

## Original Research Article

# Prevalence of myopia in school children in Southern Rajasthan

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### ABSTRACT

**Background:** Among the refractive errors, myopia is the most common in school children. Due to myopia, school children are unable to see the blackboard which severely affects their performance. Moreover, they are unable to play outdoor sports thereby hampering their all-round development.

**Methods:** This is a cross-sectional observational and analytical study. All children from 5-12 years attending eye OPD were included. Detailed history was taken and complete ophthalmic examination was done. Low myopia was defined as refractive error of -0.25D to -3D. Moderate myopia was defined refractive error of -3.25 D to -6 D. High myopia was defined as refractive error of  $\geq$ -6D. The children were divided into 3 groups according to their age (in years): group-1 (5-7), group-2 (8-9) and group-3 (10-12). The data obtained was subjected to statistical analysis using IBM SPSS version 24. P value was calculated by chi-square test.  $P < 0.05$  was considered statistically significant.

**Results:** 153 children were examined, out of which 72 (47.1%) were males and 81 (52.9%) were females. Group-1, group-2 and group-3 had 38, 38, 77 children respectively. Out of 153 children, 26 (16.99%) were found to be myopic. Out of 26 myopic children, males were 11 (42.3%) and females were 15 (57.69%) ( $p > 0.05$ ). Low, moderate and high myopia was found in 19 (73.07%), 6 (23.07%) and 1 (3.84%) child respectively.

**Conclusions:** The prevalence of myopia in school children is 16.99%. There is a need for regular screening of school children to diagnose myopia in them. The limitation of this study is hospital based and small sample size. So, we recommend a community-based study with a larger sample size.

**Keywords:** Myopia, School children, Prevalence, Refractive error

### INTRODUCTION

Refractive error is defined as an optical condition in which parallel rays of light coming from the infinity does not come to a point focus on the neurosensory layer of the retina.<sup>1</sup>

Refractive error is usually classified as myopia and hypermetropia. Among the refractive errors, myopia is the most common in school children.<sup>2</sup> Although exact etiology of myopia is unknown but it is postulated to be due to hereditary and environmental factors.<sup>3</sup> Amongst the environmental factors, near work is increasingly being considered as an important risk factor.<sup>4</sup> Due to increasing use of digital devices by school children, there

is increase in duration of near work which may lead to higher prevalence of myopia.<sup>5</sup>

Due to myopia, school children are unable to see the blackboard which severely affects their performance. Moreover, they are unable to play outdoor sports thereby hampering their all-round development.

Although some studies have been conducted in the other parts of the globe, no such study has been conducted in this region.<sup>3-7,9-12</sup> Therefore, we have decided to conduct a study in school children to know the prevalence of myopia in school children of southern Rajasthan India.

## METHODS

### Study design

The study was cross sectional, observational and analytical study.

### Inclusion criteria

All children from 5-12 years attending eye OPD were included.

### Exclusion criteria

Unco-operative children and parents of children who refused eye examination were excluded.

### Study procedure

After taking permission from institutional ethics committee, the study was conducted at department of ophthalmology, Geetanjali medical college and hospital, Udaipur, Rajasthan, India from January 2018 to June 2020. Informed consent was taken from the parents of all subjects. It was an out-patient based study and following examinations were done.

### Ocular examination

Visual acuity assessment, slit lamp examination (Zeiss SL115), cover test and alternate cover test, eye movements, cycloplegic refraction was done. Cycloplegia was achieved using tropicamide (0.8% w/v) eye drops.

Refractive error  $\geq -0.25D$  was defined as myopia. Low myopia was defined as refractive error of  $-0.25D$  to  $-D$ . Moderate myopia was defined refractive error of  $-3.25D$  to  $-6D$ . High myopia was defined as refractive error of  $\geq -6D$ .

The children were divided into 3 groups according to their age (in years): group-1 (5-7), group-2 (8-9) and group-3 (10-12).

### Statistical analysis

The data was entered in MS excel version 17 worksheet. The data obtained was subjected to statistical analysis using IBM SPSS version 24. P value was calculated by chi-square test.  $P < 0.05$  was considered statistically significant.

## RESULTS

There were 153 children included in the study, out of which 72 (47.1%) were males and 81 (52.9%) were females.

**Table 1: Distribution of patients according to gender**

Numbers	Male	Female	P value
No. of patients	72	81	0.466
Percentages (%)	47.1	52.9	

The minimum age was 5 years and maximum age was 12 years (mean age 9.2 years). The mean age of males and females (in years) was and 11.0 respectively was 9.3. No bias was noted in the distribution of children according to gender ( $p > 0.05$ ).

All the children were divided into 3 groups: group 1 (5-7 years), group 2 (8-10 years) and the group 3 (10-12 years).

**Table 2: Distribution of patients according to age group and gender.**

Sex	Group-1	Group-2	Group-3
Male	14	19	39
Female	24	19	38
P value	0.1047	1.000	0.9092
Total	38	38	77

Group-1, group-2 and group-3 had 38, 38, 77 children respectively. Of all the 77 children in group-3, males and females were 38 (49.35%) and 39 (50.65%) respectively. Of 38 children in group-1, males and females were 24 (63.15%) and 14 (36.84%). Of all the 38 children in group-2, males and females were 19 (50%) and 19 (50%) respectively. No bias was noted in the distribution of children according to gender in all the groups  $p$  value  $> 0.05$ .

**Table 3: Distribution of myopia in children.**

Number of myopia	26
Total children	153

Out of 153 children, 26 (16.99%) were found to be myopic.

**Table 4: Distribution of myopia according to gender.**

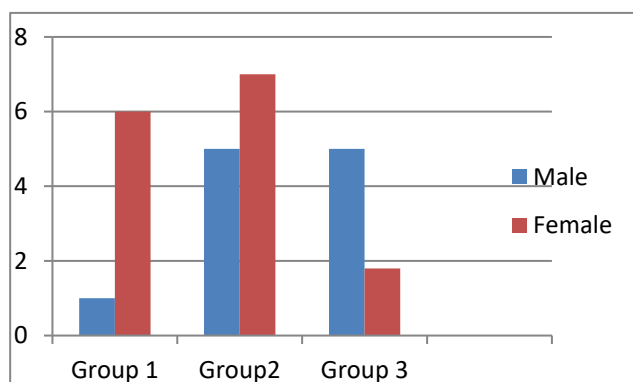
Gender	Number of children	%
Male	11	42.30
Female	15	57.69
Total	26	100

Out of 26 myopic children, males were 11 (42.3%) and females were 15 (57.69%). No significant difference among males and females was noted in children affected by myopia ( $p > 0.05$ ).

**Table 5: Distribution of grades of myopia according to gender (n=26).**

Variables	Male	Female	Total	P value
<b>Low (-0.25D to -3D)</b>	6	13	19	0.1083
<b>Moderate (-3.25D to -6D)</b>	4	2	6	0.4142
<b>High (&gt;6D)</b>	1	0	1	NA
<b>Total</b>	11	15	26	0.4328

Out of 26 myopic children low, moderate and high myopia was found in 19 (73.07%), 6 (23.07%) and 1 (3.84%) child respectively.

**Figure 1: Distribution of myopia in different groups (n=26).**

## DISCUSSION

Our study is probably the first to know the prevalence of myopia in school children of southern Rajasthan.

In myopia, children can easily see the near objects but they find it difficult to see at distant objects clearly. Therefore, school children are unable to see the blackboard clearly. This hampers their school performance severely.

Moreover, myopia is progressive in nature. Pathological myopia can lead to retinal changes such as posterior staphyloma, peripapillary atrophy, choroidal neovascular membrane, Foster-Fuch's spots on macula, and retinal detachment.<sup>8</sup> This can lead to permanent loss of vision.

We studied 153 children in our study and analysed the pattern of myopia in them. Out of 153 children, 26 (16.99%) were found to be affected by myopia (Table 3). The prevalence of myopia in our study (16.99%) (Table 6) was found to be higher than that of other studies (4.1-7.4%).<sup>9-11</sup> Now days, more amount of time is spent in near work activities like mobile phones, laptop, and studies by the children. Increasing duration of near work coupled with decreasing outdoor activities may be possible cause of high prevalence of myopia.<sup>12</sup> Another reason for higher prevalence of myopia in our study as

compared to others could be due to different set of criteria used to ascertain myopia. We have considered refractive error of -0.25 D and above as myopia while other studies have considered -0.5D and above as myopia.<sup>9-11</sup>

In our study, we found 11 myopic males as compared to 15 myopic females Table 4. This difference was not statistically significant ( $p>0.05$ ). Our results were similar to the results found in other studies.<sup>13</sup>

In our study different grades of severity of myopia were found to be unequally distributed amongst males and females Table 5. But the difference between males and females was not statistically significant ( $p>0.05$ ). Our study is probably the first to analyse the association of severity of myopia according to gender. Extensive literature search did not reveal any such study of the association.

We will like to draw the attention to the limitations. The limitations of our study were its hospital-based nature and small sample size. Also, we did not analyse the risk factors associated with myopia. So, we suggest a community-based study with a larger sample size and wider study design be conducted, so as to have a better understanding of prevalence of myopia and its associated risk factors.

## CONCLUSION

The prevalence of myopia in school children is 16.99%. There is a need for regular screening of school children to diagnose myopia in them. This also underlines the need for increasing the awareness in the society regarding regular screening of all children. The limitation of this study is hospital based and small sample size. So, we recommend a community-based study with a larger sample size be conducted.

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