

Association of anisometropia with near work habits among

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ABSTRACT

PURPOSE: To assess the association of anisometropia with near work habits among young school children in Sahiwal city.

MATERIAL AND METHODS: A comparative cross-sectional study was conducted on 80 anisometropic children of 5 to 16 years of age. Prior approval was sought from the Ethical Review Board (ERB) College of Ophthalmology and Allied Vision Sciences to conduct this study. Children with any congenital or acquired ocular pathology, a history of intraocular surgery and those having hazy media were excluded from this study. Visual acuity of all the patients was assessed on the Snellen visual acuity chart at 6m distance. Anisometropia was defined as the spherical equivalent difference > 0.5 diopters between the two eyes. Types of near activities e.g. book reading, writing and playing video games etc. were observed in children.

RESULTS: Children who used gadgets for more than one hour were affected more than those who used them for less than one hour ($p=0.005$). Anisometropic children with age less than 3 years were more amblyopic than strabismic amblyopia ($p=0.02$). Likewise, children doing near work at a distance of less than 30cm were compared with children doing it at more than 30cm ($p=0.000$).

CONCLUSION: It is concluded that there is an association of anisometropia with near work habits among young school children in Sahiwal city. Types of anisometropia (strabismic, amblyopic and simple) were compared with time, distance and age of children's near work activities (playing, writing, using a computer and watching TV).

KEYWORDS: Near work activities, Anisometropia, Young school-going children, Association.

INTRODUCTION

Anisometropia is a condition that is caused by an interocular difference in the refractive status of an individual. It is an important condition in children because it can lead to significant visual problems, including aniseikonia, impaired stereopsis, amblyopia, and strabismus.¹ Aniseikonia is the difference in perceived image size. Strabismus is a misalignment of the visual axis. Anisometropia is a major amblyogenic factor.² A study conducted by Elfein reported that uncorrected anisometropia causes 50% of amblyopia.

Different types of anisometropia include anisomyopia, anisohypermetropia, and anisoastigmatism. Myopic anisometropia typically defined as the interocular difference in the myopic spherical equivalent of 1.00 diopter or more. It is usually due to an interocular asymmetry in the axial length of the eyeball. Anisoastigmatism is defined as the absolute interocular difference in refractive astigmatism, to facilitate comparison with other populations, the prevalence of anisometropia and anisoastigmatism of >1.00 diopters are reported.³

The prevalence of anisometropia is up to 28% globally.⁴

Prevalence of anisometropia in childhood is complicated; it may be population-specific. Its prevalence in Australian children aged 6 years is 1.6%.⁵ In American Indians, its prevalence is 6.7% in children aged 4 to 13 years.⁶ In Taiwan, children 7 to 18 years old have 9.9% anisometropia.⁷ Anisometropia significantly exists in children aged 5 to 15 years. Dobson and his co-researchers found that astigmatic anisometropia is more prevalent in school going, group.

On structural basis, anisometropia is considered as an interocular difference in axial length. Asymmetry in vision during early childhood can cause a change in axial development and growth. All indoor and near work activities can generate transient axial elongation. Two eyes of an individual may have different refractive status. When vision is used for near work unequal accommodation and convergence may induce an asymmetrical axial elongation which may result in refractive anisometropia.⁸

Several epidemiological studies had reported an association between near work and myopia, it was suggested that during near work convergence or ciliary muscle contraction

can produce axial elongation. During near work the eyes converge and accommodate to maintain binocular vision. Saw considered that convergence and accommodation cause development of asymmetrical myopia.⁹

METHODOLOGY

Ethical clearance to conduct the study was obtained from the College Of Ophthalmology And Allied Vision Sciences, King Edward Medical University Lahore. A comparative cross-sectional study design was utilized. From a study population of children at schools in Sahiwal city, study sample of 80 children of 5 to 16 years of age with anisometropia were selected. Students with any congenital or acquired pathology, with a history of intraocular surgery and any eye with hazy media, were excluded. Visual acuity of all patients was assessed on the Snellen visual acuity chart at 6m. Anisometropia was defined as the spherical equivalent difference > 0.5 diopters between two eyes. Types of near activities e.g. book reading, writing and playing video games, etc. were observed by parents. Statistical package for social science (SPSS version 22.0) was used for data entry of all types and its evaluation For comparison chi-square test was used. All the data was presented in the form of frequencies, percentages, pie charts and tables. Significance was evaluated at P<0.05 levels for every parameter.

RESULTS

Out of 80 patients, 25% were anisomyopic, 26.3% were anisohyperopic (21/80) and 48.8% were anisometropic / astigmatic. 11.3% were Strabismic anisometropic patients, 48.8% amblyopic anisometropic and 32% had simple anisometropia (myopic and hypermetropic).

Table 1:

Distance from the eye to the object when your child writes, paints, plays on the computer or performs other near work			
Types of Anisometropia	less than 30 cm	more than 30 cm	Unknown
Strabismic anisometropia	6(7.50%)	3(3.75%)	0(0.0%)
Amblyopic anisometropia	24(30.0%)	15(18.75%)	0(0.0%)
Simple	6(7.50%)	25(31.25%)	1(1.25%)

Types of anisometropia were compared with the distance of writing, painting, watching TV or using a computer. The results show that those who perform these activities at less than 30 cm were more amblyopic than strabismus and simple anisometropic, the difference is statistically significant (Kruskal-Wallis H test, p-value- 0.000)

Table 2:

Time spent on using mobile and computers				
Types of Anisometropia	< 1 hour	1 hour	1 – 2 hours	> 2hours
Strabismic anisometropia	6(7.50%)	2(2.50%)	0(0.0%)	1(1.25%)
amblyopic anisometropia	7(8.75%)	19(23.75%)	10(12.50%)	3(3.75%)
Simple	9(11.25%)	12(14.75%)	11(13.75%)	0(0.0%)

Types of anisometropia were compared with the starting time period of using mobile, computer, etc. The result shows that those who were using these gadgets for less than 1 hour, were amblyopic than strabismic and simple anisometropic, the difference is significant ((Kruskal Wallis H test, p=0.005).

Table 3:

Ages of anisometropic children for the usage of near products			
Types of Anisometropia	less than 3 years old	3 year or more than 3 years old	others
Strabismic anisometropia	2(2.50%)	7(8.75%)	0(0.0%)
amblyopic anisometropia	19(23.75%)	16(20.0%)	4(5.00%)
Simple	7(8.50%)	25(31.25%)	0(0.0%)

Types of anisometropia were compared between the ages of children for the usage of near targets. The results show that children with less than 3 years of age were more amblyopic than strabismic and simple anisometropic, the difference being statistically significant (Kruskal Wallis H test, p=0.02).

Table 4.

Distance from the eye to the television for anisometropic children				
Types of Anisometropia	lessthan1meter	1meter	2meters	morethan2meters
Strabismic anisometropia	6(7.50%)	2(2.50%)	1(1.25%)	0(0.0%)
amblyopic anisometropia	14(17.50%)	10(12.5%)	5(6.50%)	10(12.50%)
Simple	5(6.50%)	23(28.75%)	0(0.0%)	4(5.00%)

Types of anisometropia were compared with the distance of watching TV. The result shows that those who performed this activity at less than 1 m were more amblyopic than strabismic and simple anisometropic. The difference is statistically significant (Kruskal Wallis H test, p= 0.004).

Table 5.

Average time spent on near work activities (writing, painting or playing on the computer, or performing the near work)				
Types of Anisometropia	lessthan1Hour	1hour	2hours	morethan2hours
Strabismic anisometropia	4(5.00%)	2(2.25%)	3(3.75%)	0(0.0%)
amblyopic anisometropia	9(11.50%)	10(12.50%)	8(10.00%)	12(15.00%)
Simple	3(3.75%)	3(3.75%)	11(13.75%)	15(18.75%)

Types of anisometropia were compared with time spent on near work activities. The results show that those who perform this activity at less than 1 hour were more amblyopic than strabismic and simple anisometropic, the difference is statistically significant (Kruskal Wallis H test, p=0.002).

DISCUSSION:

In 2014 Lin et al. assessed the minor changes of ocular characteristics during near work in anisometropic individuals and found that more myopic eyes exhibited significantly increased near work-induced transient myopia.¹⁰

In a recent study, results revealed that anisometropic amblyopia in a child of any phase has no notable

consequence on the concluding visual acuity.¹¹The quantity of visual disorder i.e. refractive error and point of anisometropia at performance do associate strappingly by way of concluding visual acuity and difficulty in near vision work.¹²Thus it is concluded that the offspring with shoddier visual acuity at the demonstration and developing steps of anisometropia should be pickled additional antagonistically and offspring with anisometropic amblyopia ought to be well-maintained irrespective of child age.¹³

Another study suggested that the decline of the visual acuity after interruption of occlusion treatment occurred in 61% of the subjects in the assembly with a minor sum of anisometropia and in 74% of the subjects in the assembly with a huge quantity.¹⁴At the end of management, the usual visual acuity in two sets organized assemblages was 6/9 partial. At the extensive period survey and screening inspection, though, the usual visual acuity was 6/9– 6/12 partial.¹⁵

In this study out of 80 patients 25% were anisomyopic (20/80), 26.3% were ansiohyperopic (21/80) and 48.8% (39/80) were anisometropic / astigmatic. There were about 11.3% (9/80) Strabismic anisometropic patients, 48.8% (39/80) amblyopic anisometropic. The types of anisometropia were compared with myopia. The subjects with simple anisometropia are more than strabismic and amblyopic. The difference is statistically significant $p = 0.026$. The types of anisometropia were compared with the starting time period of writing, playing video games or watching the computer or TV. The result shows that children's near work activities with amblyopic anisometropia are more effected than strabismus and simple. The difference is statistically non-significant $p = 0.986$.

The types of anisometropia were compared with the distance of writing, painting, watching TV or using a computer. The results show that those who perform these activities at less than 30 cm were more amblyopic than strabismic and simple anisometropic, the difference is statistically significant $p=0.004$. The result shows that those who have a past history of watching mobile, computer, etc., were more simple anisometropic than strabismus and amblyopic. The difference is statistically significant $p=0.05$. The types of anisometropia were compared with the past history of watching a computer or TV.

The types of anisometropia were compared between the ages of a child for the usage of near products. The results show that children with less than 3 years old were more amblyopic than strabismus and simple anisometropia. The difference is statistically significant $p=0.012$.

The types of anisometropia were compared with the starting time period of using mobile, computer, etc. The result shows that those who were using these gadgets less than 1 hour were more amblyopic than strabismus and simple anisometropic. The difference is statistically significant $p=0.032$. The type of anisometropia was compared between time spent on watching television.

The results show that those who were watching television less than 1 hour were more amblyopic than strabismus and simple anisometropic. The difference is statistically significant $p=0.028$. The types of anisometropia were compared with the distance of watching TV. The result shows that those who performed this activity at less than 1 m were more amblyopic than strabismus and simple anisometropia, the difference is statistically significant, $p=0.001$.

The types of anisometropia were compared with the distance of watching TV. The result shows that those who performed this activity at less than 1 m were more amblyopic than strabismus and simple anisometropia, the difference is statistically significant $p = 0.001$. The types of anisometropia were compared with the usage of a table lamp while reading. The result shows that those who use table lamps were more strabismic than amblyopic and simple anisometropic. Those who don't use were more simple anisometropic than strabismus and amblyopic, the difference significant $p = 0.00$.

CONCLUSION

It is concluded that there is an association of anisometropia with near work habits among young school children in Sahiwal city. Types of anisometropia (strabismic. Amblyopic and simple) compared with time, distance and age of children's near work activities (playing, writing, using a computer and watching TV).

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