

## Prevalence and Causes of Ocular Morbidity among Primary School Children in Sokoto Metropolis, North-Western, Nigeria

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### ABSTRACT

**Background:** Vision plays an important role in child development, as this is essential for receiving visual sensory information from the external environment and social development.

**Objectives:** This study aims at determining the prevalence and causes of ocular morbidity among primary school children within sokoto metropolis.

**Materials and Method:** A descriptive cross sectional survey of primary school children in Sokoto metropolis was carried out between July 2016 and August 2016. Relevant socio-demographic history and ocular examination was carried out on the primary school children that were selected using a multi-stage sampling technique. Data were entered and analysed using the MS Excel 20 and Statistical Package for Social Sciences (IBM SPSS) version 20.

**Results:** A total of 184 pupils were surveyed; 85 (46.2%) were males and 99 (53.8%) were females. The age range was between 5 and 15 years and the mean age was 10.84 years  $\pm$  2.19. The prevalence of ocular morbidity among the primary school children was 29.3%. Conjunctivitis was found to be the commonest ocular morbidity with a prevalence of 17.9% followed by refractive error with a prevalence of 7.6% while no cases of colour vision or cataract were seen.

**Conclusion:** The sheer magnitude of ocular morbidity among primary school children calls for need to introduce or improve the school eye health program as part of the routine school health services.

**Keywords:** Prevalence, Causes, Ocular morbidity, Primary school children.

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### Introduction

Vision plays an important role in child development, as this is essential for receiving visual sensory information from the external environment and social development<sup>1</sup>. Many ocular diseases have their origin in childhood<sup>1</sup> and if the morbidity goes unnoticed, may put the child at risk of physical injuries, stigmatisation among their peers or even cause severe ocular disability in the later part of life. Visual difficulties may influence the life of an individual in physical, mental, social, educational and vocational aspects<sup>2</sup>. It has been estimated that more than three-fourth of all learning comes through the use of eyes, and that about one child in every five has a correctible visual defect which if left undetected or uncorrected for too long may bring about failure, retardation, or other maladjustment<sup>2</sup>. Globally there is a surge in the burden of disease related to vision disorders ranging from 12,858,000 disability

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adjusted life years (DALYs) in 1990 to 18,837,000 DALYs in 2010; that is a 47% increment<sup>3</sup>. Effective methods of screening for visual defect in school children are useful in detecting preventable and correctable visual disorders and in minimizing long-term visual disability<sup>1</sup>.

Thus study aims to establish the prevalence and causes of ocular morbidity among primary schools' children in sokoto metropolis, North-Western Nigeria.

### Material and method

The study was conducted in Sokoto metropolis, the capital of Sokoto State. The Metropolis has a projected population of 687,767 people out of the projected population of 4,968,458 million people in the state<sup>4</sup>. There are 230 registered primary Schools within the metropolis as at March 2016 with a total of 118,830 pupils<sup>5</sup>.

A descriptive cross sectional study was employed with a study population comprising of primary schools' pupils aged between 5-15 years in Sokoto metropolis, Sokoto State.

Sample size was estimated using the formula

$$n = z^2 p q / d^2,$$

Where the prevalence "p" of the primary school children population estimated to have ocular morbidity from previous studies was 12.2%<sup>6</sup> and the degree of accuracy "d" was set at 0.05.

Thus  $n = 164.60$

Twenty percent (20%) non response was anticipated, which was adjusted as  $n_s = n/R = 206$  pupils.

Two hundred and six pupils were recruited for the study using a multistage sampling technique as follows;

Stage I: four primary schools were selected by using simple random sampling technique (balloting). There was proportionate allocation of pupils to each selected school.

Stage II: from each selected school, stratified sampling technique was used for selecting a class from classes 1-6 as follows

From each class arm, a sub-class was selected using a balloting technique. Proportionate allocation of samples was done to each sub-class.

Stag III: from each of the selected sub-class, systematic sampling technique was used to select pupils.

Method of data collection was interviewer-administered semi-structured questionnaires which were completed for the selected pupils by the researchers'/research assistants.

Proportionate allocation of samples was done to each sub-class.

Stag III: from each of the selected sub-class, systematic sampling technique was used to select pupils.

Method of data collection was interviewer-administered semi-structured questionnaires which were completed for the selected pupils by the researchers'/research assistants. The examinations were carried out in the classrooms in broad day light with the class teacher present. Data were collected through the months of July and August 2016.

Visual Acuity Measurement was done using the Illiterate E chart which was hung on a wall at a distance of six metres in well-lit room and at a height of two metres. Visual Acuity was measured (one eye at a time) with each pupil standing and facing the chart, and then reading out the letters on the charts starting from the biggest one to the smallest readable. The eye not being measured was covered with a hand-held occluder held in place by the researcher/research assistant<sup>7</sup>.

Pin Hole Visual Acuity Measurement was done for those with impaired visual acuity, i.e. below 6/6. This was done at the same distance. With the occluder still in place, the eye being measured was made to peep through the pin hole at the chart and the Pin Hole visual acuity was recorded<sup>7</sup>. Colour Vision Test was done using the Ishihara colour vision plate, each plate was shown to the pupil binocularly at the distance of about 75cm for 30 seconds. Ability to identify all the numbers mean good colour vision and were recorded as such<sup>7</sup>.

Large angle squint (20 degrees or more) requires no special testing procedure for its detection. For smaller angles of deviation, a cover-uncover test was done by placing a translucent occlude paddle over the eye for a short time and removed observing eye movements<sup>1</sup> with the aid of pen



torch, the eye lids, conjunctiva, the cornea, the anterior chamber, the iris and the pupil of each eye were examined separately for each respondent pupil by the researchers and were recorded accordingly.

Funduscopy and the intra-ocular pressure measurement were not done because complete ophthalmology examination could not be done in the school setting, as it requires student's pupil dilatation and the permission for the papillary dilatation was not granted keeping in view the safety of the students.

Collected data was entered and analyzed using statistical package for social science (SPSS) version 20 (SPSS Inc. Chicago, IL, U.S.A.) and MS Excel 20. Frequency distribution tables were constructed; cross tabulations were done to examine relationship between categorical variables, Chi-square test was used to compare differences between proportions. All statistical analysis was set at 5% level of significance ( $p < 0.05$ ). Refractive error was diagnosed based on visual acuity of 6/9 or worse that improved with pin-hole test<sup>8</sup>. Posterior segment eye pathology was reported for visual acuity of 6/9 or worse that remain the same with pin-hole test<sup>9</sup>.

Approval for the study was obtained from the ethics committee of Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto. Written informed consent was obtained from the parents of participating pupil and assent from each participating pupil.

A limitation of the study was inability to carry out full ophthalmologic examination.

### Results

A total of 206 questionnaires were administered, out of which 184 questionnaires were completed fully giving a response rate of 89.30%. Majority of the respondents were Muslims 180 (97.8%) while 4 (2.2%) were Christian. There was predominance of female 99 pupils (53.8%) compared to male 85 pupils (46.2%) with male to female ratio of 1:1.2. 50% of the sampled pupils were between 10 - 12 years. Ocular morbidity was found in 54 pupils out of the total of 184 pupils given a prevalence of 29.3%. Ocular morbidity was found to be statistical significantly associated with male gender ( $p=0.049$ ) while no age difference was found among the respondents ( $p=0.065$ ). Parental education or income have no association with ocular morbidity.



Table 1: Socio-demographic characteristics of the respondents

Variable	Ocular morbidity Present N= 54 Frequency (%)	Ocular morbidity Absent N= 130 Frequency (%)	p- values
<b>Gender</b>			
Male	31 (16.8)	54 (29.3)	0.049
Female	23 (12.5)	76 (41.3)	
<b>Age</b>			
< 7	2 (1.1)	0 (0)	0.065
7 – 9	14 (7.6)	35 (19.0)	
10 – 12	30 (16.3)	62 (33.7)	
13– 15	8 (4.3)	33 (17.9)	
<b>Religion</b>			
Islam	54(29.3)	126(68.5)	0.192
Christianity	0(0.0)	4(2.2)	
<b>Fathers' education</b>			
None	4 (2.2)	15 (8.2)	0.711
Primary	3 (1.6)	5 (2.7)	
Secondary	10 (5.4)	29 (15.8)	
Tertiary	37 (20.1)	81(44.0)	
<b>Mothers' education</b>			
None	20 (10.9)	48 (26.1)	0.778
Primary	5 (2.7)	8 (4.3)	
Secondary	16 (8.7)	35 (19.0)	
Tertiary	13 (7.1)	39(21.2)	
<b>Fathers' occupation</b>			
Business	18 (9.8)	47 (25.5)	0.474
Civil servant	36 (19.6)	80 (43.5)	
Farmer	0 (0)	3 (1.6)	
<b>Mothers' occupation</b>			
Business	7 (3.8)	9 (4.9)	0.475
Civil servant	10 (5.4)	31 (16.8)	
Farmer	0 (0)	1 (0.5)	
Unemployed	37 (20.1)	89 (48.4)	

Ocular morbidity seen were Conjunctivitis 33(17.9%), Refractive error 14 (7.6%), Squint 7 (3.8%) while none had cataract or colour vision defect.



**Table 2: Distribution of ocular morbidity among respondents**

Variable	Frequency (%)
Conjunctivitis	33 (17.9)
Refractive error	14 (7.6)
Squint	7 (3.8)
Cataract	0 (0.0)
Colour vision defect	0 (0.0)

### Discussion

Baltussen et al.<sup>10</sup> states that screening of children aged 5-15 years is one of the most cost-effective strategies for assessing visual problems among children.

In this study, the prevalence of ocular morbidity was found to be 29.3%. Similar prevalence of 27.65% was reported by Deshpande and Malathi<sup>1</sup>. However lower prevalence of 3.7%, 12.2% and 22.7% were reported by Srijina et al.<sup>11</sup> in Nepal, Ajaiyeoba et al.<sup>6</sup> in South-Western Nigeria and Rajesh et al.<sup>9</sup> in India respectively. Higher prevalence of 40% and 36.64% were also reported Chaturvedi and Aggarwa<sup>12</sup> in rural area of Delhi, India and Lian-Hong et al.<sup>13</sup> in Western China respectively. These differences may be due to level of health care system, availability of ophthalmologic services and status of school health services of the concerned region.

There is no significant association between socio-economic variables such as parental income or educational statuses and ocular morbidity. Rajesh et al.<sup>9</sup> also found no relationship between both parental education and parental income with ocular morbidity among primary school children in Delhi, India.

Conjunctivitis was found to be the most common ocular disease condition with a prevalence of 17.9%. This was higher than those of previous studies<sup>6,8,9</sup>. These differences may be due to seasonal variation of conjunctivitis. Refractive error was the second most common ocular conditions/ diseases. Similar findings were

reported by Ajaiyeoba et al.<sup>6</sup> and Nwosu<sup>14</sup>. The prevalence of squint in this study was found to be 3.8%. This is higher than what was obtained by several researchers; 0.3% by Ajaiyeoba et al.<sup>6</sup>, 1.6% by Okoro and Odeyemi<sup>7</sup> and 0.5% by Rajesh et al.<sup>9</sup>, but lower than 6.39% obtained by Deshpande and Malathi<sup>1</sup>. These differences may be due to geographic location, ethnicity, age, and other population characteristics which might have affected the prevalence of squint.

### Conclusions

The sheer magnitude of ocular morbidity among primary school children calls for need to introduce or improve school eye program as part of the routine school health service and Public enlightenment on the importance of children ocular health especially for the government and among parents should be given.

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