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Original Research Article

A study on prevalence of myopia and its associated factors in school children of Salem, Tamil Nadu

Chellavel Ganapathi K., Arun Vijay Paul R.*, Kokila K., Bharath Kumar S.

Department of Community Medicine, GMKMC, Salem, Tamil Nadu, India

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***Correspondence:**
Dr. Arun Vijay Paul R.,
E-mail: docavp1973@gmail.com

ABSTRACT

Background: Myopia is the major refractive error having a worldwide prevalence of 1.5 billion. Children with Myopia feel difficulties in viewing blackboard in school; they avoid outdoor activities and get isolated from the peer groups. Untreated myopia may lead to Macular degeneration, Glaucoma, Cataract, Retinal detachment. Thus this study was carried out. The aim of the study to find out the prevalence of myopia among school children and its associated factors.
Methods: The study was a cross sectional study carried out among students of government higher secondary school, Sarkar Kollapatti, Salem. Total sample size of 854 Students from class 6-12 was selected by simple random sampling. Students were examined by Snellen's chart, non-cycloplegic auto refractometry and by pin hole test. Finally all data were entered in EPIDATA and analysed in IBM SPSS software version 20.
Results: After complete analysis, prevalence of myopia was 11.7% of which 46% were boys and 54% were girls. Among students of age 8 to 19 years, the most common age group involved was 14-17 years of age followed by students of 10-13 years of age. Time spent on visual gadgets was the major factor associated with myopia. Familial predisposition, average amount of time a person spends on near work showed significant association with myopia.
Conclusions: This study throws light on prevalence of myopia in semi-urban school children & various factors associated with myopia. Students with myopia were referred to Department of Ophthalmology, GMKMCH and thus they were prevented from further complications due to myopia and improve the academic performance.

Keywords: Myopia, School children, Tamilnadu

INTRODUCTION

Myopia is the major refractive error having a wide prevalence all over the world. By definition, Myopia is a state of refraction in which a parallel rays of light coming from infinity is focused in front of retina, while accommodation is at rest.[1] Myopia is genetically inherited and the most common age group is 6-18 years of age.[2] Myopia has worldwide prevalence of 1.5 billion (22% of total world population). Recent studies have showed that myopia incidence is more among Asian countries with the prevalence of 70-90%.[3] According to WHO-NPCB survey in 1989, 1.49% population is blind of which 7.35% is due to refractive error. In the study conducted in 2001 prevalence of myopia at an urban population was 7.45% and 4.1% in rural population. The earliest study at 1970 by Jain et al and study at 2001 showed higher prevalence in urban population.[4] Myopia, when unnoticed causes severe visual disturbances to the patient and it also hinders day to day activities. Untreated myopia leads to complications like Myopic macular degeneration, glaucoma, cataract, choroidal neo vascularization and retinal detachment.[5] On a broader aspect, Myopia in children makes them feel difficulties in viewing blackboards in school and they avoid outdoor activities and they get socially isolated. Further myopic

progression and complications can be prevented when detected early. Hence, this study was carried out.

Aims and objectives

The aim of the study was to find out the prevalence of myopia among school children and factors associated with myopia.

METHODS

The study was a cross sectional study carried out from May 2015 to October 2015 among students of Government Middle and Higher secondary school, Sarkar Kollapatti, Salem. Out of six schools, Govt. Middle and Higher Secondary school was randomly selected and students of class 6 -12 were selected by Simple Random Sampling and students who were absent on the day of study and mentally challenged students were excluded from the study and the final study sample was of 854 students based on the previous prevalence of myopia 13% with absolute precision of 2.5%.[6] Students were explained about the study and after getting consent, a pilot study was carried out to standardize the study. Students were examined for refractive error by Snellen's chart and by non-cycloplegic auto refractometry and pinhole test. Myopic error alone was taken into consideration. Students were provided with validated semi structured questionnaire to assess the prevalence of myopia and its associated factors.[7] For operative purpose, visual acuity <6/9, which improved on pinhole test was considered as myopia. Finally, all data were entered in EPIDATA and analyzed in IBM SPSS software version 20. Frequencies and descriptive were analyzed. Associated factors were analyzed using chi square test and $p<0.05$ is taken as significant association.

RESULTS

After complete analysis of data obtained, it showed that the prevalence of Myopia was 11.7% (100 students out of 854), of which 46% were boys and 54% were girls in Table 1.

Table 2 shows, among the students, age ranging from 10 years to 19 years, the most common age group involved was 14-17 years age group, accounting for 79 students, followed by 10-13 years age group, with count of 19 students.

The mean spherical error was found to be - 0.5+ 1 diopters, with more students with error of -0.5 diopters. Based on Table 3, of the various factors included, Factor analysis showed that Time spent on gadgets, near work duration, distance of watching television, outdoor activity time, distance of book reading and family predisposition were the major factors influencing myopia.

Table 1: Gender based distribution of myopia in school going children (10-19 years).

Gender		Myopic		Total
		Yes	No	
		n (%)	n (%)	
	Male	46 (46)	379 (50.3)	425
	Female	54 (54)	375 (49.7)	429
Total		100 (11.7)	754 (88.3)	854

Table 2: Distribution of myopia based on age group.

		Myopic		
Age group		Yes	No	**Total**
		n (%)	n (%)	
	Oct-13	19 (19)	125 (16.5)	143
	14-17	79 (79)	606 (80.4)	685
	18-21	2 (2)	23 (3.1)	25
Total		100	754	854

Time spent on visual gadgets (i.e. watching television >2 hours/day and usage of mobile phones, video games >2 hours/day) was the major factor associated with myopia ($p<0.001$). Family predisposition with either parent or both having myopia was found to play a significant role in myopia among children ($p=0.001$). Average amount of time a person spends on near work (i.e. computer usage, book reading, gaming products) showed significant association with myopia ($p=0.001$). Distance at which a person reads the book was also found to have significant association with myopia ($p=0.047$). Students placing the book very close, i.e. less than 25 cms were associated with myopia. Outdoor activities and time spent on it was found to inversely associate with myopia, indicating that more time on outdoor activities serves as a protective factor for myopia.

Table 3: Factors associated with myopia.

S.no	Factors	No. of students exposed to risk factor N (%)	Myopic N (%)	Non-myopic N (%)	P value
1	Distance of book reading	602 (70.49)	79 (79)	523(69.4)	0.047 (s)
2	Rest for eye	336 (39.3)	45 (45)	291 (38.6)	0.218 (ns)
3	Family predisposition	126 (14.)	72 (86)	54 (4)	<0.001 (s)
4	Time on gadgets	365 (42.7)	75 (75)	290(38.5)	<0.001 (s)
5	Time spent in near work	265 (31.03)	57(57)	208 (27.6)	<0.001 (s)
6	Decreased outdoor activity duration	732 (85.7)	93 (93)	639 (84.7)	0.027 (s)
7	Position of reading	601 (70.4)	71(71)	530 (70.3)	0.884 (ns)
8	Preferred time for reading	220 (25.8)	22(22)	198 (26.3)	0.360 (ns)
9	Distance of watching television	497 (58.2)	85 (85)	412 (54.6)	0.002 (s)

*ns -Not significant; s -Significant.

DISCUSSION

In recent times, Myopia has increased in number among East–Asian population and even in India and has evolved as a major health burden for the nation. Study was conducted to find out the prevalence of myopia among school children and various factors associated with myopia.[3] Our study included 854 students in and around field area of our medical college. Prevalence of myopia was found to be 11.7%, showing a lower value than that of urban prevalence 13%.[6] In that girls were predominantly myopic when compared to boys, probably due to more time spent indoor, watching television, using mobiles, and habit of reading more books. According to International journal of health sciences survey among 4306 students, myopia was found in 4.74% of which 3.23% is contributed by girls. It can also be due to more access to gadgets as a result of modernization and more knowledge regarding usage of gadgets. It is more among the age group of 14-17 years, due to start of mobile usage around that age and also due to more books reading behavior.

Factors association showed that, out of students with more gadget usage, 75% were myopic, and family risk accounted for 86%, showing a strong association according to our study. Out of students with risk of watching television at close distance, 85% were myopic. This altogether indicates that visual gadgets and habit of using it and family predisposition are the major factors associated with myopia.[8] Of students studying book at low distance, 79% were myopic and those involved in more near work, 57% were myopic. But, based on previous data it is not clear whether myopia develops due to increase near work or as a consequence of myopia, people use things by placing it close to their eyes. This controversy is yet to be clarified. Extremely low socio-economic status; illiteracy; rural residence were significantly associated with myopia.[9] A protective factor so far is more time spent on outdoor activities. With students having decreased outdoor activities 93% were myopic, showing its importance. An inverse association with outdoor activities/playing was observed with children playing >2 hours in a day.[6] We can reduce the incidence of myopia by increasing the time spent on outdoor activities.[10]

CONCLUSION

The study throws light on prevalence of myopia in semi-urban school children and various factors associated with myopia. All students were explained about Myopia and its complications and necessary precautions were advised. They were referred to Department of Ophthalmology, GMKMCH, and Salem for further management. Knowledge about Myopia and factors influencing it helps us to prevent or delay myopia occurrence and progression, thus reducing the burden that patient has to undergo and various complications can be avoided. A detailed multi-centric study should be carried out to look for factor association with myopia. Early Identification and prevention of myopia can produce significant change in an individual's life.

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