

A Prospective Study on Spectacle Use among Children with Refractive ErrorsNeha Bharati¹, Vandana Kumari², Nageshwar Sharma³¹Senior Resident, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India²Senior Resident, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India³Professor and HOD, Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India

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Abstract:**Background:** Refractive errors are a leading cause of visual impairment in children, affecting academic performance, social interaction, and psychological development. Despite the availability of cost-effective corrective measures like spectacles, compliance remains a challenge.**Aim:** To evaluate spectacle compliance among schoolchildren with refractive errors and identify factors contributing to non-use.**Methodology:** A cross-sectional follow-up study was conducted in the Department of Ophthalmology, Patna Medical College and Hospital, India, including 60 children aged 10–16 years who had received spectacles within the past two years. Information regarding spectacle utilization, frame classification, and causes of noncompliance was gathered by direct observation and interviews. Adherence was characterized as consistent utilization of prescribed eyewear.**Results:** Among participants, only 30% wore spectacles during school hours, while 33.3% had spectacles at home but did not bring them, and 31.7% lost their spectacles. Pediatric frames were preferred (25%), whereas 8.3% used adult frames. Key barriers included loss, social stigma, peer pressure, discomfort, and lack of awareness.**Conclusion:** Spectacle provision alone is insufficient to ensure regular use. Targeted interventions, including child-friendly frames, education, parental involvement, and follow-up for replacements, are essential to improve compliance and prevent avoidable visual impairment.**Keywords:** Refractive Errors, Spectacle Compliance, Schoolchildren, Visual Impairment, Pediatric Ophthalmology.

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Introduction

Refractive error has become one of the most common causes of visual impairment and low vision worldwide. Vision is especially crucial during childhood not only because of its direct impact on visual acuity but because of its implication in a child's psychological and social development. Poor vision may adversely impact a child's academic performance and lead to learning difficulty, reduced attention and participation in classroom activities [1]. Uncorrected refraction error may further contribute to lower self-esteem and social withdrawal in a child that influences emotional and cognitive development. Therefore, identification and timely correction of refractive error is necessary to ensure the full development of a child.

The fact that these disorders are especially worrying is that refractive errors are among the simple,

inexpensive, and lowest risk visual impairment disorders to treat. Adjusting refractive error can be done well and accurately by trained paramedical persons, with spectacles or eyeglasses as the most common form of correction, removing the need to engage a trained ophthalmologist specialist in the first instance. Notwithstanding the relatively simple procedure of refractive error and the availability of very affordable corrective measures specifically in the form of spectacles [2], children remain untreated, often owing to a deficit in education, access, and compliance with spectacle use. These are all practical opportunities to address an unacceptable gap in school screening programs, parental education opportunities addressing compliance, national public health programs to reduce the increasing burden of avoidable childhood Visual Impairment.

A key element of the National Programme for the Control of Blindness, which aims to identify and treat visual impairment in school-aged children early on, is school-based eye screening. This program supports preventative health for children, given the important role that uncorrected refractive errors can have on a child's learning, academic success and overall development [3]. Over time, many stakeholders including ophthalmologists, optometrists, teachers and health workers have involved screening larger numbers of students in schools. There has been emphasis not only on the diagnosis of visual impairment, but the management of timely referral and treatment, as the management of the visual problems is vital for preventing avoidable visual disability.

Free spectacles for children with refractive errors comprise an integral part of the entire initiative. This facility is provided by the District Blindness Control Society (DBCS) to ensure that monetary factors will not inhibit access to much-needed vision correction. This program targets children and thus creates awareness about eye health from an early age and contributes to their academic and social development [4]. The school eye screening program, therefore, reflects a collaborative public health effort to promote visual health, lessen the burden of childhood visual impairment, and further the vision of control of the possible causes of blindness in India.

The number of eyeglasses given out through school screening programs has been significant and increasing. During the 2007–2008 school year, an estimated 192,000 teachers were trained to conduct eye screening activities at school. 1.1 million of the 2.72 million kids who had vision screening were found to have refractive problems, and 492,000 of those students (44% of the total) were given spectacles that same year [5]. The scale of eyeglasses distribution indicates a substantial effort to ameliorate vision impairment in children of school age and continues to demonstrate the importance of early detection and intervention.

Even with the robust findings, feedback from screening programs at schools has echoed that the prevalence of refractive errors reported for these children diverges from the national average. Nevertheless, there are limited scientific studies that have investigated why there are discrepancies in children's refractive error, meaning there are substantial gaps concerning the true prevalence of refractive error within school populations. There is also uncertainty regarding whether children are always wearing the spectacles dispensed during these programs, thus questioning the efficacy and overall value of the screening intervention to visual health [6].

Peer pressure highlighted an important reality since many children with spectacles were often teased with names and associated stigma such as

"chasmish." Similarly, spectacles in themselves were only minimally accepted in the communities, including students' homes. The uniform color of frames for all children meant injected monotony that did not incorporate individual preference [7]. In addition, many children with mild refractive error did not feel a necessity to wear the spectacles; therefore, they didn't opt to do so. In many rural circumstances, cultural beliefs associated with girls indicated that wearing spectacles would jeopardize their future marriage prospects. Some refractive eye practitioners offered inadequate refractive services which began with incorrectly prescribing the spectacles. This would create discomfort in their eyes, either headaches or watering, which would further offset the utility of wearing their glasses.

Based on these findings, a study was organized to systematically assess spectacle noncompliance among schoolchildren. The study had three main aims: to assess the proportion of children who avoided wearing their spectacles; to explore the reasons behind spectacle noncompliance; and to gather information that could inform research into school eye screening programs. The study was concerned with the social, cultural, and clinical barriers to spectacle wearing with the aim of suggesting targeted changes to the vision care service to improve acceptance and regular use of spectacles, and ultimately visual health in rural children.

Methodology

Study Design: This was a cross-sectional follow-up study designed to assess spectacle compliance among children with refractive errors.

Study Area: The study was conducted in the Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India for six months

Study Participants

Inclusion Criteria:

- School children aged 10–16 years (classes 5–9) who had been refracted and provided spectacles within the last years.
- Children enrolled in both private and public schools within the study area.

Exclusion Criteria:

- Children with ocular pathologies other than refractive errors.
- Children who were not available or unwilling to participate during the school visit.

Sample Size: A total of 60 children were included in the study.

Procedure: In compliance with the Declaration of Helsinki, the study was approved by the institutional ethical committee. Demographic information was obtained via interviews with students in the presence

of an instructor. Direct observation was employed to ascertain if children were wearing their spectacles during the visit. Students not wearing spectacles were interrogated about their whereabouts and reasons for non-compliance. Information concerning the origin of spectacles, usage frequency, and perceived advantages was also gathered. The efficacy of spectacles was evaluated using 0.75 D (+ & -) lenses by qualified ophthalmic assistants, with compliance defined as the consistent utilization of prescribed spectacles for, astigmatism, hypermetropia, or myopia. Supplementary details regarding the look, frame type, fitting quality, and scratches on the spectacles were documented. All operations were standardized and adhered to identical rules to guarantee consistency in data collecting.

Statistical Analysis: Data was analyzed using SPSS version 27 (IBM SPSS Software 2010; IBM Corp, New York). Qualitative analysis was performed, and

basic quantitative statistical tests were used to validate the results.

Result

Table 1 presents observations of 60 students regarding their spectacle usage and availability. At the time of observation, 18 students (30%) of the total were wearing spectacles. A small proportion, 2 students (3.3%), had brought their spectacles to school but were not wearing them, while 20 students (33.3%) had spectacles at home but did not bring them to school. Additionally, 19 students (31.7%) did not have spectacles due to loss, and there was 1 participant (1.7%) with missing data. Overall, the data indicates that although most students have access to spectacles either at school or at home, only a minority were wearing them during school hours, highlighting potential issues with spectacle compliance.

Accessibility of Spectacles	Number of Participants	Percentage	Cumulative Percentage
Wearing spectacles	18	30	30
Not wearing spectacles but having them at home	20	33.3	66.6
Not wearing spectacles but have brought them to school	2	3.3	33.3
Does not have spectacles (Lost)	19	31.7	98.3
Missing data	1	1.7	100
Total	60	100	100

Table 2 illustrates the gender distribution of the students included in the study. Out of the total 60 participants, an equal number of boys and girls were enrolled, with 30 students (50%) identified as boys and 30 students (50%) as girls, indicating a perfectly balanced gender representation. There were no missing data points, ensuring complete information for all

participants. The cumulative percentages reflect this balance, with boys accounting for 50% and girls bringing the cumulative total to 100%. This equitable distribution suggests that gender-related differences, if any, can be assessed without bias in this sample.

Gender	Number	Percentage	Cumulative percentage
Girls	30	50	100
Boys	30	50	50
Missing data	0	0	100
Total	60	100	100

Table 3 illustrates the distribution of types of frames worn by students in the study. Out of 60 participants, the majority, 40 students (66.7%), were not wearing spectacles. Among those who wore spectacles, 15 students (25%) used pediatric frames, while only 5 students (8.3%) wore adult frames. The cumulative percentages show that by combining students

wearing adult and pediatric frames, one-third of the participants (33.3%) were using spectacles, whereas the remaining two-thirds (66.7%) did not wear any. This indicates relatively low spectacle usage among the study population, with pediatric frames being the more commonly used type among children who did wear spectacles.

Table 3: Frame type applied by students

Type of frame	Number of participants	Percentage	Cumulative Percentage
Wearing pediatric frame	15	25	33.3
Wearing adult frames	5	8.3	8.3
Not wearing spectacles	40	66.7	100
Total	60	100	100

Discussion

This study explored spectacle availability and use by surveying 60 school children and revealed important issues surrounding compliance. As summarized in Table 1, only 18 students (30%) used spectacles in school, despite many having spectacles available to them either at school or home. A small subset of students (2 or 3.3%) brought their spectacles to school but did not wear them. However, a much larger subset of students (20 or 33.3%) had spectacles at home but did not bring them to school. These findings suggest that availability of spectacles does not automatically result in wear, and that behavioral, social or practical considerations may influence consistent spectacle use. Bhandari et al., (2016) [8] reported analogous results, indicating that children of parents with lesser educational qualifications exhibited greater non-compliance in spectacle wear compared to those whose parents possessed better educational rank. These findings can be ascribed to the lack of awareness among less educated parents of untreated refractive problems.

Additionally, 19 students (31.7%) did not have spectacles because of lost spectacles which points to a possible deficit in timely replacement and follow-up care. Lost spectacles may intensify uncorrected visual problems which can impact academic performance and quality of life. The fact that there is 1 participant with missing data (1.7%) does not materially contribute to overall findings of magnitude and illustrates the need for complete, and reliable, usable data in an observational study. Overall, the findings demonstrate that guidance and attention around education and education regarding importance of spectacles wear and replacement is needed beyond distance - spectacles distribution - which may be required for compliance. Holguin et al., (2006) [9] demonstrated that noncompliance with spectacle wear was markedly greater among urban youngsters than their rural counterparts. Nonetheless, we could not detect any statistically significant correlation between non-compliance in spectacle wear and the kind of residency.

The participants in the study composed an even gender distribution of 30 boys (50%) and 30 girls (50%) (see Table 2). This distribution will allow for unbiased assessment of possible gender differences, as prior studies have found differences in compliance with spectacle use that were dependent on social acceptance, or peer pressure. In the study presented here, with even gender distribution, the effects of

unequal representation of gender were minimized. Messer et al., (2012) [10] concluded that, despite receiving two pairs of complimentary spectacles, 80% of American participants cited breakage or loss as the reason for not wearing them.

Table 3 shows how many students wore each type of frame worn. Children's frames were the most common (15 students, 25%), and adult frames were worn by only 5 students (8.3%). Notably, at the time of observation, 40 students (66.7%) did not wear glasses. This is a very low utilization rate that could reflect issues with comfort, social desirability, peer influence, or lack of knowledge about the need for correction for vision. The number of children who wore children's frames may indicate a demand for child appropriate-sized and friendly frames that are comfortable and durable enough to be good wear. Khandekar et al., (2002) [11] determined that over 50% of participants were wearing their spectacles during the follow-up.

In summary, the investigation illustrates a pronounced disconnection between availability of spectacles and wearing status among students. Approximately two-thirds of students possessed spectacles either at home or at school, but only one-third reported wearing them regularly. That finding suggests that simply providing spectacles may not be sufficient; a more comprehensive set of interventions addressing behavioral, social, and environmental barriers are needed to improve compliance. The outcome illustrates the importance of not only ensuring spectacles are available for children and adolescents, but that they are used in a regular manner. Education on eye health in schools, follow-up for spectacles that are lost, and counseling for children and their families may be key facilitators of spectacle compliance. Addressing barriers to spectacle compliance is important to prevent avoidable visual impairment and facilitate academic performance and physical and mental well-being of children.

Conclusion

This study highlights a substantial gap between spectacle provision and reality among school-aged children with refractive errors. Subsequently, we observed that even though many had spectacles at home or at school, only 30% of the children wore spectacles during our observations, indicating high rates of noncompliance. Reasons for noncompliance include spectacle loss, social perceptions, peer pressure, discomfort with the spectacle, and lack of knowledge about the importance of consistent wear.

The finding that children preferred to wear pediatric frames suggests an interest in designs that are relatively child-friendly, comfortable, and acceptable for young children. These data indicate that distribution alone is insufficient, and comprehensive interventions such as education, involvement with parents, follow-up mechanisms from school, and replacement mechanisms must accompany spectacle distribution. Increasing these measures can ultimately lead to increased consistent compliance to eyeglasses, help prevent potentially avoidable visual impairment, and promote the development of children socially, emotionally, and academically.

Reference

1. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. *Bulletin of the World Health Organization*. 2008 Jan;86(1):63-70.
2. Schiefer U, Kraus C, Baumbach P, Ungewiß J, Michels R. Refractive errors: epidemiology, effects and treatment options. *Deutsches Ärzteblatt International*. 2016 Oct 14;113(41):693.
3. Metsing IT, Hansraj R, Jacobs W, Nel EW. Review of school vision screening guidelines. *African Vision and Eye Health*. 2018 Feb 26;77(1):1-0.
4. Pirindhavellie GP, Yong AC, Mashige KP, Naidoo KS, Chan VF. The impact of spectacle correction on the well-being of children with vision impairment due to uncorrected refractive error: a systematic review. *BMC Public Health*. 2023 Aug 18;23(1):1575.
5. Sathyan S. Vision screening at schools: Strategies and challenges. *Kerala Journal of Ophthalmology*. 2017 May 1;29(2):121-30.
6. Baltussen R, Naus J, Limburg H. Cost-effectiveness of screening and correcting refractive errors in school children in Africa, Asia, America and Europe. *Health Policy*. 2009 Feb 1;89(2):201-15.
7. Aldebasi YH. A descriptive study on compliance of spectacle-wear in children of primary schools at Qassim Province, Saudi Arabia. *International journal of health sciences*. 2013 Nov;7(3):291.
8. Bhandari G, Pradhan S, Shrestha M, Bassett K. Eyeglasses compliance among children undergoing school visual acuity screening in Nepal. *Adv Ophthalmol Vis Syst*. 2016;5(3):00162.
9. Holguin AM, Congdon N, Patel N, Ratcliffe A, Estes P, Flores ST, Gilbert D, Rito MA, Munoz B. Factors associated with spectacle-wear compliance in school-aged Mexican children. *Investigative ophthalmology & visual science*. 2006 Mar 1;47(3):925-8.
10. Messer DH, Mitchell GL, Twelker JD, Crescioni M, CLEERE Study Group. Spectacles wear in children given spectacles through a school-based program. *Optometry and Vision Science*. 2012 Jan 1;89(1):19-26.
11. Khandekar R, Mohammed AJ, Al Raisi A. Compliance of spectacle wear and its determinants among schoolchildren of Dhakhiliya region of Oman: a descriptive study. *SQU Journal for Scientific Research-Medical Sciences*. 2002 Apr;4(1-2):39.