

## ORIGINAL RESEARCH

# CHANGE IN EDUCATION METHOD IN COVID-19 PERIOD: EFFECT ON PATTERN OF MYOPIA IN PEDIATRIC AGE GROUP

<sup>1</sup>Dr. Shailly Raj, <sup>2</sup> Dr. Naveen Kumar, <sup>3</sup> Dr. Granth Kumar, <sup>4</sup> Dr. Vimal Nag, <sup>5</sup> Dr. Rashmi

<sup>1</sup>Assistant Professor, Department of Ophthalmology, Government Medical College, Saharanpur, U.P., India

<sup>2</sup>Assistant Professor, Department of ENT, Government Medical College, Saharanpur, U.P., India

<sup>3</sup>Professor, Department of Medicine, U.P. University of Medical Sciences, Saifai, Etawah, U.P., India

<sup>4</sup>Associate Professor, Department of Pediatrics, Dr.Baba Saheb Ambedkar Medical College and Hospital, Rohini, New Delhi, India

<sup>5</sup>Assistant Professor, Department of Pathology, U.P. University of Medical Sciences, Saifai, Etawah, U.P., India

### Correspondence:

Naveen Kumar

Assistant Professor, Department of ENT, Government Medical College, Saharanpur, U.P., India

Email: [drnaveen11@gmail.com](mailto:drnaveen11@gmail.com)

### ABSTRACT

**Introduction:** Myopia is a major health issue in our society. There is a large number of proportion remain undiagnosed. High myopia can be associated with multiple consequences as myopic retinopathy, myopic macular degeneration, retinal detachment and amblyopia. The aim of our study to focus on magnitude of childhood myopia, increase awareness for myopia in our society so that we can reduce vision threatening sequelae in children.

**Methods:** Study was conducted in ophthalmology department and ENT department government medical college Saharanpur, medicine department Uttar Pradesh medical sciences, Saifai and pediatric department GTB medical college New Delhi. Children between 7 to 16 years with ametropia included in the study to find out magnitude of myopia among them.

**Result:** A total of 1460 children between the age of 7-16 years with complains of eyeache, headache, heaviness of head diminution of vision, and with other asthenopic symptoms included in the study. Among these 320 children were myopic. It shows high

**magnitude of myopia in children. Out of these myopic children mild grade myopic children were in high proportion (35.9%).**

**Conclusion: The study showed the pattern of myopia in children in Indian population. Screening in schools and early diagnosis of refractive error affect the learning and performances of children. In our study we showed the pattern of severity of myopia in children. Study also showed the effect of digital screen time of children with myopia.**

**Keywords: myopia, children, Covid-19**

## **INTRODUCTION**

Myopia is a commonest refractive error [1]. It is also known as nearsightedness or shortsightedness. It is a condition of eye when light rays focus on a single point in front of retina. So the object to be out of focus only for distant objects but does not affect the near vision.

In the last decade the load of myopia in pediatric age group increased significantly due to excess use of electronic gadgets.

It has become a major public health problem globally, with a prediction of up to 50% of the world population will be myopic by 2050 [2]. There is much needed attention due to possibility of irreversible vision threatening sequel after degenerative changes happen in retina and optic nerve.

Increase load of myopia is a cause of concern, still it is not given needed importance in India [3,4]. After the era of home confinement and overuse of digital screen for education and official uses due to Covid-19 pandemic, there is increase in myopia especially in pediatric age group. Insufficient exposure to outdoor activity may be the major risk factor for myopia development [5,6].

Little data is available to know prevalence of myopia in Indian population. Although it varies between 2.77% to 7.4% [7,8].

According to WHO-NPCB survey in 1989, 1.49% population in India is blind of which 7.35% is due to refractive errors [9]. The proportion of blindness due to refractive error increased to 19.7% in the NPCB-National blindness survey even though the

Overall prevalence of blindness was reduced to 1.1% [10]. In another study prevalence of myopia is 3.16% in urban India but 1.5% in rural population [11].

The prevalence of myopia reported as high as 70-90% in some Asian population [12] and 84% in Taiwan reporting among 16-18 years old high school students [13].

## **METHODS**

This study was undertaken in from June 2021 to May 2022.

In the study ophthalmology department and ENT department government medical college Saharanpur, medicine department Uttar Pradesh medical sciences, Saifai and pediatric department GTB medical college New Delhi. We studied the pattern and prevalence of myopia in pediatric age group after limited outdoor activity and excess use of electronic screen.

Total 1460 children between age group of 7-16 years were screened. Give special emphasis to find out correlation between uses of electronic gadgets and incidence, amount or severity of myopia.

It was a cross sectional hospital based study. The children between age 7-16 years, whose visual acuity was worse than 6/6 and improved/ not improved with pinhole were included in the sample.

Patient with prior trauma, cataract surgery, refractive surgery or any other intraocular surgery were excluded from the study. The demographic profile of patients was recorded in terms of name, age, sex and socioeconomic status. Detailed history of patients was taken and the chief complaints were noted.

1. Complaint related to vision – Diminution of vision, difficulty in reading.
2. Associated complaints – Headache
  - Heaviness of head
  - History of nausea or vomiting
3. Other eye symptoms – Pain in eyes
  - Deviation of eyes
  - Asthenopic symptoms
  - Redness

Family history of refractive errors also recorded.

Any syndromic associations also ruled out

Visual acuity was noted and detailed ocular examination with slit lamp and indirect ophthalmoscope was performed to look for any other ocular morbidity.

Retinoscopy with cycloplegia done to evaluate the type and amount of myopia. Detailed fundus examination done to rule out any posterior segment involvement.

## RESULT

A total 1460 children were included in the study.

**Table no.1-Prevalence of ametropia in children attending eye OPD**

S.No.	No. of pediatric patient	No. of ametropic children	No. of myopic patient
1.	1780	1460	320

The total load /Prevalence of ametropia in pediatric age group (7-16 years) was 1460 i.e. 82.02%. And out of 1460 children with refractive error there was 320 children affected with myopia i.e. 21.91%. Out of total pediatric population between 7 years to 16 years the myopic children were 17.97%.

**Table no.2- Association of myopia with demographic variables**

S.no.	Variables	No. of children	No. of children (%)	
1.	Age	7-10 years	112	35%
		11-16 years	208	65%
2.	Gender	male	190	59.3%
		female	130	40.6%
3.	Family history of myopia	no	103	32.1%
		yes	217	67.8%
4.	Amblyopia	yes	76	23.75%
		no	244	76.25%

5.	History of wearing glasses	yes	145	45.3%
		no	175	54.7%

Table no.2 showed the association of myopia among pediatric age group with demographic variables. Myopia is more prevalent in children in age group between 11 to 16 years. It is seen that there is strong correlation between children affected with myopia and their positive family history. Amblyopia is common in children reported with myopia. We also study the history of already wearing glasses in children reported to eye OPD for refractive error. There are a variety of clinical profiles examined in children e.g. headache, heaviness of eyes and watering. These were the common complaints of children reported to eye OPD for refractive error.

**Table no.3 – Grading of myopia**

S.no.	Visual impairment (Grading)	No. of children	No. of children (%)
1.	Normal(6/6 to 6/9)	94	29.3%
2.	Mild (>6/9 to 6/18)	115	35.9%
3.	Moderate (>6/18 to 6/60)	79	24.6%
4.	Severe (>6/60)	32	10.0%
	Total	320	100%

Table no.3 showed the distribution of children with normal, mild, moderate and severe myopia. The maximum number of patients with myopia reported mild grade of visual impairment that is between 6/9 to 6/18 and second highest number of children were moderate grade of visual impairment. Least number of children were having severe grade of visual impairment.

**Table no.4-Association between no. of hours per week for online classes with development of myopia**

S. No.	No. of hours/week for online classes	No. of children of age group 7-10 years	No. of children age group 11-16 years	Total
1.	0-6 hours	5	21	56
2.	>6-20 hours	74	67	141
3.	>20 hours	3	120	123
		112	208	320

Table no.4 showed the association of myopia with amount of hours per week spent on digital screen for online classes during the period of study from June 2021 to May 2022. In this study time there were offline school classes were mostly closed and children had to spend more hours on digital screen for education.

In the study we found that there was more myopia prevalence in children with 11 to 16 years age group spending >20 hours per week on online classes. But the load of myopic children was slightly larger in 7 to 10 years age group spending optimal 6 to 20 hours per week for online classes.

## DISCUSSION

Myopia specially high grade may be associated with Rhegmatogenous retinal detachment, retinal degeneration, myopic retinopathy and myopic glaucomatous optic neuropathy. In this study we found 17.9 % of total pediatric patient reported to eye and pediatric OPD had myopia. Another Indian study shown prevalence of 3.16% and 1.5 % respectively in urban and rural India. A study has shown 4.74 % prevalence of myopia in north India [14]. Higher prevalence of myopia reported in our study can be explained as it is a hospital based study along with it is strongly associated with raised screen time among children due to dependency on online classes in COVID pandemic scenario.

Czepita et al reported that gender affect the prevalence of myopia in school age children [15]. In our study we noted 59.3% male and 40.6% female were myopic of total school aged myopic children between 7 to 16 years age.

The positive history of myopia play the major role in prevalence of myopia in school aged children. In our study 67.8% of total myopic children has the positive family history. It showed the genetic correlation of myopia [16].

In our study 72.2% children were developed amblyopia out of total myopic children.

There is also positive correlation between the prevalence of myopia with age. In this study 65% children between age 11-16 years and 35% myopic children are between 7-10 years. It showed myopia increases with age as it may be due to increase in near work due to more study time. There are multiple environmental factors, educational level and change in life style [17, 18]. Higher classes students tend to spend more time on studies and near work lead to more prevalence of myopia with increasing age.

In our study we also report that due to current scenario of limited outdoor activity and increase in home confinement there is major effect on status of vision of children. Because of online classes there is marked increase in screen time of children specially of higher age group. Our study shown that there was only 18.4% of total myopic children who spend only 0-6 hours/week developed myopia. There was maximum proportion of 44% develop myopia spend >6-20 hours/week on digital screen, rather than children spending bigger than 20 hours/week on screen as only higher age group children spent that much of time on screen.

It was observed that out of total myopic children 35.9% children had mild grade myopia and only 10% children had severe grade myopia or visual impairment of >6/60.

In our study children between younger age group of 7-10 years, 66.07% children develop myopia spending 6-20 hours/week on online classes.

In the older age of 11-16 years there are 57.7% children developed myopia, spending >20 hours /week for online classes.

## CONCLUSION

There is no proven or established protocol to prevent the onset of myopia and its progression. It is a major public health problem in the both urban and rural areas. It is considered on priority in the national program for control of blindness. There is very high magnitude of myopia in school age children that is a point of concern. The school vision screening program is fully sponsored by the government of India and free spectacles are provided to poor children. The program is aimed to early diagnosis of any refractive error in children and to avoid progression to amblyopia and other myopia related vision threatening sequelae.

Although it is well structured center sponsored program but most of the states are able to implement this program.it leads to large number of uncorrected refractive error. The myopia in school age children leads to learning difficulties,reduced performances in school, ultimately affecting the psycho social development of the child.To decrease the magnitude of amblyopia and visual impairment due to myopia in school age children, it is mandatory to conduct vision screening at regular interval in schools. Large scale vision screening program help to detect vision threatening myopia early and regular vision check up to update the spectacles,and avoid amblyopia.

School teachers and awareness of parents play the major role in visual health of school age children.

## REFERENCES

1. Congdon N, Burnett A, Frick K. The impact of uncorrected myopia on individuals and society. *Community eye health*. 2019; 32 (105):7-8.
2. Holden BA, Fricke TR, Wilson DA, Jong M, Naidoo KS, Sankaridurg P, et al. Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050.*Ophthalmology*.2016 May; 123(5):1036-42.
3. Saw SM, Pan CW, Dirani M, Cheng C-Y, Wong TY.Is myopia more common in Asians? A systematic review and meta-analysis. *Invest Ophthalmol Vis Sci*. 2014 Apr 30; 55(13):3632-3632.
4. Census of India: age structure and marital status. [Cited 2020 Mar 10].
5. Saxena R, Vashist P, Menon V.Is myopia a public health problem in India? *Indian J community Med*.2013 Apr 1; 38(2):83.
6. Hashemi H, Fotouhi A, Yekta A, Pakzad R, Ostadimoghaddam H, KhabazKhoobM.Global and regional Estimates of prevalence of refractive errors: Systematic review and meta-analysis.*JCurrOphthalmol* 2017 Sep 27;30(1):3-22.
7. Jain IS, Jain S, Mohan K.The epidemiology of high myopia: Changing trends .*Indian J Ophthalmol*.1983; 31:723-8.
8. Murthy GV, 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: 623-31.
9. Mohan M.NPCV-WHO report .New Delhi: ministry of health and family welfare, Government of India;1989.National survey of blindness-India.
10. Murthy GV, Gupta SK, Bachani D, Jose R, John N.Current estimates of blindness in India .*Br J Ophthalmol*.2005;89:257-60.
11. Amruta S.Padhye, Rajiv Khandekar, 1 SheetalDharmadhikari, Kuldeep Dole, ParikshitGogate, and Madan Deshpande, Prevalence of uncorrected refractive error and other eye problems among Urban and Rural School Children. *Middle East Afr J Ophthalmol*.2009 Apr-Jun;16(2):69-74
12. Pan CW, Ramamurthy D, Saw SM. Worldwide prevalence and risk factors for myopia. *Ophthalmic Physiol Opt*.2012; 32: 3-16
13. Lin LL, Shih YF, Hsiao CK, Chen CJ. Prevalence of myopia in Taiwanese School Children: 1983 to 2000.*Ann Acad Med Singapore*.2004; 33: 27-33.

14. Ishfaq Ahmad, 1 SeemaMian, 2 Syed Mudasir, 3 and K. I. Andrabi. Prevalence of myopia in students of Sri Nagar City of Kashmir, India. *Int J Health Sci (Qassim)*.2008 January; 2(1):77-81.
15. Czepita D, Mojsa A, Ustianowska M, Czepita M, Lachowicz E. Role of gender in the occurrence of refractive errors. *Ann Acad Med Stetin*. 2007; 53:5-7.
16. French AN, Morgan IG, Mitchell P, Rose KA. Risk factors for incident myopia in Australian School children: The Sydney Adolescent Vascular and Eye Study. *Ophthalmology* .2013 May 11. pii: S0161-6420(13)00213-3.
17. Simensen B, Thorud LO. Adult onset Myopia and occupation. *ActaOphthalmol*. 1994; 72:469-71.
18. Leiby HM, Krueger DF, Mauser LR, Milton RC, Kini MM, Kahn HA, et al. The Framingham Eye Study Monograph: An Ophthalmological and Epidemiological study of cataract, glaucoma, diabetic Retinopathy, Macular Degeneration, and Visual Acuity in a general population of 2631 adults, 1973-1975. *SurvOphthalmol* .1980; 24: 472-9.