



ORIGINAL RESEARCH PAPER

Ophthalmology

A STUDY OF UNCORRECTED REFRACTIVE ERRORS AMONG SCHOOL GOING CHILDREN IN URBAN SLUMS OF RAIPUR.

KEY WORDS: Refractive Error, Uncorrected, School Students, Raipur

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ABSTRACT

INTRODUCTION: Uncorrected refractive error is the leading cause of eye problem and the second cause of blindness worldwide. Among children aged 5–15 years, 12.8 million are visually impaired because of refractive errors. Objective is To assess the magnitude of refractive error among school going children in slum areas of Raipur city near its Urban Health Centre

METHOD: Study was designed as a cross sectional study conducted in primary schools of urban slums of Raipur city near its Urban Health Centre .300 children were randomly selected and examined .Snellen chart, Roman test type chart, and pinhole were used to detect refractive error. Analysis was done using 2-test and Fisher's exact test. P value of <0.05 was taken as significant. Information was analysed by using the Microsoft Excel and SPSS .

RESULTS: Prevalence of refractive error was 29.14% and among them only 20.5% were already wearing glasses for correction. Prevalence of refractive error was significantly associated with watching television sitting nearby, using mobiles, positive family history, problem while reading the blackboard in the class, and problem while watching TV, computer, or playing video games.

CONCLUSION: Study showed that this preventable cause of ocular morbidity is still prevalent in fair magnitude. Studies are needed on this issue to highlight the importance. Students, parents, and teachers must be educated about the early detection of refractive error and correction with spectacles to prevent progression of visual impairment.

INTRODUCTION

Refractive error is an optical defect intrinsic to the eye, which prevents the light from being brought to a single focus on the retina; thus, reducing normal vision.¹ Uncorrected refractive error is the leading cause of eye problem worldwide and the second cause of blindness.² It is estimated that about 2.3 billion people worldwide have refractive errors; of which 1.8 billion have access to adequate eye examination and affordable corrections leaving behind 500 million people, mostly in developing countries, with uncorrected error causing either blindness or impaired vision.³ Among children aged 5–15 years, 12.8 million are visually impaired because of refractive errors representing a prevalence of 0.97% with higher prevalence reported in China and urban areas of Southeast Asia.⁴ Refractive errors are usually present in the childhood and continue to the adult life.^{5,6} Undetected and uncorrected refractive errors are particularly a significant problem in school children.³ As children are not mature enough to point out the deficiency at an early stage or the parents have no idea on the gradually developing vision problem, uncorrected refractive error can have a dramatic impact on learning process and educational capacity.⁷ Most of the children with such diseases are apparent and hence, screening helps in early detection and correction with spectacles.⁸ In the global initiative, Vision 2020, for the elimination of avoidable blindness, refractive error has been emphasized.⁹ As the treatment of refractive errors is perhaps the simplest and effective forms of eye care, blindness because of refractive error can be prevented. This study was conducted to assess the magnitude of refractive error among school-going children and to determine the association between refractive error and variables such as sex, dietary habits, family history, and daily activities such as watching television and using mobiles & computers.

Present study was carried out in school children (6-15 years age) from slum areas of Raipur city near its Urban Health Centre . Very few studies have been done to clinically assess the extent in school children

METHODOLOGY

After local ethical committee approval a community-based

study was planned. The study area was near the Urban Health Centre of the Institute. Over a period of 4 months A cross sectional study was conducted among primary school children in the age group 6-15 years. Taking prevalence as 50%, with an absolute precision of 7.5% at 5% significance level, sample size was calculated to be 177. With a design effect of 1.5, the final sample size was estimated to be 267. Hence, approximately 300 students were targeted for data collection. Schools were randomly selected with probability proportionate to size, and students in each school were selected by simple random sampling. The number of students selected from each school was proportionate to the strength of the school. Those who were absent on the day of data collection were excluded from the study. The study tools used were a structured interview schedule, Snellen chart, Roman test type chart, measuring tape, eye shield, torch light, and pinhole. After interviewing the respondents, visual acuity was tested for far vision with Snellen chart at a distance of 6 m for each student, one at a time. Near vision was tested with Roman test type chart kept at a distance of 30 cm from the eyes of the subjects. One eye was tested first with the other eye covered with an eye shield. After 2 min, the other eye was tested similarly. Any other eye problems were also checked. Students having visual acuity $\leq 6/9$ for far vision and $< N5$ for near vision were tested with the pinhole. Students who had improvement in the visual acuity after pinhole testing were considered to be having refractive error. Students found to have refractive error and other eye problems were referred to Ophthalmology Outpatient Department.

Data collected were checked for completeness and consistency, and those were entered in IBM SPSS version 20 software. Descriptive statistics such as mean and percentages were used. Analysis was done using χ^2 -test and Fisher's exact test. P value of < 0.05 was taken as significant.

RESULTS

Prevalence of refractive error was 29.14%. Myopia was the most common type of refractive error constituting 27.15% of the participants whereas 1.3% had both myopia and hypermetropia . Figure 2 shows that of those who were having refractive error, only 20.5% of them were already wearing

glasses for correction & about 16.9% of the respondents had an eye checkup in the past. Prevalence of refractive error was greater among those who had problem when reading the blackboard in the class and when viewing the television, using computer, or playing video games, and was found to be statistically significant. Prevalence of refractive error was significantly higher among those who watch television sitting nearby and those who use computers. Refractory error was significantly associated with family history of wearing glasses because of refractory error either among parents or siblings.

DISCUSSION

This study shows that the prevalence of refractive error was 29.3%, which was more than most of the studies conducted around the world.^{10,11,12,13,14,15,16} Studies conducted in China,¹⁷ Japan,¹⁸ Hong Kong,¹⁹ Taiwan,²⁰ and Srinagar²¹ showed higher prevalence whereas one study in Kancheepuram²² showed prevalence similar to our study. These variations in prevalence could have been due to differences in demographic factors and different operational definitions for refractive error. The possibility of differences in ethnic background and differences in environment and socioeconomic conditions causing varying prevalence rates should also be considered. Among the refractive errors, myopia was common, which is similar to the findings seen in other studies.^{10,11,12,13,15,18} This finding is contrast to that seen in some studies where prevalence of hypermetropia was higher.^{14,17} Prevalence of uncorrected refractive error was higher as seen in some other studies in India.^{11,17,23} But in studies conducted outside India such as China¹² and Egypt,¹⁸ a higher proportion (95% and 43%, respectively) of children with refractive error were already wearing glasses. This higher prevalence of refractive error may be due to poor utilization of eye care services, which can be seen from the finding that only 16.9% of the participants had an eye checkup in the past. Ogbomo GOO et al.¹⁴ reported a similar finding in Ghana where only 13.3% of the respondents had an eye checkup in the past. There was no difference in the prevalence of refractive error between boys and girls but in some studies^{10,12,13,15} girls showed higher prevalence. Rahman et al. Niroula and Sahal,¹⁶ and Sun et al.¹⁸ reported higher prevalence among boys. Prevalence of refractive error was significantly higher among those who had problem in reading blackboard in the class. El-Bayoumy et al.¹² reported a similar finding where the prevalence of refractive error was higher among those who had problem in seeing distant objects. Presence of refractive error was significantly associated with a positive family history as seen in other studies.¹⁰ Prevalence of refractive error was significantly high among those watching television sitting nearby and those who use computers. A similar finding was reported in some studies^{13,15,21} where refractive error was significantly associated with close work or near activity such as prolonged study hours, watching computers/television, and so on. Prevalence of refractive error was high among those who do not eat fruits and vegetables daily but it is not statistically significant. The most worrying finding is that very few students consume fruits and vegetables daily because there are evidences to suggest that daily intake of fruits and vegetables can prevent refractive error.^{25,26}

CONCLUSION

Refractive error was a significant cause of visual impairment among school children. Students must be educated to avoid unhealthy practices, such as watching television sitting nearby and indiscriminate use of mobiles, computers and video games, to prevent the development of refractive error. Prevalence of uncorrected refractive error was very high. Students, parents, and teachers must be educated about the early detection of refractive error and correction with spectacles to prevent progression of visual impairment. The existing school health services should be strengthened and implemented effectively for regular screening and to provide affordable corrective services.

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The study was approved by the Ethics Committee

REFERENCES

1. Egbe AK, Ogbomo GOO, Adio A. Refractive error status in Bayelsa State, Nigeria. *J Niger Optom Assoc* 2010;16(1):11-6.
2. Fricke TR, Holden BA, Wilson DA, Schlenker G, Naidoo KS, Resnikoff S, et al. Global cost of correcting vision impairment from uncorrected refractive error. *Bull World Health Organ* 2012;90(10):1288-38.
3. Holden BA, Sulaiman S, Knox K. The challenge of providing spectacles in the developing world. *Community Eye Health* 2000;13(33):9-10.
4. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *Bull World Health Org.* 2008;86(1):63-70.
5. Zhao J, Mao J, Luo R, Li F, Munoz SR, Ellwein LB. The progression of refractive error in school-age children: Shunyi district, China. *Am J Ophthalmol* 2002;134(5):735-43.
6. Pointer JS. A 6-year longitudinal optometric study of the refractive trend in school-aged children. *Ophthalmic Physiol Opt* 2001;21(5):361-7.
7. Yingyong P. Refractive errors survey in primary school children (6-12 years old) in 2 provinces: Bangkok and Nakhonpathom (one year result). *J Med Assoc Thai* 2010;93(10):1205-10.
8. Padhye AS, Khandekar R, Dharmadhikari S, Dole K, Gogate P, Deshpande M. Prevalence of uncorrected refractive error and other eye problems among urban and rural school children. *Middle East Afr J Ophthalmol* 2009;16(2):69-74.
9. Global Initiative for the Elimination of Avoidable Blindness. Geneva, Switzerland: WHO program for the prevention of blindness, World Health Organization, 1997. WHO/PBL/9761.
10. Pavithra MB, Maheshwaran R, Rani Sujatha MA. A study on the prevalence of refractive errors among school children of 7-15 years age group in the field practice areas of a medical college in Bangalore. *Int J Med Sci Public Health* 2013;2(3):641-5.
11. Rahman M, Devi B, Kuli JJ, Gogoi G. A study on the refractive status of school going children aged between 10 to 15 years in Dibrugarh Town, Assam, India. *IOSR J Dent Med Sci* 2015;14(2):27-33.
12. El-Bayoumy BM, Saad A, Choudhury AH. Prevalence of refractive error and low vision among school children in Cairo. *East Mediterr Health J* 2007;13(3):575-9.
13. Sewunet SA, Aredo KK, Gedefew M. Uncorrected refractive error and associated factors among primary school children in Debre Markos District, Northwest Ethiopia. *BMC Ophthalmol* 2014;14:95.
14. Ogbomo GOO, Assien R. Refractive error in school children in Agona Swedru, Ghana. *S Afr Optom* 2010;69(2):86-92.
15. Ali A, Ahmad I, Ayub S. Prevalence of undetected refractive errors among school children. *Biomedica* 2007;23:96-101.
16. Niroula DR, Saha SG. Study on the refractive errors of school going children of Pokhara city in Nepal. *Kathmandu Univ Med J* 2009;7(25):67-72.
17. Murthy GVS, Gupta SK, Ellwein LB, Munoz SR, Pokharel GP, Sanga L, et al. Refractive error in children in an urban population in New Delhi. *Invest Ophthalmol Vis Sci* 2002;43(3):623-31.
18. Sun Y, Cao H, Yan ZG. Prevalence of refractive errors in middle school students in Lanzhou city. *Int J Ophthalmol* 2008;1(2):180-82.
19. Hosaka A. Population studies—myopia experience in Japan. *Acta Ophthalmol Suppl* 1988;185:37-40.
20. Lin LL, Chen CJ, Hung PT, Ko LS. Nation-wide survey of myopia among school children in Taiwan, 1986. *Acta Ophthalmol Suppl* 1988;66(S185):29-33.
21. Khan AA, Nasti AR, Dar MA, Lone SA. Prevalence of refractive errors in school children. *JK-Practitioner* 2005;12(3):156-9.
22. Prema N. Prevalence of refractive error in school children. *Indian J Sci Technol* 2011;4(9):1160-1.
23. Mutti DO, Mitchell GL, Moeschberger ML, Jones LA, Zadnik K. Parental myopia, near work, school achievement, and children's refractive error. *Invest Ophthalmol Vis Sci* 2002;43(12):3633-40.
24. Saw SM, Zhang MZ, Hong RZ, Fu ZF, Pang MH, Tan DT. Nearwork activity, night-lights, and myopia in the Singapore-China study. *Arch Ophthalmol* 2002;120(5):620-7.
25. Home remedies for myopia. Available at: <https://www.organicfacts.net/home-remedies/home-remedies-for-myopia.html> (last accessed on August 20, 2014).
26. Best eye vitamins for far sightedness. Available at: <http://www.rebuildyourvision.com/blog/vision-conditions/farsightedness/best-eye-vitamins-for-farsightedness-2/> (last accessed on September 25, 2014).