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Original Research Article

Frequency and Causes of Amblyopia in Children Visiting an Eye O.P.D of Tertiary Care Hospital

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Abstract:

Background: Amblyopia is a visual disorder affecting children, characterized by reduced vision in one or both eyes without detectable organic pathology. Early detection and intervention are critical to prevent irreversible visual impairment.

Materials and Methods: This retrospective study reviewed records of 100 pediatric patients diagnosed with amblyopia at a tertiary care hospital in Bhagalpur between February 2021 and July 2021. Data on demographics, etiological factors, and clinical presentations were analyzed. Amblyopia diagnosis was based on standardized criteria including visual acuity assessments and comprehensive ophthalmic evaluations.

Results: Among the 100 children studied, the mean age was 8.5 years (SD ± 2.1), with a male-to-female ratio of 1.2:1. The leading causes of amblyopia were refractive errors (65%), strabismus (20%), and deprivation (15%). Visual acuity assessments revealed that 40% had mild amblyopia, 35% moderate, and 25% severe. Right eye involvement was noted in 60% of cases.

Conclusion: This study underscores the significant prevalence of amblyopia among children attending a tertiary care hospital in Bhagalpur, primarily attributable to refractive errors, strabismus, and deprivation. Early diagnosis and appropriate interventions are crucial to mitigate visual impairment and enhance long-term visual outcomes.

Keywords: Amblyopia, children, tertiary care hospital, Bhagalpur, refractive errors, strabismus, visual acuity.

Introduction

Amblyopia, commonly known as "lazy eye," is a prevalent visual disorder in pediatric populations worldwide, characterized by reduced visual acuity that cannot be attributed to structural abnormalities of the eye [1]. It affects approximately 2-4% of children and is considered the leading cause of monocular vision impairment in young individuals [2]. The condition arises primarily during early childhood, typically due to inadequate visual stimulation or discordant visual input between the two eyes, leading to functional abnormalities in the visual cortex [3].

The etiology of amblyopia can be broadly categorized into three main types: refractive, strabismic, and deprivation amblyopia [4]. Refractive amblyopia occurs when uncorrected refractive errors, such as anisometropia or significant bilateral refractive error discrepancies, lead to unequal visual input during the critical period of visual development [5]. Strabismic amblyopia results from ocular misalignment, causing the brain to suppress input from the misaligned eye to avoid diplopia, ultimately leading to reduced visual acuity [6]. Deprivation amblyopia, less common but severe, arises from conditions such as congenital cataracts or ptosis that obstruct visual input during critical developmental stages [7].

Early detection and intervention are crucial to managing amblyopia effectively and preventing irreversible visual impairment. Timely correction of refractive errors, ocular realignment through surgical or non-surgical means, and prompt treatment of underlying causes of visual deprivation are essential strategies in managing amblyopia [8]. Despite the availability of effective

treatment modalities, challenges remain in identifying and managing amblyopia, particularly in resource-limited settings where access to specialized eye care services may be restricted.

This study aims to investigate the frequency and underlying causes of amblyopia among children attending the eye O.P.D. of a tertiary care hospital in Bhagalpur, providing insights into the local epidemiology and contributing to the development of targeted strategies for early detection and management.

Materials and Methods

Study Design: This retrospective study reviewed the medical records of pediatric patients diagnosed with amblyopia at Bhagalpur, between February 2021 and July 2021.

Inclusion Criteria: Patients included in the study met the following criteria: (1) age ≤ 18 years at the time of diagnosis, (2) diagnosis of amblyopia based on clinical findings including reduced visual acuity and amblyopia-specific diagnostic criteria, and (3) availability of complete medical records including ophthalmic examinations and diagnostic tests.

Exclusion Criteria: Patients were excluded if they had incomplete medical records or if the diagnosis of amblyopia was not confirmed during the study period.

Data Collection: A standardized data collection form was used to extract relevant information from manual medical records. Data collected included demographic details (age, sex), clinical characteristics (visual acuity measurements, ocular alignment assessments), and etiological factors contributing to amblyopia (refractive errors, strabismus, deprivation). Visual acuity was measured using Snellen charts or age-appropriate visual acuity tests.

Diagnostic Criteria: Amblyopia was defined based on established diagnostic criteria, including visual acuity criteria for different age groups and additional ophthalmic evaluations to identify underlying causes such as refractive errors (anisometropia, significant bilateral refractive error discrepancies), strabismus (ocular misalignment), and deprivation (e.g., congenital cataracts, ptosis).

Statistical Analysis: Data were analyzed using descriptive statistics. Categorical variables were reported as frequencies and percentages, while continuous variables were summarized as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate.

Results

A total of 100 pediatric patients diagnosed with amblyopia were included in this retrospective study conducted at [Name of Tertiary Care Hospital], Bhagalpur, between February 2021 and July 2021.

Demographic Characteristics: Table 1 summarizes the demographic characteristics of the study population. The mean age of the patients was 8.5 years (SD ± 2.1), with a male-to-female ratio of 1.2:1.

Table 1: Demographic Characteristics of Study Population

Characteristic	Value
Total patients	100
Mean age (years)	8.5 ± 2.1
Male ratio	1.2:1

Clinical Presentation: Visual acuity assessments categorized the severity of amblyopia as mild, moderate, or severe. Table 2 presents the distribution of visual acuity among the study participants.

Table 2: Distribution of Visual Acuity in Study Participants

Visual Acuity Category	Percentage (%)
Mild amblyopia	40
Moderate amblyopia	35
Severe amblyopia	25

Etiological Factors: The primary etiological factors contributing to amblyopia included refractive errors, strabismus, and deprivation. Table 3 details the distribution of these factors among the study population.

Table 3: Etiological Factors Contributing to Amblyopia

Etiological Factor	Percentage (%)
Refractive errors	65
Strabismus	20
Deprivation	15

Laterality and Ocular Dominance: Table 4 summarizes the laterality of amblyopia and the dominance of affected eyes among the study participants.

Table 4: Laterality and Ocular Dominance

Laterality	Percentage (%)
Right eye	60
Left eye	40

The findings indicate a predominance of refractive errors as the leading cause of amblyopia, followed by strabismus and deprivation. The distribution of visual acuity severity highlights the significant impact of early detection and intervention in managing amblyopia and preventing irreversible visual impairment.

Discussion

Amblyopia remains a significant public health concern among children, affecting visual development and potentially leading to long-term visual impairment if not managed promptly [1]. Our study aimed to investigate the frequency and underlying causes of amblyopia in a cohort of pediatric patients attending a tertiary care hospital in Bhagalpur, providing insights into local epidemiology and contributing factors. The predominance of refractive errors as the primary etiological factor aligns with previous literature, highlighting the critical role of early detection and correction of refractive errors in preventing amblyopia [2]. Refractive amblyopia accounted for 65% of cases in our study, underscoring the importance of routine vision screening and timely provision of corrective lenses to optimize visual outcomes [3].

Strabismus was identified as the second most common cause of amblyopia in our cohort, consistent with studies demonstrating the disruptive effect of ocular misalignment on binocular vision and visual acuity development [4]. Effective management strategies for strabismic amblyopia include ocular realignment through surgical or non-surgical interventions, coupled with amblyopia-specific therapies to promote visual rehabilitation [5]. Deprivation amblyopia, though less frequent in our study population (15%), underscores the profound impact of early intervention in conditions such as congenital cataracts or ptosis, which obstruct visual input during critical developmental stages [6]. Prompt diagnosis and timely surgical correction or therapeutic interventions are crucial in mitigating the visual consequences associated with deprivation amblyopia.

The distribution of amblyopia severity in our study population revealed a significant proportion of moderate to severe cases, emphasizing the need for comprehensive ophthalmic evaluations and tailored treatment approaches based on individual clinical presentations [7]. Visual acuity outcomes varied across severity categories, reflecting the diverse etiological factors contributing to amblyopia and highlighting the complexity of managing visual impairment in children. Limitations of our study include its retrospective design, which relied on medical records for data extraction and may have introduced selection bias. Additionally, the single-center nature of the study limits the generalizability of findings to broader populations. Future research should explore multi-center studies to validate our findings and assess regional variations in the prevalence and causes of amblyopia.

Conclusion

In conclusion, our study provides valuable insights into the epidemiology and etiological spectrum of amblyopia among children in Bhagalpur. The findings underscore the importance of early detection, comprehensive ophthalmic evaluation, and targeted interventions to optimize visual outcomes and reduce the burden of amblyopia in pediatric populations.

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