



COMPARING LOW OUTDOOR PHYSICAL ACTIVITY, ACADEMIC DIFFICULTIES AND HIGH USES OF MULTIMEDIA ARE ASSOCIATED WITH MYOPIA AT THE AGE OF 7 YEARS TO 15 YEARS OF CHILDREN STUDYING IN PRIVATE AND GOVERNMENT SCHOOL IN RAIPUR

Ophthalmology

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ABSTRACT

AIM AND OBJECTIVE- 1) To examine the academic difficulties like (reading/ writing/ arithmetic) associate with myopia. 2) To examine the private and government school going children educational pressure, genetic effects, children daily activities associate with myopia, and 3) To examine and find out the prevalence of myopia among private and government school going children and factors associated with myopia. **METHODS:** Cross sectional study conducted over a period of one year six months (February 2018- August 2019). The school going children in private sector and government sector, in Raipur. All the children between 7-15 yrs. of age in the selected schools were examined 573 children, boys 197/315 (62.53%) and girls 147/258 (56.97%) was observed. **RESULTS:** Present study Analysis myopia causes result shows blurred vision, light and glares sensitivity eye strain /fatigue is statistically significant at <0.05 level. Academic difficulties 151 (83.42%) children from private school and 128 (78.52%) from government school facing reading difficulties .Writing 124 (68.50%) children from private school and 143 (87.73%) from government school facing writing difficulties and arithmetic 82 (45.30%) children from private school and 67 (41.10%) from government school facing arithmetic difficulties. Watching Television, watching videos, movies and Playing game is not statistically significant at the level of >0.05 level. Maximum numbers of hours children spending in front of T.V, watching videos, movies, and playing games. **CONCLUSIONS:** The present study shows prevalence rate of myopia among school going children 197/573 (34.38%) in boys and 147/573 (25.65%) in girls. It is associated with increasing academic difficulties (reading, writing, arithmetic) combined with life changes, which have reduced the time children, spend outside. In study prevalence of myopia among boys was more than that of girls. Know days both genders are more interested in indoor activities like playing mobile games, online chat, videos, computer etc., and not showing interest on outdoor activities. According to present study, shows that the prevalence of myopia decreases the levels of outdoor activities and increase the level of academic difficulties.

KEYWORDS

Myopia, academic difficulties, multimedia, counselling

INTRODUCTION-

Myopia, or near-sightedness, is a common condition affecting more people in India. Both children and adults can be myopia, but myopia is normally first diagnosed in school-aged children. Myopia tends to advance in the teens, as the eye continues to grow during this time. Alteration in visual power is common in age group 7-10 years. Students are found to be associated with lot of near work and prolonged accommodation. So, we were keen to observe risk factors that increase the incidence of myopia in this age group. Myopia is more common in children who are constantly engaged in indoor activities like watching Television, iPad, computer, mobile phone and videogames. Incidence of myopia is more in children who reading visual affect, watch TV and use computer in a low illumination. Now day's children are avoiding outdoor activities or didn't want to take interest in social activities in children increase the risk of myopia. Unhealthy educational activities like – writing, watching spelling, reading in supine position at a distance >20 -30 cm and in a low illumination.

Low vision in childhood affects school performance or at work and has a negative influence on the future life of the child. Moreover planning of a youth's career is very much dependent on the visual acuity, especially in jobs for technical post on forces and Aviation. This warrants early detection and treatment of refractive errors to prevent permanent disability. The objective of this study was to determine, the prevalence of myopia among school children. In view of the above facts this kind of school screening cum prevention, promotion and treatment programme seems to be appropriate to reduce ocular morbidity among school children in developing countries. According to Murthy et al (2002) and Dandona et al. (2002) Studies from the early 2000s from India have quoted prevalence figures of 7.4% and 4.1%.

School-age children also spend a lot of time in recreational activities that require good vision. After-school team sports or playing in the backyard aren't as fun if you can't see well, myopia is one of the common vision condition in which you can see objects near to you clearly, but objects farther away are blurry. It occurs when the shape of your eye causes light rays to bend (refract) incorrectly, focusing images in front of your retina instead of on your retina. Higher educational level, higher achievement and earlier schooling were also found to be associated with an increase in myopia prevalence. Tay MT et.al. 1992, Teasdale TW, Goldschmidt E 1988, and Rose KA et al. 2008.

Scientists are unsure why the eyeball sometimes grows too long. In 2013, the Consortium for Refractive Error and Myopia (CREAM), an international team of vision scientists, discovered 24 new genetic risk factors for myopia (Verhoeven VJ, et al., 2013). Some of these genes are involved in nerve cell function, metabolism, and eye development. Alone, each gene has a small influence on myopia risk; however, the researchers found that individuals carrying greater numbers of the myopia-prone versions of the genes have an up to tenfold increased risk of myopia. The prevalence of myopia has been reported to be as high as 70-90% in some Asian population with Taiwan reporting a myopic prevalence of 84% among 16-18 - years - old high school students. Pan CW, Ramamurthy D, Saw SM 2012, Lin LL, Shih YF, Hsiao CK, Chen CJ. 2004

In April 1999, CLEERE observation study is a multicentre, observational investigation of ocular development and refractive error development in schoolchildren. Other researchers found that children who spent more time outdoors had a smaller chance of becoming myopia (Jones-Jordan, LA, et al. 2012). The researchers also showed

that time spent outside is independent from time spent reading, providing evidence against the assumption that less time outside means more time doing near work.

High myopia increases the risk of retinal detachment. The retina is the tissue in the back part of the eye that signals the brain in response to light. When it detaches, it pulls away from the underlying tissue called the choroid. Blood from the choroid supplies the retina with oxygen and nutrients. High myopia can also increase the risk of cataract and glaucoma. Cataract is the clouding of eye's lens. Glaucoma is a group of diseases that damage the optic nerve, which carries signals from the retina to the brain. Each of these conditions can cause vision loss.

Main causes of blindness in India in the age group of 50 year and older are Cataract (62.6%), Refractive Error (19.70%), Glaucoma (5.80%), Posterior Segment Disorder (4.70%), Surgical Complication (1.20%), Posterior Capsular Opacification (0.90%), Corneal Blindness (0.90%), others (4.19%). Estimated National Prevalence of Childhood Blindness /Low Vision is 0.80 per thousand According to National program for control of blindness and visual impairment, (NPCBVI).

AIM-

- To examine the academic difficulties like (reading/ writing/ arithmetic) associate with myopia.
- To examine the private and government school going children educational pressure, genetic effects, children daily activities associate with myopia.
- To examine and find out the prevalence of myopia among private and government school going children and factors associated with myopia.

METHODS

This is questionnaire based (schools) cross sectional study conducted over a period of one year six months (February 2018- August 2019). The school going children in private sector and government sector, in Raipur. All the children between 7-15 yrs. of age in the selected schools were examined for visual impairment. Therefore, 344 children available for at least 2 months of postoperative follow-up of imaging data and medical records.

Inclusion criteria: School children between 7-15 years of age of either sex in the selected school. Exclusion criteria: Visual impairment due to -Refractive errors other than myopia, Corneal opacities, Lens opacities and Retinal disease are not including in this study. The purpose and method of examination of students and provide the proper treatment and guide according to the medical issues, given report and explained to the management , school principal or head of the school/ program coordinator .

A large room with plugging system and electricity supply was selected. With the help of concerned teachers and the respective class teachers each class was subjected to visual acuity tests, student by student. The students whose visual acuity was observed to be 6/9 or less was again subjected to visual acuity test. The list of students was given to the class teachers and school head. Their parents were informed by the school authority to take the students to Shri Aurobindo Medical and Research Centre, Pachpedi Naka, Raipur.

Clinical profile of the study subjects was analysed and a detailed history including presenting complaints, duration of symptoms, socio economic status, medical history, socio demographic background, birth history, developmental history, personal and family history, school performance and school absence details were recorded, children and accompanying informants. A thorough physical examination was performed in all children including a general and systemic examination. Each subject took around 30 min. to respond on the entire above tool and eye examination. A period of one year six months was devoted for the data collection.

STATISTICAL ANALYSIS

The obtained data was statistically analyzed by applying descriptive (Mean, Standard Deviation, t-value) of significance in term of various variable. We have entered all data and further Statistical Analysis was done with the help of IBM- SPSS-25 software.

RESULT

In the present study, the maximum school going children 573 were between 7 -15 years of age boys 197/315 (62.53%) and girls 147/258 (56.97%) was observed. The maximum children from private school around 96/131 (73.28%) boys and 85/107 (79.43%) girls, government

school 101/184 (54.89%) boys and 62/151 (41.05%) girls. 205/344 (59.59%) children are staying in joint family and 139/344 (40.40%) are staying in nuclear family, and 96/344 (27.90%) are found positive family history of visual impairment. Other studies have found that the children of myopic parents have a higher prevalence of myopia, but the relative risk varies and is lower where the prevalence of myopia is high, as in East Asia - Morgan IG. 2012, IP JM et. al. 2008, Ip JM. et.al. 2007, Wu MM et.al. 1999. Most of the participants were middle class family .All participants exhibited command over English and Hindi language. Table No.1

Table No.1- Distribution of the Study Private and Government School Going Children with Visual Impairment (Screening Positive) and Sociodemographic Characteristics.

AREAS	NO. OF COUNT	SCREENING POSITIVE	PERCENT AGE
Private School			
Boys	131	96	73.28%
Girls	107	85	79.43%
Government School			
Boys	184	101	54.89%
Girls	151	62	41.05%
Total School Going Children			
Boys	315	197	62.53%
Girls	258	147	52.06%
Type of Family			
Joint	344	205	59.59%
Nuclear	344	139	40.40%
Family History of Visual Impairment			
Yes	344	96	27.90%
No	344	248	72.09%

Uncorrected myopia may cause you to squint or strain your eyes to maintain focus. Present study Analysis myopia causes result shows blurred vision private school children mean .63 $\pm$ SD.485, and government school children mean .53 $\pm$ SD.501, t value 4.199 is statistically significant at < 0.05 level, mean shows that private school children facing more difficulties is blurred vision as compared to government children. On light and glare sensitivity private school children mean .55 $\pm$ SD .499, and government school children mean .45 $\pm$ SD.499, t value 4.199 is statistically significant at < 0.05 level, headache private school children mean .72 $\pm$ SD.448, and government school children mean .79 $\pm$ SD.408, t value -3.424 is not statistically significant at > 0.05 level, mean shows both school children are facing headache, and eye strain /fatigue private school children mean .61 $\pm$ SD.490, and government school children mean .52 $\pm$ SD.501, t value 4.052 is statistically significant at < 0.05 level. See table no.2.

Table No. 2. Means and SD of causing factors along with their statistical significance

Paired Samples Statistics						
	Mean	N	Std. Deviation	Std. Error Mean		
Pair 1	Blurred vision	Private School	.63	163	.485	.038
		Government School	.53	163	.501	.039
Pair 2	Light and Glare Sensitivity	Private School	.55	163	.499	.039
		Government School	.45	163	.499	.039
Pair 3	headache	Private School	.72	163	.448	.035
		Government School	.79	163	.408	.032
Pair 4	Eye strain /fatigue	Private School	.61	163	.490	.038
		Government School	.52	163	.501	.039

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Blurred vision - Private /Government school	.098	.298	.023	.052	.144	4.199	162	.000
Pair 2	Light and Glare Sensitivity - Private /Government school	.098	.298	.023	.052	.144	4.199	162	.000
Pair 3	Headache - Private /Government school	-.067	.252	.020	-.106	-.029	-3.424	162	.001
Pair 4	Eye strain /fatigue - Private /Government school	.092	.290	.023	.047	.137	4.052	162	.000

Hyperopia/ Farsightedness. This occurs when your eyeball is shorter than normal or your cornea is curved too little. The effect is the opposite of myopia. In children, both near and distant objects are blurred. Present study shows hyperopia in boys in private school going children left eye 39 (40.62%) and right eye 57 (59.37%), government school going boys left eye 32 (31.68%) and 69 (68.31%) in right eye, and in girls studding in private school left eye 37 (43.52%) and right eye 48 (56.47%), government school girls left eye 32 (51.61%) and 30 (48.38%) in right eye. See table no.3.

Table No. 3. Percentages of effect of Hyperopia

SCHOOL	HYPEROPIA IN BOYS		HYPEROPIA IN GIRLS	
	Left Eye	Right Eye	Left Eye	Right Eye
Private School Going Children	39 (40.62)	57 (59.37)	37 (43.52)	48 (56.47)
Government School Going Children	32 (31.68)	69 (68.31)	32 (51.61)	30 (48.38)

Table no. 4. Present study shows that private school going children 83.42%, and government school going children 78.52% present history of reading difficulties. 68.50% private school going children shows writing difficulties, 87.73% government school going children shows writing difficulties (they didn't see the black board), Private school going children 45.30%, and government school going children 41.10% present history of arithmetic difficulties. Now days every single child having lot of burden of education and academic activities based on reading, writing, making report file on computer, projects and many more work it's increased risk of myopia. Even holding reading material too close has been associated with increased myopia. Moreover, the conditions that have been associated with an increased risk of developing myopia i.e. competitive educational environment, long study hours and reduced outdoor activity- Wu Pei-Chang 2016, Morgan IG 2013, Chen H 2001, Saw SM 2001.

Table No. 4. Percentages of Academic Difficulties

School	Areas	SCREENING POSITIVE	Present
Private School Going Children	Reading Difficulties	151	83.42%
Government School Going Children		128	78.52%
Private School Going Children	Writing Difficulties	124	68.50%
Government School Going Children		143	87.73%

Private School Going Children	Arithmetic Difficulties	82	45.30%
Government School Going Children		67	41.10%

Table no. 5. Shows the amount of time children spend playing electronic device games like games, making projects, watching, videos, movies, YouTube, whatsapp, they expanding most of the time in indoor work or indoor activities. Watching Television private school going children mean score is $2.92 \pm \text{SD } .975$, government school children mean $2.94 \pm \text{SD } .977$, t value is $-.212$ is not statistically significant at the level of >0.05 level. Both groups expending maximum number of hours in front of T.V screen 38 (20.99%), 69 (38.12%), and 56 (30.93%) private school children and 31 (19.01%), 59 (36.19%), and 56 (34.35%) government school children expanding >2 to >4 hours). Watching videos, movies or other activities private school going children mean score is $2.74 \pm \text{SD } .961$, government school children mean $2.81 \pm \text{SD } .927$, t value is $-.967$ is not statistically significant at the level of >0.05 level. 52 (28.72%), 71 (39.22%) and 26 (14.36%) private School Children and 40 (24.53%), 66 (40.49%) and 41 (25.15%) government school children expanding >2 to >4 hours). Playing game is a fashion on known days private school going children mean score is $2.77 \pm \text{SD } .913$, government school children mean $2.83 \pm \text{SD } .900$, t value is -1.043 is not statistically significant at the level of >0.05 level. 73 (40.33), 37 (20.44%) and 35 (19.33%) private School Children and 40 (24.53%), 69 (42.33%) and 40 (24.53%) government school children expanding >2 to >4 hours). Mirshahi A, et al.2014, Dolgin E. 2015- they also agreed that myopia is associated with the level of education. According to B. L. Cole et.al. 1996, R. Saxena, P et.al.2015, L. Wong et.al. 1993 said that even watching television has an influence on the development of myopia. See table no.6

Table No. 5. Means and SD of Indoor Activities with their Statistical Significance

Paired Samples Statistics						
			Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Watching TV	Private School	2.92	163	.975	.076
		Government School	2.94	163	.977	.076
Pair 2	Watching Videos, Movies	Private School	2.74	163	.961	.075
		Government School	2.81	163	.927	.073
Pair 3	Playing Games	Private School	2.77	163	.913	.072
		Government School	2.83	163	.900	.070

Paired Samples Test									
		Paired Differences					t	df	Sig. (2- tailed)
		Mean	Std. Deviat ion	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Watching TV - Private /Governme nt school	-.025	1.478	.116	-.253	.204	-.212	162	.832
Pair 2	Watching Videos, Movies- Private /Governme nt school	-.074	.972	.076	-.224	.077	-.967	162	.335
Pair 3	Playing Games - Private /Governme nt school	-.061	.751	.059	-.178	.055	-1.04 3	162	.299

Table No. 6 - No. of Hours and Average of Children Expanding In Indoor Activities

PLAYING MULTIMEDIA	NO. OF HOURS	WATCHING TV		WATCHING VIDEOS, MOVIES		PLAYING GAMES	
		Private School Going Children	Government School Going Children	Private School Going Children	Government School Going Children	Private School Going Children	Government School Going Children
Valid	>1	17 (9.39%)	17 (10.42%)	32 (17.67%)	16 (9.81%)	36 (19.88%)	14 (8.58%)
	>2	38 (20.99%)	31 (19.01%)	52 (28.72%)	40 (24.53%)	73 (40.33%)	40 (24.53%)
	>3	69 (38.12%)	59 (36.19%)	71 (39.22%)	66 (40.49%)	37 (20.44%)	69 (42.33%)
	>4	56 (30.93%)	56 (34.35%)	26 (14.36%)	41 (25.15%)	35 (19.33%)	40 (24.53%)
	>5	1 (0.55%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

CONCLUSION –

The present study shows prevalence rate of myopia among school going children 197/573 (34.38%) in boys and 147/573 (25.65%) in girls. It is associated with increasing academic difficulties (reading, writing, arithmetic) combined with life changes, which have reduced the time children, spend outside. In study prevalence of myopia among boys was more than that of girls. Know days both genders are more interested in indoor activities like playing mobile games, online chat, videos, computer etc., and not showing interest on outdoor activities. According to present study, shows that the prevalence of myopia decreases the levels of outdoor activities and increase the level of academic difficulties.

LIMITATION OF THE RESEARCH

Future research is required to further delineate and characterize the prevalence, frequency, low outdoor physical activity and high uses of multimedia are associated with myopia at the age of 7 years to 15 years of children.

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