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Hospital-Based Prevalence and Patterns of Refractive Errors Among Children Aged 6–15 Years in Northern Bangladesh: A Retrospective Analysis of 2015 Clinical Records

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ABSTRACT

Background: Uncorrected refractive error is an important and treatable cause of childhood vision impairment. Historical clinical datasets can provide useful evidence when their sampling frame, diagnostic criteria, and methodological limitations are clearly defined.

Objective: To estimate the hospital-based prevalence of study-defined refractive error and describe the distribution of myopia, hyperopia, and astigmatism among children aged 6–15 years attending Gausul Azam BNSB Eye Hospital, Dinajpur, Bangladesh, with interpretation alongside contemporary Bangladesh evidence.

Methods: This retrospective secondary analysis used aggregate clinical and demographic information documented in the original 2015 thesis. The original study was conducted at Gausul Azam BNSB Eye Hospital, Dinajpur, Bangladesh, from 1 May to 31 August 2015. Among 1,665 assessed children aged 6–15 years, 211 met the documented historical criteria for refractive error. Wilson 95% confidence intervals were calculated from aggregate counts, and a secondary Pearson chi-square test examined the aggregate association between sex and refractive-error category.

Results: Among 1,665 assessed children, 211 met the study-defined criteria for refractive error, corresponding to a hospital-based prevalence of 12.7% (95% CI, 11.2–14.4%). Of the 211 cases, 108 (51.2%) were male, and 103 (48.8%) were female. The reported mean age was 10.5 years; 89 (42.2%) were aged 14–15 years and 164 (77.7%) were aged 10–15 years. Myopia was the most frequently recorded refractive-error type (114, 54.0%; 95% CI, 47.3–60.6%), followed by astigmatism (76, 36.0%; 95% CI, 29.8–42.7%) and hyperopia (21, 10.0%; 95% CI, 6.6–14.7%). The aggregate sex-by-refractive-error distribution was not statistically significant ($\chi^2(2) = 3.94$, $p = .140$).

Conclusion: The hospital-based proportion of study-defined refractive error was 12.7%, with myopia representing the most frequently recorded category. Most identified cases were aged 10–15 years. Because the dataset was historical, hospital-based, and based on aggregate clinical records, the estimate should not be interpreted as contemporary population prevalence. The findings provide a historical clinical reference and support the need for contemporary population-based surveillance using standardized refractive definitions, appropriate examination protocols, and age- and sex-specific denominators.

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Introduction

Refractive error is a common and treatable cause of vision impairment and remains an important public-health concern in childhood. When uncorrected, it can affect visual function, educational performance, and well-being [1]. Myopia, hyperopia, and astigmatism are the principal refractive-error categories considered in this study, and their observed distributions can vary according to age, sex, geography, sampling frame, and examination methods.

Current World Health Organization (WHO) guidance identifies uncorrected refractive error as a leading cause of vision impairment globally and emphasizes access to quality, affordable, people-centred refractive services. WHO Member States have endorsed a global target of a 40-percentage-point increase in effective refractive-error coverage by 2030, supported by the SPECS 2030 framework (World Health Organization [2]. In Bangladesh, WHO reported in August 2026 that the country had formally launched the WHO SPECS 2030 Initiative to strengthen refractive-error services, workforce capacity, affordability, public education, and data systems. The WHO Bangladesh report also cited a 2020 national survey estimate of 48.6% refractive error prevalence excluding presbyopia and spectacle coverage of 26%; these national estimates are not directly comparable with the present child-specific hospital-based estimate because of differences in population, age structure, sampling frame, and study methodology [3].

Global epidemiological evidence shows substantial variation in childhood myopia according to age, ethnicity, geography, urbanicity, and study design [4,5]. Evidence from the Eastern Mediterranean Region similarly demonstrates substantial heterogeneity in childhood myopia according to age, sex, refraction methodology, and study setting [6]. More recent evidence indicates that childhood myopia remains a major and evolving public-health issue, with pooled prevalence and projections varying considerably across regions and demographic groups [7].

Contemporary evidence further demonstrates the continuing relevance of childhood refractive error in Bangladesh. An earlier school-screening study of 4,625 children aged 6–15 years in Narayanganj reported refractive error in 439 children (9.5%), with myopia, hyperopia, and astigmatism all represented [8]. More recently, a school-based study of 3,000 children aged 5–18 years in Sylhet Division reported a refractive-error prevalence of 5.3%, with myopia accounting for most detected cases [9]. A 2026 Bangladesh school-screening report based on 3,268 children aged 4–10 years also reported refractive error in 28.3% of participants, although that study focused primarily on amblyopia and used baseline data from [10]. These estimates are not directly interchangeable because their populations, settings, sampling strategies, age ranges, diagnostic criteria, and examination protocols differ.

Historical hospital-based data nevertheless retain value when their clinical context is clearly defined. They can document patterns observed within eye-care services, provide a historical comparator for later population-based work, and identify refractive-error categories that required clinical attention. Recent Bangladeshi hospital-based evidence also describes refractive-error patterns among pediatric patients, including children with strabismus, reinforcing the clinical relevance of refractive assessment within pediatric ophthalmic services [11].

Age is particularly relevant to the interpretation of childhood refractive error. Myopia may become more prominent during later childhood and adolescence, while the distribution of hyperopia and astigmatism can vary across developmental stages. However, apparent age differences in a hospital series can reflect referral patterns and age-specific healthcare-seeking behaviour as well as underlying epidemiology. Consequently, age-specific counts from a hospital-based series should not be interpreted as age-specific population risk without appropriate denominators.

Measurement methodology is also important. Contemporary standards recommend consistent definitions and thresholds for myopia in clinical and epidemiological studies [12]. In children, cycloplegic refraction can materially influence classification, particularly for hyperopia and lower levels of refractive error; a systematic review concluded that cycloplegic refraction remains important in children, particularly at younger ages [13]. The present manuscript therefore retains the historical case definitions used in the source thesis rather than retrospectively reclassifying cases according to modern thresholds.

Against this background, the present manuscript revisits documented clinical data from Gausul Azam BNSB Eye Hospital, Dinajpur. The original study assessed 1,665 children aged 6–15 years and documented refractive error in 211 children. The present analysis focuses on the distribution of refractive-error types by age and sex and places the historical findings within contemporary childhood vision-care priorities in Bangladesh.

Study Objective

This study aimed to estimate the hospital-based prevalence of study-defined refractive error and describe the distribution of myopia, hyperopia, and astigmatism among children aged 6–15 years attending Gausul Azam BNSB Eye Hospital, Dinajpur, with particular emphasis on age and sex, and to interpret the findings in relation to contemporary Bangladesh evidence and current refractive-error service priorities.

Methods

Study Design

The original study used a hospital-based cross-sectional descriptive design, while the present manuscript represents a retrospective secondary analysis of aggregate clinical and demographic data collected between 1 May and 31 August 2015. The present analysis was designed to estimate the proportion of assessed hospital attendees who met the documented historical refractive-error criteria and to describe the distribution of refractive-error categories; it was not designed to estimate prevalence in the community, region, or nation.

Study Setting

The study was conducted at Gausul Azam BNSB Eye Hospital, Dinajpur, Bangladesh, a secondary/tertiary eye-care facility serving Dinajpur and surrounding areas. The source thesis describes ophthalmic services provided by ophthalmologists, optometrists, ophthalmic nurses, dispensing opticians, and other personnel, including pediatric ophthalmology/strabismus and refraction services.

Study Population

The target population comprised children aged 6–15 years attending the pediatric OPD as new patients during the study period. The source thesis reports 1,665 children assessed, of whom 211 met the documented criteria for refractive error and formed the descriptive analytic group.

Study Period and Source Verification

The participant assessment period was 1 May–31 August 2015. This period is used consistently throughout the present manuscript for the assessment of the 1,665 children included in the reported denominator.

Eligibility Criteria and Historical Definitions

Children aged 6–15 years were eligible when they met the refractive-error criteria documented in the source thesis. The reported visual-acuity criterion was 6/9 or worse. The documented thresholds were myopia of ≥0.50 D; hyperopia of ≥+2.00 D under full cycloplegia or ≥+0.50 D

without cycloplegia; and astigmatism of ≥0.50 D, whether isolated or associated with myopia or hyperopia. Children younger than 6 years, children with visual acuity better than 6/9, those below the specified refractive thresholds, and children with obvious ocular disease other than refractive error that could explain reduced vision or symptoms were excluded.

The historical thresholds were retained as documented in the source thesis and were not retrospectively reclassified according to newer consensus definitions. This approach preserves fidelity to the original clinical dataset while avoiding unsupported reclassification of cases [12].

The available aggregate source tables did not permit independent verification of the participant-level rules used to assign mixed refractive errors to the mutually exclusive categories reported in the original dataset. Accordingly, the present analysis retained the aggregate classification as documented in the source thesis and did not retrospectively reclassify cases.

Data Source and Clinical Assessment

The present manuscript represents a secondary analysis of information documented in the original thesis. The original study used a structured data-collection form containing demographic and clinical variables, including age, sex, school attendance, visual acuity, refractive-error type, spectacle power/prescription, and corrected visual acuity. The thesis describes the use of a retinoscope, ophthalmoscope, torch, cycloplegic eye drops when indicated, Snellen visual-acuity charts, and a trial set with a trial frame. Subjective refraction results were recorded on the data-collection form.

The source materials do not permit participant-level determination of which children underwent cycloplegic refraction. Therefore, the manuscript does not assume universal cycloplegia. This limitation is important because differences between cycloplegic and non-cycloplegic refraction can affect refractive-error classification in children, particularly hyperopia [13].

Clarification of Visual-Acuity Thresholds

The 6/9-or-worse threshold was used in the source thesis as part of the criteria for identifying children with refractive error. Separately, the source thesis defined visual impairment as visual acuity of 6/12 or worse in either eye. These thresholds represent different operational constructs and are not interchangeable. The present manuscript retains both definitions and explicitly distinguishes the refractive-error eligibility criterion from the visual-impairment definition.

Operational Definitions

Refractive error was classified as myopia, hyperopia, or astigmatism according to the definitions and thresholds documented in the original thesis. Dioptre (D) was used as the unit of refractive power. Because the historical definitions differ from some contemporary consensus definitions, the results are interpreted as a description of the original clinical classification rather than as a standardized contemporary epidemiological estimate.

Outcomes

The primary outcome was documented refractive error among children assessed at the study facility. Secondary descriptive outcomes were the distribution of refractive-error categories and their distributions by age group and sex. Age groups were 6–7, 8–9, 10–11, 12–13, and 14–15 years.

Statistical Analysis

The original thesis summarized information using frequencies, percentages, and cross-tabulations. For the present manuscript, aggregate counts were restructured for publication. The overall hospital-based proportion was calculated as 211/1,665. Wilson score 95% CIs were calculated for the overall proportion and refractive-error categories. The association between sex and refractive-error category was evaluated using Pearson's chi-square test on the aggregate 2×3 table; the two-sided significance threshold was $p<.05$. No participant-level regression, adjusted odds ratio, or individual-level age-risk model was performed because the available source material did not contain the raw participant-level dataset. Age-by-type counts were reconstructed arithmetically from reported aggregate male and female tables and were therefore treated as descriptive reconstructed counts.

Ethical Considerations

This retrospective secondary analysis utilized routinely collected Electronic Medical Record (EMR) data from Gausul Azam BNSB Eye Hospital. Permission to access and use the relevant EMR data for research purposes was obtained from the hospital administration. The present analysis involved existing clinical records and did not involve direct participant intervention or collection of new participant data. No separate individual informed consent was obtained for this retrospective analysis. Patient confidentiality and data privacy were maintained throughout the study, and all analyses were conducted using de-identified aggregate information in accordance with applicable institutional policies and ethical principles.

Reporting Framework

Because the study population consisted of children attending an eye hospital, the 12.7% estimate is termed hospital-based prevalence and is defined here as the proportion of assessed hospital attendees who met the documented historical criteria. It is not presented as contemporary population prevalence for northern Bangladesh or Bangladesh as a whole.

Results

Study Population and Hospital-Based Prevalence

During the participant assessment period of 1 May–31 August 2015, 1,665 children aged 6–15 years were assessed at the pediatric OPD. Of these, 211 met the documented historical criteria for refractive error, corresponding to a hospital-based proportion of 12.7% (95% CI, 11.2–14.4%). This estimate represents the proportion of assessed hospital attendees meeting the historical study criteria and should not be interpreted as contemporary population prevalence for northern Bangladesh or Bangladesh as a whole (Table 1)

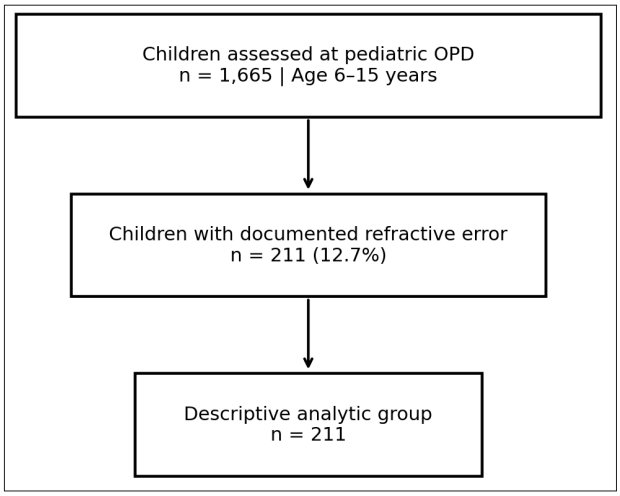


Figure 1: Flow of Children Assessed and Included in the Hospital-Based Refractive-Error Analysis

Figure 1 summarizes the aggregate participant numbers documented in the source thesis. It represents the available historical aggregate data and does not imply participant-level exclusions or a CONSORT-style trial allocation process.

Table 1: Hospital-Based Proportion of Study-Defined Refractive Error Among Assessed Children

Measure	n	%	95% CI
Children assessed	1,665	100.0	—
Refractive error	211	12.7	11.2–14.4%

The 12.7% estimate represents the proportion of assessed children who met the documented historical refractive-error criteria during the study period. Confidence intervals were calculated from aggregate counts using the Wilson score method.

Sex Distribution

Among the 211 children with refractive error, 108 (51.2%) were male and 103 (48.8%) were female, indicating an approximately balanced sex distribution within the identified clinical cases (Table 5).

Age Distribution

The reported mean age was 10.5 years. The largest age group was 14–15 years (89, 42.2%), followed by 12–13 years (40, 19.0%), 10–11 years (35, 16.6%), 6–7 years (29, 13.7%), and 8–9 years (18, 8.5%). Overall, 164 children (77.7%) with documented refractive error were aged 10–15 years (Table 2).

Table 2: Age Distribution of Children with Documented Refractive err#or (n = 211)

Age group (years)	Total n	Total %
6–7	29	13.7
8–9	18	8.5
10–11	35	16.6
12–13	40	19.0
14–15	89	42.2
Total	211	100.0

Percentages are based on the 211 children with documented refractive error and describe the age distribution within the hospital-based case series.

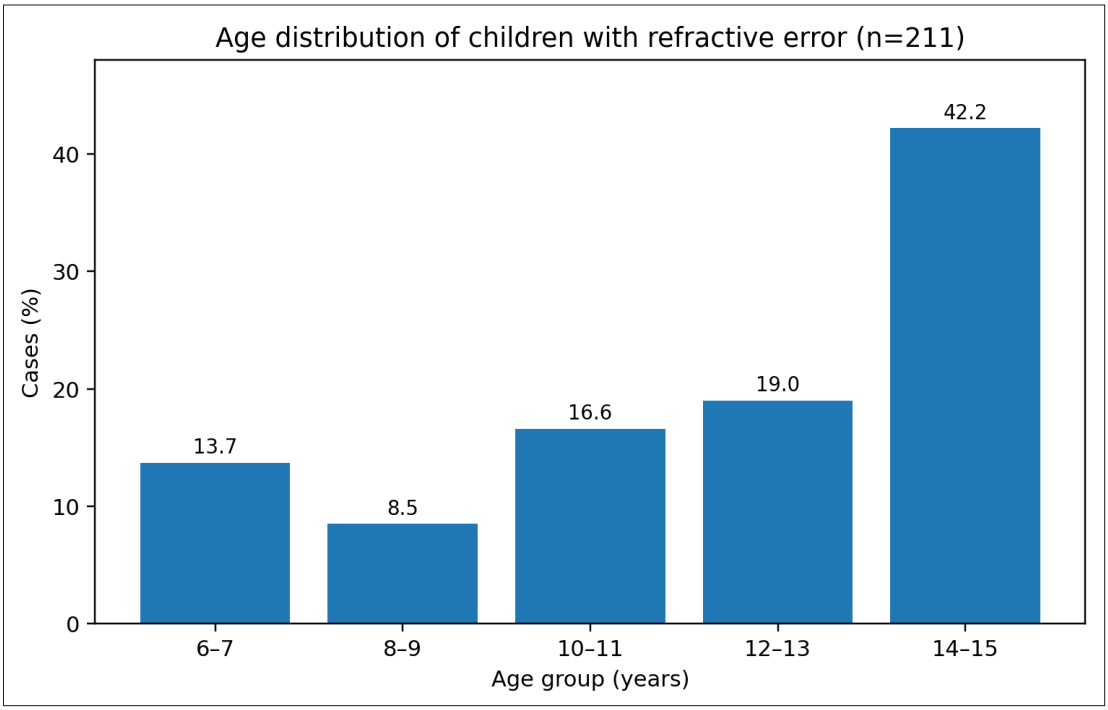


Figure 2: Age Distribution of Children with Documented Refractive Error (n = 211)

Percentages are based on the 211 identified refractive-error cases and describe the distribution of cases within this hospital-based sample; they do not represent age-specific population prevalence.

Distribution of Refractive-Error Types

Myopia was the most frequently recorded refractive-error category, occurring in 114 of 211 cases (54.0%; 95% CI, 47.3–60.6%). Astigmatism accounted for 76 cases (36.0%; 95% CI, 29.8–42.7%), while hyperopia accounted for 21 cases (10.0%; 95% CI, 6.6–14.7%) (Table 3).

Table 3: Distribution of Recorded Refractive-Error Categories Among Children with Documented Refractive Error (n = 211)

Refractive-error type	n	%	95% CI
Myopia	114	54.0	47.3–60.6%
Astigmatism	76	36.0	29.8–42.7%
Hyperopia	21	10.0	6.6–14.7%
Total	211	100.0	—

Percentages are calculated among the 211 children with documented refractive error. Confidence intervals were calculated from aggregate counts using the Wilson score method.

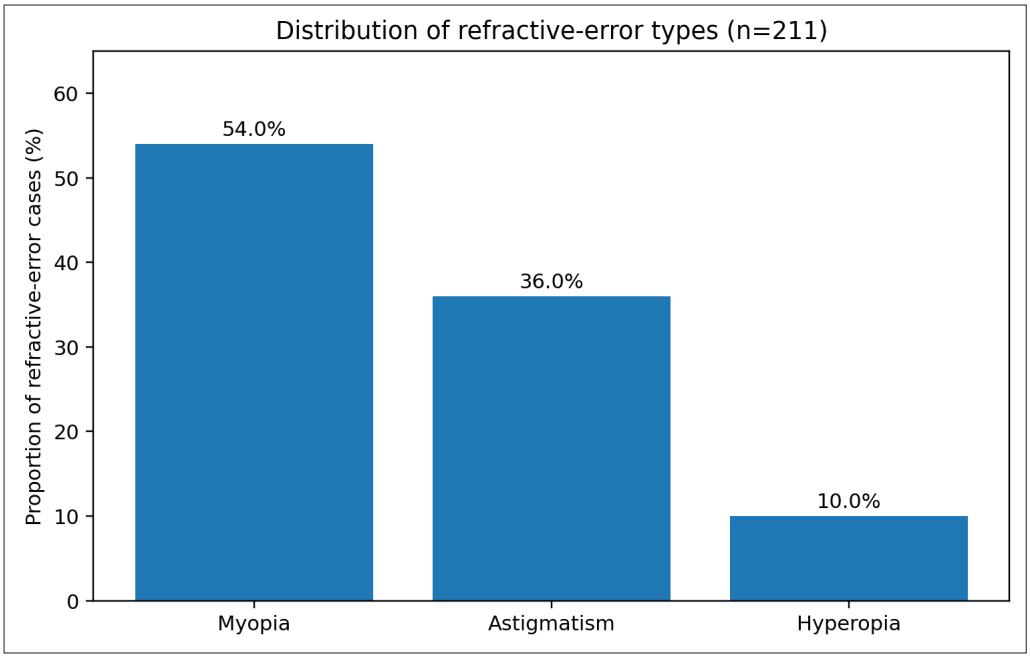


Figure 3: Distribution of Recorded Refractive-Error Categories Among Children with Documented Refractive Error (n = 211)

Percentages are calculated among the 211 identified refractive-error cases. The figure is descriptive and does not represent population prevalence.

Age-Specific Refractive-Error Pattern

The reconstructed age-by-type table showed that myopia accounted for 2 cases in the 6–7-year group, 2 in the 8–9-year group, 23 in the 10–11-year group, 27 in the 12–13-year group, and 60 in the 14–15-year group. Corresponding hyperopia counts were 9, 5, 3, 0, and 4, while astigmatism counts were 18, 11, 9, 13, and 25, respectively.

Table 4: Reconstructed Descriptive Age-Specific Distribution of Recorded Refractive-Error Categories Among Children with Documented Refractive Error (n = 211)

Age group (years)	Myopia n	Hyperopia n	Astigmatism n	Total n
6–7	2	9	18	29
8–9	2	5	11	18
10–11	23	3	9	35
12–13	27	0	13	40
14–15	60	4	25	89
Total	114	21	76	211

Age-by-type counts were reconstructed arithmetically from the reported male and female aggregate tables. These are descriptive reconstructed counts rather than independently verified participant-level observations and were not used for inferential testing of age trends.

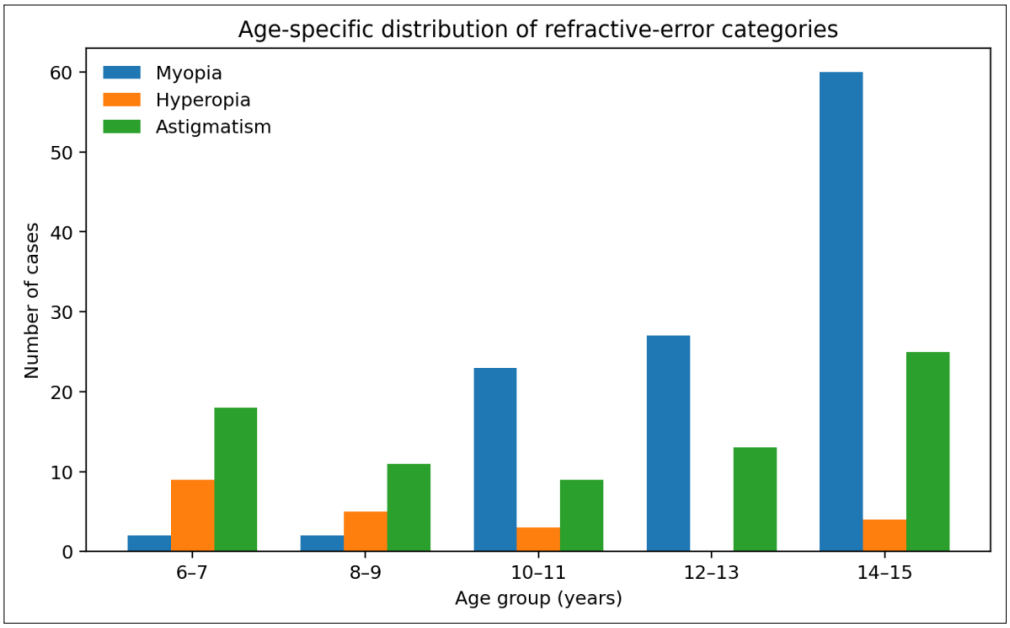


Figure 4: Reconstructed Descriptive Age-Specific Distribution of Recorded Refractive-Error Categories Among Children with Documented Refractive Error

Age-by-type counts were reconstructed from aggregate source tables. The figure is descriptive and should not be interpreted as evidence of a statistically tested age trend or age-specific population risk.

Sex-Specific Refractive-Error Pattern

Among male children with documented refractive error, 52 (48.1%) had myopia, 14 (13.0%) had hyperopia, and 42 (38.9%) had astigmatism. Among female children, 62 (60.2%) had myopia, 7 (6.8%) had hyperopia, and 34 (33.0%) had astigmatism. Pearson's chi-square test of the aggregate sex-by-refractive-error table was not statistically significant ($\chi^2(2) = 3.94$, $p = .140$).

Table 5: Sex-Specific Distribution of Refractive-Error Categories Among Children with Documented Refractive Error (n=211)

Sex	Myopia n (%)	Hyperopia n (%)	Astigmatism n (%)	Total
Male	52 (48.1)	14 (13.0)	42 (38.9)	108 (100.0)
Female	62 (60.2)	7 (6.8)	34 (33.0)	103 (100.0)

Percentages are calculated within sex. Pearson's chi-square test: $\chi^2(2) = 3.94$, $p = .140$. This secondary manuscript-level analysis was based on aggregate counts rather than the original participant-level dataset.

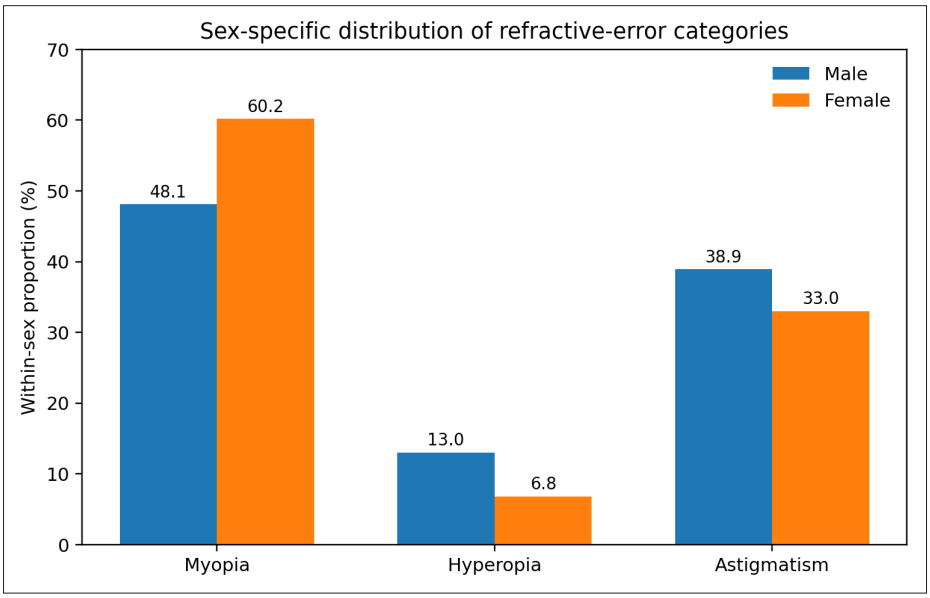


Figure 5: Sex-Specific Distribution of Recorded Refractive-Error Categories among Children with Documented Refractive Error

Percentages are calculated within sex. The Pearson chi-square result represents a secondary manuscript-level analysis based on aggregate counts.

Discussion

The principal finding of this historical hospital-based study is that 211 of 1,665 children assessed during the documented participant assessment period met the study-defined criteria for refractive error, corresponding to a hospital-based prevalence of 12.7% (95% CI, 11.2–14.4%). In this manuscript, prevalence is used in a denominator-specific clinical sense: the proportion of assessed hospital attendees meeting the documented criteria. Because children presenting to an eye hospital are not a random sample of the community, this estimate should not be interpreted as a contemporary population prevalence for northern Bangladesh.

The refractive-error profile was dominated by myopia (54.0%), followed by astigmatism (36.0%) and hyperopia (10.0%). The predominance of myopia is compatible with broader evidence that myopia becomes more common during childhood and adolescence, although the magnitude of prevalence varies substantially by geography, age, population, and methodology [4-7]. The 36.0% contribution of astigmatism is also clinically relevant because screening and service pathways that focus only on spherical refractive errors may fail to identify children requiring optical correction.

The predominance of myopia is broadly consistent with recent Bangladesh school-based evidence [8]. reported that myopia accounted for most detected refractive-error cases among 3,000 school-going children aged 5–18 years in Sylhet Division. However, the proportion of myopia in that study and the present study should not be interpreted as evidence of a temporal change because the studies differed in sampling frame, age distribution, referral pathways, diagnostic thresholds, and refraction methodology.

The age distribution showed that 42.2% of identified cases were aged 14–15 years and 77.7% were aged 10–15 years. This concentration is compatible with the established observation that myopia can become more prominent during later childhood and adolescence. However, the present dataset does not provide age-specific denominators for all assessed children and does not contain participant-level observations. Therefore, the concentration of identified cases among older age groups cannot be interpreted as evidence that older age independently increases the risk of refractive error.

The reconstructed age-by-type table suggested that myopia was increasingly represented in older age groups, whereas hyperopia was more concentrated in younger groups and astigmatism was distributed across the age categories. These observations are descriptive and hypothesis-generating rather than inferential. The age-by-type counts were reconstructed arithmetically from aggregate male and female tables and should not be treated as independently verified participant-level observations.

The sex distribution of identified cases was approximately balanced. Within sex, myopia represented 48.1% of male cases and 60.2% of female cases, while astigmatism represented 38.9% and 33.0%, respectively. The secondary aggregate chi-square analysis did not demonstrate a statistically significant association between sex and refractive-error category ($\chi^2(2)=3.94$, $p=.140$). Because this analysis was based on aggregate counts rather than participant-level data, it should be interpreted as supplementary descriptive evidence rather than as a definitive assessment of sex-related epidemiological differences.

Measurement methodology is an important consideration when interpreting historical childhood refractive-error data. The source thesis indicates that cycloplegic eye drops were used when indicated but does not permit participant-level determination of which children underwent cycloplegic refraction. Differences between non-cycloplegic and cycloplegic refraction can influence classification, particularly for hyperopia and lower levels of refractive error [13]. The present manuscript therefore retains the historical case definitions and does not retrospectively reclassify cases according to newer consensus thresholds [12].

The historical nature of the dataset is both a limitation and a source of value. Although the data were collected in 2015, they provide a documented clinical snapshot from northern Bangladesh that can complement subsequent population-oriented research. Rather than serving as a contemporary regional prevalence estimate, the study provides a historical clinical reference against which later Bangladesh evidence can be interpreted, provided that differences in setting, sampling, age structure, and examination methods are explicitly considered.

Recent Bangladesh evidence provides an important contemporary context for interpreting the historical hospital-based findings [8]. reported refractive error in 439 of 4,625 schoolchildren aged 6–15 years (9.5%) in a school-screening program in Narayanganj [9]. More recently reported a refractive-error prevalence of 5.3% among 3,000 school-going children aged 5–18 years in Sylhet Division, with myopia accounting for most detected cases.

Contemporary Bangladesh Context

The 12.7% hospital-based prevalence in the present study and the 5.3% school-based estimate from Sylhet should not be directly compared as evidence of temporal change. The two studies differ in sampling frame, healthcare-seeking status, age range, geographic setting, eligibility criteria, and refractive-assessment methods. The appropriate interpretation is that they describe refractive error in different populations and settings. A 2026 Bangladesh school-screening report based on 3,268 children aged 4–10 years reported refractive error in 28.3% of participants, although its principal focus was amblyopia and its baseline data were from 2014; this estimate is likewise not directly interchangeable with the present hospital-based estimate.

Recent pediatric hospital-based evidence also reinforces the clinical relevance of refractive assessment [11]. described refractive-error patterns among 235 pediatric patients aged 6–18 years with strabismus attending Bangladesh Medical University Hospital, based on records from 2021–2022. This evidence is clinically complementary rather than a direct prevalence comparator for the present dataset.

Bangladesh's national eye-health policy environment has also evolved since the 2015 data were collected. The World Health Organization reported in August 2026 that Bangladesh formally launched the WHO SPECS 2030 Initiative to expand access to quality and affordable refractive-error services and strengthen services, personnel, education, cost, surveillance, data, and research systems [3]. The same WHO report cited a 2020 national survey estimate of 48.6% refractive error prevalence excluding presbyopia and spectacle coverage of 26%. That national estimate has a different population structure and age composition and should therefore be interpreted as contextual national evidence rather than a direct comparator for this child-specific hospital-based study.

Taken together, the historical clinical data and contemporary Bangladesh evidence support the continuing relevance of childhood refractive-error services while highlighting substantial heterogeneity across populations. The historical dataset is therefore best positioned as a clinical reference point that complements, rather than substitutes for, contemporary population-based surveillance.

Table 6: Contextual Comparison with Selected Bangladesh Childhood Refractive-Error Studies

Study	Year	Age	Setting	Sample	RE estimate	Main limitation for comparison
Present study	2015	6–15	Hospital	1,665	12.7%	Hospital-based; historical criteria
Rahman et al.	[7]	6–15	School	4,625	9.5%	Different screening methodology
Hussain et al.	[8]	5–18	School	3,000	5.3%	Different age/setting/methodology

Estimates are shown for contextual comparison only and are not directly interchangeable because the studies differ in population, sampling frame, setting, age range, case definitions, and examination methodology.

Strengths and Limitations

Strengths

The study includes a relatively large clinical assessment group of 1,665 children and provides a clearly documented descriptive distribution of refractive-error categories.

The dataset covers children aged 6–15 years and provides information on sex and age groups, allowing clinically useful descriptive stratification.

The manuscript explicitly distinguishes hospital-based prevalence from population prevalence and identifies the limitations associated with historical aggregate data.

The study contributes historical clinical evidence from northern Bangladesh that can be interpreted alongside contemporary population-based evidence.

The revised manuscript explicitly distinguishes the historical refractive-error thresholds from contemporary standardized definitions and avoids unsupported retrospective reclassification.

Limitations

The hospital-based cross-sectional design limits generalizability. Children attending an eye hospital may differ systematically from children in the community, so the 12.7% proportion cannot be interpreted as national or regional population prevalence.

The historical dataset was collected during the participant assessment period of 1 May–31 August 2015. The finalized manuscript uses this period consistently for the reported denominator.

The available materials contain aggregate tables rather than the complete participant-level dataset. Consequently, adjusted regression, participant-level risk-factor analysis, age-specific prevalence, and other advanced inferential analyses cannot be performed reliably.

The age-by-type counts used in this manuscript are reconstructed from aggregate male and female tables and therefore should be interpreted descriptively.

The source thesis does not permit participant-level determination of cycloplegic status. This limits direct comparability with studies using standardized cycloplegic refraction.

The 6/9 eligibility threshold and the 6/12 visual-impairment definition were retained as separate historical operational criteria; they should not be interpreted as interchangeable.

Longitudinal information is unavailable; the study cannot estimate myopia progression or changes in refractive status over time.

The institutional ethics-review status and any applicable approval, exemption, or waiver reference should be verified against the records of the responsible institution before final submission.

Public Health Implications

The findings support the importance of accessible childhood refractive services that move beyond visual-acuity detection to comprehensive refractive assessment and appropriate spectacle provision. The contribution of both myopia and astigmatism indicates that children identified through screening should have access to confirmatory refraction rather than a single-category screening approach. Screening should be linked to confirmatory eye examination, accurate refractive assessment, spectacle dispensing, follow-up, and mechanisms for ophthalmic referral when indicated [14]. Evidence from underserved communities in Bangladesh has also demonstrated a substantial burden of ocular morbidity among children and highlighted barriers to accessing appropriate eye-care services [15].

The concentration of identified cases among children aged 10–15 years supports continued attention to vision screening and referral pathways throughout the school years. WHO guidance emphasizes the importance of structured school-age vision screening programmes to facilitate early identification of children with vision problems and timely access to appropriate assessment and [16]. These priorities are consistent with WHO SPECS 2030, which emphasizes Services, Personnel, Education, Cost, and Surveillance as interconnected components of effective refractive-error coverage. Contemporary Bangladesh surveillance would benefit from population-based or school-based sampling, standardized age-specific case definitions, clearly documented cycloplegic protocols where appropriate, participant-level data, and age- and sex-specific denominators.

Such designs would permit valid estimation of current childhood prevalence, identification of associated factors, assessment of spectacle coverage, and monitoring of geographic and temporal variation. The present historical hospital-based dataset cannot provide these estimates, but it contributes a clinical reference that can help contextualize later population-based evidence.

Conclusion

This historical hospital-based study documented refractive error in 211 of 1,665 children aged 6–15 years assessed at Gausul Azam BNSB Eye Hospital, Dinajpur, during 1 May–31 August 2015. The hospital-based prevalence of study-defined refractive error was 12.7%, with myopia the most frequently recorded refractive-error type, followed by astigmatism and hyperopia. Most identified cases were aged 10–15 years, while the sex distribution was approximately balanced. The 12.7% estimate should be interpreted as a hospital-based prevalence among assessed attendees rather

than as a contemporary population prevalence for northern Bangladesh. In the context of recent Bangladesh school-based evidence and the country's current SPECS 2030 agenda, the findings support continued refractive-error service provision and the need for contemporary population-based surveillance using standardized definitions, appropriate cycloplegic protocols, participant-level data, and age- and sex-specific denominators.

Declarations

Ethics Approval and Consent to Participate

This retrospective study utilized routinely collected Electronic Medical Record (EMR) data from Gausul Azam BNSB Eye Hospital. Permission to access and use the relevant EMR data for research purposes was obtained from the hospital administration. As the study involved secondary analysis of existing clinical records and did not require direct participant intervention, no separate individual informed consent was obtained. Patient confidentiality and data privacy were strictly maintained throughout the study, and all analyses were conducted using de-identified data in accordance with applicable institutional policies and ethical principles.

Consent for Publication

Not applicable. This manuscript presents only aggregate, non-identifiable data derived from routinely collected electronic medical records. No individual patient information, images, or other identifiable personal data are included in the manuscript.

Availability of Data and Materials

The dataset analyzed in this study was derived from routinely collected electronic medical records and is not publicly available because of institutional data-privacy and confidentiality requirements. De-identified aggregate data may be available from Gausul Azam BNSB Eye Hospital upon reasonable request and subject to institutional authorization and applicable data-protection requirements.

Competing Interests

The authors declare no competing interests.

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Author Contributions

Mohammad Mizanur Rahman: Conceptualization, methodology, data curation, formal analysis, investigation, writing—original draft, writing, review and editing.

Md. Anowarul Sa'dat Prodhan: Data collection, investigation, and review of the manuscript.

Md Zahangir Alam: Data collection, investigation, and review of the manuscript.

Mohd Zaki Awg Isa: Supervision, methodology, interpretation of findings, critical review, and final approval of the manuscript.

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