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Prevalence of Ocular Morbidity and Refractive Errors among School-going Children in Unnat Bharat Abhiyan Villages, Raigad Maharashtra: A Cross-sectional Study

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KEYWORDS

Ocular morbidity, Refractive errors, School children, Unnat Bharat Abhiyan, Tribal, School eye screening.

ABSTRACT:

Background: Childhood ocular morbidity, especially untreated refractive defects is a major worldwide public health concern. There is little data from underprivileged tribal populations, and prevalence varies greatly throughout India. The purpose of this study was to determine how common ocular morbidity and refractive errors were among school-age children in rural communities in the Raigad region of Maharashtra that were part of the Unnat Bharat Abhiyan (UBA) program.

Methods: A cross-sectional, school-based study was conducted from March 2024 to February 2025 in five UBA villages. A total of 213 children aged 6–16 years underwent a comprehensive three-phase ocular examination, including visual acuity assessment, slit-lamp evaluation, and refraction. Socioeconomic status was classified using the Kuppuswamy scale. Data were analyzed using descriptive statistics and the Chi-square test.

Results: The overall prevalence of ocular morbidity was 30.0% (64/213). Refractive error was the most common condition, affecting 11.3% (24/213) of children, followed by conjunctivitis (4.7%), squint (3.8%) and nystagmus (2.8%). Vitamin A deficiency was observed in 1.9% (4/213) of children. The highest prevalence of refractive error was in the 14–16 years age group (14.3%). The majority of participants belonged to the upper-lower socioeconomic class (72.8%). No statistically significant association was found between ocular morbidity and age group, gender or socioeconomic class. Anterior segment findings, primarily benign pigmentary variations like perilimbal conjunctival melanosis (38.5%) were common.

Conclusions: Nearly one-third of pupils in these rural regions suffer from a high burden of ocular morbidity, according to the study. In order to prevent preventable childhood blindness, there is an urgent need for focused, school-based screening programs and nutritional treatments in underprivileged groups due to the prevalence of easily curable diseases including vitamin A deficiency and refractive errors.

1. Introduction

Vision impairment in childhood is a major global health concern. It is estimated that nearly 19 million children worldwide are visually impaired of whom 1.4 million are blind and uncorrected refractive error (URE) constitutes the leading cause of this burden affecting approximately 12 million children globally [1]. In India, refractive errors are a particularly important cause of visual morbidity. A recent systematic review and meta-analysis reported the prevalence of refractive error in Indian children to be 8.0% in population-based studies and 10.8% in school-based studies [2]. However, regional studies show wide variability, reflecting differences in methodology urban–rural distribution and socio-demographic factors. For example, Srivastava *et al*. reported a prevalence of 17.4% overall with significantly higher rates in urban schools (22.1%) compared to rural schools (12.7%) [3], whereas a study in Andhra Pradesh documented a lower prevalence of 6.41% (7.61% urban vs. 5.21% rural) [4]. These

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findings suggest refractive error prevalence in India may range from 6% to over 20%, with consistently higher rates in urban populations [2–4].

In addition to refractive problems, it has been estimated that 20–25% of Indian school children have total ocular morbidity. In Uttarakhand, an extensive population-based survey revealed that 23.2% of children had at least one ocular ailment with refractive error being the most prevalent (18.5%) [5]. Similar to this, a study conducted in Aligarh, North India found that the prevalence of ocular morbidity was 21.9% (22.4% in urban schools and 21.3% in rural ones), with refractive error being the primary cause and vitamin A deficiency coming in second [6]. Comparable findings were observed in rural Karnataka, where 20.1% of schoolchildren had ocular morbidity and 17.1% were affected by refractive errors [7]. Thus, while refractive errors consistently account for the majority of pediatric ocular morbidity, nutritional deficiencies (especially vitamin A deficiency), strabismus and infections contribute substantially to the remaining burden [6,7].

Socio-economic and geographic disparities in ocular health are also evident. Urban children are disproportionately affected by refractive errors, particularly myopia, compared to rural peers [2,3]. However, overall ocular morbidity rates (including all causes) may not differ significantly between urban and rural settings [6]. In contrast, tribal and socio-economically disadvantaged populations exhibit a different morbidity profile, often with higher rates of nutritional ocular problems. For instance, a study among tribal children in Tamil Nadu's Jawadhi Hills found that although only 10.8% of children had ocular morbidity, nearly half of these were due to vitamin A deficiency, while 25% were refractive errors [8]. Similarly, the Tribal Odisha Eye Disease Study (TOES) in Rayagada district reported a 9.7% prevalence of refractive errors, predominantly myopia and astigmatism [9-10]. These data suggest that nutritional deficiencies remain a critical contributor to childhood vision impairment in tribal communities, which comprise nearly 8–9% of India's population and often lack access to adequate eye care services.

In conclusion, between one-fifth and one-quarter of Indian schoolchildren suffer from ocular morbidity; the most common cause is refractive errors, which are followed by nutritional and other problems [5–7]. Refractive error alone has a wide regional variation in prevalence, ranging from roughly 6% to over 20% [3, 4]. Despite this, there are still a lot of unanswered questions about the combined burden of nutritional, refractive, and other ocular morbidities in Maharashtra's tribal areas [11]. The Raigad district in Maharashtra, home to a significant tribal population, has limited data on the combined burden of nutritional and ocular morbidities. This gap in knowledge hinders the development of targeted interventions to address these health issues effectively. Therefore, this study aims to assess the prevalence of ocular morbidity and refractive errors among school-going children in Unnat Bharat Abhiyan (UBA) villages in Raigad district. UBA is a flagship program initiated by the Ministry of Education to involve higher educational institutions in the sustainable development of rural areas, leveraging their expertise to address local challenges [12]. By conducting this cross-sectional study, we seek to provide comprehensive data on the ocular health status of children in these communities. The findings will inform the design of targeted health interventions and contribute to the broader objectives of UBA in enhancing the well-being of rural populations.

2. Objectives

1. To estimate the prevalence of ocular morbidity among school-going children in Unnat Bharat Abhiyan villages of Raigad district, Maharashtra.
2. To identify the various types of ocular morbidities affecting the study population.
3. To determine the association between ocular morbidity and demographic variables such as age, gender, and socioeconomic status.

3. Methods

Materials

Study Design and Setting: This was a prospective, cross-sectional, school-based observational study conducted in the rural villages adopted by Mahatma Gandhi Mission Institute of Health Sciences, Navi Mumbai, under the Unnat Bharat Abhiyan (UBA) scheme. The study was carried out over a period of March 2024 – Feb 2025 following approval from the institutional ethics committee. The research setting encompassed a cluster of five villages Dhamani, Dhodani, Dehrang, Tawarwadi and Waghachi wadi along with their satellite habitats, covering the entire Maldunge Gram Panchayat of Panvel Tehsil in Raigad

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District, Maharashtra, India. These villages represent underserved rural areas with limited access to eye care services, making them an appropriate setting for assessing ocular health among school-going children.

Study Population: The study population consisted of all school-going children aged 6–16 years enrolled in primary and secondary schools located in the selected UBA villages. Children attending school during the study period were screened after obtaining informed consent from their parents or guardians.

Sample Size and Sampling Technique

A total of 213 school-going children aged 6–16 years were recruited for the study. To ensure comprehensive coverage of the target population and minimize selection bias, universal sampling was employed wherein all children from the identified schools who met the inclusion criteria were included. This approach was adopted to obtain a representative sample of the school-going children population in the Unnat Bharat Abhiyan villages.

Age Group Classification: For analytical purposes, the study participants were categorized into three age groups corresponding to different stages of schooling. Group A comprised children aged 6–9 years representing early primary school, Group B included children aged 10–13 years corresponding to middle school and Group C consisted of children aged 14–16 years representing high school. This classification facilitated meaningful comparison of ocular health patterns across different developmental stages and educational levels.

Inclusion and Exclusion Criteria: Children were eligible for participation if they were aged between 6 and 16 years, enrolled in primary or secondary schools in the selected UBA villages, and had provided informed consent from parents or guardians along with assent from older children. Willingness to participate and cooperate with the complete examination procedures was also required.

Children were excluded from the study if they were below 6 years or above 16 years of age, if their parents or guardians refused consent, or if they were non-consenting themselves. Uncooperative or hostile children who could not undergo the complete examination protocol were also excluded. Additionally, children with known systemic illnesses associated with cortical visual impairment (such as cerebral palsy) and those diagnosed with attention deficit hyperactivity disorder (ADHD) or dyslexia that could potentially interfere with examination accuracy were not included in the study.

Data Collection Instruments and Procedures

A three-phase screening protocol was followed for comprehensive ocular assessment. All examinations were performed by trained Optometrists and Ophthalmologists using standardized techniques and calibrated instruments.

Phase 1: Preliminary Assessment: For the purpose to record demographic data, existing complaints, and pertinent medical and ocular history was taken at this phase. Snellen charts were used to test distance visual acuity under standard illumination. Each eye's unaided, aided (if appropriate) and pinhole visual acuities were noted. Ishihara pseudoisochromatic plates were used to measure color vision and the cover test was used to identify manifest or latent strabismus at both distance and near fixation.

Phase 2: Refractive and Anterior Segment Evaluation: Objective refraction was performed using a Nidek Autorefractometer and Streak Retinoscopy under standard conditions. Anterior segment evaluation was conducted using a torchlight to detect abnormalities of the lids, conjunctiva, cornea, iris and lens. Subjective refraction was performed for children with uncorrected refractive errors or those using spectacles to determine the optimal correction.

Phase 3: Posterior Segment and Comprehensive Assessment: Fundus examination was performed using direct ophthalmoscope to evaluate the vitreous, retina and optic nerve head. All anterior segment findings were documented systematically for each participant.

Socioeconomic Assessment: Socioeconomic status of the participants' families was assessed using the updated Kuppuswamy socioeconomic scale, which incorporates three key variables: education and occupation of the head of the family along with total monthly family income.

Ocular Morbidity Definition: For the purpose of this study, ocular morbidity was defined as the presence of any abnormality affecting the eye or visual system. This encompassed a comprehensive range of conditions including refractive errors (myopia, hypermetropia and astigmatism), strabismus, conjunctival disorders such as

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conjunctivitis, pinguecula, pterygium, corneal opacities, lid abnormalities, colour vision deficiencies and various fundus pathologies. Children diagnosed with any of these conditions during the comprehensive ocular examination were classified as having ocular morbidity.

Ethical Considerations: The Institutional Ethics Committee of MGMIHS approved the study, which was carried out in compliance with the Declaration of Helsinki (Approval No. MGMIHS/R&D/ECRHS/03/2024/199, dated 16 January 2024). Parents or legal guardians provided written informed consent and children over the age of seven provided assent. Information about participants was kept private and participation was entirely voluntary with the option to stop at any moment. For additional assessment and treatment, children with ocular disorders were referred to MGM Hospital's tertiary eye care centre in Kamothe

Statistical Analysis: Data were entered into Microsoft Excel and analyzed. Descriptive statistics were employed to summarize demographic and clinical characteristics. Categorical variables (gender, socioeconomic class, presence of ocular morbidity) were presented as frequencies and percentages.

4. Results

Demographic and Anthropometric Characteristics: A total of 213 school-going children aged 6–16 years were included in the study. The mean age of the participants was 11.03 ± 3.02 years, with a median of 11 years (IQR: 9–14). Of the total participants, 118 (55.4%) were females and 95 (44.6%) were males. The mean height and weight were 132.82 ± 15.09 cm and 28.37 ± 10.29 kg respectively. The mean BMI z-score was −0.80 ± 0.98 (Table 1).

Table 1. Demographic and anthropometric characteristics of study participants (N = 213)

Variable	Value
Age (years), mean ± SD	11.03 ± 3.02
Female, n (%)	118 (55.4)
Male, n (%)	95 (44.6)
Height (cm), mean ± SD	132.82 ± 15.09
Weight (kg), mean ± SD	28.37 ± 10.29
BMI z-score, mean ± SD	−0.80 ± 0.98

Age and Sex Distribution: The age and sex distribution of the study participants is presented in Table 2. The largest proportion of children belonged to the 10–13 years age group (85 children; 39.9%) followed by the 6–9 years group (72 children; 33.8%) and the 14–16 years group (56 children; 26.3%). Females outnumbered males in all age groups except the 6–9 years group where the distribution was equal. The overall female-to-male ratio was 1.2:1.

Table 2. Distribution of Study Subjects according to Age and Sex

Age (years)	Male (n)	Male (%)	Female (n)	Female (%)	Total (n)	Total (%)
6–9 yrs.	36	50	36	50	72	33.8
10–13 yrs.	41	48.2	44	51.8	85	39.9
14–16 yrs.	20	35.7	36	64.3	56	26.3
Total	**97**	**45.5**	**116**	**54.5**	**213**	**100**

Prevalence and Pattern of Ocular Morbidity: Overall, ocular morbidity was detected in 64 children, yielding a prevalence of 30.0%, while 149 children (69.9%) had no detectable ocular abnormality (Table.3). Among those with ocular morbidity, refractive error was the most common condition, affecting 24 children (11.3% of the total study population). Other ocular morbidities identified included conjunctivitis (4.7%), squint (3.8%), nystagmus (2.8%), and vitamin A deficiency (1.9%). Less frequent conditions included amblyopia, conjunctival nevus, dry eye, chalazion, color vision deficiency and congenital miotic pupil, each affecting less than 2% of the study population shown in Figure.1.

Table 3. Distribution of ocular morbidity among school-going children

Ocular Morbidity	Frequency (n)	Percent (%)
Refractive Error	24	11.27
Conjunctivitis	10	4.69
Squint	8	3.76
Nystagmus	6	2.82
Vitamin A Deficiency	4	1.88
Conjunctival nevus	3	1.41

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Amblyopia	3	1.41
Dry eye	2	0.94
Chalazion	2	0.94
Colour vision deficiency	1	0.47
Congenital Miotic Pupil	1	0.47
Normal	149	69.95
Total	**213**	**100**

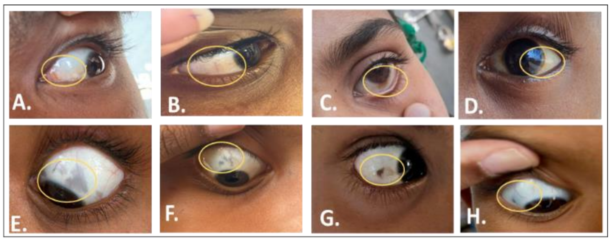

Figure 1: Representation of anterior segment photographs of conjunctival pigmentation findings (A, B) Vit. A deficiency (C, D) Perilimbal Conjunctival Melanosis (E, F) Scleral Melanocytosis, (G, H) Conjunctival Naevus.

Age-wise Distribution of Refractive Error: Table. 4 presents the distribution of refractive errors across different age groups. The highest prevalence of refractive error was observed in the 14–16 years age group (14.3%), followed by the 6–9 years group (12.3%) and the 10–13 years group (8.3%). Overall, refractive error was present in 24 children (11.3%) and absent in 189 children (88.7%).

Table 4. Age-wise distribution of refractive error

Age Group (Years)	Refractive Error Present		Refractive Error Absent		Total (n)
	n	%	n	%	
06-09	9	12.3	64	87.7	73
10-13	7	8.3	77	91.7	84
14-16	8	14.3	48	85.7	56
Total	**24**	**11.3**	**189**	**88.7**	**213**

Distribution of Other Ocular Morbidities: Some of the 64 children with ocular morbidity had more than one disease. Ten children (4.7% of the entire population) had conjunctivitis, which was the second most prevalent morbidity after refractive error. Eight children (3.8%) had squint, while six children (2.8%) had nystagmus. Four children (1.9%) had vitamin A insufficiency, which clinically showed up as conjunctival xerosis or Bitot's spots. The remaining morbidity was caused by other disorders such as amblyopia (3 children), conjunctival nevus (3 children), dry eye (2 children), chalazion (2 children), colour vision deficit (1 child), and congenital miotic pupil (1 child).

Association of Age and Gender with Ocular Morbidity: Chi-square analysis showed no significant association between age group and ocular morbidity ($\chi^2 = 3.10$, $p = 0.54$). Gender was also not associated with ocular morbidity ($\chi^2 = 0.00$, $p = 1.00$). Logistic regression indicated a gradual increase in odds of ocular morbidity with increasing age (OR = 1.05 per year; 95% CI: 0.94–1.17) and slightly higher odds among males (OR = 1.05; 95% CI: 0.58–1.90); however, these findings were not statistically significant (Table 6).

Table 5. Association of age group and gender with ocular morbidity

Variable	Category	Ocular Morbidity Present (n)	Ocular Morbidity Absent (n)	χ^2	p-value
Age Group	6–9 years	20	52	3.1	0.54
	10–13 years	24	61		
	14–16 years	20	36		
Gender	Male	29	66	0	1
	Female	35	83		

Socioeconomic Status Distribution: The majority of participants belonged to the upper-lower socioeconomic class (Class IV), accounting for 155 children (72.77%), followed by the lower-middle class (Class III) with 53 children (24.88%). A small proportion of children were from the lower class (Class V) (3 children; 1.41%) and the upper-middle class (Class II) (2 children; 0.94%). No children belonged to the upper class (Class I) (Table 7).

Table 6. Distribution of Socioeconomic Class Among Study Participants

Socioeconomic class	Frequency (n)	Percentage (%)
Upper middle (II)	2	0.94
Lower middle (III)	53	24.88
Upper lower (IV)	155	72.77
Lower (V)	3	1.41
Total	**213**	**100**

Association between Socioeconomic Class and Ocular Morbidity: The chi-square test revealed no statistically significant association between socioeconomic class and ocular morbidity (χ^2 = 5.24, df = 3, p = 0.15). The Cramer's V value of 0.16 indicated a weak association, suggesting that socioeconomic status did not significantly influence ocular morbidity in the present study population (Table.7).

Table 7. Association between socioeconomic class and ocular morbidity

Variable	χ^2	df	p-value	Cramer's V
Socioeconomic class	5.24	3	0.15	0.16

Anterior Segment Findings: Slit lamp examination revealed various pigmentary and non-pigmentary findings in the study population. Perilimbal conjunctival melanosis (PCM) was the most common finding, observed either alone or in combination with other conditions. Isolated PCM was present in 82 children (38.5%), while isolated scleral melanocytotic (SM) was noted in 18 children (8.5%). Yellow sclera (YS) was observed as an isolated finding in 29 children (13.6%). Combinations of these findings were also common, with PCM + YS being the most frequent combination, seen in 27 children (12.7%), followed by PCM + SM in 16 children (7.5%). Normal anterior segment findings were observed in 21 children (9.9%), while other non-pigmentary findings were present in 7 children (3.3%) (Table.8).

Table 8. Distribution of slit lamp findings among study participants

Slit Lamp Finding	Number of Patients	Percentage (%)
Perilimbal Conjunctival Melanosis (PCM)	82	38.5
Yellow Sclera (YS)	29	13.6
Scleral Melanocytosis (SM)	18	8.5
PCM + YS	27	12.7
PCM + SM	16	7.5
SM + YS	8	3.8
PCM + SM + YS	5	2.3
Conjunctival nevus	3	1.4
Normal	21	9.9
Other Non-Pigmentary Findings	7	3.3
Total	**213**	**100**

According to this study, over one-third (30.0%) of school-age children in Unnat Bharat Abhiyan communities had some kind of ocular morbidity. The most frequent disease was refractive errors (11.3%), which were followed by conjunctivitis (4.7%), squint (3.8%), and nystagmus (2.8%). Age, gender, and socioeconomic class differences in ocular morbidity were noted, although none of these correlations were statistically significant. Children from lower socioeconomic origins, however, had comparatively higher probabilities of ocular morbidity, which may indicate an underlying vulnerability. A gradual increase in ocular morbidity with age and slightly higher prevalence among males were also noted, though these trends were not statistically significant

5. Discussion

The present study conducted among school-going children aged 6–16 years in the Unnat Bharat Abhiyan villages of Raigad district, Maharashtra, revealed an overall ocular morbidity prevalence of 30.0%. This finding is remarkably consistent with the study by Singh *et al.* in West Uttar Pradesh, which reported a prevalence of 29.35% among 4838 school children [13], and with Gupta et al. who documented a prevalence of 31.6% in

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Shimla, North India [14]. However, our findings are higher than those reported by Agrawal et al. in Raipur, Chhattisgarh (21.2%) [9] and Kumar *et al*. in Delhi (22.7%) [12]. The variation in prevalence across different regions of India could be attributed to differences in geographical location, socioeconomic conditions, access to healthcare services, and diagnostic criteria employed. The relatively higher prevalence in our study population, drawn exclusively from rural villages, underscores the vulnerability of underserved communities where eye care services are limited. This is particularly concerning given that the World Health Organization has prioritized the control of childhood blindness through its Vision 2020 programme, recognizing that many conditions associated with blindness in children are also linked to childhood mortality [1].

Refractive error was identified as the most common cause of ocular morbidity, affecting 11.3% of the study population. This finding aligns with multiple Indian studies that have consistently reported refractive error as the leading ocular morbidity among school children. Singh *et al*. reported a refractive error prevalence of 17.36% [13], while Gupta *et al.* documented 22% in their Shimla-based study [14]. International studies have shown comparable figures, with Shrestha et al. reporting 11.9% refractive error prevalence in Nepal [16] and Lu *et al.* documenting 11.07% in Tibetan children [17]. The age-wise distribution of refractive error in our study demonstrated an increasing trend with age, from 12.3% in the 6–9 years group to 14.3% in the 14–16 years group. This pattern is consistent with the findings of Singh et al., who observed a statistically significant increase in refractive error prevalence from 12.78% in children aged 5–10 years to 21.63% in those aged 11–15 years [13], and with Agrawal *et al*. who also reported higher prevalence of myopia in the older age group compared to younger children [9]. The progressive increase in refractive error with age can be attributed to cumulative near-work demands, particularly during the crucial years of academic progression, and the physiological changes accompanying ocular growth and development [8].

Vitamin A deficiency was observed in 1.88% of our study population, manifesting as conjunctival xerosis and Bitot's spots. This prevalence is comparable to the 2.09% reported by Singh et al. in West Uttar Pradesh [1] and the 1.8% documented by Gupta et al. in Shimla [2]. However, Agrawal *et al*. reported a strikingly higher prevalence of 10% in their Raipur study, with all diagnosed cases having Bitot's spots [9], which they attributed to missed opportunities for vitamin A supplementation based on National Family Health Survey data. Notably, Singh et al. found a statistically significant difference in Vitamin A deficiency between urban (1.15%) and rural (3.03%) schools [13], highlighting the persistent nutritional disparities between geographical locations. Conjunctivitis was the second most common morbidity in our study, affecting 4.69% of children, which is higher than the 1.92% for allergic conjunctivitis and 0.95% for bacterial conjunctivitis reported by Singh et al. [13]. The prevalence of squint in our study was 3.76%, considerably higher than the 0.27% reported by Singh et al. [13] but comparable to the 2.5% documented by Gupta et al. [14]. Amblyopia was present in 1.41% of our children, which aligns with the 1.1% reported by Kalikivayi *et al.* in southern India [15]. Colour vision deficiency was observed in 0.47% of our study population, which is lower than the 3.3% reported by Agrawal *et al*. [9], though the male predominance noted in their study (6.6% in boys versus 0.7% in girls) is consistent with the X-linked recessive inheritance pattern of red-green colour vision defects [16-17]. A unique contribution of our study is the detailed documentation of anterior segment pigmentary findings with perilimbal conjunctival melanosis being the most common finding (38.5%), followed by yellow sclera (13.6%) and scleral melanocytosis (8.5%). These findings, while typically benign, contribute to the overall ocular health profile and warrant further investigation regarding their clinical significance and association with environmental factors such as ultraviolet exposure.

Consistent with the findings of Singh *et al.* [13], we observed a gradual increase in ocular morbidity with advancing age, although this trend did not reach statistical significance in our study. Regarding gender differences, we found no significant association between gender and overall ocular morbidity, with nearly equal prevalence in males and females, which aligns with Singh et al. [13] though Agrawal et al. found significantly higher ocular morbidity in boys compared to girls [10]. The majority of our study population belonged to the upper-lower and lower-middle socioeconomic classes, reflecting the rural and underserved nature of the Unnat Bharat Abhiyan villages. Although children from lower socioeconomic backgrounds showed relatively higher

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odds of ocular morbidity, the association did not reach statistical significance. This finding is consistent with Singh *et al*., who found higher overall morbidity in rural (30.05%) compared to urban (28.65%) schools, though this difference was not statistically significant, but did find significantly higher Vitamin A deficiency in rural children [13]. The overall ocular morbidity prevalence of 30.0% in our study falls within the range reported in international literature, with Wedner *et al*. finding 13.6% prevalence in Tanzanian primary school children [17] and Shrestha et al. documenting 34.2% in Nepal [18]. The finding that nearly one-third of school-going children in these rural villages have some form of ocular morbidity has significant public health implications, as the majority of these conditions are either preventable or treatable, making school-based screening an effective and cost-efficient strategy for early detection and intervention [13-15].

The authors acknowledge several limitations of this study, including the cross-sectional design which precludes causal inferences, the lack of cycloplegic refraction which may have led to underdiagnosis of hyperopia [10,13], and the absence of serum vitamin A level confirmation. Additionally, the relatively small sample size and exclusion of non-school going children may limit generalizability to the most vulnerable populations [13] . Despite these limitations, our study has notable strengths, including the comprehensive three-phase screening protocol with detailed anterior segment evaluation, documentation of pigmentary findings rarely reported in epidemiological studies, and the focus on rural underserved villages under the Unnat Bharat Abhiyan scheme, addressing a critical gap in the literature. In conclusion, this study demonstrates that ocular morbidity affects nearly one-third of school-going children in rural Maharashtra, with refractive errors being the most common condition. The high prevalence of treatable conditions such as refractive errors, Vitamin A deficiency and amblyopia highlights the urgent need for comprehensive school-based eye screening programs, nutritional monitoring and prompt referral for definitive management in underserved rural areas to reduce the burden of avoidable childhood blindness [19-20]

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