



Original Research Article

A Study of Pattern of Ocular Disorders in Children with Disabilities

Authors

**Aparna Kesavan Saraswathy, Remya Raghavan*, Krishna Iyer Mahadevan,
Antony Joosadima**

Department of Ophthalmology, Sree Gokulam Medical College and Research Foundation,
Venjaramoodu P.O, Trivandrum, 695607, Kerala, India

*Corresponding Author

Remya Raghavan

Assistant Professor, Department of Ophthalmology, Sree Gokulam Medical College & Research
Foundation, Venjaramoodu .P.O, Thiruvananthapuram, 695 607, Kerala, India
Email: drremya@rediffmail.com, Tel.:+919895271279; Fax:+914723041116

Abstract

Introduction: *Children with disabilities must be taken care of properly and ocular disorders in them should be found out early to provide clinical care and better quality of life. Also the care givers and parents must know the need for ocular examination and early treatment of ocular disorders in these children.*

Materials and Methods: *The study included 262 children studying in special schools. Ocular examination was done using standard examination techniques. Cycloplegic retinoscopy and fundus examination were also done. Children requiring further evaluation and management were referred to tertiary care centres.*

Results: *After excluding 20 uncooperative students out of the total 262, 242 students were examined of which 72.7% were males. They were categorized into various groups. 49.2% had ocular disorders, more in Down syndrome (68%). Refractive errors (42.1%) was the most common ocular problem and was more in females (51.5%). Myopia, Hypermetropia and Astigmatism were seen in 103 eyes (21.2%), 49 eyes (10.1%) and 53 eyes (10.9%) respectively. Strabismus was seen in 13.2% with 57.5% esotropia. Cataract in 14 children, nystagmus (4.1%), squamous blepharitis 0.82%, allergic conjunctivitis 4.1%, hordeolum externum (0.82%), congenital ptosis (1.2%), corneal opacity and sclerocornea (4.1%), micro cornea (1.6%) and keratoconus (0.8%) were other findings.*

Discussion and Conclusion: *Early diagnosis and treatment of ocular problems in disabled children will help in their overall development. Periodic ocular examination should be made mandatory in special schools. Parents should be made aware to identify and correct visual problems in disabled children promptly and the need for regular follow up.*

Keywords: *Ocular disorders, Down syndrome, Autism, Mental Retardation, Refractive errors, Strabismus.*

Introduction

The Social Statistics division of Ministry of Statistics and Programme Implementation, Govt

of India estimated that 2.2% of total population of India are disabled and is based on the census conducted in 2011 and 2.8% of this is in Kerala.

Children with disability are at a higher risk of visual impairment and ocular disorders. The ocular examination in these children is difficult to perform and requires immense patience, perseverance and special care.⁽¹⁾ Vision plays a fundamental role in the acquisition of skills for interacting with the outer world. Without sufficient vision, children are limited in all aspects.⁽²⁾ Since they are unable to express their problems properly, visual problems remain unrecognized by parents or caregivers, which may be correctable if diagnosed early. Delay in detection and treatment of ocular disorders compound the already existing disability in these children.⁽³⁾ Early detection and proper treatment of visual problems will improve academic and social performance and overall development of a disabled child and with this aim the study was conducted.

Materials and Methods

The study included 262 children with disabilities aged 5 to 17 years studying in special schools in Thiruvananthapuram District, Kerala. The principals of selected schools were informed and permission was obtained prior to the study. All students in the special schools were examined by a team of doctors and optometrists. Those who were non-cooperative for the examinations were excluded from the study. Parents were informed in advance and their presence requested during the day of examination and consent were also obtained. Details of previous medical records of the children were also enquired. Relevant history regarding the type of disability, birth history and family history were recorded as part of the study. Ocular examination was carried out under diffuse illumination using a torch light and head posture and facial anomalies were observed. Snellen's E chart was used for assessing Visual Acuity in children who could read and cooperate. For other children, Picture chart or HOTV Charts were used. Hirschberg light reflex test and cover uncover tests were done to evaluate strabismus. Magnifying loupe was used to rule out anomalies

of anterior segment. Pupillary light reflexes were noted. Cycloplegic retinoscopy was done in all children who were not cooperative for subjective refraction and in those with visual acuity less than 6/6 Snellen's test types, using 0.3% cyclopentolate eye drops. In case of children with history of seizures, Homatropine 0.5% eye drops was used. Dilated fundus examination was done using direct and indirect ophthalmoscopes. Spectacle correction was advised to all children with refractive errors. Children requiring further evaluation were referred to tertiary care centres. Data storing and analysis was done using SPSS 16. Findings were expressed in frequency and percentage.

Results

Out of the 262 students evaluated, 20 students who were not cooperative were excluded from the study. Remaining 242 students were aged between 5-17 years. Males were 176 (72.7%) and 66 were females (27.3%). The children with different disabilities were categorized as Down syndrome, Autism, mental retardation, learning disabilities and miscellaneous group which included students who could not be categorized under any of the above types such as Attention Deficit Hyperactive Disorder (ADHD), myotonic dystrophy etc. and those who were not medically diagnosed. The study revealed that majority of the students were mentally retarded (35.5%) followed by Autism (16.5%) and Down syndrome (15.7%) as given in Figure 1.

The common ocular disorders recorded in the study population were given in Table 1. Out of 242 children, ocular disorders were present in 166 students (68.6%). From this 47 children with mild refractive errors (<1D) were eliminated. Thus finally we obtained 119 students (49.2%) with ocular problems (p value = 0.001). Refractive error (42.1%) was the commonest ocular problem (p value 0.013) followed by strabismus (13.6%). Strabismus was seen in 33 children. Out of this 19 were esotropia and rest were exotropia.

Figure 2 shows distribution of ocular disorders among different categories of disabilities. In this 68% of children with Down syndrome had ocular disorders which was found to be statistically significant with a p value of 0.04. Ocular disorders were seen in 55.8% of children with mental retardation where as children having cerebral palsy showed less incidence (18%).

Table 2 shows distribution of common ocular findings in children with various disabilities. Refractive error was shown by 57.8 % of children with Down syndrome (22 children), 48.8 % of mentally retarded children (42 children) and 37.5% of children with Autism (15 children). Strabismus was seen among 26.3% of children with Down syndrome (10 children). Strabismus was most frequently associated with Down syndrome. Ocular movements were full in all children. One student with 15° convergent squint in left eye, gave history of squint correction during early childhood.

Figure 3 is the representation of distribution of different types of refractive errors among various disabilities. Refractive error was seen in 42.1% of 242 children. Only 12 children with refractive error were using spectacles (4.9%). Refractive errors were more in females (51.1%) compared to males. Myopia, Hypermetropia and Astigmatism were seen in 103 (21.2%), 49(10.1%), 44 (9.1%) eyes out of 484 eyes respectively. Myopia was graded into mild (2-3D), moderate (3-6D) and severe (>6D). Out of 103 eyes with myopia, 57

(55.3) % had mild myopia, 37 (35.9%) belonged to moderate and only 6(8.7%) eyes had severe myopia. Hypermetropia ranged from +0.25 to +3D. Only one student had +10D, which was a case of bilateral aphakia. Out of 44 eyes with astigmatism, majority (63%) had simple myopic astigmatism. Hypermetropia was the commonest refractive error in Down syndrome and learning disability whereas myopia was the commonest refractive error in mental retardation and Autism. Cataract was seen in 14 children. Out of these, 2 cases were total cataract, the rest were partial cataract. Squamous blepharitis was seen in 1.6%, hordeolum externum and chalazion were seen in 1.6% and 0.82% respectively and 0.41% had allergic conjunctivitis. Congenital ptosis was seen in 1.2% of children. Corneal opacity and sclerocornea (4.1%), micro cornea (1.6%) and keratoconus (0.8%) were other less common ocular findings.

Though ocular disorders were present in 49.2% of children only 9 children had any complaints and though 42.1% had refractive errors only 12 children were using spectacles (Figure 4 and 5) Spectacle correction was advised for children having significant refractive errors. Treatment for conditions like hordeolum externum, allergic conjunctivitis and blepharitis was given to children. Children with cataract were referred for detailed evaluation and treatment to a tertiary care center.

Figure 1: Distribution of study population according to disabilities

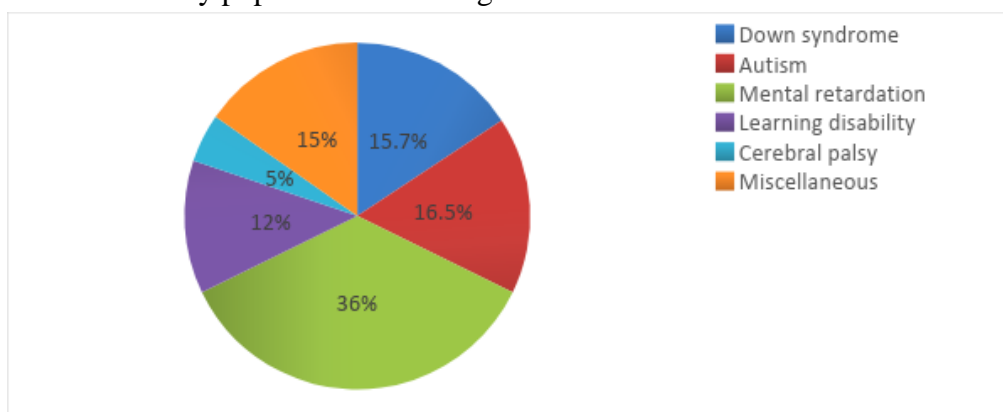


Table 1: Common ocular disorders in the study population

Ocular manifestation	Frequency	Percentage
Refractive error	102	42.1
Strabismus	33	13.6
Nystagmus	10	4.1
Ptosis	3	1.2
Cataract	14	5.7
Corneal opacity	6	2.4
Micro cornea	4	1.6
Keratoconus	2	0.82
Squamous blepharitis	4	1.6
Hordeolum externum	2	0.82
Chalazion	1	0.41
Lid lag	1	0.41
Allergic conjunctivitis	10	4.1

Figure 2: Distribution of ocular disorders among categories of disabilities

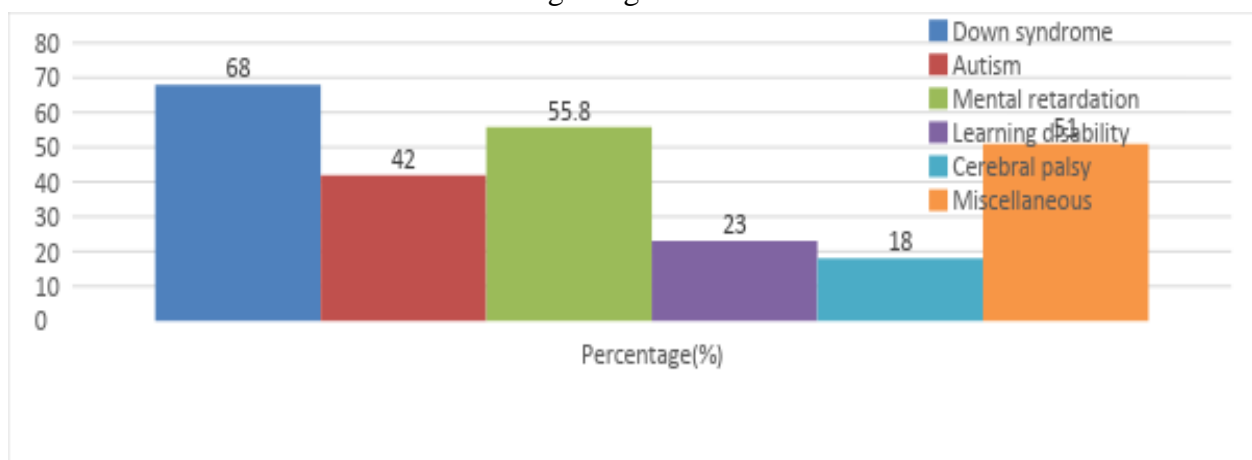


Table: 2 Distribution of common ocular findings in children with various disabilities

Disability	Refractive error	Strabismus	Nystagmus	Cataract
Down syndrome	22	10	5	7
Autism	15	3	1	2
Mental retardation	42	9	2	3
Cerebral palsy	6	2	0	0
Learning disability	2	1	1	1
Miscellaneous	15	8	1	1

Figure 3: Distribution of different types of refractive errors among disabilities (out of 484 eyes)

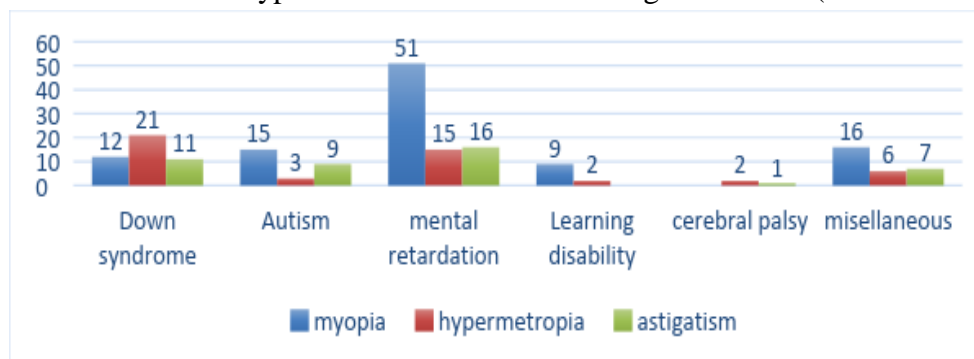
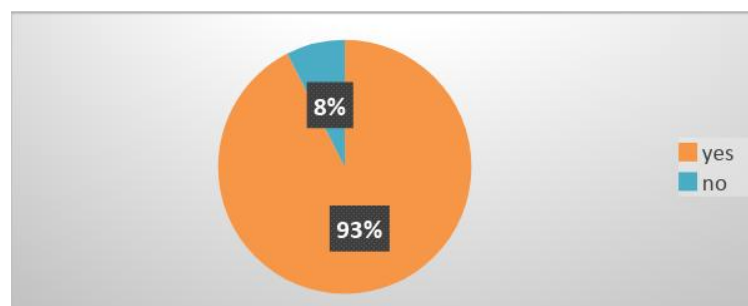
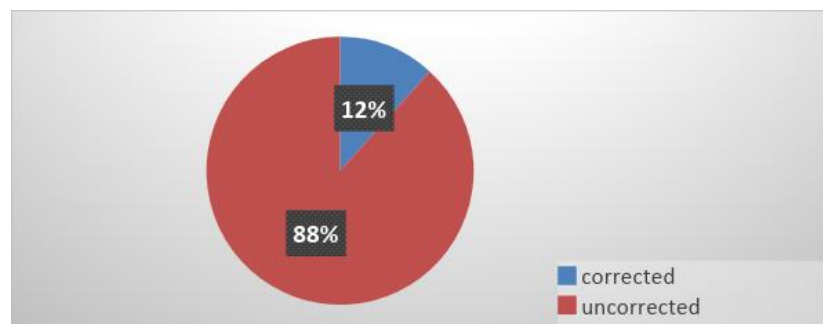


Figure 4: distribution of children with complaints among ocular disorders**Figure 5:** Distribution of children with corrected refractive error

Discussion

Our study showed presence of ocular problems in 49.2 % children with disabilities in special schools of Thiruvananthapuram and is comparable to another study conducted in India by Gurvinder Kaur et al ⁽⁴⁾ in which the ocular disability was found to be 44%. Similar results were also obtained in a study conducted by Parikshit et al ⁽⁵⁾ where the ocular disability was 45%.

Among the study population of disabled children, major group was mentally retarded children (35.5%) followed by autism (16.5%) and Down syndrome (15.7%). Out of the 242 children ocular disabilities were seen most commonly in children with mental retardation (40%), followed by Down syndrome (21.8%).

In the present study, out of 86 children with mental retardation 55.8 % had ocular disorders. A study conducted by Rajeshsubhash Joshi et al among mentally retarded children showed ocular problems in 51.45 %. ⁽⁶⁾ In our study, out of 38 children with Down syndrome 68% had ocular disabilities and it was similar to the study of Gurinder Kaur et al (69.2%).⁽⁴⁾

Among ocular disorders refractive error was the most common manifestation (42.1%) in our study.

In a similar study conducted in Oman by Urmi Gogri et al 42.6% refractive errors was seen in 321 participants.⁽⁷⁾

In our study refractive error was more common in children with Down syndrome (57.9%) followed by mental retardation (48.8%) and Autism (37.5%). In a study by Afifi et al ⁽⁸⁾ it was found to be 41% in children with Down syndrome, whereas in Gurinder Kaur et al study it was 50%.

⁽⁴⁾ In another study by Kennerly Bankes, 49% mentally handicapped children had refractive errors ⁽⁹⁾ which is similar to our results. The study of Bhandari G et al ⁽¹⁰⁾ on ocular manifestations in autism showed higher incidence of refractive errors (58%) compared to our study.

As per our study, hypermetropia was found to be the most common refractive error in children with Down syndrome (47.7%) followed by myopia (27%). Similarly, N Paudel et al study of Down syndrome, children in Nepal showed 55% hypermetropia followed by 25% myopia. ⁽¹¹⁾ In our study myopia was common among Autism (55.5%) and mental retardation (62%). In Bhandari G et al ⁽¹⁰⁾ study of ocular manifestations in autism showed myopia to be the most common refractive error (36%). Warburg found the

prevalence of myopia to be the commonest refractive error (43%) in severe intellectually impaired persons in his study.⁽¹²⁾

Strabismus was found to be 13.6% in our study correlating with the study of Joshi et al⁽⁶⁾ (10.7%) and Parikshit et al (15.7%)⁽⁵⁾ and Down syndrome had the higher incidence of strabismus. Among Down syndrome children with strabismus 60% had esotropia. A study of patients with Down syndrome in Bangalore by Nanda L et al reported 32.85% strabismus.⁽¹³⁾ Another study by J.H. Kim in Asian children with Down syndrome showed 31% strabismus.⁽¹⁴⁾

Children with Down syndrome had a higher incidence of cataract (18%) and nystagmus (13.1%). In a study among 81 children with Down syndrome, by Stephen et al, 7.85% cataract and 16% nystagmus were reported⁽¹⁵⁾, which is similar to our study.

Conclusion

The results of the present study show that early diagnosis and treatment of ocular problems in disabled children are mandatory and will help in their overall development. Since they are not able to express their problems like normal children, periodic examination by experts should be made compulsory in special schools. Parents should also take extra care to identify and correct visual problems in disabled children.

No sources of support in the form of grants

References

1. Ciner EB, Schmidt PP, Orel-Bixler D, Dobson V, Maguire M, Cyert L, Moore B, Schultz J. Vision screening of preschool children: evaluating the past, looking toward the future. *Optom Vis Sci.* 1998;75(8):571-84
2. Zaba JN, Johnson RA, Reynolds WT. Vision examinations for all children entering public school—the new Kentucky law. *Optometry.* 2003;74:149–158.
3. Vora U, Khandekar R, Natrajan S, Hadrami KA. Refractive error and visual functions in children with special needs compared with the first grade school students in Oman. *Middle East Afr J Ophthalmol.* 2010;17(4):297–302.
4. Kaur G, Thomas S, Jindal M, Bhatti S. Visual Function and Ocular Status in Children with Disabilities in Special Schools of Northern India. *Journal of Clinical and Diagnostic Research: JCDR.* 2016;10(10):NC01-NC04. doi:10.7860/JCDR/2016/23615.8742.
5. Gogate P, Soneji FR, Kharat J, Dulera H, Deshpande M, Gilbert C. Ocular disorders in children with learning disabilities in special education schools of Pune, India. *Indian Journal of Ophthalmology.* 2011;59(3):223-228. doi:10.4103/0301-4738.81036.
6. Joshi RS, Somani AAK. Ocular disorder in children with mental retardation. *Indian Journal of Psychiatry.* 2013;55(2):170-172. doi:10.4103/0019-5545.111457.
7. Gogri U, Khandekar R, Al Harby S. Visual function of children with visual and other disabilities in Oman: A case series. *Indian Journal of Ophthalmology.* 2016;64(12): 888-892. doi:10.4103/0301-4738.198845.
8. Afifi HH, Azeem AAA, El-Bassyouni HT, Gheith ME, Rizak A. Ocular findings and management in Egyptian children with Down Syndrome. *J Am SCI.* 2011;7(4):782-88
9. Bankes JLK. The ophthalmologist's role in multidisciplinary assessment of developmentally handicapped children. *Child Care, Health and Development.* 1975; 1: 325–333. doi:10.1111/j.1365-2214.1975.tb00214.x
10. Bhandari G, Neupane S, Shrestha GS. Ocular Morbidity in Children with Autism. *Optom Vis Perf* 2013;1(1):19-24
11. Paudel N, Leat SJ, Adhikari P, Woodhouse JM, Shrestha JB. Visual defects in

- Nepalese children with Down syndrome.
Clin Exp Optom. 2010; 93(2):83-90
12. Warburg M. Visual impairment in adult people with moderate, severe, and profound intellectual disability. Acta Ophthalmol Scand.2001 ;79:450-454
13. Nanda L, Adarsh, V.K.Sriastava,Nithisha TM,Shiakumar M,Garima Yadav. Ocular manifestations in down's syndrome. International Journal of Contemporary Medical Research 2016;3(5):1332-1335.
14. Kim JH,Hwang, JMKim HJ, Yu YS. Characteristic ocular findings in Asian children with Down syndrome.Eye. 2002; 16:710-714
15. Stephen, E., Dickson, J., Kindley, A.D., Scott,C.C.andCharleton,P.M. Surveillance of vision and ocular disorders in children with Down syndrome. Developmental Medicine and Child Neurology. 2007; 49:513-515. doi:10.1111/j.1469-8749.2007.00513.x