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Evaluation of refractive error in urban and rural school children

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CASE REPORT	ABSTRACT
<p>ARTICLE INFORMATION</p> <hr/> <p><i>Article history</i> Received: 20 March 2014 Revised: 15 April 2014 Accepted: 20 April 2014 Early view: 28 April 2014</p> <p><i>*Author for correspondence</i> E-mail: drmhbrar@rediffmail.com Mobile/ Tel.: 000000000</p>	<p>The aim of the present study was to show the prevalence of refractive error in early years of life from urban and rural background. The subjects were school children in the age group of 6-16 years selected from an urban school of Hyderabad (Cambridge high school langerhouz Hyderabad), and a rural school of Ranga Reddy Dist. (Zilla Parishad School Peddamanglaram) of AP by conducting school health camps at the premises of the above schools. This study was carried out on total 578 student for visual acuity assessment, out of this 302 student were from urban School and 276 were from rural Schools. The prevalence of ammetropia was less in rural group. Out of the affected subjects there were more number of uncorrected ammetropic children though the magnitude of refractive state was less when compared with urban population. This could be due to neglected standards of life and low socio-economic way of living and parental literacy also account for this situation.</p>

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INTRODUCTION

Refractive errors are by far the commonest cause of defective vision in school children. This is a health related condition of the eye that causes visual impairment and may lead to blindness if not early detected and corrected. It is a disease that occurs when parallel rays of light entering the non accommodating eye are not focused on the retina. It is classified into three categories; myopia, hyperopia and astigmatism. Refractive error is one of the most common determinants of visual impairment worldwide particularly among children and frequently remains undiagnosed for long period. Childhood visual impairment due to refractive error is a significant problem among school children and has a considerable impact on public health. A person being blind due to refractive error in young age suffers more blind years than an old person with cataract blindness. This would place a great socio economic burden on society. In addition, refractive error can hinder education, personality development and carrier opportunities. Refractive error is a multi factorial health condition; risk factor includes genetic and environmental factors.

Due to increasing realization of enormous need for correction of refractive error worldwide, refractive error has been considered one of the priorities in the category of preventable blindness. Which is the major target of vision 2020 (right to sight) launched by WHO in 2000 AD; already 10 years has elapsed but still we haven't reached

50% of the target reported by Pokharel et al. (2010). School health is a part of vision 2020 program targeting school children for evaluating refractive error and vitamin A deficiency (Batra et al., 2007). This study was designed to evaluate the refractive state in school going children of rural and urban background. Rural school children lives in state of poverty illiteracy and low socioeconomic status i.e. inadequate illumination and ventilation where as the urban counterparts are exposed to more visual stimuli like television and computer viewing (Lian-Hong et al., 2010).

CASE REPORT

The subjects were school children in the age group of 6-16 years selected from an urban school of Hyderabad (Cambridge High School, Langer Houz, Hyderabad), and a rural school of RR district (Zilla Parishad School Peddamanglaram RR district) of AP, India by conducting school health camps at the premises of the above schools with an intention to assess the ocular health in different back ground of life style. During this study, total 578 students were screened for visual acuity assessment, out of this 302 student were from urban school and 276 were from rural schools. The students not cooperating for visual acuity assessment, or suffering with other ocular diseases; squint, infections and pseudophakic were excluded from the study. Student having no permission from parent, and below 6 years of age were also excluded from the study. However, the students falling in the rage of 6-16 years with parental consent were

included in the study. Permission from Ethical committee of college was taken to start the project. A special permission letter was drafted for taking permission from parents through principals/headmaster of school. A consent form was prepared and the implication of study was explained to each student's parent in English and Telugu (local language) under the supervision of nurse and school head. The student were divided into two groups; group A comprising of 302 subjects belonging to urban school, and group B comprising of 276 subjects belonging to rural school. Visual acuity was assessed by Snellen's visual acuity chart by maintaining a distance of 6 meter between the subject and chart under adequate illumination. Student were asked to read the chart from the topmost letter to the lowest line for individual eye separately, unaided, aided-those subjects who were already wearing specs. Pin hole test was conducted to check the cause of visual loss. Subjective assessment of the refractive error was carried out by ophthalmologist and finally the objective assessment was done in dark room by retinoscopy and ophthmoscopy. Retinoscopy was done under cycloplegia by using a mydriatic and cycloplegic agent (1% cyclopentolate eye drops) 2 drops was instilled in each eye and the subject was made to sit for 1 hour with closed eyes. The examination was done by making the subject sit at 1 meter distance from examiner using streak. retinoscope and the refractive error is assessed by subtracting 1 diopter for cycloplegic used, simultaneously Fundus examination is carried out to check posterior segment for any retinal pathology, as it is the common association of myopia. Post mydriatic assessment of refractive error was carried on 3rd day at the same place and final prescription for best corrected vision was given to students of both the groups. Spectacles were distributed to the rural school children free of cost as the economic status was low; this financial involvement was taken up by the management of Bhaskar Medical College, Moinabad, AP, India. The parameters were analyzed by subjecting the data to paired t-test for level of significance at 5%.

The analysis of data showed that ametropia in school children is almost same pertaining to sex predilection.

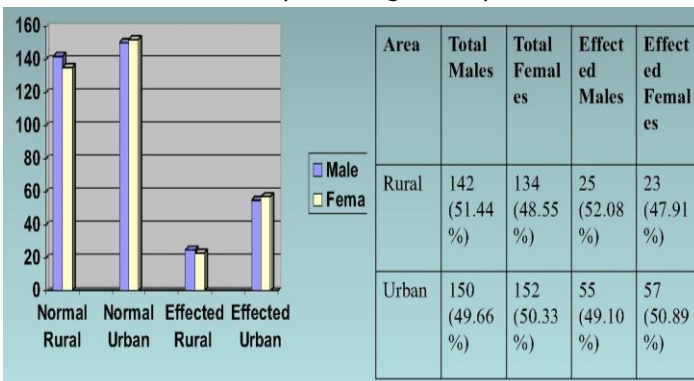


Figure 1. Total male and females affected in rural and urban populations.

The best corrected diopteric power in rural school children was seen in the smaller power rather than big power this is about 48%.

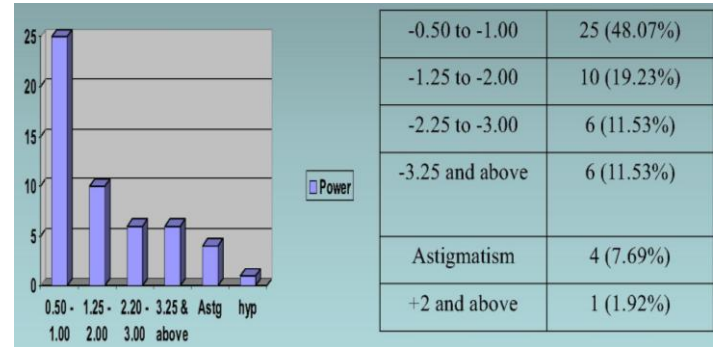


Figure 2. Diopteric power of best corrected vision in rural children.

In urban school children also the correction is in the lower power about 45%.

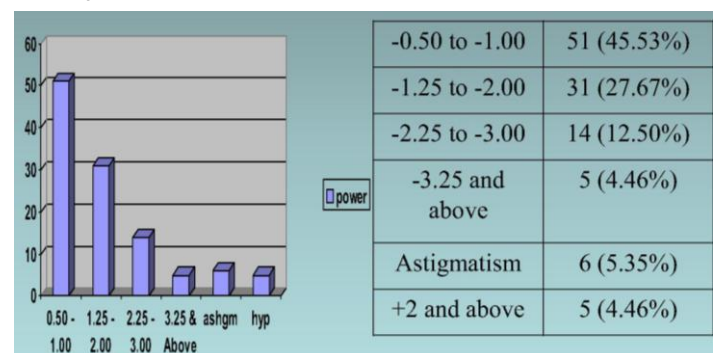


Figure 3. Diopteric power of best corrected vision in urban children.

The visual acuity defect is more in 6/9 range in rural population but it is seen in almost all the ranges.

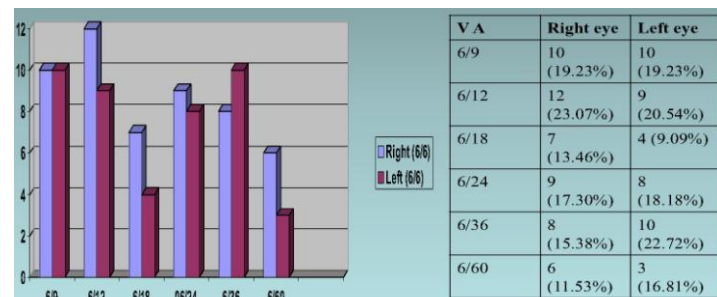


Figure 4. Visual acuity (VA) in affected eyes in rural areas.

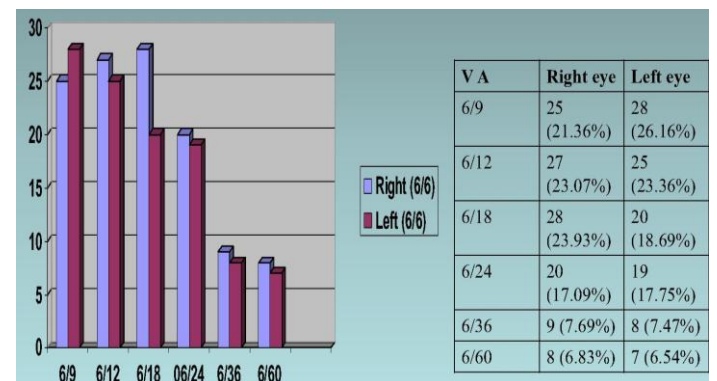


Figure 5. Visual acuity (VA) in affected eyes in rural areas.

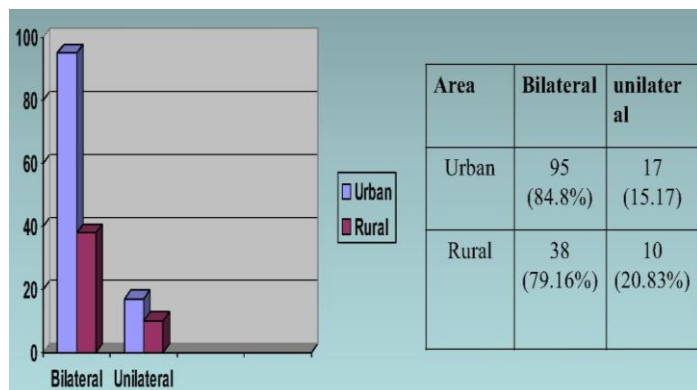


Figure 6. Distribution of involment of eyes.

DISCUSSION

The present study was done on total 578 subjects, 302 from urban school and 276 from rural school. It was observed that the prevalence of refractive error in urban children is 3.97% and rural children was 17.39% almost corroborating with international studies and WHO's data in refractive error study in children (RESC) (Negrel et al., 2000; Murthy et al., 2002) ($P < 0.05$). The gender ratio in this study was almost equal in both the groups with slight increase in female incidence in urban population accounting to 50.89% and males 49.10 %, while in rural population males dominated by 4% i.e. 52.08% and females were 47.91%. This stood statistically significant ($P < 0.01$) and there was slight deviation from other studies conducted in other parts of India where males were effected more than females. The dioptric power for best corrected visual acuity in both groups was divided into 4 ranges; -0.5 to -1.00, -1.25 to -2.00, -2.25 to -3.00, -3.25 Dsph and above. While -0.5 Dsph was taken as minimum error in myopia and +2.00 Dsph was taken as hypermetropia lower limit. On analysis of myopic subjects for best corrected dioptric power of affected eyes, it was found that in both groups maximum number of subjects were falling in the range of -0.5 to -1.00 i.e. about 48.07% in rural children and 45.53% in urban children. Similarly for -1.25 to -2.00 ranges the involvement was 19.23% in rural and 27.67% in urban children. Whereas in the range of -2.25 to -3.00 there was a little difference in urban and rural children being 12.5% and 11.53%. While in -3.25 Dsph and above range the prevalence of ammetropia was high in rural children i.e. about 11.53% and urban children was about 5.35% the variation in percentage was due to less number of ammetropia children in rural group which corroborate with study conducted by Khan et al. (2005). The analysis of other ammetropic condition i.e. hypermetropia and astigmatism was found to be low. Astigmatic subjects in rural children were 7.69% and 5.35% in urban group. While hypermetropia was not that much seen in rural group; only 1 subject with +6.00 Dsph was detected, and in urban group 5 subjects were detected amounting to 4.46%. It was observed that almost 82.6% in rural group and 62.91% subjects in urban group were emmetropia; the remaining subjects were having ammetropia with different visual acuity for both eyes. On analysis it was observed that maximum percentage of subjects were in

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6/9, 6/12 and 6/18 ranging between 18.69% to 26.16 % in urban group, while in rural group maximum children were in 6/9, 6/12, 6/18 and 6/36 acuity level ranging between 17.30 to 23.07. The involvement of eye in each case that is distribution of ammetropia was assessed. It was observed that 79.16% ammetropic subjects were having refractive error in both eyes and only 19.79% unilateral affection was seen in rural group, while in urban group 84.8% children were having bilateral involvement and 15.17% were affected in one eye only. Refractive error was mostly seen in both eyes and it was also observed that most subjects suffer with myopia and the best corrected visual acuity was 6/9. This could be due to other pathological involvement of eye such myopic degeneration. More significant observation made in this study was the visual exposure time to television and computer. This was observed on analyzing the questionnaire asked during examination, and the urban school children were exposed to these stimuli more than rural counterpart.

CONCLUSION

The present study involves the subjects from two different backgrounds of life. It was observed that both the groups suffered with refractive error, but the prevalence was less in rural group out of the affected subjects. There was more number of uncorrected ammetropic children though the magnitude of refractive state was less when compared with urban population. This could be due to neglected standards of life and low socio-economic way of living and parental literacy also account for this situation. Only positive aspect was the low dioptric power that indicates less exposure time to visual stimuli. On the contrary the urban school children needed high dioptric power for refractive error correction, and most of them were already using spectacle correction. This showed that this group of children was more exposed to visual stimuli. The changed and diminished visual acuity was detected in early stage and corrected. Due to this the blindness years were reduced in this group even though the incidence was seen in early age of life, due to parental literacy and better socio-economic status.

CONFLICT OF INTEREST

None declared.

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