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Original Research Article

PARENTAL AWARENESS, KNOWLEDGE AND PREVALENCE OF REFRACTIVE ERRORS AMONG CHILDREN OF HOSPITAL PERSONNEL IN A TERTIARY CARE CENTRE

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ABSTRACT

Background: Refractive errors are the leading cause of preventable visual impairment in children. Early detection and timely correction are essential to prevent long-term visual disability. This study aimed to determine the awareness about refractive errors among children of hospital personnel along with, associated risk factors, at a tertiary care centre.

Materials and Methods: A hospital-based cross-sectional study was conducted from May to July 2025 among 100 children aged 6 months to 18 years. Comprehensive ocular examination including cycloplegic refraction was performed. Parental awareness on the need for screening, age of first evaluation, parental refractive status, screen time, were recorded. Data was analysed using SPSS version 22, and associations were tested using Chi-square or Fisher's exact test.

Results: Parental awareness was significantly higher among doctors compared to paramedical staff ($p < 0.001$). Among children diagnosed with amblyopia, 75% of parents were unaware of the condition.The overall prevalence of refractive error was 47%, with myopia (34%) and astigmatism (33%) being the most common types. No significant association was observed with age or gender. A significant association was found between parental refractive error and refractive error in children ($p = 0.003$). Screen time was significantly associated with overall refractive error ($p = 0.006$), though not specifically with myopia.

Conclusion: Despite healthcare proximity, gaps in parental awareness remain, particularly among non-medical staff. Regular screening and targeted educational interventions are essential for early detection and prevention of avoidable visual impairment. Parental refractive status and near-work exposure are important risk factors for childhood refractive errors.

Keywords: early detection, amblyopia, screening, astigmatism, screen time.

INTRODUCTION

Uncorrected distance refractive error is the most common cause of vision impairment (VI) and the second most common cause of blindness in the world.[1] VI in childhood has a negative and sometimes irreversible impact on children's psychological, educational, and social performance, which can persist into adulthood and affect individuals' quality of life.[2]

It is predicted that VI due to uncorrected refractive errors (RE) will rise even further due to lifestyle-related factors, including intensive near-vision activity and less time spent outdoors.[3]

Health care professionals play a vital role in the in hospital protocols but often overlook the need to screen their own children for VI, due lack of awareness for early screening. Despite the proximity of the screening facilities available, the facility is often not availed due to ignorance about early onset of VI, possibly leading to amblyopia.

The American Academy of Ophthalmology (Academy) and the American Association for Paediatric Ophthalmology and Strabismus (AAPOS) recommend timely screening for the early detection and treatment of eye and vision problems in children. This includes the institution of periodic vision screening during the preschool years for the purpose of detecting amblyopia or risk factors for amblyopia.[4,5] Therefore, increased parental awareness regarding the effect of paediatric uncorrected REs is particularly important and could help in prompt diagnosis and management of childhood eye conditions, contributing to a decrease in childhood visual impairment.

There are few studies done to assess awareness about refractive errors among parents working at a hospital. The current study focused specifically on the parental knowledge and awareness about RE among the children of hospital personnel with its prevalence in this population, which are critical for the success of interventions aimed at reducing childhood visual impairment resulting from uncorrected REs.

MATERIALS AND METHODS

The study was conducted in Dr B R Ambedkar Medical College and Hospital, Bangalore

A hospital based prospective, cross-sectional study was conducted in the months of May to July 2025. The children of the hospital personnel were screened in the the ophthalmology department were registered for the study, written consents were taken from the guardian/parents. A detailed ocular history included questions regarding family history of RE, parental awareness about need to screen regularly, age of first screening, use of spectacles, annual routine eye examinations, any history of patching or history of presence of squint. The paediatric history was taken consisting of antenatal, natal and postnatal details of the subject along with family history and personal history of screen time of the child with a physical examination done in the department of paediatrics. The subjects with a past history of ocular surgery, trauma, congenital anterior segment abnormalities, and uncooperative children were excluded from the study.

Visual acuity was done, distant vision using Snellen's chart for children greater than 3 years and Allen's object recognition chart for pre-school, near vision by jaegers chart followed by automated refraction and subjective refractive correction was done. Anterior segment examination by slit lamp bio-microscopy and a squint evaluation was done. Dilated cycloplegic refraction was done using CTC [1% cyclopentolate, tropicamide 0.5%, cyclopentolate 1% at an interval of 15 minutes each]. This was followed by a retinoscopy and fundus examination by indirect ophthalmoscope. Post mydriatic test was done if needed and glasses were prescribed and advised to follow up.

Ethical consideration: The study had been approved by the Institutional Review Board (IRB) of Dr.B.R.Ambedkar medical college and hospital EC 498(Dated 10.03.2025). The children between the ages of 7 years and 18 have provided assent, followed by the written consent of their parents. Written consent was taken from the parents between 6 months and 6years old.

The selected study population and their parents were explained about the study objectives and protocol. The participants were allowed to withdraw from the research at any time without giving any explanations to the investigators. Investigators have maintained the confidentiality of the individual research data.

Statistical analysis: Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test or Fischer's exact test (for 2x2 tables only) was used as test of significance for qualitative data.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs

P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel, SPSS version 27(IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

RESULTS

In this hospital-based study, parental awareness regarding refractive errors, differed significantly between doctors and paramedics, with doctors demonstrating much higher awareness (80.8% vs 29.7%, $p < 0.001$).

Among the 100 children screened 72 children were being screened for the first time.

Out of which 47 children had refractive errors. 35(74.46%) children were detected for the first time of having a refractive error.Among the 35 screened for the first time 13 (37.14%) were children of doctors and 22 (62.85%)were children of paramedics. The average age of first time screening being being 8.8years.

The 28 children who had got their vision screened prior to this study.The average age being 10.1 years of the first screening.12 who were already wearing spectacles for refractive errors . 20(71.42%)were doctors children and 8 (28.57%) were paramedics children. Only 6(13.04%) parents had adequate knowledge regarding regular use of spectacles upon prescription. Out of which 5(83.33%) were doctors children and 1(16.67%) was a paramedics child.

The overall prevalence of refractive error (RE) was 47%, with myopia (34%) and astigmatism (33%) being the most common types, while hypermetropia was relatively rare (4%) . This pattern is consistent with recent epidemiological trends showing increasing dominance of myopia and astigmatism in school-aged children.

12 had been diagnosed with amblyopia(26.08%)out of which 05(41.66%)were doctors children and 07(58.33%) were children of paramedics. Notably, among children with amblyopia, 75% of parents lacked awareness, emphasising the critical gap in early detection and timely intervention, particularly in non-medical families. Also among 100 children screened two presented with squint of alternating esotropia.

Although the proportion of children with refractive error increased numerically with age—from 30.4% in the 1–5-year group to 66.7% in the 16–18-year group—this association was not statistically significant. Similarly, no significant difference was observed between males and females, suggesting that age group and gender were not independent predictors of refractive error in this cohort.

A strong and statistically significant association was found between parental history of refractive error and presence of refractive error in children, with 76.2% of children having positive parental history affected, compared to 39.2% among those without such history ($p = 0.003$). This supports the role of genetic predisposition in the development of refractive errors and highlights the importance of targeted screening in children with affected parents.

Screen time showed a significant association with overall refractive error ($p = 0.006$). Interestingly, a higher proportion of refractive error was seen in children with reported screen time of <2 hours; however, this finding may reflect reporting bias, small subgroup size, or confounding factors such as near-work other than digital devices. However when analyzed for myopia, screen time did not show a statistically significant association ($p = 0.301$), indicating that factors beyond screen exposure may contribute to myopia development in this population.

Table 1: Distribution of subjects according to age, sex and Refractive error

		Refractive error			
		NO		YES	
		N	%	N	%
Age group	1-5yr	15	65.2%	8	34.8%
	6-10yr	21	52.5%	19	47.5%
	11-15yrs	15	48.4%	16	51.6%
	16-18yrs	2	33.3%	4	66.7%
Gender	Female	25	49.0%	26	51.0%
	Male	28	57.1%	21	42.9%

P value 0.461, there was no statistically significant difference found between age and Refractive error

P value 0.431, there was no statistically significant difference found between sex and Refractive error

Table 2: Refractive error according to age group

	Myopia		Hypermetropia	Astigmatism		
	N	%	N	%	N	%
1-5yr	7	30.4%	1	4.3%	7	30.4%
6-10yr	14	35.0%	1	2.5%	11	27.5%
11-15yrs	10	32.3%	1	3.2%	11	35.5%
16-18yrs	3	50.0%	1	16.7%	4	66.7%

Table 3: Distribution of subjects according to parental history and Refractive error

	REFRACTIVE ERROR				
		NO		YES	
		N	%	N	%
PARENTAL HISTORY	NO	48	60.8%	31	39.2%
	Yes	5	23.8%	16	76.2%

P value 0.003, there was a statistically significant difference found between parental history and Refractive error.

Table 4: Distribution of subjects according to screen time and Refractive error

	REFRACTIVE ERROR				
		NO		YES	
		N	%	N	%
ELECTRICAL USAGE	>2hr	52	57.8%	38	42.2%
	<2hrs	1	10.0%	9	90.0%

P value 0.006, there was a statistically significant difference found between screen time and Refractive error

Table 5 :Distribution of Myopia with electrical sets usage

	MYOPIA				
		NO		YES	
		N	%	N	%
ELECTRICAL USAGE	>2hr	61	67.8%	29	32.2%
	<2hrs	5	50.0%	5	50.0%

P value 0.301, there was no statistically significant difference found between screen time and MYOPIA

Table 6: Parental knowledge about RE among doctors and Paramedical workers

	AWARENESS			
	NO	YES		
	N	%	N	%
MEDICAL	5	19.2%	21	80.8%
PARAMEDICAL	52	70.3%	22	29.7%

SCREENING

Among the 100 children screened 72 children were being screened for the first time, the average age being 8.8 years

Table-7 Distribution of first time screening	
Medical	34(47.22%)

Paramedical	38(52.77%)
	72
0-5 YEARS	17(23.61)
6-10 YEARS	29 (40.27%)
11-18 YEARS	26(36.11%)
	72

Out of the remaining 28 children, 12 were already using spectacles for refractive error. The average age being 10.1 years of the first screening.

Table-8 Previously screened children group	
Medical	20(71.42%)
Paramedical	(28.57)
	28

The 12 children who already were using spectacles for refractive correction had the following age group distribution

Table -9 Age distribution among already using glasses at time of screening	
0-5 YEARS	1(8.3%)
6-10 YEARS	4(33.33%)
11-18 YEARS	7 (58.33%)
	12

P value <0.001, there was a statistically significant difference found between Paramedical workers and doctors with respect to awareness.
Among Amblyopia kids 25% of the subjects parents had awareness and 75% of the subjects parents didn't have awareness.

DISCUSSION

The present hospital-based cross-sectional study aimed at evaluating the awareness about RE among parents working at a hospital. Awareness was significantly higher among doctors compared to paramedical staff. Similar disparities in awareness have been reported in studies assessing parental knowledge about childhood eye diseases, where medical background was strongly associated with better health-seeking behaviour and early screening.[6,7] Most parents about 41% took their children for their first screening at the age of 5-10 years inspite of being aware about need to screen in our study, early screening for refractive errors was opted by doctor parents in 18 %. In studies at Saudi Arabia by Surati et al less than 10 % were aware about need for screening at early age (less than 1 year) and 58.6% went for their first eye screening at the age of 5-10 years.[8]
Alarmingly, among children with amblyopia, 75% of parents were unaware of the condition, which is concerning since amblyopia requires early detection for optimal visual outcomes in this study. Previous studies have also documented poor parental awareness of amblyopia even in urban populations similar to our findings, leading to delayed presentation and irreversible visual impairment .The authors in these studies highlighted that the low detection rate in this preschool population suggests a significant gap in current vision screening and parental observation strategies.[9,10] Interestingly, the study Pai et al found no significant associations between the presence of amblyopia and measures of socioeconomic status, ethnicity, or parental education. This suggests that the lack of awareness was a broad issue across different demographic groups in the Australian sample, rather than being confined to disadvantaged families.[9]

The high prevalence of refractive errors (47%) among children of hospital faculty, with myopia (34%) and astigmatism (33%) being the predominant types. This prevalence is higher than that reported in many community-based Indian studies, where prevalence ranges from 10% to 25%, but is comparable to urban and school-based studies showing increasing trends of refractive errors in children, particularly myopia.[11–13] The higher prevalence in the present study may be attributable to urban lifestyle, increased near-work activities, and better case detection due to easier access to ophthalmic services among hospital staff families.

In Asian populations myopia was the most common refractive error observed, consistent with global epidemiological trends indicating a rapid rise in childhood myopia.[14] In our study astigmatism was also highly prevalent, similar to results found in studies conducted in South India and urban school children, where astigmatism prevalence ranges between 20–40%. Hypermetropia was not a common refractive error in children, as it reduces with increasing age due to emmetropization which is similar other pediatric studies.[11]

In our study the proportion of refractive errors increased with age, however this association was not statistically significant. Similar findings were reported by Murthy et al. and Dandona et al., who found increasing trends with age but without consistent statistical significance in smaller sample cohorts.[12,13] The absence of gender predilection in the present study also corresponds with studies done by Gupta et al and Pi et al which show no consistent sex-based difference in refractive error prevalence.[15,16]

A strong association between parental refractive error and refractive error in children was observed in this study, supporting the role of genetic susceptibility. Children with positive parental history had significantly higher prevalence of refractive errors (76.2%) compared to those without such history. A similar finding was noted in large cohort studies such as the Sydney Myopia Study and the Guangzhou Twin Eye Study, where children with one or both myopic parents are at significantly higher risk of developing refractive errors, especially myopia.[17,18] This highlights the importance of targeted screening for children with familial risk.

A statistically significant association between screen time and overall refractive error was noted in this study. However, when analysed for myopia, the association was not statistically significant. Screen exposure alone did not independently predict myopia and had mixed associations like reduced outdoor activity and prolonged near work as seen in other studies.[19,20] The paradoxical finding of higher refractive error among children with reported lower screen time may be due to recall bias, unaccounted near-work activities such as reading, online tuition classes, or small subgroup size, hence warrants cautious interpretation.

The Academy and AAPOS recommend that an ocular assessment be performed whenever questions arise about the health of the visual system of a child of any age .In addition, even in the absence of specific signs or symptoms, they recommend that infants and children be routinely screened for vision problems as follows.

A Paediatrician, family physician, or other properly trained health care provider should examine a newborn's eyes for general eye health and perform a red reflex test in the new born nursery.

Any baby with an abnormal red reflex requires urgent consultation.

Emphasis should be placed on checking visual acuity as soon as a child is cooperative enough to complete the assessment. Generally, this occurs between ages 3 ½ and 4 years.

Additional screening on each child should be done at routine school checks or well-child visits every 1-2 years after age 5 years.[4,5,21]

Studies have shown that REs, particularly myopia, affect more than one-third of the population globally.[5,22] Uncorrected REs have a significant effect on children and could limit their chances in relation to education, quality of life and efficiency.[23,24]

CONCLUSION

The findings of this study emphasise that even among hospital-affiliated families, gaps exist in awareness and preventive practices, particularly among non-medical staff. Routine vision screening programs, parental counselling, and institutional policies encouraging periodic pediatric eye check-ups could significantly reduce the burden of avoidable visual impairment.

Integrating vision screening into school health programs and occupational health initiatives for families of hospital personnel and other institutions may further improve early detection leading to better visual health in children.

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