

A Study to Find the Causes for Severe Visual Impairment and Blindness among Children in the School for Blind in Patiala, Punjab**Indu Khosa¹, Talvir Sidhu², Ishwar Singh³, Mohit Goyal⁴**¹Assistant Professor, Department of Ophthalmology, Government Medical College, Patiala, Punjab - 147001, India²Associate Professor, Department of Ophthalmology, Government Medical College, Patiala, Punjab - 147001, India³Professor, Department of Ophthalmology, Government Medical College, Patiala, Punjab -147001, India⁴Senior Resident, Department of Ophthalmology, Government Medical College, Patiala, Punjab -147001, India

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Abstract:

Introduction: Out of 2.2 billion visually impaired people globally, at least half have unaddressed preventable causes of blindness, mainly untreated cataract (94 million), unaddressed refractive error (88.4 million), glaucoma (7.7 million), and corneal opacities (4.2 million); and untreated presbyopia (826 million) for near vision impairment. In India, the current prevalence of blindness in children is known to be around 0.8/1000 in the age group of 0–15 years. It is very important to have accurate data regarding causes and prevalence so that proper strategies can be planned to reduce, at least, preventable childhood blindness.

Material and Methods: This is a cross-sectional study that included children from the school for the blind in Patiala, Punjab, India. The school principal was explained about the study. All the children were examined by an ophthalmologist and an optometrist. Information was gathered by interview and by consulting the medical records available. Unocular and binocular visual acuity, with best correction, using a snellen's chart; refraction, after cycloplegia; and anterior and posterior segment examination were done after pupillary dilation. For each child, the cause of visual loss was recorded in the form.

Results: 92 children studying from grades 1 to 12 were examined. The average age of the participants was 13.13 years. 51 were male and 41 were female. 61.9% patients had onset of blindness before 1 year of age. The most common cause of blindness in children in our study was Retinal Dystrophy (38.64%), followed by congenital glaucoma (16.56%), Optic nerve atrophy (12.88%), and Corneal opacity (11.04%). The majority of the children (72.8%) had visual acuity from 3/60 to light perception positive.

Conclusion: The most common cause of blindness in children in our study was Retinal Dystrophy (38.64%), followed by congenital glaucoma (16.56%). These results corroborate the past studies.

Keywords: Blindness, Children, Vision Impairment.

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Introduction

The International Classification of Diseases 11 (2018) classifies vision impairment into two groups: distance and near.

Distance Vision Impairment:

- Blindness: Presenting visual acuity < 3/60 in the better eye with available correction
- Severe visual impairment (SVI): Presenting visual acuity < 6/60–3/60 in the better eye with available correction.
- Moderate visual impairment (MVI): Presenting visual acuity < 6/18–6/60 in the better eye with available correction.

- Early visual impairment (EVI) Presenting visual acuity < 6/12–6/18 in the better eye with available correction. [1]

Near Vision Impairment: Near-visual acuity worse than N6 at 40 cm.

Globally, at least 2.2 billion people have vision impairment, near or far. At least half of them have preventable causes of blindness that have not been addressed. [2] These causes of severe vision impairment or blindness are untreated cataract (94 million), unaddressed refractive error (88.4 million), glaucoma (7.7 million), corneal opacities (4.2 million), diabetic retinopathy (3.9 million),

trachoma (2 million), and untreated presbyopia (826 million) for near vision impairment. [3] In India, the prevalence of blindness in children is relatively lower than that in adults. Population-based surveys on childhood blindness are few.

The current prevalence of blindness in children is known to be around 0.8/1000 in the age group of 0–15 years. [4] Onset of blindness at an early age can hamper the development of a child by interfering with their motor, language, social, and cognitive abilities.

This may also lead to poor educational achievement. [5] It is very important to have accurate data regarding the causes and prevalence of childhood blindness so that proper strategies can be planned to reduce, at least, preventable childhood blindness.

Also, the curable blindness can be treated, and the children can be shifted to mainstream education early. Visual rehabilitation centers can be designed as well. [6] This study aims at providing data on the major causes of severe visual impairment and blindness in children attending the school for the blind in Patiala, Punjab, and to identify the avoidable or treatable causes of severe visual impairment and blindness.

Material and Methods

This is a cross-sectional study that included children from the school for the blind in Patiala, Punjab, India.

The school principal was explained about the outline of the purpose of the study with a request for permission to visit the school and carry out ophthalmic examinations of all the children admitted to their school.

Data was collected from the children attending the school who agreed to be included in the study.

All the children were examined by an ophthalmologist and an optometrist. Each child was seen with his or her class teacher or parent, whenever possible. Information was gathered by interview and by consulting medical records available with the school.

Socio-demographic data on age, sex, and area of usual residence was recorded. A routine medical history and relevant details of family history were noted. Uniocular and binocular visual acuity measurements, with best correction, were made using a snellen's chart. These were recorded according to the categories of the following classification:

Table 1: Visual acuity in the better eye

Category	Level of vision
Early visual impairment	Presenting visual acuity 6/12–6/18 in the better eye with available correction
Moderate visual impairment	Presenting visual acuity 6/18–6/60 in the better eye with available correction
Severe visual impairment (SVI)	Presenting visual acuity 6/60–3/60 in better eye with available correction
Blindness	Presenting visual acuity < 3/60 in the better eye with available correction

Refraction, after cycloplegia, was carried out unless it was inappropriate (e.g., in children with bilateral phthisis bulbi). Anterior segment examination was undertaken by the ophthalmologist using a magnifying loupe and torch. Posterior segment examination was done by direct and/or indirect ophthalmoscopy after pupillary dilation. For each child, the cause of visual loss was recorded in the

form. The findings of the study were entered in an MS Excel spreadsheet and presented as a percentage of the total.

Results

92 children from 1 blind school at Patiala, Punjab were examined in our study. The school had children studying from class 1 to 12th.

Table 2: Age wise distribution of the participants

Age	Count
<5	0
5-9	21
10-14	33
15-19	38
Grand Total	92

Average age of the participants was 13.13 years.

Table 3: Gender wise distribution of the participants

Gender	Count
Male	55.43%
Female	44.57%
Grand Total	92

51 were male and 41 were female.

Table 4: Age of onset of blindness

Age of onset of blindness	Count
Since birth	39.1%
<1 year	22.8%
1-15 years	28.3%
Unknown	9.8%
Grand Total	92

Maximum participants had onset of blindness at birth. 61.9% patients had onset of blindness before 1 year of age and 28.3% after 1 year of age.

Table 5: Cause of blindness

Cause of blindness	Count	%
Congenital glaucoma	18	16.56
Optic nerve atrophy	14	12.88
Retinal dystrophy	42	38.64
Retinal detachment	01	0.92
Corneal opacity	12	11.04
Anophthalmos	02	1.84
Infections	02	1.84
Trauma	01	0.92
Grand Total	92	100

Among the 92 participants, 12 (13%) had a family history of the similar ocular condition. Out of these 12 participants, 7 had retinal dystrophy and 5 had glaucoma as a cause of blindness. The remaining 80 participants had no family history or did not know about such condition in their family members.

Table 6: Best corrected visual acuity of the participants

Category of vision loss	VA level	No.	%
Moderate vision impairment	<6/18–6/60	3	3.3
Severe vision impairment	< 6/60 – 3/60	12	13.0
Blindness	<3/60–Light perception	67	72.8
Blindness	No light perception	10	10.9
Total		92	100

Majority of the children (72.8%) had visual acuity from 3/60 to light perception positive.

Discussion

Childhood blindness is a major concern across the globe as it affects the psychosocial as well as economic growth of the family. There are around 1.42 million children around the world suffering from blindness; and around 17.52 million suffering from moderate to severe visual impairment. [7] As per the WHO report, the prevalence of childhood blindness in low income countries is as high as 1.5 per 1000 children.

In India, the prevalence is around 0.8 per 1000. [8,9] So, the policies and national health programmes have to target the causes of childhood blindness since it affects the future of a country. For this, studies have to be conducted to determine proper underlying causes of childhood blindness. We conducted our study to determine the causes of blindness and severe visual impairment among children in a school for blind at Patiala, Punjab. We examined 92 children for BCVA, time of onset of blindness, any past surgeries and fundus examination to determine the cause of blindness. The average age for the participants in our study was 13.13 years. This is close to the mean age of

11.7± 2.8 years in a similar study conducted by Gyawali et al School for blind in Eritrea. [10] Kotb, Amgad A et al. studied childhood blindness causes at a blind school in Riyadh, Saudi Arabia where the average age was 16 years. [6] Male to female ratio in our study was 1.24 (51 males and 41 females). This ratio was 1.17 in Kotb, Amgad A et al. study in Riyadh; 1.1 in Gyawali et al study at Eritrea and 1.43 in Huang, Lijuan et al. study at China. [6,10,11]

In our study, the onset of blindness in majority of children was before 1 year of age with 39.1% having blindness since birth and 22.8% having onset before 1 year of age. This indicates that majority of children had congenital disease and not acquired diseases. The findings are in agreement with Ntim-Amponsah, C T, and W M K Amoaku. Study of visual impairment in blind school students in Ghana who also had 52.75% cases with onset of blindness before 1 year age. [12] The most common cause of blindness in children in our study was Retinal Dystrophy (38.64%) followed by congenital glaucoma (16.56%), Optic nerve atrophy (12.88%) and corneal opacity (11.04%).

The health infrastructure in Patiala, Punjab is well developed with easy availability of Ophthalmologists in government as well as private sector. Due to this reason, the preventable causes of blindness such as untreated refractive errors and congenital cataract are not in the list. In Fadamiro CO. study in blind school of South Western Nigeria, unoperated cataract (36.84%) followed by glaucoma and infections was the most common cause of blindness. This was due to the fact that there was no resident ophthalmologist available in the state. [13] Sitorus R, Preising M, Lorenz B study for causes of blindness in "Wiyata Guna" School for the Blind, Indonesia found hereditary and infective causes like corneal staphyloma, corneal scar (29.7%) and retinal dystrophies (20.6%) to be the most common cause of blindness. [14] Our study also identifies retinal dystrophy and corneal opacity as major causes of blindness. Kotb, Amgad A et al. also found Retinal Dystrophy (54%) and Congenital Glaucoma (14%) as the most common causes of blindness in children of blind school at Riyadh, Saudi Arabi. [6]

The aim of this study was to identify the common causes of childhood blindness so that it can help in creating policies to prevent or cure or rehabilitate the visually impaired. It is easier and cheaper to prevent the causes of blindness instead of treating or rehabilitating once the blindness develops. The students must be screened for visual impairment before admission to school. The parents, teachers and community as a whole needs to be educated and counseled to be more accepting and empathic towards the visually impaired. The visually impaired children need to be well educated and taught skills which will help them to excel I life.

The limitation of our study could be the small sample size which may not be a representative of children with blindness and severe visual impairment in the region.

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