REVIEW ARTICLE

Teachers' Knowledge, Attitude, and Practice on Schoolchildren's Visual and Eye Health: A Scoping Review

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ABSTRACT

Visual impairment in children has become a public health issue due to the increasing prevalence of myopia. Studies on knowledge, attitude, and practice (KAP) of teachers regarding visual and eye health of schoolchildren is an important step before implementing further collaboration between education and healthcare systems. Such input is limited as many developing countries are early in involving teachers in school health screening programmes. This review aims to understand the level of KAP among teachers on this matter and the methodology used to conduct these studies. This scoping review was conducted using Arksey and O'Malley's framework for scoping studies. A systematic search using electronic databases (Scopus, Web of Science, PubMed and Ebscohost) was conducted to identify relevant articles, imported into the Rayyan web application for review management. A total of 463 articles were identified during the selection process, and 17 articles were eventually included in this scoping review after eligibility screening. These studies were grouped into three designs: cross-sectional, intervention, and qualitative. This scoping review revealed that the level of knowledge and practice among teachers on schoolchildren's visual and eye health was low to moderate, while the level of attitude was good. Some misconceptions exist among teachers regarding children's visual and eye health. Training programmes for teachers are crucial to significantly improve their KAP levels. Most of the teachers lacked the knowledge and practice concerning children's visual and eye health. However, with a good attitude, their awareness level can be upgraded with proper training, eye screening facilities, and access to information.

Keywords
Knowledge, attitude, practice, teachers, eye health.

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INTRODUCTION

Visual impairment in children has become a public health issue due to the increasing trends of myopia prevalence. It is estimated that by 2050, 49.8% of the global population will be myopic, a significant increase from 22.9% in 2000.[1] Myopia increases the risk of myopic macular degeneration, retinal detachment, glaucoma, and cataracts, which further leads to a reduced quality of life in children.[2] A study in Taiwan revealed that the cause of severity of myopia among schoolchildren was the early onset of myopia. That study also proposed that more consideration should be given to the eye care of preschool children to reduce the prevalence and severity of myopia.[3] Due to the lack of manpower to conduct large-scale screening programmes, school teachers served as vision screeners in some countries.[4–6]

The role of teachers are important and are well-positioned to support the healthcare system in reducing vision impairment among children.[7] Hence, creating awareness of visual and eye health of children among school teachers is an important measure to be considered. By having teachers with basic visual and eye health knowledge, they are in a position to identify whether the students need proper eye examination and treatment. Besides, teachers can also educate students to practice good visual habits and consistently encourage them to practice the habits whilst in school and at home. Therefore, data on the level of knowledge, attitude, and practice (KAP) regarding the vision and eye health of children and methodologies to conduct the studies will be helpful for researchers in the

field before involving teachers in vision screening programmes.

Knowledge, attitude and practice (KAP) studies have been applied in the investigation of health-related behaviours and health-seeking practices of a community.[8] KAP may also be done prior to implementing awareness programmes in a community to understand the environment in which the programmes are to take place. [9] Moreover, data gathered from KAP studies can be used to implement and evaluate the awareness programmes and identify factors that might contribute to particular behaviour.[10] Several studies have been conducted globally regarding the KAP of teachers on visual and eye health; hence, this review aims to understand the level of awareness and methodologies used to carry out such studies.

MATERIALS AND METHODS

This review was carried out following Arksey and O'Malley's methodological framework,[11] as follows: 1) identifying the research questions; 2) identifying relevant studies; 3) study selection; 4) charting the data; and 5) collating, summarising, and reporting the results. Data for this review are summarised and reported according to the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews) standard.[12]

Identifying the research question

Arksey and O'Malley's framework [11] recommends that a research question in scoping studies should be broad to get a broad description of the topic. The research question for this review was "What is known about teachers' knowledge, attitude, and practice on schoolchildren's visual and eye health?"

Identifying relevant studies

A search was conducted for published and unpublished studies between July 2023 and August 2023 using the following sources: electronic databases, reference lists, and hand-searching of the existing key journal network. The electronic databases used were: Scopus, Web of Science (WoS), PubMed, and EbsCohost. Studies containing keywords such as 'knowledge', 'attitude', 'practice', 'teachers', 'schoolchildren', 'visual', and 'eye health' were identified using Boolean operators such as 'OR' and 'AND'. Synonyms for all the keywords were also included in the search. The search strategy is presented in Appendix A. A hand search was conducted from the reference list and key journals. Mendeley desktop was used as the citation manager for this review, and the Rayyan web application was used to facilitate the reviewing process.

Study selection

Articles from the database and hand search were imported into the Rayyan web application for title and abstract screening. The screening was performed by two reviewers guided by the research question stated above and followed the inclusion criteria for this review. Any discrepancies were discussed with a third reviewer to finalise the study selection process. The inclusion criteria included:

- Government or private school teachers.
- With outcome assessing either knowledge, attitude, or practice of teachers on either visual or eye health of schoolchildren.
- Articles are written in English for feasibility.
- Both published and unpublished literature.

This review did not have a timeline restriction, and the articles were selected based on the above criteria. Articles that did not fall within these criteria were excluded from the review. Next, the full article of the refined search was retrieved and read by two reviewers to finalise the chosen articles to be reviewed.

Charting the data

Data charting was performed following the study selection process. During this stage, key information from the selected articles was extracted and organised into Microsoft Excel. The following variables were recorded: author(s), year of publication, country, title, study objectives, study participants, response rate,

sampling method, study design, data collection tools, language used for data collection, main findings, and study limitations.

Collating, summarising, and reporting the results

The collating, summarising, and reporting stage involves organising the relevant findings into themes. [11] The main findings of the data extracted were organised into the following themes: knowledge, attitude, and practice. For this study, all synonyms for knowledge (awareness), attitude (belief, perspective, and perception), and practice (action and habit) were reported as knowledge, attitude, and practice.

RESULTS

Selection of studies

A total of 455 articles were identified through online databases (Scopus, Web of Science [WoS], PubMed, and EbsCohost), while 8 were identified through other sources (reference lists and hand-searching of key journals). After removing duplicates, 401 articles were retained for abstract screening conducted by two reviewers. Screening of the abstract was conducted to exclude studies that do not fall into the inclusion criteria of this scoping review, resulting in 380 articles being excluded. Hence, the number of full-text articles assessed for eligibility was reduced to 21. The full-text articles were read by two reviewers to determine those complying with the study. Three articles were excluded as the outcomes did not report either knowledge, attitude, or practice but focussed on the experience of teachers having students with uncorrected poor vision and the benefits of spectacles. The other article was excluded as the outcome was not specific to teachers alone. Finally, 17 articles were included in this review for data extraction. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram for the scoping review process is presented in Figure 1.

Characteristics of included studies

The 17 studies were conducted between 2006 and 2023 and involved various countries. Six studies were conducted in Africa (Ghana, Nigeria, Ethiopia, and South

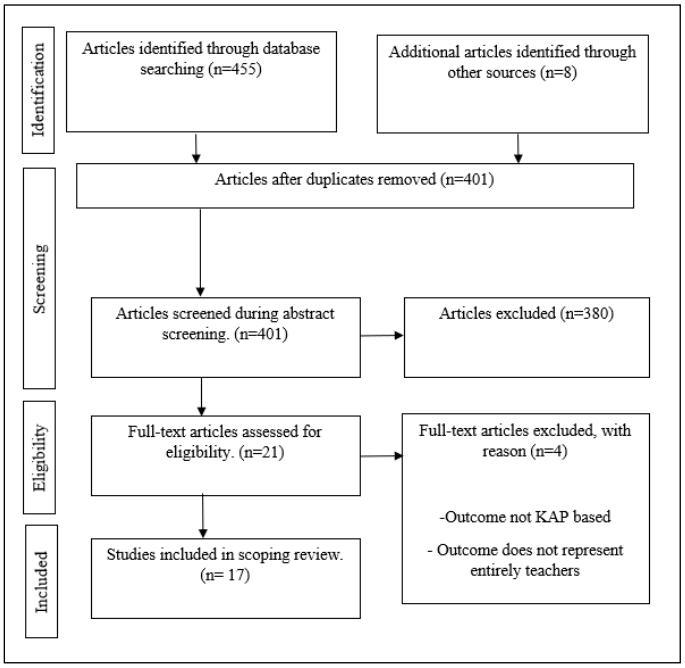

Figure 1: PRISMA flow-chart of the study selection process [13]

Africa), three in Pakistan, two in China, two in India, two in Northern Ireland, one in Malaysia, and one in the United States of America (USA)(Figure 2).

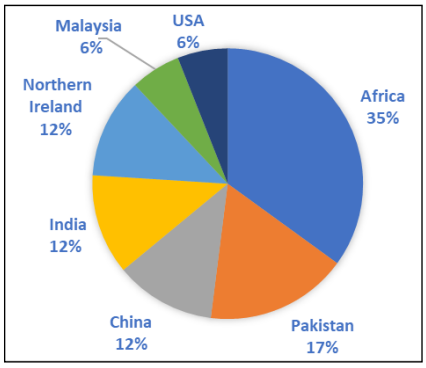

Figure 2: Distribution of included studies by country

Most of the study participants were primary school teachers,[14–21] followed by secondary teachers,[22,23] and pre-school teachers.[24] Some studies also involved preschool and primary school teachers[25,26] or primary and secondary school teachers,[27, 28] (Figure 3). However, two studies [29,30] did not describe the roles of the teachers in their study.

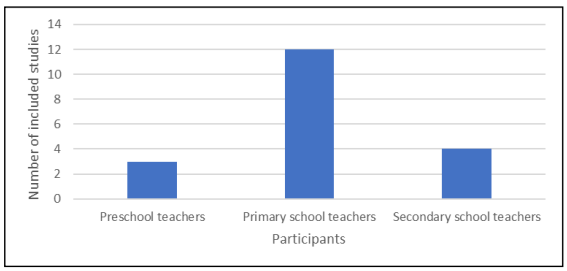

Figure 3: Distribution of included studies by participants

Methodology of included studies

Seven studies were cross-sectional, seven intervention studies, and three qualitative studies. Among the seven intervention studies, one was a cluster randomised controlled,[15] while another was a prospective study.[24] The qualitative studies were conducted as in-depth interviews [21,30] and focus group discussions.[22] Meanwhile, for the quantitative studies, ten studies used a self-administered paper questionnaire as a means of data collection,[14–16,19,20,23–26,28] while one study utilised a self-administered online questionnaire.[18] The other three studies[17,27,29] used a paper questionnaire; however, the method was not mentioned, i.e., whether self-administered or interviewer-administered. The language used in the data collection was mentioned in some studies, i.e., using the local language. Languages other than English were used, e.g., Urdu,[21,25,30] Amharic,[16] Bahasa Malaysia,[24] and Chaosan/Mandarin.[22]

Key variables from the data extraction table and main study findings are summarised in three separate tables, according to the study design. Table 1 summarises cross-sectional studies, Table 2 summarises intervention studies, and Table 3 summarises qualitative studies.

Main findings from the studies

The 17 studies identified three main themes, i.e., knowledge, attitude, and practice. Generally, most studies revolved around teachers' knowledge, attitude, or practice regarding vision screening, followed by visual and eye health among schoolchildren. For this review, studies that involved brief eye examinations were grouped under the heading of vision screening. Visual health encompasses visual impairment and treatments, whereas eye health focuses on eye diseases. The KAP levels of the studies are shown in Figure 4.

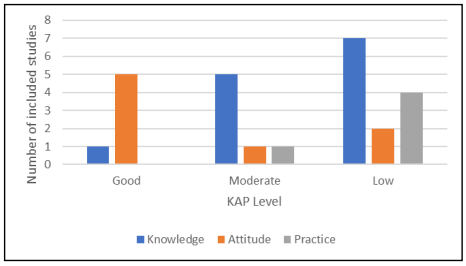

Figure 4: KAP level of included studies

Table I: Summary of the cross-sectional studies

Author, year	Country	Participants, Sampling method, Sample size, Response rate	Data collection tools	Main findings	Limitation
Habiba et al., 2017	Pakistan	Public and private preschool and primary teachers were selected via the simple random sampling technique. All preschool and primary (up to the 5th grade) teachers were invited to participate in the study, n = 443, 92.4%.	Self-administered paper questionnaire	Knowledge associated with eye health: 35.89% high, 49.89% moderate, and 14.22% low. Practice associated with students' eye health: 10.16% high, 23.02% moderate, and 66.82% low.	A limited study sample; a larger sample, including rural areas, would have made the study more generalised.
Alemayehu et al., 2018	Ethiopia	Primary school teachers. Simple random sampling was used to select the schools from Gondar City, involving 17 schools, and all teachers in the school were included in the study, n =5 65, 96.3%.	Self-administered paper questionnaire	Knowledge of refractive error: 55.9% had good knowledge, while others had poor knowledge. Attitude towards refractive error: 57.2% had a favourable attitude, while others had an unfavourable attitude.	Not mentioned
Ambika and Nair, 2013	India	Primary school teachers. A convenient sampling of primary school teachers in Mysore, n = 60, 100%.	Paper questionnaire	Knowledge of refractive error and its early identification: 80% had adequate knowledge	Not mentioned
Hinkley et al., 2011	USA	Primary school teachers, i.e., 370 elementary schools randomly selected throughout the state of Michigan. An online questionnaire was sent, n = 154, 6%.	Self-administered online questionnaire	Attitude towards vision examination referrals: 86% of teachers had recommended a student to obtain a comprehensive vision examination. Attitude towards vision therapy and school achievement: 18% noticed a dramatic change, 63.9% noted some improvement, and 18% noticed little or no improvement. Attitude towards vision screening: 93.4% believed that mandatory vision screening prior to kindergarten would benefit the students and school.	Low response rate. The survey did not reach preschool, pre-K, Head Start, or 7–12th grades.
Tchiakpe et al., 2016	Ghana	Secondary school teachers, selected through multistage clustered sampling, n= 346	Self-administered paper questionnaire	Knowledge on common eye problems: Adequate knowledge. Most (80.06 - 89.99%) of the teachers have knowledge regarding 'red eye', followed by refractive error and eye injury. More than half of the teachers can identify common signs and symptoms of eye problems in children such as blurred vision, red eye, frequent itching, and eye pain. Attitude towards eye health: Teachers have the right attitude. 93% responded that children with visual impairment should go to school, 90% had no objection to spectacle wear, and 84.39% recommended regular eye check-ups.	Not mentioned
Ramantsi, Rasengane, and Jita, 2023	South Africa	Preschool and primary school teachers. Convenience sampling was carried out with inclusion criteria being Grade R to Grade 3 teachers in Quintile 1 schools in Bloemfontein, n=36.	Self-administered paper questionnaire	Knowledge of children's vision disorder: 34 (94.44%) had good knowledge during the pre-test and 36 (100%) had good knowledge after the intervention.	small sample size, and limited time for educational sessions.
McConnell et al., 2020	Northern Ireland	Primary and secondary special school teachers. Purposive sampling was conducted in which the largest special education school in Northern Ireland was selected, n=23.	Self-administered paper questionnaire	Attitude on vision screening: 77.3% reported vision screening is useful. 100% reported having it in a school setting is convenient.	Not mentioned

Teachers' knowledge related to visual and eye health of schoolchildren

Thirteen studies reported knowledge as the outcome of research findings.[14–17,19,20,22,23,25–27,29,31] The knowledge assessment in the studies varied widely on different topics, which were further grouped into knowledge regarding vision screening, visual health, and eye health. The overall knowledge level was low to moderate. Five of these studies assessed teachers' knowledge regarding vision screening,[15,19,20,27,31] and all studies showed improvement in teachers' knowledge regarding vision screening after the intervention. The interventions involved lectures and training on vision screening.

Besides vision screening, ten studies reported teachers' knowledge regarding the visual health of schoolchildren.[14–17,19,20,22,26,27,29] These involved topics on refractive error, identifying signs and symptoms of visual disorders, vision care, and colour vision. A study in India that assessed teachers' knowledge in identifying visual problems in children showed that none of the teachers had any knowledge in that area.[17] This differs from a study in South Africa, where 63% of the participants had knowledge of the signs and symptoms of reduced vision.[15]

Two studies reported teachers' knowledge regarding eye health. A study in Pakistan showed that most teachers had moderate knowledge regarding children's eye health.[25] While another study conducted in Ghana showed that teachers had good knowledge, where 80.06 - 89.99% of the teachers had knowledge regarding children's eye health.[23] Some of these studies also reported a small sample size as the study limitation, rendering it less likely to be generalised to the overall population.[15,22,25–27]

Teachers' attitudes related to schoolchildren's visual and eye health

Eight studies reported teachers' attitudes toward visual and eye health. Among these, a study reported on teachers' attitudes towards vision screening and visual health,[18] three studies on visual health,[14,16,22] two studies on eye health[21,23] and two studies on vision screening.[28,30] Five studies showed that teachers had a good attitude toward vision screening and eye health.[18,21,23,28,30] Regarding teachers' attitudes towards visual health, a study showed good attitude,[18] a study showed moderate attitude[14] while another two studies showed low attitude.[16,22]

A study in the USA showed that the teachers had a good attitude towards vision screening and visual health.[18] The study reported that 93.4% of the participants believed that mandatory vision screening would benefit schoolchildren, and 86% of the teachers had recommended a student obtain a comprehensive vision examination. This is in contrast to a study in Ethiopia, which concluded that the attitudes of teachers were poor, with only 57.2% of the teachers having a favourable attitude towards refractive error.[16]

A study on attitudes of teachers towards glasses-wearing in China showed that teachers are highly motivated to prevent visual impairment among schoolchildren.[22] However, the lack of knowledge became a barrier that prevented them from taking action.[22] A study in China showed that attitudes of teachers toward the vision care for students were moderate but improved significantly after receiving training. [14]

A study on attitudes of teachers towards eye health in Pakistan revealed that the teachers had a good perception of the appearance of healthy and diseased eyes, factors that could damage the eyes, and the detection of children with eye problems.[21] However, in response to an eye injury, the teachers preferred treating minor eye injuries and only referred severe injuries to the doctor.[21] Most studies showed that teachers had a favourable attitude towards vision and eye health, with some misconceptions, especially in rural areas.

Practice of teachers related to visual and eye health of schoolchildren

Five studies assessed the practice of teachers related to visual and eye health of schoolchildren. Three studies reported practices on vision screening by teachers,[15,19,30] a study each on visual[20] and eye health.[25] Four studies

showed that teachers had poor practice in visual and eye health of schoolchildren, while a study showed moderate practice.

The practice on vision screening by teachers conducted in South Africa showed that none of the teachers could conduct vision screening before training was given.[15] After training, 79% of participants can conduct visual acuity screening correctly, and 73% can refer appropriately.[15] Another study on practice towards colour vision screening by teachers also showed similar results, whereby none of the teachers managed to perform the test prior to training.[19] However, after receiving training, 84.6% of participants managed to perform the colour vision test.

A study conducted in Pakistan regarding practice toward vision screening by teachers showed that most teachers (78.6%) followed the procedures for conducting vision screening. However, not all the teachers were able to make proper referrals to optometrists after vision screening.[30] This study also reported that some suggestions were given for improvements such as refresher training and supervisory visits from trainers.

DISCUSSION

This scoping review was carried out to gain input on the level of KAP among teachers regarding visual and eye health of schoolchildren and to identify the methods used to conduct the studies. The findings revealed some misconceptions among teachers regarding visual and eye health of children. In rural areas in China, teachers have the perception that schoolchildren should not get glasses before the age of 18.[22] Although they are aware of the dangers of uncorrected refractive error to children, the lack of knowledge and misinformation that prevails among teachers on how refractive error affects vision became a barrier for teachers to have good practice. Instilling good practice among teachers will positively contribute towards preventing further damage to the children's eyes.

Most of the studies in this review showed that teachers had good attitudes towards the visual and eye health of children. A study in the USA, a developed country, demonstrated that teachers had a good attitude toward visual health and vision screening.[18] The study indicated that Michigan state has a law that requires children enrolling in preschool to submit their eye examination evidence. Almost 95% of the schools participating in this study have a vision screening programme. This law might have affected teachers' awareness of children's visual health.

Studies that showed low to moderate levels of KAP towards visual and eye health of schoolchildren were from lower- and middle-income countries.[15–17,19,20,24–27] This could be due to the availability of facilities and access to healthcare services that are limited in those developing countries.[32] Overall, the levels of knowledge, attitude, and practice are similar in these countries. However, the factors that contribute to the level of knowledge could not be an indicator of the awareness level. A study in Ethiopia[16] reported that four factors were associated with the level of knowledge regarding refractive error. Teachers who wore spectacles, had their eyes examined, had undergone training on eye health, and had longer teaching experience had a higher level of knowledge than the rest. Surprisingly, the more experienced teachers had an unfavourable attitude towards refractive error. It indicates that experience affects the level of knowledge positively, although it might not portray a positive attitude. Other factors that contributed to the level of attitude towards refractive error are gender, i.e., being male, older age, and teachers working in the private sector. These factors instigate a more favourable attitude towards refractive error.

This review also revealed that training programmes introduced to teachers significantly improved their level of knowledge, attitude, and practice. The training programmes involved theory and practical sessions delivered to the teachers with the variation of training between 3 and 6 hours. Most of the studies were intervention programmes, whereby the baseline awareness was measured prior to a training programme, and then a post-assessment was given to identify the level of awareness. A study in China [14] investigated the impact of the teachers' knowledge and attitude on children's

behaviour. According to the study, students are more likely to be given an outdoor recess when teachers have better knowledge and attitudes toward vision care. Studies have shown that outdoor activities play an important role in minimising the progression of refractive error.[33–35] Thus, teachers need to have good knowledge, attitude, and practice towards visual and eye health, as these will significantly have an impact on their student's well-being.

CONCLUSION

This scoping review shows that the level of knowledge and practice among school teachers towards visual and eye health was low to moderate in many countries, while the attitude level was good. There was a vast difference in the research methodology of the studies. Most studies included intervention programmes, and the self-administered questionnaire was the most popular method used in data collection. The outcomes from qualitative studies were outstanding as they provided a more in-depth perception of this topic. Further exploration of the level of teachers' KAP and its effects on the behaviour of schoolchildren should be considered in future studies.

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