Original Article

Frequency of Myopia in School Going Students of Rural and Urban Areas of Sahianwala and Chiniot, Punjab

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ABSTRACT

Objective: To find the frequency of myopia in rural versus urban primary and secondary school going students from 6 to 16 years of age.

Methodology: A school based cross sectional study was conducted from August to December 2021 in rural area of Sahianwala, and in urban area of Chiniot region. The study was approved by ethical review board of The University of Faisalabad. A total of 1000 subjects of both gender and ages ranged between 6 to 16 years were included through a stratified random sampling technique. The sample consist a set of 500 subjects each from rural and urban areas. Subjects of 1st class to 10th class were selected. Data was collected using a proforma and retinoscopy was done for diagnosis of myopia. Data was analyzed by using Chi-square test in SPSS 20 software.

Results: The frequency of myopia was higher in urban area 41.6% than rural area 28% (P 0.00). Other findings included a frequency of emmetropia of (42.6%) in urban in comparison to (56.6%) in rural areas. Other types of refractive errors including hypermetropia and astigmatism were (15.8%) in urban and (15.4%) in rural area. Myopia was more among female 39.6% than male 30% (P value= 0.00). Frequency of myopia was more in high level 35.5% than primary 34.8% and middle 34.0% level education (P value= 0.04).

Conclusion: The frequency of myopia is higher in students of urban schools as compared to rural schools Myopia is more frequently found in females as compared to male students.

KEYWORDS: Emmetropia, Myopia, Retinoscopy, Visual problems.

INTRODUCTION

Vision is essential to carry out daily activities of life and to move in society.[1] Perfect vision is the result of parallel rays of light coming from infinity and sharply focused on sensitive layer of eye; with the lens in a relaxed state. A condition where the corneal dioptric power and axial length of the eyeball balance out, this condition is called emmetropia.[2] When these rays of light do not fall on retina, the condition is called ametropia, includes myopia, hypermetropia and astigmatism. Refractive error cause blurry vision. It is frequently categorized as spherical and cylindrical error. When the dioptric power is too little or too much then the rays of light are focused behind or in front of the retina, respectively. These are called spherical errors. When a person sees lines of particular orientation less clearly then lines at right angle to that meridian it is called cylindrical error.[3] People with such condition cannot see clearly and different ophthalmic lenses are required to correct this condition.[4] Myopia, also called nearsightedness is the most common type of ammetropia, in which light coming from infinity are focused in front of the retina, with patient's accommodation relaxed. Myopia is also defined as increased refractive power of the eye due to either increase in axial length of the eyeball, curvature of the cornea or refractive index of lens. So, myopic patient sees near objects clearly and feels difficulty to look at distant objects. Uncorrected refractive error is a common cause of visual problems.[5]Both environmental and hereditary factors are crucial risk factors for myopia development. In genetics myopia may present with certain heritable connective tissue disorders and has also been reported as an X-linked disorder. Increased Reading hours, higher level of education and low/high socioeconomic status are also the risk factors for myopia.[6] Numerous environmental factors contribute to progression of myopia such as amount of near work performed. Near work is defined as any activities that require accommodation of a lens to focus clear images on the retina such as reading, studying (doing homework and writing), playing video games, using computers, or watching television. As more near

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work is performed; it increases chances to develop myopia.[7] Based on recent studies, myopia in children is associated with both genetic and environmental factors such as near work and outdoor activities.[8] It is evident a student who spends more time in near work and reduces outdoor activities, reading in supine position more prone to rapid progression in myopia.[9] Myopia is more frequently developing in school going children in this era of modern technology and of growing increase in the use of electronic screens including, computers and smart mobile phone during online classes and for playing video games and watching cartoons and drama frequently.[8,9] Myopia may divide into three types according to the degree of severity such as low myopia, medium myopia and high myopia. Low myopia is < 3 D, medium 3-6 D and high is > 6 D. Myopia may also be classified based on fundus changes, e.g. simple or physiological myopia and pathological or degenerative myopia. The main problem of myopic children is that distant objects are blurry or unclear such as the white board or blackboard. During watching television or using a computer uncorrected myopic child usually sit close to the screens for clear vision that further progresses the myopia. Difficulty in reading and studying due to poor eye sight will compromise their studies as well as quality of lives and will face difficulty in coping with other students.[10] Myopia is manageable and there are various treatment options are available to correct myopia such as corrective lenses, surgical and non-surgical ways. Corrective lenses included both glasses and contact lenses. In surgical procedure, a laser is used to modify corneal curvature, so it brings light to focus on the retina.[11] This study was aimed to screen the students with refractive errors especially for myopia. If this condition is screened early in life it will be easily manage and treated thereby help to halt the progression of disease. Hence, in this way it will also help for better performance in their education.

METHODOLOGY

A school-based cross-sectional study was conducted from August to December 2021 at rural area of Sahianwala and urban area of Chiniot regions. The study was approved by ethical review board of The University of Faisalabad (TUF/IRB/006/2021). School going students from class 1 to class 10th aging from 6-16 years old were screened for myopia. All the students from 1st class to 10th class without any known ocular pathologies were included in the study. Formal permission was taken from the principle of these schools. The inclusion criteria of this study were children with any problems in seeing white boards, watching TV and distance blurred vision. Students with ocular pathologies e.g. keratoconus, strabismus were excluded from this study. The sample was selected using stratified random sampling technique. Three groups of classes were made, including primary, middle and high in which students ranging from class 1 to 5th, 6 to 8th and 9 to10th were examined. Thus a total sample of 1000 students was taken through empirical approach in which male and female, both are equally divided including 500 males and 500 females. The sample consisted of 500 subjects in rural and 500 subjects in urban schools. The children's parents gave the consent and completed a detailed questionnaire that included each child's demographics, the use of electronic devices and other related risk factors. Objective refraction with streak retinoscope (Heine Model number Beta 200) was done. History was taken from each student particularly for any problem in seeing white boards, watching TV and distance blurred vision. Before performing dry retinoscopy a distant large target was given to children on a wall and they were asked to maintain steady fixation. Retinoscopy method which was done is as follows: In dim light room children were seated in front of retinoscope and arm's length distance was maintained by asking the children to look at a fixation target for relaxing his accommodation. The child's right eye was examined with observer right eye, right hand and vice versa with the child both eyes opened. The retinoscopy is performed at 67cm distance. Then by turning on retinoscope light and shown into child eye while his other eye was opened, the reflex which was observed have the following characteristics. In case of myopia against movement of the reflex was seen. In case of hypermetropia with motion of reflex was seen. In case of emmetropia no red reflex was seen instead a fully illuminated pupil was seen.

Statistical analysis: After the collection of data, data were analyzed with the help of IBM SPSS-20 version to get a statistical result. The descriptive statistics were presented in the form of frequencies and percentages. Chi-square test was used and a p-value <0.05 is taken as significant.

RESULTS

The numbers of total subjects examined in rural and urban school were 1000. Out of 1000 students, 496 (49.6%) were emmetropic, 339(33.9%) myopic and with other types of refractive error 165 (16.5%).

Table 1 is showing comparison of frequencies of refractive error among the students of urban and rural

schools. Higher frequency of myopia was noticed among the students of urban areas. Chi-square was used to compare the frequency of myopia which showed significant p-value = 0.00.

Table 1: Comparison of frequency of myopia in Urban and Rural areas (N=500 rural, 500 urban)

Variable	Emmetropia	Myopia	Others **	P value
	Frequency (%)	Frequency (%)	Frequency (%)	
Urban	213 (42.6%)	208 (41.6%)	79 (15.8%)	0.00*
Rural	283 (56.6%)	140 (28%)	77 (15.4%)	

* p value <0.05 is considered as significant.
**Hypermetropia, astigmatism

Equal number of males and females were examined. Greater number of males were emmetropic than female. Other types of refractive errors include hypermetropia and astigmatism is more in males than females. The frequency of myopia is more in females as compared to males are described in (table. 2). The results are significant against the P value of 0.006.

Table 2: Comparison of frequency of myopia according to gender & Class level (N=1000)

Variable	Emmetropia		Myopia		Other**		P value
	Frequency (%)		Frequency (%)		Frequency (%)		
Male (N=500)	276	53.4%	150	30%	74	14.8%	0.006
Female (N=500)	229	45.8%	198	39.6%	73	14.6%	
Primary (N=359)	170	47.3%	125	34.8%	64	17.8%	0.044
Middle (N=332)	159	47.8	113	34%	60	18%	
High (N=309	167	54%	110	35.5%	32	10.3%	

* p value <0.05 is considered as significant.
**Hypermetropia, astigmatism

The 1000 subjects were examined which are divided into three class levels primary (1 to 5th), middle (6 to 8th) and high (9 to 10th). The result of this study shows that there is higher frequency of myopia in higher level as compared to primary and middle is described in (Table 2). The results are significant with P value 0.044.

DISCUSSION

About 285 million people are visually impaired worldwide, 36 million are blind and 216.6 million have low vision.[12] Visually impaired people are 41.8% due to a major cause of refractive error. Visual impairment from uncorrected refractive errors can have long term effects in children and adults including loss of education and impaired quality of life.[13] The factors which are responsible for uncorrected refractive errors are lack of education and awareness, resources including money problem and unavailability of health care facilities. Therefore, screening of children of primary level is very important to know about frequency of myopia and give proper education and correction including spectacles at time. According to present study the frequency of myopia was 33.9%. The frequency of emmetropia and other refractive error including hyperopia and astigmatism was 49.6% and 16.5%. Contradictory to our finding, the study conducted at Iran documented lower prevalence of myopia, hyperopia.[14] Lower prevalence of refractive errors were also reported from previous researches of in Malaysia, and Iran was 7.7%, and 3.5%. However higher prevalence of myopia affecting >1/2 of children was reported from china and Singapore.[15] Higher prevalence of myopia were also reported from Nepal, affecting 3.5% of children.[16] In current study we found lower frequency of myopia among the students of rural school as compared to urban areas (28% vs. 41.6 %). Our results are in line with Previous studies that also showed that lower prevalence of myopia in rural school children as compared to urban schools Our results are also in accordance with the study conducted in Nepal that reported only <3% prevalence of myopia in children of rural area and 27.3 % in student of urban area schools.[17] The most probable reason of myopia in children are might be due to, less time spent at outdoor activities, playing games on smart phone, using computer and more near work activities reading and writing. In this study we interestingly found significantly higher frequency of myopia in high school students, followed by primary school children while lowest frequency was found in middle school children. Our results are in accordance with study performed at eastern china that also reported high prevalence of myopia in higher school students.[18] However, in contrast to this previous studies in Saudi Arabia have reported high prevalence of refractive error in middle school going children.[19] Current results also revealed that females students were more frequently found to be myopic than the male counterparts and this may be attributed to spending more time in reading and writing as they are more conscious about their studies. It is necessary to established screening programs at primary school level and proper medical facilities should be available. Proper guidance should be given to children; teachers and parents so if they recognize any problem in vision then immediately go for refraction.

Limitations: No casual inferences are established due to cross sectional study.

CONCLUSION

Frequency of myopia was higher in urban school going students. Myopia was comparatively higher among female students as compared to male counterparts. Effective strategies are needed to eliminate the cause of significant visual problems.

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Authors' Contribution:

Shakila Abbas	Concept, study design, data collection, literature search, analysis, first draft write- up
Nimra Gul	Study design, Data collection, literature search, second draft write up
Ayesha Kiran	Data analysis, final review, overall supervision
Komal Shahzadi	Data analysis, revised and approved the article
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