STUDENT'S CORNER

Frequency of Amblyopia in Anisometropic Children 6-13 years age

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ABSTRACT

Objective: To determine the frequency of amblyopia in anisometropic children 6-13 years age.
Methods: This descriptive cross-sectional study was conducted in the Outpatient clinic of department of Ophthalmology, Dow University Hospital and LRBT Hospital Karachi, Pakistan from January 2017 to April 2017. All children aged 6 to 13 years were enrolled. An assessment of visual acuity with Snellen's visual acuity table was conducted. Those who had visual acuity less than or equal to 6/9 or had a difference of two lines on Snellen's Chart between the two eyes were examined further with cycloplegic refraction with 1% cyclopentolate. Presence of amblyopia in these patients was noted.
Results: Out of 65 children, majority were males (n=36, 55.4%) while 29 (44.6%) were females. All (100%) children were resident of Karachi city. In majority of the children, outdoor activities were found lower (n=9, 13.8%). Amblyopia was found in 39 (60%) of the children with anisometropia. Out of these 39 amblyopic children, right side was affected in 19 (48.7%), left eye in 15 (38.5%) while both eyes were affected in 5 (12.9%) children. A significant association of amblyopia was found with change in prescribe power (p-value <0.001) and family history of eye related disorders (p-value 0.046).
Conclusion: Children with anisometropia have higher chance of amblyopia. Furthermore, change in prescribe power and family history of eye related disorders are significant factors causing amblyopia in children with anisometropia.
Key words: Anisometropia, amblyopia, children.

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INTRODUCTION

Amblyopia may be monocular or bi-ocular disorder in which the precise filmic sharpness is lower than the standard without the presence of clear physical or pathologic defects.[1] It is one of the main causes of vision deficiency in children. Various signs of amblyopia are reported in literature which includes imperfect structure of cornea, imbalance of ocular muscle, vitamin A deficiency, and congenital cataract.[2,3]

Most of the children with uncorrected refractive error are asymptomatic and hence screening helps in early detection and timely interventions. In an untreated population, the rise of strabismus amblyopia is an indication of amblyopia in children from age's six to twelve.[4] A thorough literature search has revealed that studies on combine strabismus, refractive errors and amblyopia with anisometropia are scarce. Its incidence is on the rise globally due to the over usage of computer gadgets like I-pad, tablets, smartphones, laptop and television. These video terminals are the significant risk factors of vision deficiency in children. We have conducted this study with the aim to determine the current frequency of amblyopia in population of anisometropia with age in between six to thirteen years.

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METHODS

This descriptive cross-sectional study was conducted in the eye OPD of Dow University Hospital, Karachi, Pakistan from January 2017 to April 2017. All children aged 6 to 13 years of either gender presented with suspected diplopia and anisometropia were examined. All those children with history of systemic diseases like diabetes and congenital micro-cornea were excluded. They underwent an assessment of visual acuity with Snellen's visual acuity table. Those who had visual acuity less than or equal to 6/9 or had a difference of two lines on Snellen's Chart between the two eyes were examined further with cycloplegic refraction with 1% cyclopentolate. The presence of amblyopia along with side of the eye of affected, physical activity, eye strain, diplopia, nutritional status, change in prescribe power, and family history of eye related disorders were noted along with demographic information of the children.

Statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 21. Chi-square test was applied to see the association of amblyopia with risk factors like age, gender, side of the eye of affected, physical activity, eye strain, diplopia, nutritional status, changes in prescribe power, and family history of eye related disorders. P-value <0.05 was taken as significant.

RESULTS

Out of 65 children with anisometropia 36 (55.4%) were boys while 29 (44.6%) were girls. All (100%) children were resident of Karachi city. In particular, majority 27 (41.5%) children were from south region, 17 (26.2%) were East region, 14 (21.5%) from Central, 7 (10.8%) children were from cantonment areas. Outdoor activities were present in nine (13.8%) and absent in 56 (86.2%) children.

The frequency of amblyopia was found in 39 (60%) of the children. Out of these 39 amblyopic children, right side was affected in 19 (48.7%), left eye in 15 (38.5%) while both eyes were affected in 5 (12.9%) children. (Figure 1 & 2)

A significant difference of amblyopia in anisometropia children was observed with change in prescribe power (p-value <0.001) and family history of eye related disorders (p-value 0.046). (Table 1 & 2) Whereas age (p-value 0.874), gender (p-vlaue 0.185), physical activity (p-value 0.323), eye strain (p-value 0.761) diplopia (p-value 0.712), and nutrition (p-value 0.724). were found to be insignificant.

Table 1: Association between presence of amblyopia in anisometropia and presence of family history for related eye disorders in children of 6-13 years (n=65)

Variables	Presence of Amblyopia		Row Totals	Chi-Square Value	Degree of freedom	P value
Family History	Yes	No				
	O (E) [%]	O (E) [%]				
Yes	13 (9.6) [81.3]	3 (6.4) [18.8]	16	3.99	1	0.046
No	26 (29.4) [53.1]	23 (19.6) [46.9]	49			
Column Totals	39	26	65 (Grand Total)	Chi-Square test of Association=H_0 rejected		
Note: O=Observed count, E=Expected count, x^2=chi-square value						

Table 2: Association between presence of amblyopia in anisometropia and change in prescribed power in children of 6-13 years (n=65)

Variables	Presence of Amblyopia		Row Totals	Chi-Square Value	Degree of freedom	P value
Change in prescribed power	Yes	No				
	O (E) [%]	O (E) [%]				
Yes	23 (18) [76.7]	7 (12) [23.3]	30	6.45	1	0.011
No	16 (21) [45.7]	19 (14) [54.3]	35			
Column Totals	39	26	65 (Grand Total)	Chi-Square test of Association=H_0 rejected		
Note: O=Observed count, E=Expected count, x^2=chi-square value						

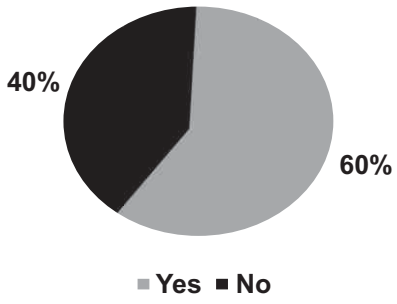

Figure 1: Presence of amblyopia in anisometropic children (n= 65)

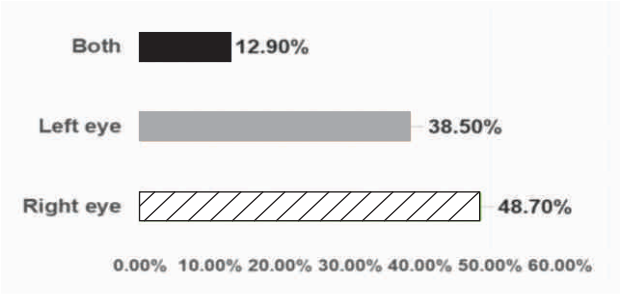

Figure 2: side of the eye affected by amblyopia

DISCUSSION

We examined 65 anisometropic children for the research to prove the possibilities of the changing arrangements that may cause the outbreak of amblyopic conditions. For this, 36 males and 29 females were consecutively enrolled; out of them 60% was suffering from amblyopia. The finding of this study has showed that frequency of amblyopia was found higher in anisometropic children with 6 to 13 years of age. This findings somewhat matched with the findings reported Donahue SP, in which the authors has reported 14% amblyopia in children aged 1 year or less, 40% amblyopia in anisometropic children with 2 years of age, 65% in anisometropic children with 3 years of age while 76% in anisometropic children with 5 years of age or above.[5] A study conducted on the African American, Hispanic, and Singaporean-Chinese children population resulted in the presence of refractive amblyopia was 78% and 85% of cases respectively.[6,7] Evidence in Iran[8] and China[9] found anisometropic amblyopia in 58% and 67% of the amblyopic subjects.[8,9] In Nepal, anisometropia was the most mutual cause of amblyopia ($P< 0.001$)[10]. These findings revealed that amblyopia in anisom etropic children increases as the age increases.[11,12] Various randomized clinical trials (RCTs) have proven it is possible to treat amblyopia in a vast population. This includes children, youth, and adults.[13-16] Children aged 7-12 have conveyed improvement in visual insight for up to 1 year after terminating treatment in addition to spectacle wear.[13-16] Therefore, treatment of amblyopia in an elder age group may attest to a permanent advantage. However, caution is encouraged for any decline in vision, which is likely for this age group. Until proven, life-long investigation is needed to regulate the stability of visual improvement after ending therapy.

In our study, majority of amblyopic children were males. However, no association of amblyopia was observed with respect to age and gender of the children. Similar finding was observed in a study conducted by Sapkota et al.[17]

In this study, change in prescribe power and family history of eye related disorders were found to be an important factor in contributing amblyopia in children with anisometropia. A study has reported type, magnitude of refractive error of the amblyopic eye and the magnitude of anisometropia as significant factors.[17]

Literature reviews reported conflicted findings in the prediction of association between amblyopia and anisometropia.[3] It is stated that direct evidence for the causes of anisometropic amblyopia requires longitudinal tracking of at risk infants. In addition, various methodological and ethical issues need to tackle while identifying the aetiological factors to prevent and understand the factors that cause it to develop.

The finding of this study could be observed in the light of limitation that this is a cross-sectional study, so the temporal association could not be developed. Secondly, we considered only one factor that is amblyopia in anisometropia, whereas in the previous studies researchers have had compared strabismus or refractive errors, or both with anisometropia. Lastly, the sample size in our study was small when compared with other published literature. As for future recommendation, multicentre studies with large sample size are recommended that not include only amblyopia in anisometropic children but other significant factors as well.

CONCLUSION

Children with anisometropia have higher chance of amblyopia particularly with the increase in age. Furthermore, change in prescribe power and family history of eye related disorders are significant factors causing amblyopia in children with anisometropia.

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