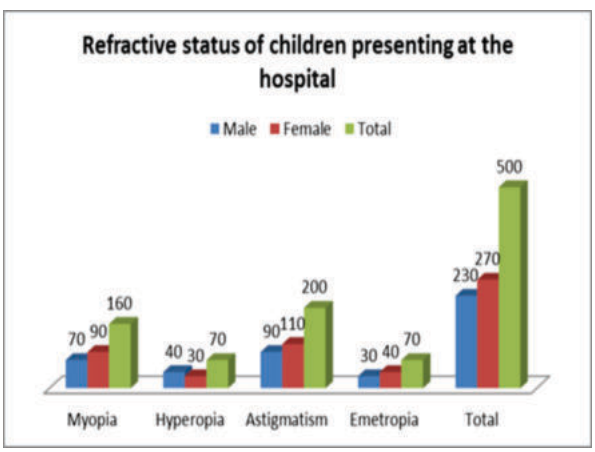
Distribution of Best corrected Visual Acuity:

Best corrected visual acuity was calculated using the spectacle correction which was best suited to the child.

If needed, retinoscopy was performed after proper dilatation and later on BCVA was calculated.

Best corrected Visual acuity category	Number of children
>=6/9 in both eyes	260
>=6/9 in one eye	90
<=6/12 to >=6/18 in better eye	80
<=6/24 to >=6/36 in better eye	50
<=6/60 in better eye	20
Total	500





Gender	Total Number of children with refractive error	Met Need	Unmet Need	Spectacle Coverage(%)
Male	200	40	160	20
Female	230	40	190	17.39
Total	430	80	350	37.39

- Myopia with retinoscopy was associated with older age and female gender.
- Hyperopia was associated with younger age.
- Astigmatism was present in 200 children.
- Total 350(70%) of all the children examined had improved baseline visual acuity to 6/9 or better in at least one eye with prescription of glasses.

DISCUSSION:

In present study, we found total 230 children from 500 who had visual acuity <=6/12 but >=6/18 in better eye, Refractive error was the main cause for reduced vision being 58.6%. Refractive error was also the dominant cause of visual impairment in the other RESC (Refractive Error Study in Children) studies but with major differences in prevalence between them.

This series of studies show that myopic refractive error is associated with the educational and socioeconomic status of the family ,related possibly to reading and other near vision tasks pertaining to school performance. [5-8]

These studies have confirmed that the need for refractive error correction is higher for children and causes up to 77% of blindness and severe visual impairment (<6/60 in the better eye)in India,75% in China and 62.5% in Chile.

The Baltimore Eye Study showed that correcting refractive errors increases the visual acuity by at least one line in 54% of people, among whom 7.5% could experience a gain of three lines or more. In other study in Australia ,at least one line of visual improvement with correct prescriptions was seen in 45% of people who had a presenting vision worse than 6/6, and 13% gained three lines or more.

A study in Chile found that proper spectacles could improve vision in 7% of children and in 56% of these cases, poor vision was the result of refractive errors.

CONCLUSION

• In conclusion, significant visual impairment due to refractive error was found among school-aged children.

• There was a benefit of spectacles in 70% (unmet need) of those who had visual acuity 6/12 or worse in the better eye at the initial examination.

• Only 18.6% of the children having refractive error were wearing appropriate glasses.

• Because visual impairment can have a significant impact on a child's life in terms of education and development, it is important that effective strategies be developed to eliminate this easily treated cause of visual impairment.

• The vision – testing programme in school age children can be useful in detecting the visual impairment and refractive errors at the same time.

• In short, the importance of spectacles, as a simple and inexpensive solution, should not be overlooked in correcting poor vision in children.

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