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## To assess the awareness and knowledge of refractive errors in school children among school teachers in Ludhiana

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### Abstract

**Introduction:** Refractive error is an error in the focusing of light on the retina. Worldwide, uncorrected refractive errors are the leading cause of vision impairment and the second leading cause of blindness in developing countries, including India. Children spend a considerable amount of time in school and it is possible for the teachers to access them easily. Increased awareness and knowledge about refractive errors among teachers may increase the chances for early detection and subsequent management, hence preventing sequelae such as visual impairment and blindness.

**Aims & Objectives:** To assess the awareness and knowledge of refractive errors in school children among school teachers in Ludhiana.

**Material and methods:** This was a questionnaire based prospective study done in different schools in Ludhiana. All available primary school teachers were handed a questionnaire and their responses were noted after an informed written consent. Based on the responses, a total score was calculated and the teachers were graded. Depending on the results, workshops were held for educating the teachers about refractive errors.

**Results:** The study included 100 primary school teachers, of which 97 teachers had adequate awareness regarding refractive errors. 72% of the participants had previous knowledge regarding refractive errors and the majority received their information from health personnel/school health programme. Amongst teachers with adequate awareness, 24% had satisfactory level of knowledge, 66% had good level of knowledge and 7% had very good knowledge regarding refractive errors.

**Conclusion:** Even with high awareness levels, there was a wide difference in knowledge levels which can be bridged through formal training programs, school vision screening programs and by coordinating with health professionals. Strengthening teacher training in ocular health will help in early intervention, thereby improving children's ocular health and overall well-being.

**Keywords:** Refractive errors in children, school teachers, awareness, knowledge

### Introduction

Uncorrected refractive errors are a major public eye health challenge, requiring concerted efforts from health providers, education providers and parents to manage this issue. Refractive errors are an avoidable cause of visual impairment which affects children worldwide <sup>[1]</sup>. A refractive error is an error in the focusing of light on the retina with accommodation at rest. Instead of focusing images on the retina, the eye focuses light in front of the retina (myopia), behind it (hyperopia), or at two separate points near the retina, resulting in near-sightedness, farsightedness, or astigmatism, respectively <sup>[2]</sup>. Paediatric uncorrected refractive errors are associated with increased morbidity and can limit their educational opportunities which in turn affects their quality of life in the adult population <sup>[3, 4]</sup>. VISION 2020 initiative considered refractive errors as a priority disease. Despite the availability of a cost-effective intervention to address this problem, uncorrected refractive errors are a major public health challenge. Globally, uncorrected refractive errors are the leading cause of vision impairment and the second leading cause of blindness in developing countries, including India <sup>[5]</sup>. According to the World Health Organization (WHO), refractive errors are responsible for 42% and 3% of visual impairment and blindness respectively, in the world. WHO says that myopia can have a potential negative impact on career choice, ocular health, and sometimes self-esteem <sup>[6]</sup>. Awareness of common eye diseases is important

for teachers as they are the first to recognise a symptom in the child and report it to the parents. Children spend a considerable amount of time in school and it is possible for teachers to assess them easily. Early detection and management of this disease is essential to prevent visual impairment, blindness, and its sequelae [7]. Lack of awareness in teachers regarding common eye diseases can lead to visual impairment and ocular morbidity [8].

### Material and Methods

This is a questionnaire based cross-sectional study which was started following Research committee and ethics committee approval of the institution. The study was conducted in various English medium schools in Ludhiana after obtaining due permission from the principal's office of the institution and the respective school principals.

100 primary school teachers were randomly selected and handed a questionnaire after a written informed consent was

obtained. The questionnaire consisted of two sections. Section A specifies details about the demographic profile of the subject. Section B is divided into two parts: Part 1 consisting of 18 multiple choice questions and part 2 consisting of 17 true or false questions. A total score was calculated and the teachers were graded based on the scores. The grading of knowledge table was based on the responses filled in correctly. The range of percentage is a numerical depiction on percentage basis which helps in grading the responses to the questionnaire.

**Sample Size:** The sample size was calculated using open epi version3, software. Based on the prevalence of primary school teachers who had adequate awareness regarding refractive errors in school children (80%) observed from the earlier publication [9].

### Results

**Table 1:** Demographic Data N=100

Age	Percentage
<=30	24
31-40	35
41-50	25
51 & above	16
Gender	
Male	13
Female	87
Educational qualification	
Ba/bsc/bcom	44
Ma/msc/mcom	56
Years of experience	
<=5	28
6-10	23
11-20	31
21-30	16
31 & above	2

The data presented in Table 1 shows that 35% of the school teachers belonged to the age group of 31-40 yrs and 87% of the teachers were females. Fifty six teachers have done

postgraduation i.e. MA/MSC/Mcom and 31 teachers had 11-20 years of experience in teaching.

**Table 2:** Prior Knowledge & Experience Regarding Refractive Errors

Do you have any prior knowledge regarding refractive errors?	
Yes	72
No	28
Do you have previous experience of identifying visual problems in children	
Yes	57
No	43

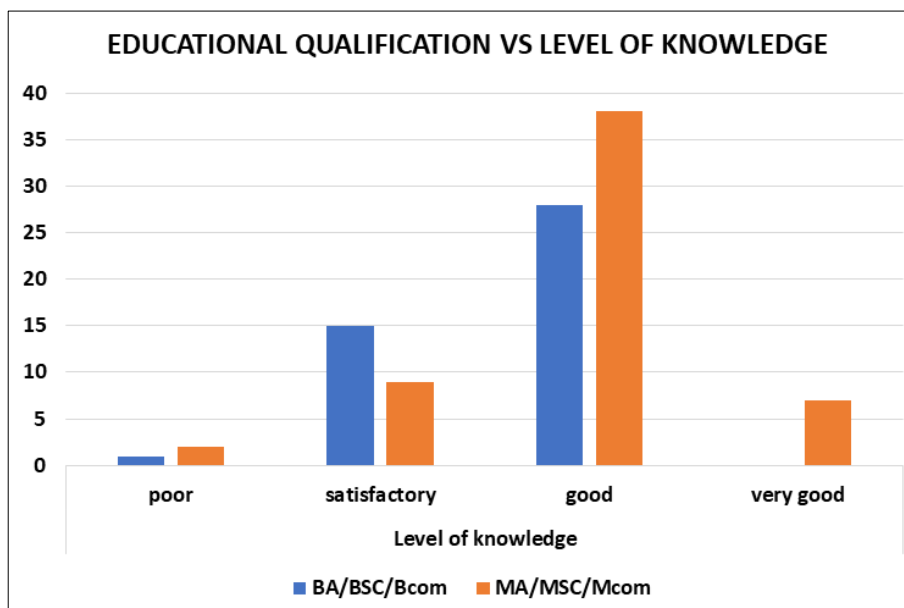
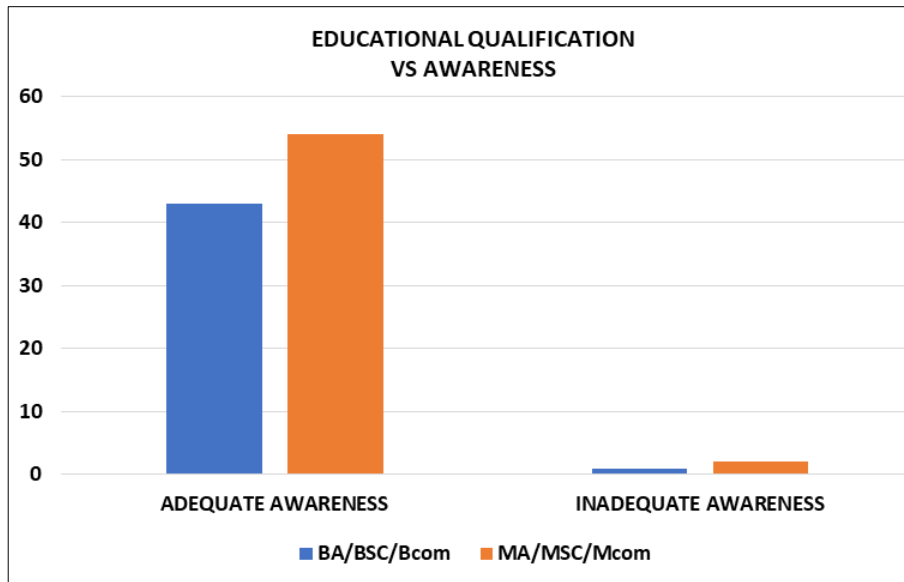
Majority (72) of the teachers had prior knowledge of refractive errors. However, 28 teachers had no such prior knowledge. With regards to previous experience of identifying visual problems in children, 57 teachers had such prior experience whereas 43 did not have such prior experience (Table 2).

Based on their educational qualification, 56 teachers were post graduates (MA, MSc, MCom) and 44 were undergraduates (BA, BSc, BCom, B.Ed.). Amongst the post graduates 54 teachers had adequate awareness whereas 2

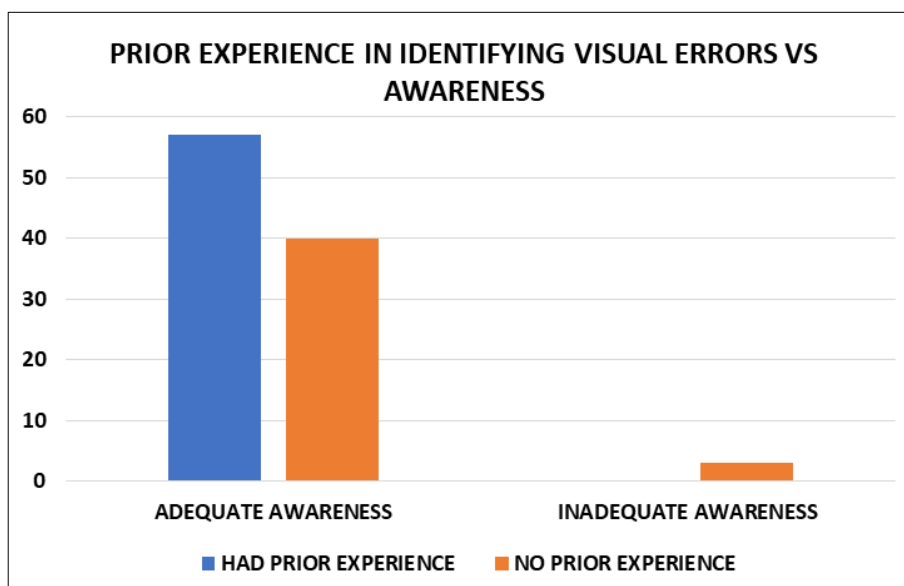
had inadequate awareness; in the under graduates, 43 teachers had adequate awareness whereas 1 had inadequate awareness.

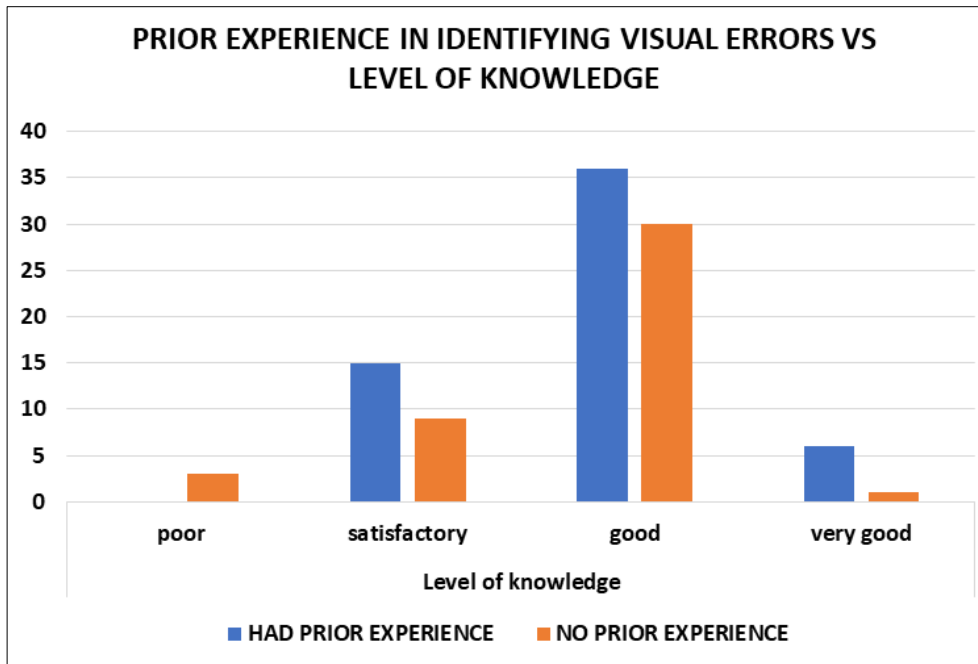
Among the postgraduates, 7 had very good knowledge, 38 had good, 9 had satisfactory and 2 had poor knowledge; whereas among the undergraduates 1 had poor knowledge, 15 had satisfactory, 28 had good and none had very good knowledge.

### Educational Qualification



**Prior experience in identifying visual errors**

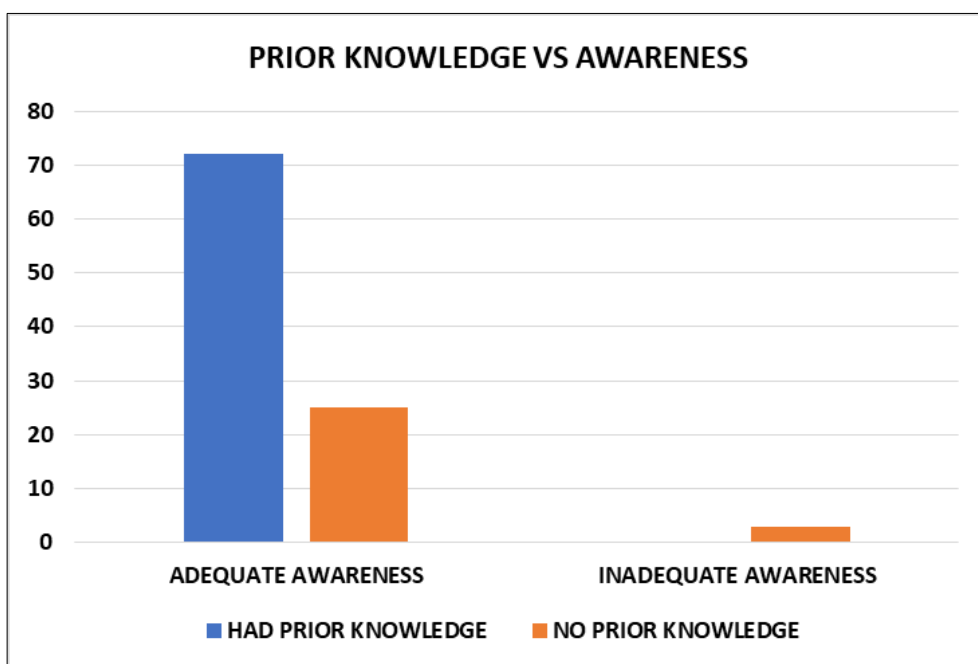


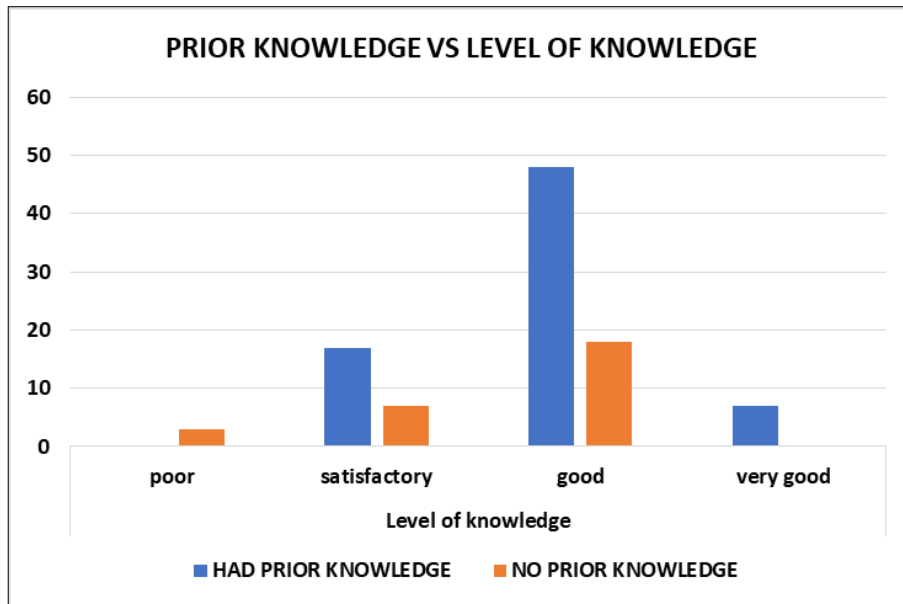


With regard to prior experience in identifying visual errors in children, 57 teachers said they had prior experience in identifying visual errors whereas 43 teachers had no such prior experience. Among those with prior experience, everyone (57) had adequate awareness. Among teachers who said they had no such prior experience, 3 teachers had inadequate awareness and 40 had adequate awareness. Among the teachers with prior experience of having identified visual problems, none had poor knowledge, 15 had satisfactory knowledge, 36 had good knowledge and 6 had very good knowledge; among those who had no prior experience of having identified visual problems, 1 had very good knowledge, 30 had good knowledge, 9 had satisfactory knowledge, and 3 had poor knowledge. About 72 teachers reported having prior knowledge

regarding refractive errors and 28 teachers said they had no such prior knowledge. Among those with prior knowledge, everyone (72) had adequate awareness. In teachers who said they had no such prior knowledge 3 teachers had inadequate awareness and 25 had adequate awareness. Among the 72 teachers who reported having prior knowledge regarding refractive errors, none had poor knowledge, 17 had a satisfactory level of knowledge, 48 had a good level of knowledge, and 7 fell into the very good level of knowledge category. In contrast, of the 28 teachers who did not have prior knowledge regarding refractive errors, none had very good knowledge, 18 had good level, 7 had satisfactory and 3 had poor knowledge.

**Prior Knowledge Regarding Refractive Errors**





**Table 3:** Source of Information With Respect To Level of Knowledge

Level of knowledge					
Source of information related to refractive error (if yes)	Poor	Satisfactory	Good	Very good	Total
Mass media	0	4	11	2	17
Health personnel/ school health programs	0	7	21	3	31
Interaction with children with refractive error	0	5	8	0	13
Miscellaneous sources	0	1	7	2	10
Information from parents	0	0	1	0	1

Among the teachers with prior knowledge about refractive errors (72 teachers), based on the source of information, 31 received information from health personnel/ school health programs, 17 from mass media, 13 from interaction with children with refractive errors, 10 from miscellaneous sources and 1 from parents of the children. Among the teachers who received their information from health personnel/ school health programme, 7 had satisfactory knowledge, 21 had good knowledge and 3 had very good knowledge. Among those who received their knowledge from mass media, 4 had satisfactory knowledge, 11 had good knowledge and 2 had very good knowledge. In teachers who received their knowledge from interaction with children with refractive errors, 5 had satisfactory knowledge, 8 had good knowledge and none had very good knowledge. In teachers who received their information from miscellaneous sources, 1 had satisfactory knowledge, 7 had good knowledge and 2 had very good knowledge. Only 1 teacher received their information from parents and exhibited a good level of knowledge

**Discussion**

Refractive errors are one of the most common ocular conditions, and they are an avoidable cause of visual impairment affecting children worldwide [1]. In a study done by Vijayalakshmi *et al.*, it was concluded that uncorrected refractive errors continue to be the most common cause of vision impairment seen in Indian children [10]. Early detection and management of refractive errors are essential to prevent visual impairment, blindness, and their sequelae [7].

A significant percentage (97%) of the participants demonstrated adequate awareness regarding refractive errors in children. Among teachers with adequate awareness, 24% had satisfactory level of knowledge, 66% had good level of

knowledge, and 7% had very good knowledge regarding refractive errors. This is consistent with the findings of Singh *et al.*, who reported a high level of awareness among teachers regarding common eye diseases [8].

In our study, teachers who had postgraduate qualifications had better awareness and knowledge of refractive errors compared to teachers who had undergraduate qualifications, which showed that higher educational qualifications have an impact on the understanding of refractive errors. This is in congruence with the study by Wilhelmsen *et al.* [11].

In this study, 57% of teachers had prior experience in identifying visual problems in children, whereas none had such exposure in the study conducted by Kohli and Nair *et al.* in Karnataka and this was statistically significant. 9 Out of these 57 teachers, 6 had very good knowledge, 36 had good and 15 had satisfactory knowledge. Among the 43 teachers with no prior experience, 3 teachers had poor knowledge, 9 had satisfactory, 30 had good and 1 teacher had very good knowledge. This concurs with the study done by Latorre-Arteaga *et al.*, who had a similar conclusion that teachers with prior experience of identifying visual problems in children were better at identifying refractive errors in children [2].

A majority (72%) of the teachers reported having prior knowledge of refractive errors. Of the 97 teachers with adequate awareness, 72 had prior knowledge and 25 did not have any prior knowledge which was a significant difference. All teachers with inadequate awareness also lacked prior knowledge. Despite high levels of awareness, differences in knowledge levels existed among the teachers which could be attributed to various factors such as higher level of education and their source of information about refractive errors. Similar results were observed in a study by Wilhelmsen *et al.* [11].

Although the association between the source of information and knowledge levels was not statistically significant, teachers who got information from health professionals/school health programs had relatively better knowledge levels than those who received information from other sources. This indicates the importance of conducting training or informative sessions with respect to child health to enhance teachers' knowledge and their ability to recognize visual impairments in students. This is consistent with WHO RESC (Refractive Error Study in Children) protocol which stresses on the importance of school based training in identifying refractive errors and thus highlights the importance of conducting such sessions to improve awareness of refractive errors among teachers [6].

### Conclusion

In conclusion, the study depicts that although most teachers possessed adequate awareness (broader understanding) about refractive errors, there was a considerable variation in their knowledge (detailed and concrete understanding) levels. For improved screening and early intervention, it is important to strengthen the teachers' education through regular, organized training programs and active interaction with healthcare professionals. Having a structured training program coupled with school screening programs could further contribute towards early detection of refractive errors, amblyopia, and other ocular problems, leading to improved visual health and performance of children. It can also improve the academic performance of the affected children as well as their social well-being.

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