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Knowledge and practices of teachers associated with eye health of primary school children in Rawalpindi, Pakistan

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Abstract:

PURPOSE: Teachers' perspectives on eye health can be limited, particularly in developing countries. The aim of this study was to assess teachers' knowledge and practices associated with eye health of primary students in Rawalpindi, Pakistan.

METHODS: This was a cross-sectional survey of primary school teachers. Simple random sampling technique was used to select 443 participants from 34 private and 17 public schools. A self-administered questionnaire was used.

RESULTS: Teachers' knowledge ranged from "high" (35.89%), "moderate" (49.89%), and "low" (14.22%). Teachers' practices associated with students' eye health ranged from "high" (10.16%), "moderate" (23.02%), and "low" (66.82%). The teachers' knowledge index scores increased 4.28 points with successive age groups and increased 2.41 points with each successive level of education. For teachers whose close relatives experienced eye disease, their knowledge index score was 4.51 points higher than those teachers whose relatives never had any eye disease. Teachers' age, education level, and their close relatives experiencing eye disease were significant predictors of their knowledge ($R^2 = 0.087$, $P < 0.001$). Female teachers' practices index score was 10.35 points higher than the male teachers and public school teachers had 10.13 points higher than the private school teachers. Teachers' gender and type of school were significant predictors of their practices ($R^2 = 0.06$, $P < 0.001$).

CONCLUSION: There was a significant gap among primary school teachers' knowledge and practices related to students' eye health. Innovative strategies are needed to improve how teachers address students' eye health issues in the classroom.

Keywords:

Eye health, knowledge, practices, students, teachers

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Introduction

Globally, an estimated 19 million children are visually impaired or blind. Among them, 12 million children are visually impaired due to uncorrected refractive errors, which could be diagnosed and corrected with the provision of spectacles.[1,2]

Between the ages of 0 and 12 years, a child's vision development is a critical period, as vision impacts the child's learning ability.[3] In resource-poor settings, school age children may be affected by a number of eye diseases including trachoma, conjunctivitis, allergies, injuries, Vitamin A deficiency, and congenital cataract. Due to the lack of appropriate eye health services, many children may be developed permanent vision loss resulting in severe low vision.[1]

In Pakistan, the prevalence of avoidable blindness among children of <15 years of age is 0.08%, and the estimated number of blind children is 125,388.[4] However, childhood blindness is a lifelong disability making it a very critical public health issue

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that needs to be addressed through improved awareness and interventions.

In this respect, school health programs can play an essential role in eye health promotion, prevention, early detection, and treatment of ocular problems in children. In developing countries, the provision of specific eye health training in school programs equips the children to play a vital role in improving the eye health of their families and community. The decline in infectious diseases such as trachoma has been influenced because of children taking eye health messages to their families.[5] As children spend most of their time in school, primary teachers' knowledge and awareness of eye health issues are essential to influence the provision of better eye health-care practices among their students. This can help in creating awareness about eye health among children, their parents, and communities and may also help in developing a school curriculum that incorporates eye health as an important component in messages related to overall health and well-being of the children. In Pakistan, little is known about teachers' perspectives about eye health and its importance for students' learning. This study aimed to determine the primary school teachers' level of knowledge about common eye problems, their prevention, and best treatment options, and to assess the general practices of teachers regarding eye care, prevention, and treatment of eye problems in their students, in Rawalpindi city, Pakistan.

Methods

This cross-sectional study was conducted in Rawalpindi city, the 4th most populous metropolitan area of Pakistan.[6] Rawalpindi was chosen due to its adequate representation of public and private schools and students belonging to all socio-demographic strata.

The sample size was calculated using OpenEpi software (Open Source Epidemiologic Statistics for Public Health, Version. www.OpenEpi.com) (95% confidence interval) with a 50% anticipated frequency of knowledge. The sample size calculated was 384 plus 15% of error rate. The total sample size to be collected was 443. All schools were stratified into private and public with a ratio of 2:1, on the basis of the proportion of total number of schools in the city. Simple random sampling technique was used to select the schools using computer's random number tables. From the selected schools, all the preschool and primary level (up to 5th grade) teachers were invited to participate in the study. A total of 59 schools were visited to participate in the study, but 8 (5 private and 3 public) schools declined.

Preparation of the questionnaire

The questionnaire was based on research conducted in Cambodia[7] and adapted for Pakistan. Additional questions applying to the school context were included in the study. The questionnaire was then checked for content validity by an Ophthalmologist, a public health professional and the author of the Cambodian knowledge, attitude and practice (KAP) survey.

In total, there were 68 items (knowledge 54 and practice 14). A total of 54 items or questions, relating to general knowledge about children's eye health (common eye diseases); symptoms to observe in the classroom (e.g., squinting, reading ability, involvement in activities, and academic achievement); and prevention were included. Fourteen items were related to practices of teachers, regarding the eye care of their students in the classrooms.

The questionnaire was translated into Urdu, Pakistan's national language. It was then piloted in one public and two private schools. The revised questionnaire was self-administered, in paper format, and comprised closed-ended multiple choice questions.

Ethics approval

The study followed the tenets of the Declaration of Helsinki. Ethics approval was granted by the Ethics Committee of the Al-Shifa Trust Eye Hospital. School administrators were approached and invited to participate in the study. Informed written consent was obtained from all participants. The provision was made by the Al-Shifa Trust Eye Hospital for schools to refer students seeking further assistance or to conduct vision screening in the school.

Data collection and management

The data collection was conducted by the first author. All the questionnaires were collected and coded to ensure anonymity of the respondents. Data were analyzed using SPSS version 18 (SPSS Inc., Chicago, IL, USA). All statistical tests were performed using 0.05 as the level of significance.

Analysis process

Reliability of scales

Total scores were calculated for knowledge and practices and were then computed as an index score out of 100. The total score for knowledge and practices was classified into three categories: "Low" ≤50 index score, "Moderate" from 51 to 69 index score, and "High," 70 and above index score.

The Cronbach's alpha coefficient was used to measure the internal consistency, as a measure of reliability.

Explanatory variables

Variables included in the survey were age group (16–25, 26–45, 46–60), sex, education level (undergraduate,

graduate, masters, or above), type of school (public or private), respondent ever had an eye disease, and relatives ever had an eye disease. The outcome (continuous) contained index scores of knowledge and practices. As the data were not normally distributed in all the four outcome variables, nonparametric tests were selected for analysis.

The Mann–Whitney U-test was used to compare the index scores of knowledge and practices among public and private schools, males and females, and among respondents who or their close relatives, ever had any eye disease compared to those respondents or their close relatives who never had any eye disease. The Kruskal–Wallis test was used to compare the index scores of knowledge and practices among three age groups and three education levels.

Multiple linear regression was used to predict the knowledge and practices index scores of teachers based on their age, gender, type of school, education, and teachers or their close relatives who had experienced eye diseases.

Results

Of the 59, (39:20) randomly selected schools, 34 private and 17 public schools participated in the study. A total of 443 teachers (85.7% of female) were interviewed with 34.3% (n = 152) teaching in public schools and the remainder 65.6% (n = 291) from private schools. The overall participation rate of teachers was 92.4% (443 out of 479 teachers from 51 schools). Of the teachers, 197 (44.4%) had completed graduate studies, 183 (41.3%) had a master's degree or higher, whereas 47 (10.6%) teachers were undergraduates [Table 1].

The Cronbach's alpha coefficient for the knowledge scale score was 0.83, and 0.81 for practices scale. Teachers' knowledge (having heard about the eye diseases) showed some variation between private and public schools. A significantly higher knowledge was observed for glaucoma, refractive error, trachoma, conjunctivitis, pterygium, age-related macular degeneration, and diabetic retinopathy among the public school teachers [Table 2]. Teachers' knowledge of the causes of blindness and vision impairment were similar between the private and public schools except diet and systemic diseases, in which the public school teachers had significantly higher knowledge than the private school teachers [Table 3].

Knowledge

Using the Mann–Whitney U-test, no significant difference of knowledge index scores was found between public and private school teachers (P = 0.28) and female teachers versus male teachers (P = 0.75) [Table 4].

However, the knowledge index scores of the teachers who had experienced eye disease were significantly higher than those who did not experience eye disease (P = 0.04). Similarly, the knowledge index scores of the teachers who had a close relative with an eye disease anytime in their life were significantly higher than those whose close relatives never had any eye disease (P = 0.008) [Table 4].

The Kruskal–Wallis test revealed a significant difference in knowledge scores among three different age groups (P < 0.001) and three different levels of education (P = 0.01) [Table 4].

A significant regression equation was found (F [6, 404] =6.41, P < 0.001), with an R^2 of 0.087. The teachers' knowledge index scores increased 4.28 points with successive age groups and increased 2.41 points with each successive level of education. For teachers whose close relatives experienced eye disease, their knowledge index score was 4.51 points higher than those teachers whose relatives never had any eye disease. Teachers' age, education level, and their close relatives experiencing eye disease were significant predictors of their knowledge [Table 5].

Practices

There was a significant difference in practice index scores of teachers in public and private schools (P = 0.001) and teachers who had experienced eye disease as compared to those who never experienced eye disease (P = 0.004) [Table 4]. However, no difference in practice index scores was found for gender or between teachers whose close relatives had an eye

Table 1: Demographic profile of primary school teachers in Rawalpindi, Pakistan

Variables	Private schools, *n* (%)	Public schools, *n* (%)
Gender		
Male	13 (4.5)	50 (32.9)
Female	278 (95.5)	102 (67.1)
Age groups		
16-25	173 (59.5)	4 (2.6)
26-45	105 (36.1)	104 (68.4)
46-60	5 (1.7)	29 (19.1)
Education level		
Under graduate	35 (12.0)	12 (7.9)
Graduate	141 (48.5)	56 (36.8)
Masters or above	111 (38.1)	72 (47.4)
Respondents had eye disease ever		
Yes	194 (66.7)	112 (73.7)
No	97 (33.3)	40 (26.3)
Relatives had eye disease ever		
Yes	241 (82.8)	122 (80.3)
No	50 (17.2)	30 (19.7)

Table 2: The frequency of teachers who had heard about any eye disease

Eye diseases	Heard about eye disease		Total Yes (%)	*P**
	Private school Yes/*n* (%)	Public school Yes/*n* (%)		
Pediatric eye diseases				
Congenital cataract	168/291 (57.7)	102/152 (67.1)	270 (60.9)	0.061
Xerophthalmia	216/291 (74.2)	118/152 (77.6)	334 (75.4)	0.501
Pediatric and adult eye diseases				
Cataract	280/291 (96.2)	149/152 (98)	429 (96.8)	0.303
Glaucoma	208/291 (71.5)	126/152 (82.9)	334 (75.4)	0.008
Squint	267/291 (91.8)	148/152 (97.4)	415 (93.7)	0.021
Refractive error	246/291 (84.5)	145/152 (95.4)	391 (88.3)	0.002
Trachoma	100/291 (34.4)	100/152 (65.8)	200 (45.1)	<0.001
Conjunctivitis	198/291 (68)	133/152 (87.5)	331 (74.7)	<0.001
Pterygium	26/291 (8.9)	32/152 (21.1)	58 (13.1)	<0.001
Adult eye diseases				
Age-related macular degeneration	209/291 (71.8)	128/152 (84.2)	337 (76.1)	0.007
Diabetic retinopathy	191/291 (65.6)	119/152 (78.3)	310 (70)	0.006

*Mann–Whitney U-test

Table 3: Teachers' knowledge about causes of blindness

Causes of blindness	Heard about eye disease		Total Yes (%)	*P**
	Private school Yes/*n* (%)	Public school Yes/*n* (%)		
Ocular disease	178/291 (61.2)	95/152 (62.5)	273 (61.6)	0.818
Congenital	145/291 (49.8)	85/152 (55.9)	230 (51.9)	0.237
Trauma to eye	110/291 (37.8)	61/152 (40.1)	171 (38.6)	0.652
Old age	104/291 (35.7)	60/152 (39.5)	164 (37.0)	0.456
Poor diet	73/291 (25.1)	64/152 (42.1)	137 (30.9)	<0.001
Systemic disease	52/291 (17.9)	47/152 (30.9)	99 (22.3)	0.002

*Mann–Whitney U-test

disease and teachers whose close relatives had never experienced eye disease. There was also a significant difference in practice index scores among three age groups ($P < 0.001$) [Table 4]. A significant regression equation was found (F [6, 404] =4.32, $P < 0.001$), with an R^2 of 0.06. Female teachers' practices index score was 10.35 points higher than the male teachers and public school teachers had 10.13 points higher than private school teachers. Teachers' gender and type of school were assessed as significant predictors of their practices [Table 5]. In total, 76.2% of teachers reported that some blindness can be prevented; however, 17.3% of teachers did not know, and 5.4% of teachers reported that any type of blindness cannot be prevented.

Discussion

The general knowledge index score was not found to be significantly different among teachers (of either gender) among public and private schools. However, knowledge scores of the teachers who had an eye disease were significantly higher than those who had no eye disease. Consequently, they may be more likely to have greater knowledge about these diseases than private school teachers.

Teachers' practice index scores were significantly different among public and private schools. Gender was also found to be a predictor of practice, with female teachers being likely to be more proactive toward eye health.

A Nigerian KAP study of elementary school teachers reported that 98.8% of teachers rated good eyesight as important or very important, identified good nutrition (84.9%) and adequate lighting (74.4%) as requirements for optimal eye health.[8] A KAP study of parent or guardians and childhood eye care in Southern Ethiopia found that while 90.3% had heard of childhood eye diseases, 75.7% did not know of the proper solutions.[9]

Other studies have reported differences in knowledge levels and education. While a population-based Iranian study found that there was no significant correlation between age and knowledge of different eye diseases,[10] a study from Nepal reported that older respondents had less awareness of cataract, glaucoma, trachoma, and diabetic retinopathy.[11]

Although our study focused on teachers, we found that those in the age group of 26–45 years had higher levels of knowledge than younger or older age groups. This could be attributed to the lack of awareness of eye diseases among older teachers and less education among younger teachers, a finding consistent with other studies.[7,12]

A Cambodian study found that only two-thirds of community participants believed blindness can be prevented,[7] whereas, in an Ethiopian study, 88.5% of

Table 4: Comparison of Knowledge and Practices, and explanatory variables

	Knowledge				Practices			
	Median	Minimum	Maximum	*P*	Median	Minimum	Maximum	*P*
Gender								
Male	64.81	35.19	92.59	0.755*	28.57	0.00	92.86	0.165*
Female	64.81	20.37	92.59		42.86	0.00	92.86	
Age groups								
16-25	61.11	20.37	85.19	<0.001**	35.71	0.00	71.43	<0.001**
26-45	66.67	29.63	92.59		42.86	0.00	92.86	
46-60	63.89	27.78	92.59		35.71	0.00	85.71	
Type of school								
Public	64.81	35.19	92.59	0.277*	42.86	0.00	92.86	0.001*
Private	64.81	20.37	92.59		35.71	0.00	78.57	
Education level								
Under graduate	61.11	20.37	87.04	0.01**	28.57	0.00	78.57	0.234**
Graduation	62.96	27.78	92.59		42.86	0.00	85.71	
Masters or above	66.67	27.78	92.59		42.86	0.00	92.86	
Respondents had eye disease ever								
Yes	64.81	27.78	92.59	0.046*	42.86	0.00	92.86	0.004*
No	62.96	20.37	88.89		28.57	0.00	92.86	
Relatives had eye disease ever								
Yes	64.81	27.78	92.59	0.008*	42.86	0.00	92.86	0.065*
No	62.04	20.37	87.04		32.14	0.00	92.86	

*Mann–Whitney U-test, **Kruskal–Wallis test

Table 5: Multiple linear regression analysis of factors associated with knowledge and practices of teachers regarding eye care of their students

Independent variables	Knowledge				Practices			
	B	SE	*t*	*P*	*B*	SE	*t*	*P*
Age groups	4.28	1.28	3.35	0.001	3.73	2.80	1.33	0.18
Gender	1.43	1.98	0.72	0.47	10.35	4.34	2.39	0.01
Type of school	−0.02	1.79	−0.01	0.99	10.13	3.94	2.57	0.01
Education level	2.41	0.97	2.47	0.01	2.43	2.13	1.14	0.25
Respondents ever had any eye disease	1.43	1.45	0.98	0.33	4.64	3.18	1.45	0.14
Respondents close relatives ever had any eye disease	4.51	1.68	2.68	0.008	2.83	3.69	0.77	0.44

SE = Standard error

the respondents believed that childhood eye diseases can be cured.[9] In this study, 76.3% of teachers reported that some blindness can be prevented. This has important implications as health education interventions can be targeted to teachers who can play an important role in blindness prevention.

A Nigerian study on the level of knowledge of glaucoma and attitudes toward prevention and treatment of blindness reported that people with a relative who had a diagnosis of glaucoma, older people, females, and people with correct knowledge of common eye diseases were significantly more likely to be under eye care.[13] In this study, public school teachers were also found to be knowledgeable about glaucoma and teachers who had a relative with an eye disease were more likely to have knowledge about students' eye health. In this regard, media can play a major role in educating the masses about different eye diseases and their prevention.

A program implemented by Sightsavers Pakistan for children's eye health in five slum areas of urban cities reported that their efforts had improved school teachers' skills to detect children in their classes for obvious eye defects or problems.[14] In Timor-Leste, a baseline study of student's KAP about eye health conducted among four rural primary schools, teachers included in the study believed that the awareness creating intervention could be beneficial and should be incorporated into the school curriculum.[15] This study supports the notion of revising the school curriculum to include eye health among students and providing health education training and materials to teachers.

The Punjab government has taken the responsibility of giving right to education to all children between 5 and 16 years of age in the province.[16] Rawalpindi city has the highest literacy rate in Punjab and 2nd highest literacy rate in the country;[17] therefore, teacher focused interventions are more likely to reach all primary level children.

Strengths of this study were the use of a random sampling technique for data collection and adequate sample size. However, a larger sample including rural areas would have made the study more generalizable. The scale scores for knowledge and practices were strongly reliable.

This study revealed a huge gap of knowledge and practices among the primary school teachers of public and private schools regarding eye care of their students, demonstrating an essential area of need for improved strategies to train teachers about the importance of eye health. School administered interventions should teach the children the importance of proper hand washing, good nutrition, and other preventive measures for their eye care. Nongovernmental organizations and the government should increase and improve strategic interventions to enhance childhood eye health in Pakistan. The Ministry of Health, Ministry of Education and eye care professionals should work in collaboration to organize school screening programs and ensure better provision of eye care for all children.

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Conflicts of interest

The authors have no any conflicts of interest to declare.

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