PREVALENCE OF REFRACTIVE ERROR, STRABISMUS AND AMBLYOPIA AMONG CHILDREN WITH NORMAL DEVELOPMENT OR GLOBAL DEVELOPMENTAL DELAY/INTELLECTUAL DISABILITY ATTENDING OPHTHALMOLOGY OPD AT KLES HOSPITAL, BELAGAVI- A RETROSPECTIVE STUDY

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ABSTRACT

BACKGROUND

Global developmental delay/intellectual disability are on a rise in children in the present time. Ocular and visual anomalies are frequently associated with it of which refractive errors are the most frequent. This if goes unnoticed leads to strabismus and amblyopia.

MATERIALS AND METHODS

This study aims to assess the prevalence of refractive error, strabismus and amblyopia among children with normal development or global developmental delay/intellectual disability attending ophthalmology OPD at KLES Hospital, Belagavi. Case records of all 200 new patients less than or equal to 12 years of age group who attended KLES, Dr. Prabhakar Kore Hospital between January 2015 and December 2015 were retrospectively reviewed.

RESULTS

The male:female ratio was 1.22:1. Out of the total evaluated 200 cases, 130 cases were with normal development and 70 with GDD/ID. Refractive errors were 85%, whereas the cases of amblyopia was 45.50% and strabismus 39.50%. Amblyopia with refractive error having GDD/ID was stastically significant as compared to amblyopia with refractive error having normal development (p=0.001).

CONCLUSION

Refractive error was the most common ocular disorder seen. Refractive error with amblyopia is more in children with GDD/ID as compared to normal children. Owing to the high percentage of visual anomalies, ophthalmological referral becomes essential in children with developmental anomalies.

KEYWORDS

Refractive Error, Strabismus, Amblyopia.

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BACKGROUND

In children, visual impairment is a serious disability and its management under the campaign of vision 2020 is a main priority of World Health Organization.[1] An estimate of 285 million people around the world are visually impaired. 19 million being children below the age of 12 years. 43% of the population is visually impaired due to refractive errors, which is the principle cause of visual impairment in children.[2] A condition of the eye in which the eye fails to focus the image on the retina resulting in blurred vision is known as refractive error.[3] Strabismus is a condition where there is misalignment of the eyes and in coordination between the extraocular muscles, adversely affecting the binocularity, stereopsis or depth of perception. Amblyopia is a developmental defect of spatial visual processing that occurs in the central visual pathways of the brain.[4] A critical period is the time when, if cortex is deprived of normal stimulation, the functions and development will be permanently disrupted. Strabismic suppression causes reduced activity in cortical cells leading

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to amblyopia and amblyopia in this age will result in permanent visual impairment.[5] Uncorrected refractive error can result in strabismus and amblyopia. In children, strabismus is a common factor contributing to amblyopia. There is an increase in frequency of ocular, visual anomalies and refractive error in children with global developmental delay.[6] Uemera et al presented a classification of delayed visual maturation. It has 3 categories, type 1 being patients with visual maturation delay with no other anomalies, type 2 are patients with visual maturation delay who are mentally retarded or have a seizure disorder, whereas type 3 children are with visual abnormality and a superimposed visual maturation delay.[7] Of the various ocular manifestations, refractive error is the most common finding (51%) followed by strabismus (18%).[8]

Objectives

To study the prevalence of refractive error, strabismus and amblyopia in children under 12 years of age with normal development or with global developmental delay/intellectual disability attending the Ophthalmology OPD of KLES, Dr. Prabhakar Kore Charitable Hospital and MRC over a period of one year.

MATERIALS AND METHODS

This is a hospital-based retrospective study done to know the prevalence of refractive error, amblyopia and strabismus in children attending Paediatric Ophthalmology OPD of our hospital referred from paediatrics and Child Development Centre. Case records of all new patients less than or equal to 12 years old who presented to KLES, Dr. Prabhakar Kore Charitable Hospital and MRC between January 2015 and December 2015 were retrospectively reviewed. Global developmental delay is defined as performance that is two standard deviation or more below the mean on age-appropriate, standardised norm-referenced testing in at least two or more developmental fields of gross/fine motor, cognition, social/personal and activities of daily living.[9,10] This study included the cases of GDD/ID who had undergone DQ/IQ test referred from the child development center to Ophthalmology OPD of KLES, Dr. Prabhakar Kore Charitable Hospital and diagnosed by the paediatric neurologist. Children attending ophthalmology OPD with complaints of blurring of vision, deviation of eyes, delayed milestones and children with best corrected visual acuity less than 6/9 (20/30) on Snellen's chart on examination were included in the study. Data was stored for age, sex, clinical diagnosis of refractive error, strabismus and amblyopia with or without global developmental delay/intellectual disability. This data was statistically analysed. The Chi-square test was used to compare variables and a p value less than 0.05 was considered statistically significant. Ratio and percentages were calculated and tabulated. The results were described, summarised and presented in tables.

RESULTS

Records of 200 patients were evaluated with a male:female ratio of 1.22:1. Out of the total evaluated 200 cases, 130 cases were with normal development and 70 with GDD/ID. We observed that patients aged 2-6 yrs. old were the largest group (45.50%).

	0-1 Year	2-6 Years	7-12 Years	Total
Refractive error	22	73	75	170
Amblyopia	11	51	29	91
Strabismus	8	43	28	79

Table 1. Number of Cases of Refractive Error, Amblyopia and Strabismus According to Age Group

22 cases of age group 0-1 year, 73 cases of age group 2-6 years and 75 cases of age group 7-12 years were diagnosed with refractive errors, which were the most common ocular disorder seen (85%). Wherein, 32.94% children were cases of global developmental delay/intellectual disability and 67.06% had normal development. 11 cases of age group 0-1 year, 51 cases of age group 2-6 years and 29 cases of age group 7-12 years were diagnosed with amblyopia, which was 45.50% and 8 cases of age group 0-1 year, 43 cases of age group 2-6 years and 28 cases of age group 7-12 years were diagnosed with strabismus that was 39.50%. Age group of 7-12 years have maximum number of refractive errors (44.11%). It was observed that 2-6 years of age group has highest number of amblyopia cases (56.04%) and strabismus was more common in the age group of 2-6 years (54.43%).

	0-1 Year	2-6 Years	7-12 Years	Total
Amblyopia with refractive error	10	42	26	78
Amblyopia without refractive error	1	9	3	13

Table 2. Number of Cases of Amblyopia with or without Refractive Error According to Age Group

10 cases of age group 0-1 year, 42 cases of age group 2-6 years and 26 cases of age group 7-12 years were had amblyopia with refractive error. In contrast to this, 1 case of age group 0-1 year, 9 cases of age group 2-6 years and 3 cases of age group 7-12 years had amblyopia without refractive error.

7 cases of age group 0-1 year, 27 cases of age group 2-6 years and 19 cases of age group 7-12 years were diagnosed as strabismus with refractive error, wherein 1 case of age group 0-1 year, 16 cases of age group 2-6 years and 9 cases of age group 7-12 years had strabismus without refractive error.

	0-1 Year	2-6 Years	7-12 Years	Total
Strabismus with refractive error	7	27	19	53
Strabismus without refractive error	1	16	9	26

Table 3. Number of Cases of Strabismus with or without Refractive Error According to Age Group

Esotropia was found to be the commonest type of strabismus (56.96%). Children with global developmental delay/intellectual disability having refractive error with amblyopia were more in number (54.92%) as compared to children with normal development having refractive error with amblyopia. In contrast to this, children with normal development having refractive error with strabismus were more in number (62.50%) as compared to children with global developmental delay/intellectual disability having refractive error with strabismus.

	0-1 Year	2-6 Years	7-12 Years	Total
Amblyopia with refractive error having GDD	8	23	10	41
Amblyopia with refractive error having ND	2	18	16	36

Table 4. Number of Cases of Amblyopia with Refractive Error having GDD vs. ND According to Age Group

8 cases of age group 0-1 year, 23 cases of age group 2-6 years and 10 cases of age group 7-12 years had amblyopia with refractive error having GDD/ID. In contrast to this, 2 cases of age group 0-1 year, 18 cases of age group 2-6 years and 16 cases of age group 7-12 years were diagnosed as amblyopia with refractive error having normal development. This was statically significant as with Chi-square test, the p value is 0.001 (for 95% confidence interval). However, cases of age group 0-1 year, 10 cases of age group 2-6 years and 6 cases of age group 7-12 years had strabismus with refractive error having GDD/ID. 2 cases of age group 0-1 year, 18 cases of age group 2-6 years and 15 cases of age group 7-12 years had strabismus without refractive error having normal development.

	0-1 Year	2-6 Years	7-12 Years	Total
Strabismus with refractive error having GDD	5	10	6	21
Strabismus with refractive error having ND	2	18	15	35

Table 5. Number of Cases of Strabismus with Refractive Error having GDD vs. ND According to Age Group

There was no statistical significance as Chi-square for 95% confidence interval was p=0.667.

DISCUSSION

This hospital-based retrospective study was done to know the prevalence of refractive error in children with normal development, which was 67.04% and in global development delay/intellectual disability children was 32.94%. This high prevalence can be explained by the fact that it includes children referred with specific complaints of headache, blurring of vision and deviation of eyes.

We found that in our study strabismus is more (39.50%) as compared to a report carried out in Iraq, which showed the prevalence of strabismus as 12.1%.[9]In contrast to a study done in China,[10] proportion of esotropia was more in our study correlating with other studies done in India. It was observed that in our study refractive error with amblyopia is more in children with GDD/ID as compared to normal children and this was statistically significant as, p=0.001. This could be explained by the fact that it is a spectrum of disease involving delayed and stunted development of the brain and the eye. Evaluation of visual acuity is difficult and maybe underestimated and enough efforts are not taken to evaluate visual acuity in them. The fact that refractive error itself is undiagnosed and neglected in children with GDD/ID having complex needs where the stress is on treating the associated systemic anomalies, thus losing out on the crucial years of growth, which makes all the difference when treated.

Limitations

This being a convenience sampling, prevents its generalisation to the population as a whole as it overestimates the incidence compared to the population. However, the strength of our study is it gives a general view of the pattern of prevalence of amblyopia and strabismus in children with refractive error. It also gives a comparative picture of the prevalence of the same in children with normal development and in children with GDD/ID. This helps in focusing our screening programs on the youngest age groups and also creates awareness among the paediatricians and healthcare providers to stress on the importance of ophthalmic examination and visual screening of children with GDD at an early age.

CONCLUSION

Referral to ophthalmic care is quite essential in children with GDD/ID and normal development for their overall development and optimum care.

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