



A Study of Ocular Manifestations in Children with Developmental Delay

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 01 Nov 2023	Background and Objective: The study was conducted to determine the occurrence and types of ophthalmologic abnormalities in children with developmental delay. Methods: children with developmental delay between age group of 6 months to 16 years visiting Himalayan hospital were studied for presence and types of ocular manifestations over a period of 1 year. Results: Among 54 children, ocular manifestation was noted in 48 (88.89%) children. Among various ocular manifestations refractive error was commonest seen in 29 out of 54 (53.70%) cases of which hypermetropia was most common. Second most common manifestations was esotropia 11 out of 54 (20.37%) followed by exotropia 7 out of (12.96%). In 12 out of 54 (22.22%) subjects temporal disc pallor was present. Conclusion: In developmentally delayed children, visual handicap plays an important role in overall morbidity. early assessment and correction of visual problems will provide such children greater chances of achieving their true potential and will prevent unnecessary visual impairment
CC License CC-BY-NC-SA 4.0	Keywords: Global developmental delay; refractive error; temporal disc pallor; birth asphyxia

1. Introduction

Developmental delay is defined as delay in two or more developmental domains which include gross motor, fine motor, speech, vision, hearing and language, personal and social domain (1). Apart from several other disabilities, it has been noted that children with developmental delay have higher incidence of ocular abnormalities like refractive errors, strabismus, optic nerve and retinal abnormalities (2). A majority of these ophthalmological disorders are treatable and early recognition of these will help plan proper management and avoid complications like amblyopia (3). Also, it is difficult to evaluate these children ophthalmologically as the ocular signs are mostly missed, and there are coexisting handicaps in other functional domains. In case of visual impairment, the earlier we intervene, better the visual sense function and greater the chances of the child achieving his true potential. In view of above facts, the purpose of the planned research was to assess the ocular symptoms in children who had developmental delays.

2. Materials And Methods

The present observational and cross-sectional study was conducted in the Department of Ophthalmology, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Swami Ram Nagar, Jolly Grant, Dehradun.

Ethical Approval

The study protocol was approved by the institute Ethics committee with registration no: ECR/483/Inst/UK/20I3/RR-16. The study was conducted in children between 6 months to 16 years age group over a period of 12 months.

Inclusion criteria:

All patients from 6 months to 16 years of age with any of the following:

- History of any type of developmental delay

- b) children with Cerebral palsy
- c) History of birth asphyxia

Exclusion criteria:

- a) Patients of age more than 16 years.
- b) Debilitated patients not fit for ophthalmic examination.

Sample size and sample technique

Sample size was calculated using formulae:

$$n = 22a/2p(1 - p)/d^2 \quad (1)$$

Minimum sample size was 52. A total of 54 subjects were taken in this study.

Procedure and Statistical Analysis

After obtaining informed consent complete ophthalmic examinations were conducted. Ophthalmological assessment included routine ocular examination with examination of visual acuity testing, strabismus, cycloplegic refraction and detailed fundus examination. The data obtained was evaluated statistically using SPSS (statistical package for social sciences) and Microsoft excel. A p value of <0.05 was considered significant.

3. Results and Discussion

Among 54 children, ocular manifestation was noted in 48 (88.89%) children. (p=0.001) (Table 1). A total of 42 (77.78%) males and 12(22.22%) females with a male: female ratio of 7:2 was included in the study.

Out of total 54 subject, 21(38.89%) children were born preterm and 33 (61.11%) were born full term (p=0.004). History of consanguinity was present only in 4(7.40%) cases while the remaining 50 were non-consanguineous. Out of 54 subjects, esotropia was noted in 11(20.37%) subjects (Table 2).

Refractive error was seen in 29 (53.70%) subjects (Table 3). Out of total 54 subjects 18 (33.33%) had some fundus findings. Disc pallor 12(22.22%) was most common finding.

Table 1: Type of developmental delay among subjects

Ocular manifestation	Global	Motor	Motor and social	Speech and motor	Total
Present	31(57.41%)	11(20.37%)	1(1.85%)	5(9.26%)	48(88.89%)
Absent	5(9.26%)	1(1.85%)	0	0	6(11.11%)
	36(66.67%)	12(22.22%)	1(1.85%)	5(9.26%)	54(100%)

Table 2: Association between anterior segment and developmental delay

Anterior segment	Global N=15(27.77%)	Motor N=5(9.25%)	Motor and social N=0	Speech and motor N=2(3.70%)	Total
Microspherophakia	0	1(1.85%)	0	0	1(1.85%)
Nystagmus	2(3.70%)	0	0	0	2(3.70%)
Ptosis	1(1.85%)	0	0	0	1(1.85%)
Esotropia	7(12.96%)	2(3.70%)	0	2(3.70%)	11(20.03%)
Exotropia	5(9.25%)	2(3.70%)	0	0	7(12.96%)
Total	15(27.77%)	5(9.25%)	0	2(3.70%)	22(40.74%)
P value	0.394				

Table 3: Association between refractive error and developmental delay (n=29)

Refractive error	Global N= 18 (62.06%)	Motor N=8(27.58%)	Motor and social N=3(10.34%)	Speech and motor N=0	Total
Astigmatism	5(9.25%)	2(3.70%)	0	0	7(12.96%)
Hypermetropie	7(12.96%)	4(7.41%)	0	3(5.17%)	14(25.96%)

Myopia	6(11.11%)	2(3.70%)	0	0	804.81%)
Total	18(62.06%)	8(27.58%)	0	3(10.34%)	29(53.70%)
P value	0.859				

of the 54 children studied, ocular disorders were present in 48(88.89%) children (Table 1). This is comparable with the other studies which stated that relation between developmental delay and presence of ocular manifestations is statistically significant such as, study by Smitha et al., who reported 83.6% and Akinci et al., reported 77% of children with ocular manifestations (4, 5). In this study there was male preponderance with a male: female ratio of 7:2. In a study by Wu et al., sex distribution was found to be 68% males and 32% females which is similar to this study (6).

The present study revealed that history of preterm birth was present in 21 (38.89%) subjects. Similar study conducted by Pardhi et al., delayed cry was present in 18% of children who had ocular manifestation (7) and Elmenshawy et al., showed preterm as risk factor in 51.4% of the children (8). In the current study consanguinity was seen in 4 (7.41%) out of total 54 subjects. In a similar study done by Reena et al., consanguinity was reported in 3% subjects (9). The present study shows higher occurrence of consanguinity and this is probably because many of the subjects in present study were from Muslim community where consanguinity is common (10).

In present study strabismus was seen in 18 (33.33%) subjects of which esotropia was seen in 11(20.03%) and exotropia 7 (12.96%) subjects (Table 2). study conducted by Fink, Günther and Hill, showed occurrence of strabismus in developmental delay children to be 37% (11). Katoch et al., and Elmenshawy et al, showed similar results (12, 13). There are several reasons that are frequent in children who have developmental delays that contribute to the high incidence of strabismus. Strabismus is associated with refractive problems and vision impairment. Because of the muscles' spastic activity, strabismus—primarily esotropia—occurs often in children with cerebral palsy (14,15,16).

In current study refractive error was seen in 29 (53.70%) subjects (Table 3). In a similar study done by Reena A et al., refractive errors were seen in (41.3 %) and in Kalaiselvi et 31 (54.5%), which is comparable to current study which shows slightly higher occurrence (9,17). refractive errors increase significantly with severity of mental disability (17).

In present study out of 54 subjects 18 (33.33%) had fundus findings of which temporal disc pallor 12 (22.22%) was most common finding. A study by Smitha et al., reported optic-atrophy in 9.78% of subjects (4). Prematurity is the most common reason for optic atrophy observed in <10 years of age (16). On analysing the study, it was found that global developmental delay was most commonly associated with some ocular manifestations. Most common ocular manifestation was refractive error which was seen in 53.70% subjects of which hypermetropia was most common. This was followed by strabismus, disc changes.

4. Conclusion

In developmentally delayed children, visual handicap plays an important role in overall morbidity. early assessment and correction of ocular abnormality will prevent unnecessary visual impairment in such children. Parent's education regarding early detection of delayed milestones and visual deficits is also vital so that these children can be treated timely.

Limitations

A limitation of the present study is the small sample size in tertiary care teaching hospital. A multi-centre study with a large sample size will be essential to confirm the results of this study.

Declarations

Conflict of interest

The authors declare that they have no conflict of interest.

Informed Consent

Informed consent was taken from the patients participating in this study.

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