

Perception of Primary School Teachers on Pupils' Eye Health in the Ga West Municipality, Greater Accra Region, Ghana

Abstract

Background: Eye health education is lacking in low- and middle-income countries due to limited availability of eye care personnel in the school setting. Teachers have been considered possible human resource for maintaining eye health in schoolchildren. **Objective:** The aim of this article is to determine the knowledge of teachers on the nature of eye problems among schoolchildren and their ability to recognize visual disorders. **Materials and Methods:** This was a descriptive cross-sectional survey among primary school teachers in the Ga West Municipality. Cluster sampling was used to select 140 teachers from 12 public and private schools. A structured questionnaire was used in assessing teachers' knowledge about the features of a healthy and diseased eyes, common causes of visual impairment (VI) and blindness, and recognizing and preventing eye problems in the children. Aggregate scores were computed for correct responses concerning healthy and diseased eyes, and scores were categorized into poor (0–25%), fair (26–50%), good (51–75%), and very good (76–100%) knowledge. **Results:** Eighty-six (61.4%) of the teachers were females. The mean age was 33 ± 9.1 years. Most teachers were found to have good knowledge about healthy and diseased eyes (75.0% and 60.0%). Hypermetropia, red eye, allergy, and cataract were cited by 50.0–57.9% as the most common causes of VI and blindness. Between 27.1% and 92.1% of teachers identified difficulties seeing the writing board, inability to concentrate in class, holding the book close to the eye to read, and squinting as ways of recognizing eye problems. Most respondents, 132 (94.3%), were of the view that teachers should be involved in screening schoolchildren for ocular morbidities. **Conclusion:** Teachers in the Ga West Municipality had good knowledge of the characteristics of healthy eyes and a fair knowledge of the causes of VI in primary schoolchildren. Teachers require further training if they are to serve as focal persons for vision screening and eye health education in primary schools.

Keywords: Ga West municipality, primary school pupils, school eye health, vision impairment

Résumé

Contexte: L'éducation à la santé oculaire fait défaut dans les pays à revenu faible et intermédiaire en raison de la disponibilité limitée de personnel de soins oculaires dans le cadre scolaire. Les enseignants ont été considérés comme une ressource humaine possible pour maintenir la santé oculaire des écoliers. **Objectif:** Déterminer les connaissances des enseignants sur la nature des problèmes oculaires chez les écoliers, et leur capacité à reconnaître les troubles visuels. **Méthodes:** Il s'agissait d'une enquête transversale descriptive auprès des enseignants du primaire de la municipalité de Ga West. Un échantillonnage en grappes a été utilisé pour sélectionner 140 enseignants de 12 écoles publiques et privées. Un questionnaire structuré a été utilisé pour évaluer les connaissances des enseignants sur les caractéristiques d'un œil sain et malade, les causes courantes de déficience visuelle (DV) et de cécité, et pour reconnaître et prévenir les problèmes oculaires chez les enfants. Les scores globaux ont été calculés pour les réponses correctes concernant les yeux sains et malades, et les scores ont été classés en mauvais (0–25%), passable (26–50%), bonne (51–75%) et très bonne (76–100%) connaissance. **Résultats:** Quatre-vingt-six (61,4%) des enseignants étaient des femmes. L'âge moyen était de $33 \pm 9,1$ ans. La plupart des enseignants ont une bonne connaissance des yeux sains et malades (75,0% et 60,0%). L'hypermétropie, les yeux rouges, l'allergie et la cataracte ont été cités par 50,0% à 57,9% comme les causes les plus courantes de DV et de cécité. Entre 27,1% et 92,1% des enseignants ont identifié des difficultés à voir le tableau d'écriture, une incapacité à se concentrer en classe, le fait détenir le livre près des yeux pour lire et à plisser les yeux comme moyens de reconnaître les problèmes oculaires. La plupart des répondants, 132 (94,3%), étaient d'avis que les enseignants devraient être impliqués dans le dépistage des morbidités oculaires chez les écoliers. **Conclusion:** Les enseignants de la municipalité de Ga West avaient une bonne connaissance des caractéristiques des yeux sains et

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une bonne connaissance des causes de la déficience visuelle chez les enfants du primaire. Les enseignants ont besoin d'une formation complémentaire s'ils doivent servir de personnes focales pour le dépistage des troubles visuels et l'éducation à la santé oculaire dans les écoles primaires.

Mots clés: *Élèves du primaire, santé oculaire à l'école, déficience visuelle, municipalité de Ga de l'ouest.*

Introduction

Visual impairment (VI) in childhood is a worldwide problem and has significant impact on pupils' education, personal development, and economic productivity.^[1] Childhood blindness is a priority because of the number of years of blindness that ensues.^[2] There is a wide regional variation in the burden and causes of blindness in children.^[2] The prevalence of blindness in children varies from approximately 0.3 per 1000 children in high-income countries to 1.2 per 1000 in low-income countries.^[2] The major causes of blindness and VI in children include uncorrected refractive errors, trachoma, vitamin A deficiency-related disorders, cataract, and retinopathy of prematurity.^[2]

VI and blindness in children can be controlled through health promotion and interventions that allow early detection of eye diseases.^[3] Health education and health promotion are components of the school health education program, and trained teachers can play a pivotal role in promoting eye health in primary schoolchildren, especially in low- and middle-income countries with scarce eye health personnel.^[3] It has been recommended that all primary school children should have eye test to detect reduced visual acuity followed by annual eye screening for new primary school pupils and for those wearing spectacles to maintain correct prescriptions.^[3]

There is limited availability of eye care personnel in the school setting in low- and middle-income countries due to the general shortage of health personnel. This supports the involvement of teachers in eye health education. Various studies have also explored the use of teachers and general nurses for eye screening in schools.^[4-6] It has been observed that training teachers in vision screening has the potential to provide good-quality and cost-effective service without significantly affecting their normal workloads.^[5-7]

A number of studies have reported the prevalence of visual disorders among schoolchildren in Ghana.^[8,9] Akuffo *et al.*^[10] have reported on the absence of preschool vision screening in most schools in the Kumasi metropolis.

Utilizing teachers for screening school-going children will substantially reduce the workload of eye care service providers.^[11] The objective of this study was to determine the knowledge of primary school teachers about the nature of visual problems among their pupils and their ability to recognize these visual problems.

Materials and Methods

A descriptive cross-sectional survey was used to explore the perceptions of primary school teachers on their pupils'

eye health in the Ga West Municipality of the Greater Accra Region, Ghana, from August 8 to November 4, 2016. The Ga West Municipality is located in the Greater Accra Region with Amasaman as its District Capital.

At the time of the conduct of this study, there were 12 educational circuits and a total of 73 public primary schools and 201 private primary schools in the Ga West Municipality.^[12] The population of the Municipality is youthful with 33.4% aged below 15 years. Of the population aged 3 years and older in the Municipality, less than two-fifths (37.4%) were currently attending school. Of those attending school, 13.8% were in kindergarten, 41.3% in primary schools, and 17.7% in Junior High Schools.^[12] The Municipality had only one eye clinic based in the Municipal Hospital and run solely by four ophthalmic nurses, with weekly screening conducted in rural health facilities and schools. A visiting ophthalmologist made scheduled visits to perform surgeries mainly for cataract and pterygium. There were no integrated primary schools for the visually impaired in the Ga West Municipality.

The inclusion criterion was all primary school teachers from both public and private schools who consented to participate in the study. Selected teachers who were absent from school on the day of the study were excluded from the study and replaced by the next teacher in the school register.

The minimum sample size required from the sample size calculation was 138 teachers from both private and public schools. The Cochran sample size formula was used in calculating the number of teachers enrolled in the study as follows: $N = Z^2 * P * (1 - P) / D^2$,^[13] where N is the required minimum sample size, Z the confidence level, i.e., 1.96, P the proportion of teachers affirming that vision problems might cause poor academic performance, 10%,^[14] D the degree of accuracy desired, i.e., 0.05. Therefore, $n = 1.96^2 \times 0.10 (1 - 0.10) / 0.05^2 = 138$.

A sampling frame consisting of the list of primary schools was obtained from the Educational Directorate of the Ga West Municipal Assembly. The municipality is divided into 12 clusters of educational circuits by the Ghana Education Service with a total of 73 public primary schools and 201 private primary schools. Six circuits were randomly selected by cluster sampling with the help of random number generator in Microsoft Excel 2010 software. For each circuit, the schools were grouped into public and private schools, respectively. One public and one private school was also selected from each of the six selected circuits by simple random sampling technique using random number generator in Microsoft Excel 2010 software with the names of the public schools and private schools listed on separate work sheets, respectively, to have

a total of 12 participating schools in the Municipality. About 12 teachers were selected from each of the schools by simple random sampling using the list of teaching staff provided by the school.

Both guided and self-administered closed- and open-ended questionnaires were used. The teachers were given pre-designed, pre-tested, and self-administered questionnaires which addressed their bio-data and their knowledge of vision screening (Snellen's chart), common childhood vision disorders, and ways of recognition of eye problems in the classroom. Eye problems explored included refractive errors such as hypermetropia (long-sightedness) and myopia (short-sightedness), corneal opacity (whiteness of the cornea), cataract (whiteness of the pupil), strabismus (squint), and phthisis bulbi (grossly shrunken abnormal eye). Further clarifications of medical terms were made as necessary. Ways of recognizing symptoms of eye disorders in the classroom such as blurring of vision, persistent headaches, tearing, squinting, and poor academic performance were explored. The teachers were asked what action they will take if they incidentally discovered a class pupil with possible vision disorder.

To determine the teachers' knowledge about the nature of visual problems among their pupils, features of a healthy and of a diseased eye were presented on the questionnaire. For both healthy and diseased eyes, seven features were presented, respectively, of which four were correct and three were not. The seven features presented for a healthy eye were: a healthy eye looks white with black pupil, has white pupil, has eyelashes, has eyelids, has white cornea, and is watering. For a diseased eye, the features presented were: a transparent cornea, black pupil, painful eye, itching, discharging, eyes looking white, and red eyes. The teachers were asked to identify the four correct features (of healthy and diseased eyes) out of the seven. A score of 25% was assigned to each correct feature identified. A respondent who identified all four correct features was given a score of 100%. An aggregate score was computed for all the correct responses. Aggregate scores of 0–25%, 26–50%, 51–75%, and 76–100% were identified as “poor knowledge,” “fair knowledge,” “good knowledge,” and “very good knowledge,” respectively, for the overall knowledge. Teachers were asked to mention ways of preventing eye problems causing VI and blindness, common causes of VI and blindness among pupils, and ways of recognizing eye problems in the classroom.

The questionnaire was validated between two schools which did not participate in the study. The internal consistency and reliability of the questionnaire were assessed after pretesting among 30 teachers at the selected schools. A Cronbach's alpha value of 0.7 was obtained, which indicated acceptable reliability of the questionnaire.^[13]

Data collected were entered into a Microsoft Access 2010 database and cleaned. IBM SPSS version 20.0 was used for the statistical analysis. Descriptive statistics such as percentages and means (with standard deviations) were used to describe and summarize the data. The need for training of primary

school teachers in detecting visual problems was estimated by the outcome of their knowledge and ability to recognize visual problems among their pupils. Knowledge about some common causes of VI and blindness and ways of preventing and recognizing eye problems were presented on a frequency table.

Ethical clearance for the survey was obtained from the Ethical and Protocol Review Board of the College of Health Sciences, University of Ghana (CHS-Et/M.10-P 4.3/2015–2016). Permission was obtained from the Ghana Education Service and the heads of the participating schools. Consent was obtained from each participating school teacher.

Results

A total of 140 teachers participated in the study with 86 (61.4%) of them being females and 54 (38.6%) males [Table 1]. The mean age was 33±9.1 years (median 31 years, range 22–52 years). There were more teachers participating from the private schools, 74 (52.9%) [Table 1].

The characteristics of healthy eyes as perceived by the teachers were as follows: 104 (74.3%) selected white eyes, 88 (62.9%) black pupils, 77 (55.0%) eyes with eyelashes, and 65 (46.4%) eyes with eyelids.

With regard to the characteristics of diseased eyes, 117 (83.6%) selected painful eyes, 102 (72.9%) red eyes, 102 (72.9%) discharging eyes, and 97 (69.3%) itchy eyes. The results of the scores for knowledge of healthy and diseased eyes were as follows: healthy eye, 75.0±6.3% score and disease eye, 60.0±4.5% score.

Hypermetropia 81 (57.9%), red eye 80 (57.1%), allergy 76 (54.3%), and cataract 70 (50.0%) are the most common causes of VI and blindness cited by the teachers [Table 2]. All the teachers, 140 (100.0%), cited regular eye checkup as a means of prevention of VI. Concerning other ways of prevention of eye problems eventually causing VI and blindness, 116

Table 1: School types and sex of teachers

Sex of teachers	Type of school		
	Public N (%)	Private N (%)	Total N (%)
Female	63 (45.0)	23 (16.4)	86 (61.4)
Male	3 (2.1)	51 (36.4)	54 (38.6)
Total	66 (47.1)	74 (52.9)	140 (100.0)

Table 2: Teachers' knowledge of common causes of VI and blindness among pupils

Causes	Number	Percentage
Allergies	76	54.3
Cataract	70	50
Corneal opacity	45	32.1
Hypermetropia	81	57.9
Myopia	56	40
Red eye	80	57.1
Strabismus	65	46.4

Table 3: Teachers' knowledge of methods of preventing eye problems causing VI and blindness

Prevention method	Number of teachers identifying method	Percentage
Regular check up	140	100.0
Good nutrition	116	82.9
Reading with good lighting	116	82.9
Early treatment	103	73.6
Eye health education	63	45.0

Table 4: Teachers' knowledge of indicators of eye problems in the classroom

Indicator	No. of teachers identifying indicator	Percentage
Difficulties seeing the writing board	129	92.1
Inability to concentrate in class	38	27.1
Holding book close to the eye to read	115	82.1
Poor academic performance	55	39.3
Squinting eye	83	59.3

(82.9%) teachers cited good nutrition, 116 (82.9%) reading with good lighting, and 103 (73.6%) early treatment of eye conditions [Table 3].

In terms of knowledge of indicators of eye problems in the classroom, 129 (92.1%) teachers identified difficulties seeing the writing board, 38 (27.1%) inability to concentrate in class, 115 (82.1%) holding the book close to the eye to read, and 83 (59.3%) squinting [Table 4].

Regular checkup and avoiding reading in dim light, indicated by 140 (100%) and 101 (72.1%) teachers, respectively, were the most common pieces of advice teachers would give their pupils on how to keep their eyes healthy.

All the teachers alluded that they would advise the parents of pupils with visual problems to take their children to see an eye specialist. They also reported that they do not teach lessons on eye health promotion in primary schools. Most of the respondents, 132 (94.3%), were of the view that teachers should be involved in screening school children for ocular morbidities. All the teachers were able to identify the Snellen chart but were not able to describe how it is used to check visual acuity.

Discussion

The school environment is an important place and a second home for the physical and mental development of a child. Consequently, school eye health plays an important role in any community health program, making the role of teachers in the identification of pupils with visual challenges very important. Poor vision may affect the performance of children with possible negative influence on their future life. The WHO has made recommendations for the integration of vision

screening and refractive error services in school programs.^[15] This study examined teachers' knowledge of common vision disorders in children. The teachers had good knowledge of the characteristics of healthy and diseased eyes (healthy eye, 75.0% score and diseased eye, 60.0% score) and were able to cite some common causes of VI. Eye health promotion and eye health protection were not part of the formal curriculum of the schools and hence were not taught by the teachers.

Class teachers are in constant interaction with students and may be able to identify students with eye diseases and VI if provided with the necessary knowledge and skill. Okoloagu *et al.*^[16] observed that primary school teachers had poor knowledge of their pupils' eye health and also there was absence of school-based eye care services in public schools in Enugu, Nigeria.

Although the teachers in this study did not have any formal education about the eyes, they had good knowledge on the characteristics of healthy and diseased eyes. Guidelines on health education in schools, issued by the WHO, UNICEF, and UNESCO, recommend that children at this level be taught about the parts of the eye.^[17] These guidelines should also be incorporated into the curriculum of the teachers' training program.

Teachers in this survey were knowledgeable about ways of recognizing eye problems in their pupils. It is encouraging to note that they knew visual problems such as difficulty seeing the board and holding the book close to the face, but most were unaware of poor academic performance as an indicator of visual problems. Teachers must be trained to identify uncorrected refractive errors as these can adversely affect pupils' academic performance. Other visual-related challenges such as increased risk of trauma, social isolation, and stigmatization may also affect the psychosocial development of schoolchildren.^[18,19] Poor vision and inability to see the board can seriously impact pupil's participation and learning in class, and this can adversely affect their education, occupation, and socio-economic status in life.^[18,20]

Uncorrected refractive error is the most common cause of VI in primary schoolchildren.^[21] Myopia is the most common type of refractive error in primary schoolchildren.^[21] Most of the teachers had no knowledge of other causes of ocular morbidity among schoolchildren, such as glaucoma, nystagmus, and amblyopia. Teachers can be taught simple eye examination to detect poor vision and causes of VI.^[3] Paudel *et al.*^[22] have observed that unaided visual acuity-based testing by school teachers demonstrated good accuracy in the detection of VI among schoolchildren. The training of primary school teachers in eye screening can be achieved either by training only a limited number of teachers per school or training all primary school class teachers. Training all primary school class teachers in the detection of VI and other visual disorders has been found to be more efficient and associated with improved hospital referral.^[6,21] Vision screening should be part of the curriculum of teacher training institutions, and ongoing training of teachers on detection of refractive errors, strabismus, cataract, and

impaired vision should be established with appropriate referral pathway to eye care facilities.

Eye health promotion in primary schools encompasses health education to increase awareness of eye conditions and their implications, promoting healthy eye practices in the school environment and engagement of parents or the community on need for eye care services.^[3,23] All the teachers interviewed in this study indicated that eye health promotion was not part of the curriculum of their school and did not teach lessons on eye health promotion. We recommend broadening the school eye health programs to include eye health promotion, detection of common eye disorders among schoolchildren, and referral of children with visual disorders to designated eye care facilities within the district. School eye health programs should be modeled around class teachers, and all class teachers should be trained in health promotion, detection of uncorrected refractive errors, and common eye conditions.

In a descriptive cross-sectional study of the awareness and perception of stakeholders regarding preschool vision screening in the Kumasi metropolis of Ghana, Akuffo *et al.*^[10] observed that 74% of respondents reported absence of preschool vision screening and 90% reported no written policies on preschool vision screening in schools. Due to lack of effective, comprehensive, and inclusive school health programs in low- and middle-income countries including Ghana, Sightsavers and the Partnership for Child Development developed the School Health Integrated Programming (SHIP) with support from the World Bank and Global Partnership for Education (GPE).^[24] The first phase of the initiative was implemented in 2016 in four focus countries including Ghana. They used deworming and vision screening in schools to raise awareness, develop capacity, and increase engagement with governments toward integration of inclusive school health and nutrition into their education sector plans. Over 10,000 students from 60 schools in Ghana had vision screening and deworming, and 120 school teachers were trained in identifying eye conditions and eye health education. Teachers were further trained to screen students for refractive errors and examine them for common eye conditions. The cost data generated in phase 1 of SHIP were used to assess the cost of implementing an integrated vision screening intervention. This information will help inform governments on the cost of scaling up the school health and nutrition program within education sector development plans.^[24]

Findings from this study suggest the need for the implementation of eye health promotion in primary schoolchildren in the Ga West Municipality. We recommend inclusion of eye health in the curriculum of primary schools and teacher training institutions and the training of teachers in an effort to promote eye health in primary schools.

The limitations of this study include the small sample size which may not be representative of primary school teachers in Ghana. The study has, however, provided information on the knowledge gap of teachers on the eye health of their pupils.

Conclusion

Teachers in the Ga West Municipality of the Greater Accra Region of Ghana had good knowledge of the characteristics of healthy and diseased eyes and were able to cite common causes of VI in primary schoolchildren and ways of preventing and recognizing eye problems among the children. Eye health promotion was, however, non-existent in the schools. The implementation and scaling up of the integrated inclusive health and nutrition program in the education sector will help reduce VI in children and contribute to their academic and personal development.

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Conflicts of interest

There are no conflicts of interest.

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