

Ocular Conditions among School Children in the Sunyani Municipality in Ghana

Kumah David Ben^{1*}, Akuffo Kwadwo Owusu¹, Antwi-Adjei Konadu Ellen¹
Yiadom-Boakye Sylvia¹, Osaе Appenteng Eugene¹, Adaboh Hayford¹

¹Department of Optometry and Visual Science, Kwame Nkrumah University of Science and Technology,
Kumasi, Ghana.
ben56kay@gmail.com

***Corresponding Author:** Dr. David Ben Kumah, Department of Optometry and Visual Science, Kwame Nkrumah University of Science and Technology, Kumasi-Ghana.

Abstract

The study aimed at determining the commonest ocular conditions among basic school children and their prevalence in the Sunyani Municipality, Ghana. The study also sought to assess the level of awareness of school teachers on ocular conditions affecting the school children. A total of 400 students and 50 teachers were randomly selected from 5 different basic schools in the Sunyani Municipality. Data was collected through vision screening of the school children and in-depth questionnaires for school teachers. The Statistical Package for the Social Sciences (SPSS) version 20.0 was used for data analysis. Out of the 400 participants, 227 (57%) were females and 173 (43%) were males. The prevalence of ocular conditions detected was 51.25%. Refractive errors accounted for 25.25% with hyperopia being the highest (18.5%), followed by astigmatism (4.5%) and myopia being the least prevalent (2.5%). The prevalence of ocular pathologies among the pupils screened was 26.0% with the commonest condition being allergic conjunctivitis (18.5%). Only one pupil (0.1%) suffered from low vision while none was blind in both eyes. The prevalence of ocular conditions amongst the school children was very high and the rate of eye clinic attendance was also low among them. These findings warrant pragmatic intervention to alleviate the burden of ocular conditions among the school children.

Key words: School children, teachers, ocular morbidity, refractive errors, awareness.

INTRODUCTION

The school years of life are particularly important for children. It is certain that all parents are ardent about the academic success of their wards and so they do all they can to provide them with the best educational opportunities. They however, may overlook one important learning tool without which academic pursuits of their children will be compromised- the child's vision^[1].

According to Talsania *et al.*^[2], good eyesight is the most important source of information about one's environment and hence it is of vital developmental significance. It has been estimated that as much as 80 % of the learning a child does occurs through his or her eyes; reading, writing, chalkboard work, computer use for assignments and extracurricular activities such as

sports all require the school child to have good vision. When vision and visual health are compromised, the school child's participation in education and sports suffer^[1].

It will suffice to say that, visual loss in children apart from influencing their education, also affects their future employability and social activities^[3]. Children who are blind for example, must overcome a lifetime of emotional, economic and social difficulties which in turn affects family and society at large^[3]. Visual deficits in children should attract the attention of parents, teachers and clinicians. The high number of blind years resulting from childhood blindness was one reason for the control of childhood blindness to become a priority for the World Health Organization/ International Agency for Prevention of Blindness (WHO/IAPB) Vision 2020: The Right to Sight Programme^[4].

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Eye conditions in school children vary from minor to profound forms. In a hospital based study done by Ajaiyeoba^[5] and a school based study done by Abiose *et al.*^[6] in southwestern and southeastern Nigeria respectively, results indicated that refractive errors, conjunctivitis, corneal scarring and injury were among the common eye conditions affecting Nigerian children.

In most cases, the eye conditions remain elusive to both teachers and parents of the school children; typically, children may not tell that they have vision problems because they think the way they see is how everyone sees. They typically in the classroom, adapt to vision problems by opting to sit close to the chalkboard, 'slitting' their eyes or covering one eye. Others may avoid visual tasks such as participating in reading lessons^[1,7].

Considering the fact that, some of these childhood eye conditions could cause permanent visual deficits necessitates timely and consecutive screening of children to aid in the early detection, prevention and management of such sight threatening conditions; a practice which is more common in most developed countries^[8,9].

Although blindness among school children is comparatively rare, children are a priority because severe visual impairment in children has a significant influence on their development, education, mobility and quality of life. This has prompted many investigators to study the prevalence of ocular conditions in children and determine the socio-demographic factors that influence the occurrence of ocular morbidity in children^[10,11].

The objective of this study was to determine the commonest ocular conditions existing among school children in the Sunyani Municipality and to determine their prevalence.

METHODOLOGY

A descriptive cross-sectional study was used in this school-based survey to determine the distribution of ocular conditions existing among schoolchildren in the Sunyani municipality. A total of 450 study subjects comprising 400 school children and 50 teachers were randomly selected from 5 different basic schools in the Sunyani Municipality.

Informed consent was sought from the Municipal head of education, heads of selected schools and from

parents of the schoolchildren who signed an informed consent form for their wards to participate in the study. Simple questionnaires covering age, sex, attendance to the eye clinic and any chief ocular complaint was used to solicit ocular problem of the study subjects. Thoroughly explained ophthalmic procedures were carried out on the respondents to detect the presence of ocular conditions. Tools employed include Snellen visual acuity charts, ophthalmoscopes, retinoscopes, trial lens sets and measuring tapes.

The tests included visual acuity measurement, ophthalmoscopy, retinoscopy using the fogging technique, plus one dioptre blur test, phoria test and near point of convergence test. Teachers' awareness or knowledge on ocular conditions was assessed using a questionnaire and evaluated with a grading scheme set at 60 percent pass mark.

Data collected was checked for completeness of answers, comprehensiveness, accuracy and consistency. The Statistical Package for Social Sciences (SPSS) version 20.0 was used to analyze data collected ($P < 0.05$ was considered as significant). Descriptive statistics was used to determine the ocular conditions existing among the schoolchildren.

RESULTS AND DISCUSSION

Demographics of Study Participants

Out of the 400 schoolchildren recruited, 227 (57%) were females and 173 (43%) were males. The age distribution with sex representation of the study subjects is shown in table 1.

Table 1. Age distribution and sex representation of study subjects

Age Group (yrs)	Frequency (%)		Total (%)
	Male	Female	
5-10	39 (9.8)	55 (13.8)	94 (23.5)
11-15	98 (24.5)	156 (39.0)	254 (63.5)
16-18	36 (9.0)	16 (4.0)	52 (13.0)
Total	173 (43.0)	227 (57.0)	400 (100.0)

Mean age = 12.96±2.90 Modal age = 12 years

Median age = 13 years.

Ocular Conditions Detected in the Study Subjects

Out of the 400 school children examined, 195 (48.75%) had no ocular abnormality. Refractive errors

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and ocular diseases were found in the remaining 205 (52.25%) school children. Allergic conjunctivitis, was the most prevalent non-refractive ocular condition found among the 74 (18.5%) of the schoolchildren. Hyperopia had a similar prevalence value of 18.5%. Table 2 displays the prevalence of the seven (7) ocular conditions detected.

Compared to a similar study by Pavithra *et al.*^[12] on the prevalence of refractive errors in schoolchildren aged 7-15 in Bangalore, results showed that myopia was the most prevalent refractive error among the school children; myopia accounted for 62.9% out of the 97 refractive conditions found among those school children. Astigmatism followed with 22.7% and hyperopia was the least, with 14.4%.

Table 2. Prevalence of the ocular conditions detected

Ocular condition	Number of school children	Prevalence rate
Myopia	10	2.5%
Allergic conjunctivitis	74	18.5%
Suspicious disc	4	1%
Hyperopia	74	18.5%
Astigmatism	17	4.25%
Other pathologies	12	3.0%
Trauma	14	3.50%
Total	205	51.25%

Ovenseri *et al.*^[13], also reported results that are different from those of this current study and that of Pavithra *et al.*^[12]. The results stated that uncorrected refracted error- a major cause of impaired vision among school children in the Cape Coast Municipality followed a pattern in which there was 44 (4.6%; 95% CI: 3.3-5.9) hyperopia cases, 66 (6.9%; 95% CI: 5.3-8.5) myopia cases and 135 (14.1%; 95% CI: 11.9-16.3) astigmatism cases of the 957 school children examined in their study.

With hyperopia being the highest in this current study, the difference could be due to age and physiological differences. Schoolchildren in this study were more hyperopic than myopic or astigmatic, because they probably were still undergoing emmetropization; Murthy *et al.*^[14] demonstrated age related shift from hyperopia in young children towards myopia in older children.

Children like those found in this study encounter a lot of environmental elements which make them prone to allergic conjunctivitis; the results thus agree with the fact that they are exposed to dust, pollen, smoke and other irritants during school play hours^[15]. This could account for the high prevalence of allergic conjunctivitis. Baig *et al.*^[16] and Geraldini *et al.*^[17] also mentioned that schoolchildren are invariably burdened with allergic conjunctivitis which may vary with age, gender and may exist with other morbidities.

Distribution of Ocular Conditions by Age

Table 3. Distribution of ocular conditions among the school children

Ocular Diagnosis	Age (yrs)			Total (%)
	5-10	11-15	16-18	
No abnormality	48	124	23	195 (48.80)
Myopia	2	8	0	10 (2.50)
Allergic conjunctivitis	18	45	11	74 (18.50)
Hyperopia	17	48	9	74 (18.50)
Astigmatism	1	11	5	17 (4.20)
Suspicious disc	0	3	1	4 (1.00)
Pathology (cornea scar; toxo scar)	1	9	2	12 (3.00)
Trauma	7	6	1	14 (3.50)
Total	94	254	52	400 (100)

Table 3 displays results that appear to be varying age; Allergic conjunctivitis, hyperopia, corneal and toxo

scars were much prevalent in subjects aged 11-15 years and ocular trauma was highest in those aged 5-10 years.

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Distribution of Ocular Conditions by Gender

The 195 (48.8%) school children who were diagnosed as having normal eyes comprised 86 male and 109 female study subjects. Apart from the pathological conditions (corneal and toxoplasma scars) in which the males recorded two (2) subjects more than females, the various conditions had higher counts in the females than male regarding the fact that the overall number of female study subjects was higher than that of males. Female subjects recorded a higher count of ten (10) for trauma than males with a count of four (4) but other studies show that trauma is a leading cause of corneal scarring and unilateral blindness in children and its incidence is higher in males than in females, obviously due to their rambunctious nature. Onwasigwe^[18] in Enugu, reported 60 children with trauma forming 8.2% of pediatric out-patients seen, with blunt trauma as the commonest cause.

The number of males diagnosed with hyperopia was equal to the number of females diagnosed with hyperopia (37 in each case). This result is contrary to that of Kalkivayiet *al.*^[19], whose study reported hyperopia as significantly associated with the female gender ($p = 0.001$). Table 4 shows the distribution of the various diagnoses made by gender. Chi square analysis revealed that there was no statistical significant relationship between gender and the various ocular diagnoses made ($\alpha = 0.05$). It thus could be said that being either male or female puts one at the same risk of being diagnosed with a particular ocular condition.

Distribution of Refractive Error by Gender

The general pattern of the various ocular conditions by gender, including trend of distribution of refractive errors remain elusive – it apparently confounded by age and the greater female study subject participation. Our results remain similar to a study conducted in the UK by Peckhamet *al.*^[20], where a large study sample of children yielded no significant differences in refractive errors between boys and girls. Opposing findings were mentioned by Hirsch^[21]; he revealed a distribution that went both ways.

Table 4. Distribution of ocular conditions by gender

Diagnosis	Male	Female	Total (%)
Normal eyes	86	109	195 (48.80)
Myopia	4	6	10 (2.50)
Allergic conjunctivitis	31	43	74 (18.50)

Hyperopia	37	37	74 (18.50)
Astigmatism	3	14	17 (3.50)
Suspicious disc pathologies (cornea scar, toxo scar)	1	3	4 (1.00)
Trauma	7	5	12 (3.00)
Trauma	4	10	14 (3.50)
Total	173	227	400 (100.0)

Hirsch found a more myopic mean refraction in boys than in girls among 5- to 6-year-olds but more myopia among girls by age 14 years. Studies by Pavithra *et al.*^[12] also showed conflicting results to ours; their studies showed that prevalence of refractive error was more in girls (9%) compared to boys (5.3%) and this difference was statistically significant ($p = 0.0061$). Table 5 represents the distribution of refractive error according to gender.

Other studies also scrutinized the influence of puberty and earlier maturation typically found in girls to be a confounder^[22,23]. Our analysis of the refractive error distribution with age did not reveal a statistically significant association; it will suffice to say that the greater number of female study subjects recruited in the study as compared to males yielded an apparently high refractive error count.

Table 5. Distribution of refractive error according to gender

Refractive error	Male	Female	Total (%)
Myopia	4	6	10 (2.50)
Hyperopia	37	37	74 (18.50)
Astigmatism	3	14	17 (4.25)
Total	41	55	101 (25.25)

Distribution of Visual Impairment by Gender

The degree of visual impairment was ascertained by the use of Snellen distance visual acuity chart for each study participant. Visual acuity assessment is clinically widely used and it is a useful clinical tool for detecting ocular abnormalities or changes affecting the visual system. Benjamin^[24] mentioned that visual acuity is sensitive to refractive error and to many abnormalities that affect the optical media, the retina, the optic nerve, and the visual pathways. It is used routinely by eye-care practitioners during refractive procedures and during decision making when diagnosing or monitoring ocular disorders that affect vision. Table 6 shows the distribution of visual impairment according to the gender of the pupils.

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Table 6. Distribution of visual impairment by gender

Gender	Visual Acuity (Right Eye)			Total
	6/12 - 6/18	6/24 - 6/36	≥ 6/60	
Male	8	1	1	10
Female	9	1	0	10
Total	17	2	1	20

The study showed that there was no statistical significance between visual impairment and gender – by virtue of visual acuity score for only the right eyes of the study participants. In all there were 10 visually impaired males and 10 visually impaired females, giving a total of 10.18 % out of the 400 (100%) study subjects. This total value compares well with results of Pavithra *et al.*^[12], who stated that out of the 1378 children screened for defective vision with the help of the Snellen distance chart 142 (10.2%) children had difficulty in reading the chart from a distance of 6 metres. The disparity however was that, visual acuity was assessed in either eyes of the study subjects and the criterion for visual impairment was an uncorrected visual acuity of < 6/12 but that of this study was set at <6/9.

The study also showed that 3 (0.7 %) of the total number of study subjects were low vision patients with best corrected vision worse than 6/24. According to Eikie *et al.*^[25], various ocular surface conditions which may include dry eyes and corneal scars could affect the visual acuity. These conditions perhaps were unevenly distributed among the study subjects giving a figment of the true distribution of visual impairment with gender in table 6.

Attendance to Eye Clinic

The study revealed that 75 (18.62%) out of the 400 school children examined, reported of visiting an eye clinic or ever having an eye check by an eye care professional in the past year preceding the study. The remaining 325 (81%) reported of neither visiting an eye clinic nor having an eye checkup; 170 (42.5%) of the remaining 325 subjects were diagnosed of one or more ocular conditions in at least one eye. Low attendance at an eye care facility may be due to several reasons. The study subjects might not have complained of any condition warranting eye clinic attendance-most children with eye problems typically are silent about them because they think the way they see is just how everybody sees. It could also be that, as children with parents belonging to a developing

country, their parents might have no motivation either due to economic, cultural, religious or other personal reasons to take their wards for eye checkups^[8,9].

Teachers' Awareness of Ocular Conditions Affecting the School Children

All of the fifty (50) teachers randomly selected from the five different schools scored above 60% pass mark point in answering the graded simple questionnaire to ascertain their awareness of ocular conditions affecting the school children. This gives an indication that teachers could be trained as part of the eye care team in the classrooms^[26].

CONCLUSION AND RECOMMENDATIONS

This study found high prevalence of ocular conditions (51.25%) among the school children in the Sunyani Municipality. There was a low rate (18.62%) of attendance to the eye clinic for reasons unknown; either the children never reported their eye problems to merit treatment at the eye clinic or parents could not afford treatment cost at the hospital. There was 100% awareness of teachers on ocular conditions affecting the school children.

We recommend that, parents pay regular attention to the ocular health status and needs of their children by taking them for regular eye checkups.

We also recommend that the Ministry of Health, the Ghana Health Service and the Ghana Education Service plan and implement eye screening programmes for children prior to enrolment in schools and regularly after enrolment. Teachers should be trained to identify visual difficulties and ocular abnormalities in school children.

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