

Original Article

PREVALENCE OF UNDETECTED REFRACTIVE ERRORS AMONG SCHOOL CHILDREN AGED 5-10 YEARS

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Objective: To determine the undetected refractive errors and its association with different habits among school children aged 5yr-10yr in public and private schools.

Material and Methods: A cross-sectional study was conducted in a total of 200 students of class 1 to class 5, excluding those who were already wearing the glasses. Interviews using a structured questionnaire and visual acuity using standard Snellen's chart were done. Children with visual acuity less than 6/9 were marked as positive for refractive error.

Results: The results revealed that 72 out of 200 students (36%) had refractive errors, public school 37.5% and private schools 62.5%. The study students had a mean age of 7 ± 1.7 years with 47% being females and 53% males. 116 students included in the study belonged to age group 5-7 years (58%) and 84 belonged to age group 8-10 years (42%). Statistically significant association ($p < 0.05$) was found among private schools between myopia and watching television closely, over indulgence in video and computer games, studying by keeping the book at arm's length and studying in dim light.

Conclusion: Myopia was the most common refractive error occurring among students examined. A strong correlation was found between myopia and watching TV closely, studying in dim light and over indulgence in playing video and computer games. It is recommended that eye care services should be integrated in the schools and annual eye examination of all students should be done to timely detect the presence of refractive errors.

Keywords: Prevalence, refractive error, children.

Introduction

A refractive error is a very common eye disorder. It occurs when the eye cannot clearly focus the images from the outside world. The result of refractive error is blurred vision, which is sometimes so severe that it causes visual impairment.¹

According to WHO, 285 million people are estimated to be visually impaired worldwide. 39 million are blind and 246 million have low vision. About 90% of the world's visually impaired live in developing countries. Globally uncorrected refractive errors are the main cause of the visual impairment but cataract remains the leading cause of blindness in middle and low income countries. Globally uncorrected refractive errors (myopia, hypermetropia, astigmatism) account for 43% of visual impairment, Un-operated cataract 33% and glaucoma 2%. An estimated 19 million children below age 15 are visually impaired. Of these 12 million children who have refractive errors, a condition that could be easily diagnosed and corrected. 1.4 million are irreversibly blind for rest of their lives.² In Pakistan 11.4% of blindness is due to uncorrected refractive errors and the third commonest cause of blindness in Pakistan after cataract (66%) and corneal opacity (12.6%).³

Refractive error is the second most common eye disorder in pediatric age group after vernal catarrh.⁴

The study was conducted to find the prevalence of undetected refractive errors among school children and promote the acquisition of eye care services in schools and the periodic examination of the vision in the schools so as to timely detect the refractive errors in students and prevent their complications.

The objective for which this study was conducted was to determine the prevalence of undetected refractive errors among school children aged 5yr-10yr.

The study hypothesis was to find out the association of refractive errors with factors such as family history of wearing glasses, overindulgence in playing video and computer games, prolonged television and computer watching etc.

Normally, the rays of light entering the eye are focused on fovea centralis of retina after passing through cornea, aqueous humour, lens and vitreous humour when the refractive power and axial length of eye correlates with each other. When these two factors do not correlate with each other the rays of light entering the eye ball will not be focused on fovea centralis and the image will not be correctly formed. This condition is known as refractive error.

Materials And Methods

Settings: 2 public and 2 private schools of Lahore.

Time: 1 month from April 2014 to May 2014.

Study design: Cross sectional study.

Sampling design: Simple Radom Probability technique.

Sample size: 200

Formula used for calculating sample size:

Sample size determination in Health Studies.

Version 2. 0 .21

World Health Organization.

Sampling Frame: A complete list of all public and private sector schools from Board of Secondary Education, Lahore was obtained and then two schools from each sector were selected by simple random sampling (lottery method). 50 students were selected from each school of class 1 to class 5 and questionnaires were filled by self-interviewing method.

Inclusion criteria: All the students of 5yr-10yrs of age both males and females of class 1 to 5 were included in the study in the selected schools.

Exclusion criteria: Students below 5yrs and above 10yrs of age were excluded and those already wearing glasses were also excluded from the study.

Data collection tools: 1) A written questionnaire (attached).

2) Standard Snellen's chart and Jagger's chart.

3) WHO criteria for recording vision: (17)

Analysis:

Data analysis plan: SPSS version 17.

Test of significance applied: As the study includes qualitative variables, frequency tables were drawn and frequency percentages were calculated. Data is graphically represented by pie and bar charts. Chi-square and t-test were applied as test of statistical significance.

Hypothesis formation:

Null hypothesis: There is no association of refractive errors with factors such as positive family history of wearing glasses, overindulgence in video and mobile games, prolonged television and computer watching etc.

Alternate hypothesis: There is an association of refractive errors with factors such as positive family history of wearing glasses, overindulgence in video and mobile games, prolonged television and computer watching etc.

Results

A total of 200 children between 5-10 years of age were examined in 4 schools, 2 public and 2 private.

The mean age of study population was 7±1.7yrs. Among them 53% were males and 47% were females.36% children were found to be positive for refractive error.

Table-1: Shows distance visual acuity.

Category	Presenting distance visual acuity	
	Worse than:	Equal to or better than:
Mild or no vision impairment		6/18
Moderate vision impairment	6/18	6/60
Severe vision impairment	6/60	3/60
Blindness	3/60	1/60*
Blindness	1/60*	Light perction
Blindness	No light perception	

* Or count fingers (CF)at 1 meter.

Fig 1.: prevalence of refractive errors (n=200)

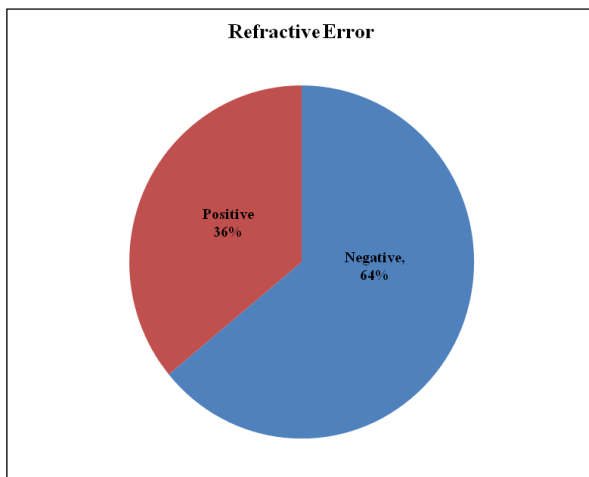


Fig-1:Prevalence of refractive errors (n=200).

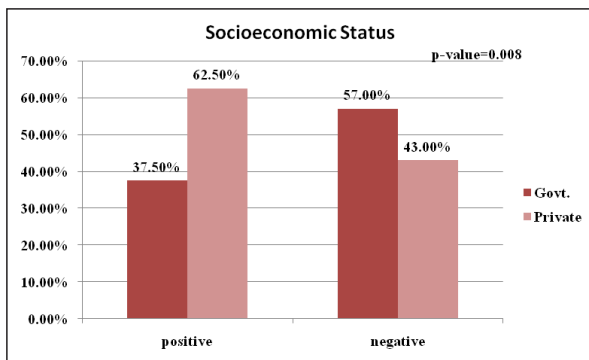


Fig-2:Comparative prevalence of refractive errors (according to schools).

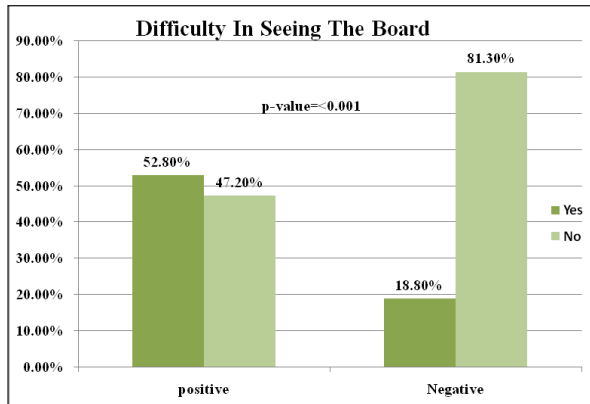


Fig-3: Association of refractive error with difficulty in seeing the school board.

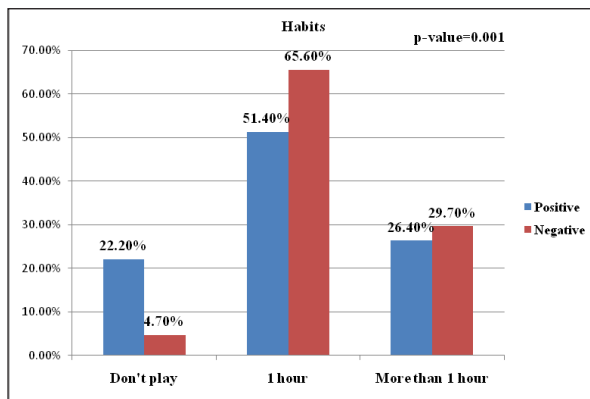


Fig-4: Association of refractive error with duration of playing video games.

Discussion

The vision 2020 Global initiative of WHO aims at early recognition of avoidable causes of blindness and visual disability and prompt treatment. It has identified uncorrected refractive errors among school children as a major area where immediate action is needed.

In our study 72 out of 200 school children had refractive errors. Of these 27 out of 100 belong to Government Schools and 45 out of 100 belong to private schools depicting a total prevalence of 36%. Our study shows a significantly higher prevalence of refractive errors among private schools children.

Our result are in accordance with the studies conducted by Institute of Public Health and Punjab Institute of Preventive Ophthalmology, Mayo Hospital, Lahore⁸, in Jhapa Nepal⁹ and in Pune India¹⁰ which also show a significantly higher prevalence of refractive errors in private school children as compared with government school

children.

Our study shows no statistically significant age and gender association of Myopia. Our results are supported by the study conducted in Karachi¹² which also show no age and gender association of Myopia. It is noteworthy that there is statistically significant association found between presence of refractive error and risk factors such as difficulty in seeing the board, difficulty in reading the text books, pain in eyes, discharge from the eyes and blurring of vision. Likewise our results are supported by study conducted by Pakistan Institute of Community Ophthalmology, Peshawar¹⁸ which also shows significant association between refractive errors and above mentioned risk factors.

Our study shows significant association between occurrence of refractive errors and prolonged playing of video and mobile games and television watching, these results are supported with the studies conducted at College of Ophthalmology and Allied Vision Sciences Lahore,¹⁹ in Pune India,²⁰ Pokhara city of Nepal.²¹

Our results show a significant association between refractive errors and studying in dim/candle light which is also in accordance with the study conducted in University of Pennsylvania.²²

Moreover, there was no association found between prevalence of refractive errors and positive family history of wearing glasses. Our results about this association are not in accordance with the studies conducted in Pennsylvania and by Institute of Public Health and Punjab Institute of Preventive Ophthalmology Lahore.¹²

Conclusion

It was concluded that the refractive error is one of the most important cause of visual impairment. Of the refractive errors affecting visual acuity, myopia is the most common.

The prevalence of refractive errors is higher in private run schools as compared with government run schools and is also influenced by factors like increase indulgence in video games, computer games, television watching and din/candle light studying habits etc.

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