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Special needs reports for children: diagnosis distribution and age relationship in visual function*

Emine Tınkır Kayıtmazbatır, Ayşe Bozkurt Oflaz, Şule Acar Duyan

Department of Ophthalmology, Faculty of Medicine, Selçuk University, Konya, Turkiye

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ABSTRACT

Aims: This study aimed to analyze the most common eye disease diagnoses in children with special needs and their distribution by age and special needs levels.

Methods: Records of 1771 patients evaluated by the health board of our hospital between February 2019 and March 2024 were reviewed. Data from 134 children assessed in the visual function domain were categorized based on special needs levels: presence of special needs (PSN), presence of significant special needs (PSSN), and presence of special conditions (PSC). Diagnoses were analyzed by age groups.

Results: The most common diagnoses among children evaluated for special needs reports were refractive errors (20.8%), optic atrophy (18.6%), and strabismus (14.1%). Among children identified with PSSN, optic atrophy (37.5%) was the most frequent diagnosis, followed by nystagmus (16.7%), hereditary retinal dystrophies (16.7%), and retinopathy of prematurity (ROP) (12.5%). In children identified with PSC, the most common diagnosis was also optic atrophy (37.1%), followed by hereditary retinal dystrophies (14.3%) and congenital glaucoma (11.4%). Of the 25 children diagnosed with optic atrophy, 15 had accompanying conditions such as hydrocephalus, cerebral palsy, and intracranial pressure elevation caused by masses.

Conclusion: The diagnoses in special needs reports for children vary according to the visual function category. However, optic atrophy appears as a frequently observed diagnosis across all age groups. Age-specific diagnostic distributions may serve as a guide in planning early intervention and treatment strategies.

Keywords: Assessment of healthcare needs, optic atrophy, vision disorders

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INTRODUCTION

Vision loss significantly restricts individuals' cognitive, motor, and social development[1], limiting their ability to perceive the environment, learn, and move independently.[2] Developmental delays in achieving milestones, alongside deficiencies in social relationships, cognitive skills, and motor abilities, are frequently observed in children with vision loss.[3] It is estimated that approximately 40 million children worldwide experience mild vision loss, 22 million suffer from moderate to severe vision loss, and 1.4 million children are blind.[5] Reports indicate that 72% of children with vision loss also have other clinically significant conditions unrelated to the eye. Regular monitoring of at-risk groups, particularly those born prematurely or diagnosed with cerebral palsy or neurodevelopmental disorders such as Down syndrome, is emphasized.[6]

Early-onset vision loss restricts a child's ability to perceive the environment, learn, and move independently[2], resulting in individual and familial challenges that necessitate special needs.

In Turkiye, the "Regulation on Special Needs Assessment for Children" (ÇÖZGER) adopts a comprehensive approach to assessing and reporting special needs, aiming to address these children's needs within a holistic framework. The presence of special needs (PSN) is classified into mild, moderate, advanced, and severe levels of PSN, as well as distinct categories such as presence of significant special needs (PSSN) and presence of special conditions (PSC), with disability rates determined accordingly.[7] In the visual function category, the classification is based on the degree of visual impairment, ranging from mild vision loss to complete blindness, with special attention to functional limitations in daily activities.

This study aims to evaluate the distribution of special needs statuses and diagnoses related to visual function among children who applied to the health board under ÇÖZGER, based on age groups.

Corresponding Author: Emine Tınkır Kayıtmazbatır, drtinkir@gmail.com

METHODS

The study was initiated with the approval of the Selçuk University Medical Faculty Clinical Researches Ethics Committee (Date: 02.07.2024, Decision No: 326), which was planned and conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. The medical records of patients who applied for a ÇÖZGER report to our hospital's health board between February 2019 and March 2024 were reviewed. Patients assessed for special needs in the visual function category were included in the study. Data were classified based on the types of special needs into ASN (absence of special needs), mild PSN, moderate PSN, advanced PSN, severe PSN, PSSN, and PSC, and the diagnoses in the visual function category were recorded. The distribution of diagnoses by age groups (<12 months, 1–3 years, 3–6 years, 6–12 years, and 12–18 years) was analyzed.

Statistical Analysis

The data analyses were performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive analyses of numerical variables were presented as mean±standard deviation or median (minimum–maximum) values, depending on the distribution. Categorical data were expressed as numbers and percentages. The Chi-square test was used to evaluate the relationship between age groups, gender, special needs status, and diagnoses. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 1771 medical records were reviewed, and 134 cases were evaluated for visual function. Of the evaluated cases, 52.2% were male (n=70), and 47.8% were female (n=64). The mean age was 94.6±52.7 months (minimum 4–maximum 211 months). When distributed by age groups, cases aged 0–1 years accounted for 6.7% (n=9), those aged 1–3 years for 8.9% (n=12), those aged 3–6 years for 23.8% (n=32), those aged 6–12 years for 40.2% (n=54), and those aged 12–18 years for 20.1% (n=27) (**Figure 1**).

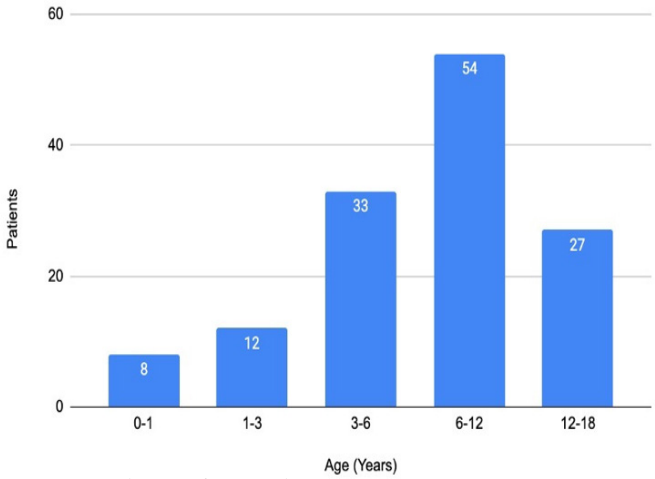

Figure 1. Distribution of patients by age groups

When the distribution of cases by the level of special needs was examined, 55.2% (n=74) of cases had no special condition requirements (ASN). Mild PSN was present in one case, while 35 cases (26.1%) had PSC, and 24 cases (17.9%) had PSSN (**Figure 2**). When diagnoses of all cases were examined, 28 cases (20.8%) had refractive errors, 25 cases (18.6%) had optic atrophy, and 19 cases (14.1%) had strabismus (**Figure 3**).

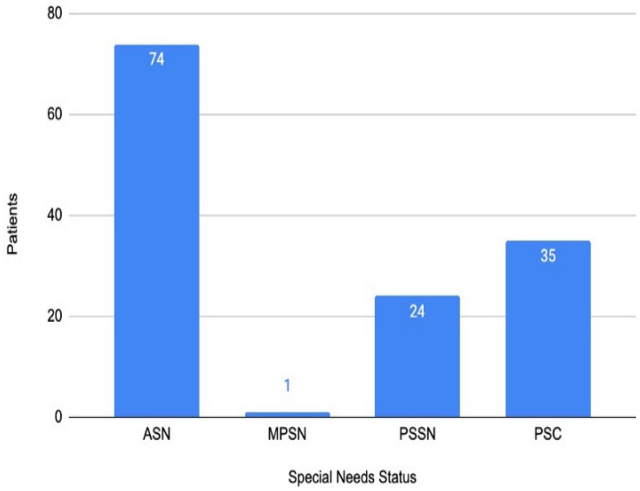

Figure 2. Distribution of patients by special needs status

ASN: Absence of special needs, MPSN: Mild presence of special needs, PSSN: Presence of significant special needs, PSC: Presence of special conditions

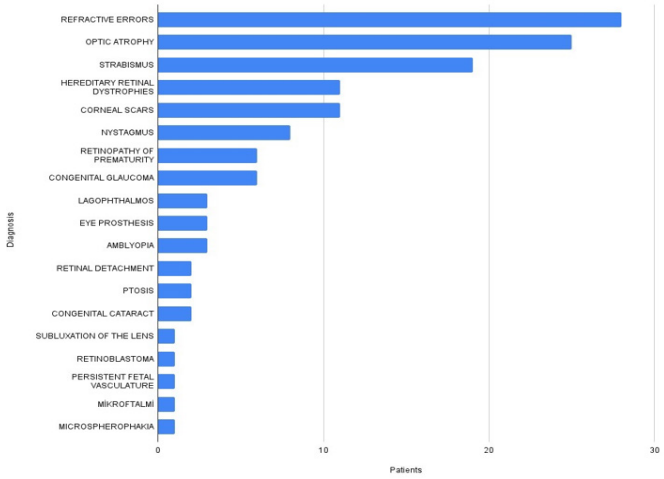

Figure 3. Distribution of patients by diagnoses

In ASN group (n=74), 33.8% (n=25) had refractive errors, 24.3% (n=18) had strabismus, and 10.8% (n=8) had corneal scars and opacities (**Table 1**). The single case with mild PSN had a refractive error accompanied by high astigmatism (-6.50@15/-7.00@160). Among 35 cases with PSC, 13 (37.1%) had optic atrophy, five (14.3%) had hereditary retinal dystrophy, four (11.4%) had vision loss due to congenital glaucoma, and three (8.6%) had retinopathy of prematurity (ROP). Two cases with PSC had refractive errors accompanied by high hyperopia (5.7%) (**Table 2**). Among 24 cases with PSSN, nine (37.5%) had optic atrophy, four (16.7%) had nystagmus, four (16.7%) had hereditary retinal dystrophy, and three (12.5%) had ROP (**Table 3**). One case diagnosed with nystagmus also had accompanying albinism and foveal hypoplasia.

When diagnoses were analyzed by age groups, the most common diagnosis in the 0–1-year age group was optic atrophy (n=2), strabismus (n=5) in the 1–3-year age group, optic atrophy (n=8) and refractive errors (n=8) in the 3–6-

Table 1. Diagnosis distribution of patients in the ASN group

Diagnosis	Patients	
	(n)	%
Refractive errors	25	33.8
Strabismus	18	24.3
Corneal scars	8	10.8
Eye prosthesis	3	4.1
Optic atrophy	3	4.1
Lagophthalmos	3	4.1
Amblyopia	3	4.1
Ptosis	2	2.7
Nystagmus	2	2.7
Hereditary retinal dystrophies	2	2.7
Retinal detachment	1	1.4
Microspherophakia	1	1.4
Subluxation of the lens	1	1.4
Congenital cataract	1	1.4
Congenital glaucoma	1	1.4

ASN: Absence of special needs

Table 2. Diagnosis distribution of patients in the PSC group

Diagnosis	Patients	
	n	%
Optic atrophy	13	37.1%
Hereditary retinal dystrophies	5	14.3%
Congenital glaucoma	4	11.4%
Retinopathy of prematurity	3	8.6%
Nystagmus	2	5.7%
Refractive errors	2	5.7%
Strabismus	1	2.9%
Retinoblastoma	1	2.9%
Retinal detachment	1	2.9%
Persistent fetal vasculature	1	2.9%
Microphtalmia	1	2.9%
Corneal scar	1	2.9%

PSC: Presence of special conditions

Table 3. Diagnosis distribution of patients in the PSSN group

Diagnosis	Patients	
	n	%
Optic atrophy	9	37.5%
Nystagmus	4	16.7%
Hereditary retinal dystrophies	4	16.7%
Retinopathy of prematurity	3	12.5%
Corneal scar	2	8.3%
Congenital cataract	1	4.2%
Congenital glaucoma	1	4.2%

PSSN: Presence of significant special needs

year age group, refractive errors (n=15) and optic atrophy (n=9) in the 6–12-year age group, and refractive errors (n=5) and hereditary retinal dystrophies (n=5) in the 12–18-year age group.

Among 25 cases diagnosed with optic atrophy, 15 had accompanying neurological pathologies such as hydrocephalus (n=6), cerebral palsy (n=8), and medulloblastoma causing increased intracranial pressure (n=1). Bilateral involvement was present in 21 cases (84%).

Statistical analyses were conducted to further examine the relationship between age groups, gender, special needs status, and diagnoses. There was no statistically significant relationship between gender and overall diagnoses (p=0.414). A significant relationship was observed between special needs status and diagnoses ($p<0.05$). Diagnoses such as optic atrophy and hereditary retinal dystrophies were more frequently seen in children classified under PSC, while refractive errors and strabismus were commonly found in children without special condition (ASN). Trend analysis revealed that nystagmus and hereditary retinal dystrophies were more prevalent in early childhood, while refractive errors were significantly more common in school-age children.

DISCUSSION

Studies examining children with special needs have reported that boys are more frequently affected.[8,9] Similarly, in our study, boys were more common; however, the male-to-female ratio (1.09) was lower than in other studies. This discrepancy may be due to the demographic characteristics of families applying for ÇÖZGER reports and the limitation of the sample population to a specific healthcare facility.

There are limited studies on ÇÖZGER reports from different centers and specialties in our country. A study by Temeltürk et al.[10] reported that 18.6% of cases required special needs in multiple areas, while Kaba et al.[11] found this rate to be 34.7% in cases referred for psychiatric evaluation. In a study evaluating physical therapy and rehabilitation patients by Büyükavcı et al.[12], 71.6% of cases had PSN. In our study, 7.5% of all applicants for ÇÖZGER reports were evaluated for visual function, and 44.2% of them were found to have special needs.

In this study, diagnoses in the visual function category were frequently observed not only in children with special needs but also in children without special needs. This finding indicates that visual function problems extend beyond children with special needs, affecting a broader population. A study from Latin America reported a high prevalence (45%) of refractive errors and ophthalmological diseases in children with developmental disorders and behavioral problems.[13]

There are two studies from our country that evaluate the visual function domain in ÇÖZGER reports. In Güner and Bozbıyık's[14] study, involving 1026 cases, 5.6% of children were found to have special needs in ophthalmological terms, with 26 cases categorized as PSN, 21 cases as PSSN, and 10 cases as PSC. Refractive errors and accommodation disorders, strabismus, amblyopia, nystagmus, optic atrophy, and hereditary retinal dystrophy were the most common diagnoses. Similarly, in our study, refractive errors, optic atrophy, and strabismus were the most common diagnoses.

In the study by Sayın et al.[15], optic atrophy was the most common diagnosis among children requiring special needs reports. Similarly, in our study, optic atrophy was the most

frequent diagnosis, among cases requiring special needs reports, followed by hereditary retinal dystrophies, ROP, and nystagmus. Optic atrophy was accompanied by neurological conditions such as hydrocephalus, cerebral palsy, and intracranial mass-related pressure increases in 14 cases. This finding aligns with the literature, supporting the relationship between optic atrophy and neurological conditions.[16] Bilateral involvement was present in 84% of cases, aligning with previous studies showing a higher prevalence of intellectual disabilities and neurodevelopmental disorders, such as autism spectrum disorder, in bilateral optic atrophy cases.[17,18]

The study by İdil[19] evaluating visually impaired children reported that the most common diagnoses among children aged 7–18 were hereditary macular degeneration, albinism, and optic atrophy. In Turkiye, a study by Tunay[20] covering diagnoses of 150 visually impaired children aged 6–18 years identified hereditary macular dystrophies as the leading diagnosis, followed by cortical visual impairment. Albinism, optic atrophy, structural anomalies, retinitis pigmentosa, and ROP were also reported as common diagnoses. The study emphasized the importance of low vision rehabilitation, highlighting significant improvements in both distance and near vision with rehabilitation in school-aged visually impaired children, and the importance of referral to visual rehabilitation services by both pediatricians and ophthalmologists.[20]

A study investigating the eye health needs of individuals with learning difficulties in England found high prevalence rates of eye problems across all age groups. It also revealed challenges in accessing primary eye health services, leading to preventable and/or undiagnosed vision loss among individuals with learning difficulties.[21] International studies emphasize the importance of recognizing special educational needs before the age of four to ensure appropriate support services are in place. Sethi and Trend reported that delayed identification may result in missed opportunities for early intervention, especially in regions with inconsistent child health surveillance programs.[22] This highlights the need for structured and comprehensive screening programs, both at national and regional levels, to prevent delays in diagnosis and improve long-term outcomes for children with visual impairments. In Turkiye, ÇÖZGER reports not only enable individuals and their families to access social rights and support but also facilitate comprehensive evaluation and referral to appropriate educational and rehabilitation services for eye health.

In addition to these findings, a diagnostic algorithm is crucial for early identification and management of visual impairments in children. The algorithm begins with a comprehensive initial eye examination, including age-appropriate visual acuity assessment, light reflex testing, ocular motility evaluation, anterior segment examination, and fundus evaluation. For children diagnosed with optic atrophy, referral to pediatric neurology is essential to investigate associated neurological conditions. Children with a history of ROP should be closely monitored for potential future complications such as refractive errors, strabismus, and retinal disorders. In cases of nystagmus and hereditary retinal dystrophies, electrophysiological tests are recommended, with genetic counseling offered if necessary. Refractive errors should be corrected, amblyopia treatment initiated, and families informed about low-vision rehabilitation services when needed. For serious conditions like retinoblastoma or congenital glaucoma, immediate referral and treatment planning are critical to prevent vision loss and ensure timely intervention.

Limitations

As it is single-centered, the generalizability of the results to different populations and regions is limited. The retrospective design and limited sample size restrict the representation of findings for a broader population. Socioeconomic status, education level, or cultural factors were not evaluated in this study; considering their effects on access to eye health and treatment outcomes could be beneficial. Additionally, the lack of comprehensive data on genetic factors and consanguineous marriages limits the evaluation of the etiology of hereditary retinal dystrophies. Another limitation of our study is the absence of a control group of typically developing children. Including such a control group in future research would allow for a more robust comparison of visual impairment prevalence. Addressing these limitations in future multi-center, prospective studies could provide more comprehensive insights.

CONCLUSION

This study demonstrated that diagnoses related to visual function are not limited to children with special needs but are also prevalent in a broader pediatric population. Ophthalmological issues such as refractive errors, optic atrophy, and strabismus were among the most common diagnoses in children evaluated within the scope of special needs reports. The relationship between optic atrophy, conditions requiring special needs, and neurological pathologies underscores the importance of a multidisciplinary approach. Implementing targeted screening programs focusing on early identification of these conditions is crucial. Collaboration between ophthalmologists, pediatricians, and rehabilitation specialists is essential for comprehensive care. Enhancing access to low-vision rehabilitation services and raising awareness among families about the importance of early intervention may significantly improve long-term visual and developmental outcomes.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was initiated with the approval of the Selçuk University Medical Faculty Clinical Researches Ethics Committee (Date: 02.07.2024, Decision No: 326).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure
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Author Contributions
All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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