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Ocular abnormalities in progenies with learning disabilities in the special education institution

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ABSTRACT

Eyesight is for a lifetime. About 25 percent of the population in our country belongs to school going age group. Experts worldwide believe that 90 percent of squint can be treated or prevented. To accomplish this gigantic task, we require educating the parents, school teachers and children. The pre-requisite in this regard is the redefinition of medical terminology into simple language and teaching of primary health care principles to the public reported by WHO(2001). Parents must be educated about the importance of early detection of strabismus. If any child in a family has a history of squints, they should be screened by an orthoptist. If the results are positive, the child must be referred to the ophthalmologist for a detailed examination of the eyes, refractive error, and movements. This research aims at finding a critical analysis of unbalanced visual skills in children with learning disabilities**.** Methods: The present study was conducted in 200 special schools, including urban and rural areas. Around 100 parents participated in this study and 100 teachers from special schools. There were 100 children with learning disabilities among the 10,000 children in the sample for this study, with the majority falling between the ages of five to seven. These students were enrolled in different schools.

Findings: From the results, it was evident that children's had changes in the appearance of the eye; the children's behavior also changed in; also they had complaints regarding their regular work. Conclusion: The children who have learning disabilities should be screened regularly, and their parents and other caregivers should be properly counseled about the importance of screening and correcting any visual problems. This will provide a greater chance of improving the children's developmental milestones and overall health.

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INTRODUCTION

Language, facial gestures, and hand-eye coordination are all acquired skills that rely on visual input. The flexibility of the visual system is lost around the age of 10–12 years in children with uncorrected distance visual deficits, limiting vision recovery. [1] Vision problems impact children's capacity to make informed decisions and learn from their surroundings. Optic-visual problems in cognitively disabled persons have been studied extensively. From 6th to 8th graders, the disability rate was 1.12%, with 10.36 percent of them having a learning disability (U- DISE, NIEPA, 2017). A study in Delhi found that among special needs children, 20.15 percent were learning handicapped in primary schools (1st-5th grade) and 20.08 percent in elementary schools (6th-8th grade) (U-DISE, NIEPA, 2017) [2] In contrast, assessing children with learning disabilities (LD), formerly known as mentally challenged or retarded, requires more time, skills, and tools than assessing typical children (see chart below). Refractive errors, strabismus, and nystagmus are common ocular problems in LD. [3-5] It is estimated by WHO that 2% of people under 18 have a mental impairment, whereas 3% have it. Unbeknownst to healthcare providers, the problem affects millions of people globally. Seven disabilities can have multiplicative rather than additive effects on a person's life. [8] Child health problems caused by perinatal stress include ocular disorders. [9–12] To investigate visual disorders in children with learning disabilities (defined by WHO as students aged 16 years or younger).

MATERIALS AND METHOD

It was decided to conduct this study in Special schools for children with learning disabilities based on a questionnaire rather than using a control group design with (100 parents and 100 teachers) Furthermore, the study designed a questionnaire for parents and special school teachers to conduct a thorough and critical evaluation of the participant's sensory skills, especially visual acuity skills, through sight therapy and visual efficiency training to alleviate the complaints, unwanted behaviors, and eye problems of the selected children with learning disability, with the assistance of their teachers, parents, and caregivers. The present study was conducted in 200 special schools, including urban and rural areas. Around 100 parents participated in this study and 100 teachers from special schools. There

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were 100 children with learning disabilities among the 10,000 children in the sample for this study, with the majority falling between the ages of five to seven. These students were enrolled in different schools.

Vision screening

The researcher adopted a vision screening checklist developed by WHO (1993) for this study. It consisted of 50 objects that were organized into three categories, including as

- The appearance of the eye.
- The behavior of the children.
- The children encountered complaints.

The checklist intended to screen for the presence of any other visual flaws that might be connected with the condition under consideration (enclosed in **Appendix**).

RESULTS

General appearances of the children with a learning disability

The study carried out questionnaire-based screening for 10,000 children representing 200 schools, and 26 children were clinically identified with learning disabilities. The demographic details of the children with a learning disability are presented in **Table 1**

Table 4.1 General appearances

S.No	Particulars	Category	No	%
1.	Gender Special school children	Boys	429	54
		Girls	4651	46
2.	Age Special school children	3 ½ - 5 years	3852	38
		5 - 7 years	6228	62
3.	Gender - Children with a learning disability	Boys	17	65
		Girls	9	35
4.	Age Group - Children with a learning disability	3 ½ - 5 years	2	8
		5 - 7 years	24	92
5.	The onset of Visual Problem	Congenital	100	100
		Acquired	0	0
6.	Refractive Error	Myopia	8	31
		Hyperopia	1	4
7.	Cause of Visual Problem	Abnormalities of convergence	19	73

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		Hereditary causes	13	50
		Refractive Errors	1	4
		Diabetes	2	8
		Eye injury or Eye disease	1	4
		Damage to the retina	3	12
		Low birth weight (< 1702 gm)	7	27
		Premature (< 32 weeks)	14	54
		Abnormalities of accommodation	17	65
8.	Type	Esotropia	19	73
		Exotropia	7	27
		Hypotropia	0	0
		Hypertropia	0	0

The table indicates that among the 26 children with a learning disability, boys represented 65%, and the remaining 35% were girls. Out of the 8% belong to the 3 ½ to 5 years of age group, and the remaining 92% fall between the age group of 3 ½- 7 years.

From the above table, it is evident that the majority (54%) were boys among the total children, and the remaining 46% represented girls. Thirty-eight percent of them belong to the 3 ½ to 5 years of age group, and the remaining 62% represented the age group between 5- 7 years. In the data about the onset of children with strabismus, it is inferred that cent percent of them are congenitally learning disabilities. While analyzing the refractive error of children with strabismus, it is found that 35% of them have refractive errors such as myopia and Hyperopia. The children with myopia represented 31%, and the remaining 4% is represented by children with Hyperopia, which indicated that 65% of children with strabismus do not have any refractive errors.

While analyzing the causes of visual difficulties, it is found that the predominant cause was premature birth representing 54%, 27% due to low birth weight, 50% represented due to heredity, refractive errors 4%, eye injuries or eye diseases 4%, diabetes 8%, 12% are due to damage in the retina, 65% are due to abnormalities in accommodation, and 73% are due to abnormalities in convergence. The type of learning disability indicated that the children had 73% of Esotropia, and the remaining 27% represented Exotropia.

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Vision problems of children with a learning disability

This presents the analysis of the percentage scores of eye problems of children with a learning disability.

The appearance of the eye before and after IP

Table 4.2 presents the percentage of children having a problem with the appearance of the eye in children with learning disabilities.

Table 4.2 Appearance of the eye in children with a learning disability

S.No	The appearance of the eye	No of children	Percentage (%)
1.	Redness of the eyes	14	54
2.	Watery eyes	10	38
3.	Jerky eyes	13	50
4.	Have a squint in one eye	3	12
5.	Have squint in both eyes	4	15
6.	One eye drifts	24	92
7.	Excessive blinking	11	42
8.	Suffers from crusted eyelids	13	50
9.	Suffers by styes	13	50
10.	Swollen eyelids	0	0
11.	Suffers from Unusual lid droopiness	5	19
12.	Unusual size	6	23
13.	The cloudy or milky appearance of the eye	7	27
14.	Wiggling eyes	9	35

The above table 4.2 reveals that, as far as the appearance of the eye of the children with a learning disability is concerned, the common appearance of the eye was one eye drift with 92% and non-had swollen eyes with 0% followed by the redness of the eye was reported to be 54%. On the other Jerky eyes, Suffers from crusted eyelids and Suffers from styes were 50%. Excessive eye blinking was also seen at 42%. Certain eye conditions like Wiggling eyes, Cloudy or milky appearance of the eye, unusual size, Suffers from Unusual lid droopiness range between 20 to 30%. Hand watery eyes were 38%. The other eye problems like having squint in one eye and Having squint in both eyes fall under 12 to 15%, respectively.

The behavior of the children with a learning disability

About nineteen behaviors were exhibited by the selected 100 children with a learning disability. Table 4.3 presents the percentage of children with a learning disability having numerous behavior problems.

From the below table 4.3, it is evident that, as far as the behaviors are concerned, frequent inattention and problem in telling places, objects or a person seen elsewhere was 92%. On the other hand, problem in maintaining eye contact, lack of interest in outdoor activities and taking objects nearer to the eye was 80% to 31%. The behavioral problem such as not imitating other children's actions, problem catching a ball, and poor motor control was 92%. A problem like hesitation in moving was 73%. Tilting head and failure to notice the things above the head was 85%. Becoming fatigued, Closes or covering one eye, Inability to point their body parts, Poor motor control, Staring at surrounding when awake, Gaze around white light, Inability to watch activities around him, Inability to place small objects in small openings and Inability to show interest on new objects and places was 65%, 96%, 85%, 92%, 77%, 58%, 62%, 85% and 73%.

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Table 4.3 Behaviors of the children with learning disabilities

S.No	Behaviors	No of children	Percentage (%)
1.	Frequently Inattentive	24	92
2.	Hesitate in moving	19	73
3.	Cannot maintain eye Contact	21	80
4.	Lack of interest in outdoor activities	21	80
5.	Taking objects nearer to the eye	21	80
6.	Become fatigued	17	65
7.	Closes or covers one eye	25	96
8.	Cannot imitate actions of other children	24	92
9.	Cannot point to their body parts when asked	22	85
10.	Faces problem in catching ball	24	92
11.	Turns or tilts head to see	22	85
12.	Fails to notice objects above or below the head	22	85
13.	Poor motor Control	24	92
14.	Stares at surrounding when awake	20	77
15.	Momentarily holds gaze on a bright light or bright object	15	58
16.	Cannot watch activities around him for longer periods	16	62
17.	Not able to	22	85

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Complaints reported by the children with a learning disability

Children with a learning disability exhibit thirteen complaints. Table 4.4 presents the complaints reported by the children with a learning disability

Table 4.4 Complaints reported by the children with a learning disability

S.No	Complaints	No of children	Percentage (%)
1.	Headache	24	92
2.	Burning eyes	8	31
3.	Rubbing the eyes frequently	19	73
4.	Sensitivity to light	8	96
5.	Dizziness	19	73
6.	Aching in the eyes	14	54
7.	Poor visual/motor skills	14	92
8.	Becomes easily confused when in motion	11	81
9.	Suffer from excessive tiredness after close work	15	96
10.	Short and often decreasing work Distance	19	73
11.	Overall odd posture	22	85
12.	Frequently loses things	23	88
13.	Difficulty in concentrating and paying attention	22	85
	place small objects in small openings		
18.	Cannot able to tell places, objects or people seen Elsewhere	24	92
19.	Not able to show interest in new objects and Places	19	73

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The above table 4.4 inferred that as far as the complaints concerned were, and the headache was 92%. On the other hand burning eyes, rubbing the eyes frequently, sensitivity to light, dizziness, aching in the eyes, poor visual / motor skills, confusion in motion, tiredness after close work, decreasing work distance, overall odd posture, frequently losing things and difficulty in concentrating & paying attention was 92%, 31%, 73%, 31%, 73%, 54%, 54%, 42%, 58%, 73%, 85%, 88% and 85% respectively.

Discussion

Children who have learning disabilities are more likely to struggle with various issues, such as poor communication skills and intellectual disabilities, both of which can harm their overall development. They are wholly reliant on visual inputs for both their comprehension of the external world and their capacity to communicate with those outside of it; therefore, the addition of visual difficulties to their already existing impairment has a detrimental effect on the overall quality of their lives. Therefore, it is essential to recognize and solve issues with one's vision as soon as possible.

The most common ocular issues in our study were refractive error (31%), followed by Hyperopia (4%). Refractive error was 27.3% in Gogate et al. [13]. Bankes discovered that 49% of mentally ill kids had a refractive error. In 69% of 134 cognitively disabled Nepalese students studied, there were refractive problems.[14] On average, 58.5 percent of special needs children in Oman had a refractive error. Our research found that the most common refractive defects in children with learning impairments were myopia (40.91%), astigmatism (36.3%), and hypermetropia (13.6%).

It was shown that among children with disabilities, myopia was the most prevalent, followed by hypermetropia and astigmatism. [15] In severely/profoundly mentally challenged adults, Warburg discovered 43% myopia and 21% hypermetropia. Vora et al. found that 27.1 percent of special needs children had astigmatism. This was followed by myopia (24.9%) and astigmatism (24.8%) in Ghising R et al.'s study [15]. In our study, 19.3% of kids had strabismus. While Gurvinder Kaur et al. [16] found that 18.1% were overweight. Binocularity is generally lost because of amblyopia. Early binocular vision loss impacts a child's

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development and learning. Preventive orthoptic therapy of strabismus should begin at an early age. These youngsters with specific needs may benefit from early identification of potential and extra learning and developmental difficulties.

In our investigation, ocular morbidities increased with the severity of the mental disability, as described by Joshi et al. [17]. The assessment may get more difficult as the mental disability grows in severity. According to Das et al. [18], a familiar atmosphere is helpful. Ocular disorders are often undiagnosed in children with special needs due to a lack of thorough testing and evaluation. [19] Stronger links between child development, pediatric community services, ophthalmology, and special education services for children with disabilities are required to satisfy their visual requirements. However, parents and caregivers are still not aware of the issue. For example, some parents believed their children could damage themselves wearing spectacles, while others believed their children did not need them. Many of these children's eye care needs go undetected or overlooked due to their intellectual disability. Amblyopia is prevented by early treatment of refractive errors. Most causes of visual impairment, such as refractive problems and strabismus, can be easily treated, indicating the need for regular ocular assessments in disabled children [20- 23].

Conclusion

Children with learning disabilities should be screened regularly, and their parents and other caregivers should be properly counseled about the importance of screening and correcting any visual problems. This will provide a greater chance of improving the children's developmental milestones and overall health. To open up new doors of opportunity for disabled children throughout their lives, there is a pressing need for distinct guidelines and tighter collaboration amongst the various medical experts responsible for their care.

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APPENDIX I

QUESTIONNAIRE

GENERAL PARAMETERS

Name of Child

Sex: M/F

Date of Birth:

Age:

Birth Order: First/Middle/Last Child

Family Type:

Area of Living: Urban/Semi-urban/Rural

Name of School: Class/Grade:

Mother Tongue:

Siblings: Yes/No

Onset of the Problem:_____years ago

Visit Rehabilitation Center: Yes/No

Types of Learning Disability:

Frequency to attend a Rehabilitation Center:

Father's Name:

Father's Date of Birth:

Father's Occupation:

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Father's Educational Qualification:

Mother's Name:

Mother's Date of Birth: Mother's Occupation:

Mother's Educational Qualification: Socio-economic status: High/Middle/Low

Family history of Learning Disability:

Other children with any disability:

Causes for Visual Problems in Learning disability

Abnormalities of convergence
Hereditary causes
Refractive Errors
Diabetes
Eye injury or Eye disease
Damage to the retina
Low birth weight (< 1702 gm)
Premature (< 32 weeks)
Refractive Error

- Myopia
- Hyperopia

Type of Errors

Esotropia
Exotropia
Hypotropia
Hypertropia

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VISION SCREENING FOR LEARNING DISABILITIES

The appearance of the eyes

1. Redness of the eyes or eyelids yes/no
2. Watery eyes, yes/no
3. Jerky eyes/constant motion yes/no
4. Have squint in one eye yes/no
5. Have squint in both eyes yes/no
6. Swollen eyelids, yes/no
7. One eye drifts or aims in a different direction from the other, yes/no
8. Excessive blinking or squinting yes/no
9. Suffers from Crusted eyelids, yes/no
10. Suffers by Styes, or sores, on lids yes/no
11. Suffers by Unusual lid droopiness yes/no
12. The frequent presence of jerky or wiggling eyes, yes/no
13. Unequal /Unusual size / shape of eyes / pupils yes/no
14. The frequent presence of cloudy or milky appearance of an eye yes/no

Complaints

15. Headache yes/no
16. Dizziness, yes/no
17. Burning or itching eyes, yes/no
18. Rubbing the eyes frequently, yes/no
19. Blurred or double vision yes/no

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20. Aching in the eyes, yes/no
21. Sensitivity to light yes/no
22. Poor visual/motor skills yes/no
23. Frequently bumps into things or drops things yes/no
24. Becomes easily confused when in motion yes/no
25. Frequent motion sickness or car sickness yes/no
26. Double vision yes/no
27. Excessively run or blink his eyes yes/no
28. Frown / Scowl (or) Squint yes/no
29. Suffer from excessive tiredness after close work yes/no
30. Short and often decreasing work distance yes/no
31. Overall odd posture, yes/no

Behavior

32. The child blinking yes/no
33. The child frequently becomes inattentive yes/no
34. The child becomes fatigued, yes/no
35. The child closes or covers one eye, yes/no
36. The child face problem in identifying familiar object or pictures, yes/no
37. The child hesitate in moving around yes/no
38. The child imitates the actions of other children/adults, yes/no
39. The child point to their body parts when asked yes/no
40. The child face problem in catching the ball yes/no

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41. The child maintains eye contact with persons when talking yes/no
42. Lack of interest in outdoor activities yes/no
43. Taking objects nearer to the eye yes/no
44. Closes one eye or covers eye with hand yes/no
45. Turns or tilts head to see yes/no
46. Fails to notice objects above or below head yes/no
47. Poor motor control yes/no
48. Twists or tilts head towards the object to favor one eye yes/no
49. Poor visual / motor coordination yes/no

General problem

50. Frequently loses things yes/no
51. Difficulty in concentrating and paying attention yes/no
52. Exhibits avoidance behavior yes/no
53. Frequent nausea or dizziness yes/no
54. Stares at surrounding when awake yes/no
55. Momentarily holds gaze on a bright light or bright object yes/no
56. Watches activities around him for longer periods, yes/no
57. Lack face regard / eye contact yes/no
58. Notices objects on one side only yes/no
59. Tracks with head movement yes/no
60. Not able to place small objects in small openings yes/no
61. Absence of visual alert and observant of surroundings yes/no
62. Cannot able to tell places, objects or people seen elsewhere yes/no

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63. Not able to show interest in new objects and places yes/no
64. Fails to look at or point pictures in book yes/no
65. Fails to follow visually moving objects yes/no
66. Notices objects on one side only yes/no
67. Over / under reaches for objects yes/no
68. Travel sickness yes/no