

## VISUAL STATUS OF PRIMARY SCHOOL CHILDREN IN INYISHI, IKEDURU, LOCAL GOVERNMENT AREA, IMO STATE, SOUTH-EASTERN NIGERIA

<sup>1</sup>Mbatuegwu AI, <sup>1</sup>Achigbu EO, <sup>2</sup>Mbatuegwu CU, <sup>3</sup>Nkwogu FU, <sup>4</sup>Chuka-Okosa CM, <sup>5</sup>Omoti AE

---

<sup>1</sup>Department of Ophthalmology, Federal Medical Centre, Owerri, Imo State, <sup>2</sup>Department of Family Medicine, Federal Medical Centre, Owerri, Imo State, <sup>3</sup>Department of Ophthalmology, Imo State University Teaching Hospital Orlu, Imo State, <sup>4</sup>Department of Ophthalmology, University of Nigeria Teaching Hospital, Enugu State, <sup>5</sup>Department of Ophthalmology, University of Benin Teaching Hospital, Edo State

---

### ABSTRACT

**Aim:** To describe the visual status of primary school children as baseline data and basis for recommending routine school eye screening.

**Methods:** This was a school-based, cross-sectional, descriptive study on primary school children aged 6-18 years attending 3 government-owned community primary schools in Inyishi, Ikeduru Local Government Area, Imo State. Visual acuity assessment, anterior and posterior segment examinations were performed. Intraocular pressure measurement and dilated funduscopy were also carried out in children with a vertical cup to disc ratio > 0.6 in either eye and a poor view of the fundus through undilated pupils respectively.

**Results:** Three hundred and sixty-seven children were examined. Majority 275 (74.93%) had normal ocular findings while 92 (25.07%) had ocular morbidity. Prevalence of mild, moderate visual impairment, and monocular blindness were 7.9%, 0.5% and 0.3% respectively. The ocular morbidities noted were Glaucoma suspect (9.54%), refractive error (7.63%), allergic conjunctivitis (6.27%), amblyopia (0.82%), corneal opacity (0.54%) and strabismus (0.27%). There was a statistically significant association of ocular morbidity with gender but none with academic class and age. A statistically significant association was also recorded between gender and glaucoma suspect.

**Conclusion:** High prevalence of ocular morbidity and the various types of ocular morbidities were recorded, with the commonest eye disorder being glaucoma suspect. It is important, therefore, to conduct routine school eye screening programme in order to identify such ocular morbidities and refer adequately.

**Key words:** Visual health status, primary school children, ocular morbidity

**All correspondence to:** Dr Mbatuegwu, A.I  
Consultant Ophthalmologist,  
Department of Ophthalmology,  
Federal Medical Centre, Owerri, Imo State  
Email: adambatuegwu@gmail.com

### INTRODUCTION

According to the United Nations Children's Fund (UNICEF), a child is a person below the age of 18 years unless the laws of a particular country set the legal age for

adulthood younger.<sup>1</sup> According to the World Bank data, children start primary education between 5 years and 7 years of age.<sup>2</sup> In Nigeria, children are supposed to start their six years of primary education at 6 years of age.<sup>3</sup>

It is important to screen children as they enter primary school to detect early and then treat vision problems that could lead to preventable lifelong visual impairment and disrupt normal educational development.<sup>4</sup> The prevalence and spectrum of ocular problems vary from country to country and also from region to region in the same country.<sup>5</sup>

In India, common childhood ocular problems noted included- refractive errors, blocked nasolacrimal ducts, primary squints, conjunctivitis, trauma, foreign bodies, blepharitis and nutritional diseases.<sup>5</sup> In Northern Nigeria, common ocular disorders seen were uncorrected refractive error, allergic conjunctivitis, glaucoma suspect and colour vision deficiency.<sup>6</sup> In South-western Nigeria, common ocular disorders were allergic/vernal conjunctivitis, refractive errors, lid disorders, squints, corneal scarring and cataract.<sup>3</sup> In a South-eastern Nigeria State, vernal conjunctivitis, refractive error, and amblyopia were common.<sup>7</sup>

These ocular disorders, though largely preventable or treatable, can result in significant visual impairment that can affect a child's learning ability or lead to an increased number of school absenteeism. Without prompt and adequate intervention, an affected child may be forced to drop out of school and invariably become a burden in addition to

the psychosocial stigma inflicted by his ailment and its effects.

To the best of the investigator's knowledge, there is no published literature on the visual status of primary school children in Imo state. This lack of published data points to a paucity of screening outcome reports. The results of this study will therefore reveal the common causes of ocular morbidity among primary school children in Inyishi, Ikeduru Local Government Area, Imo state, South-eastern Nigeria. The results will also aid in advocacy and planning for the establishment of a sustainable school eye health service in the State in order to prevent the avoidable effects of visual impairment.

#### **MATERIALS AND METHODS:**

This was a community-based, cross-sectional, descriptive study that assessed the visual status of children in three government-owned community primary schools in Inyishi, Ikeduru Local Government Area, Imo State, Nigeria. The three schools had a total school population of 805. The individual school populations were 255, 300 and 250 respectively. Inyishi had one health centre and no eye care delivery facility. Children aged 6-18 years who were willing to participate in the study and whose parents gave consent were included in the study. A sample size of 367 was calculated using the Leslie-Kish formula<sup>8</sup> and the prevalence of ocular morbidity of 32.1% by Ekpenyong et al<sup>9</sup> another community-based study. A systematic sampling technique was used to select three hundred and sixty-seven children from the schools.

Ethical approval was obtained from the Health research and Ethics Committee of

the Federal Medical Centre, Owerri in adherence to Helsinki declaration. Permission to conduct the study was obtained from the school authorities and Imo State Ministry of Education. Visual acuity assessment, anterior and posterior segment examinations were done. Intraocular pressure measurement and dilated funduscopy were carried out in children with a vertical cup to disc ratio > 0.6 in either eye and a poor view of the fundus through undilated pupils respectively. A diagnosis of amblyopia was made if there was reduced visual acuity which did not improve with pin-hole or refraction; normal findings on anterior and posterior segment examination in either or both eyes. Children with provisional diagnosis like glaucoma and those requiring cycloplegic refraction were referred appropriately for further evaluation and treatment.

**Operational Definitions**

**Glaucoma Suspect-** Diagnosis was made if, at least, any two of the following were present: Any asymmetry of > 0.2 in the vertical cup to disc ratio (VCDR) of the two eyes, VCDR of > 0.6 in either eye, intraocular pressure > 21mmHg in either eye by applanation tonometry using Perkins tonometer.<sup>10</sup>

**Allergic Conjunctivitis-** Diagnosis was made on account of recurrent itchy eyes with whitish discharge, conjunctival injection/brownish discoloration with or without limbal follicles.<sup>6</sup>

**Amblyopia-** was defined as a  $\geq 2$  - line difference in best corrected visual acuity (BCVA) between the two eyes; and normal findings on anterior and posterior segment examination.<sup>11</sup>

**Strabismus** – Diagnosis was made if there were abnormal findings in corneal light reflex, extraocular motility and cover-uncover tests.<sup>12</sup>

**Visual impairment** – Diagnosis was made on account of presenting visual acuity of < 6/6.

**RESULTS**

**Table 1: Prevalence of normal vision, visual impairment and blindness among school children in Inyishi**

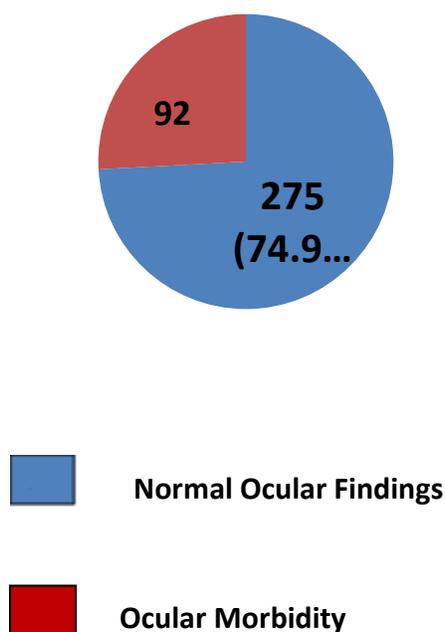
VA category	Right eye	Left eye	Better eye
<b>Normal Vision (<math>\geq 6/6</math>)</b>	333 (90.7%)	334 (91%)	336 (91.6%)
<b>Mild vision loss/Near normal vision (6/9 - 6/18)</b>	29 (7.9%)	28 (7.6%)	29 (7.9%)
<b>Moderate visual impairment (&lt;6/18 - 6/60)</b>	4 (1.1%)	5 (1.4%)	2 (0.5%)
<b>Severe visual impairment (&lt;6/60 - 3/60)</b>	0 (0%)	0 (0%)	0 (0%)
<b>Blindness (&lt;3/60-NPL)</b>	1 (0.3%)	0 (0%)	0 (0%)
<b>Total</b>	367 (100%)	367 (100%)	367 (100%)

Table 1 shows the prevalence of visual impairment and blindness in primary school children in Inyishi. Visual impairment (VI) was noted in 31 pupils. Twenty-nine (7.9%) had mild VI and 2 (0.5%) had moderate VI. There

was no severe VI and monocular blindness was noted in 0.3% (one pupil).

Fig 1 illustrates prevalence of ocular morbidity in Inyishi school children. Majority of the pupils 275(74.93%) had normal ocular findings while 92 (25.07%) had ocular morbidity.

**Fig 1: Prevalence of ocular morbidity in primary school children in Inyishi**



**Table 2: Prevalence and pattern of various ocular morbidities in primary school children in Inyishi**

Eye disorder	Frequency (percentage)
Glaucoma suspect	35 (9.54%)
Refractive error	28(7.63%)
Allergic conjunctivitis	23 (6.27%)
Amblyopia	3 (0.82%)
Corneal opacity	2 (0.54%)
Strabismus	1 (0.27%)
<b>Total</b>	<b>92 (25.07%)</b>

Table 2 shows the prevalence and pattern of various ocular morbidities in primary school children in Inyishi. Ocular disorders were noted in 92 (25.07%) out of 367 school children. Glaucoma suspect was the most common ocular morbidity with a prevalence of 9.54% while strabismus was the least common with a prevalence of 0.27%.

Table 3 shows the association between sociodemographic distribution and ocular morbidity in Inyishi primary school children. The 6-11year age range, being in class 4-6 and the male gender had the highest percentage of ocular morbidity, while gender was significantly associated with the occurrence of ocular morbidity, (p = 0.003), age and academic class were not ([p = 0.33] and [p = 0.34] respectively).

**Table 3: Association between the sociodemographic characteristics and presence of ocular morbidity in primary school children in Inyishi**

Variable	Normal ocular findings	Ocular morbidity	Total	$\chi^2$ (p value)	OR (CI)
	N (%)	N (%)	N		
<b>Sex</b>					
Male	113(67.3%)	55(32.7%)	168	8.96(0.003)	0.47(0.29-0.75)
Female	162(81.4%)	37(18.6%)	199		
<b>Age</b>					
6-11 years	199(73.4%)	72(26.6%)	271	0.96(0.33)	0.73(0.33-1.27)
12-17 years	76(79.2%)	20(20.8%)	96		
<b>Class</b>					
1-3	111(72.1%)	43(27.9%)	154	0.90(0.34)	0.77(0.48-1.24)
4-6	164(77%)	49(23%)	213		

Table 4 indicates the association between sociodemographic distribution and various ocular morbidities in primary school children

in Inyishi. Glaucoma suspect was significantly associated with gender.

Variable	Allergic conjunctivitis N (%)	Glaucoma suspect N (%)	Refractive error N (%)	Amblyopia N (%)	Corneal opacity N (%)	Strabismus N (%)	Total N
<b>Sex</b>							
Male	11(20%)	28(50.9%)	12(21.8%)	2(3.6%)	2(3.6%)	0(0%)	55
Female	12(32.4%)	7(18.9%)	16(43.2%)	1(2.7%)	0(0%)	1(2.7%)	37
$\chi^2$ (p value)	0.001(0.99)	16.76(0.001)	0.016(0.90)	0.02(0.88)	0.69(0.41)	0.001(0.99)	
CI	0.39-2.13	0.08-0.43	0.52-2.42	0.04-4.6	0	0	
OR	0.92	0.18	1.13	0.42	0	0	
<b>Age</b>							
6-11years	19(26.38%)	28(38.89%)	20(27.78%)	3(4.17%)	1(1.39%)	1(1.39%)	72
12-17years	4(20%)	7(35%)	8(40%)	0(0%)	1(5%)	0(0%)	20
$\chi^2$ (p value)	0.55(0.46)	0.45(0.50)	0.006(0.94)	0.14(0.71)	0.14(0.71)	0.001(0.99)	
CI	0.19-1.74	0.28-1.62	0.48-2.68	0.97-1.00	0.17-5.88	0.98-1.01	
OR	0.56	0.68	1.14	0	2.84	0	
<b>Class</b>							
Class 1-3	12(27.91%)	11(25.58%)	16(37.21%)	2(4.65%)	1(2.33%)	1(2.33%)	43
Class 4-6	11(22.45%)	24(48.98%)	12(24.49%)	1(2.04%)	1(2.04%)	0(0%)	49
$\chi^2$ (p value)	0.65(0.42)	1.32(0.25)	2.23(0.14)	0.08(0.77)	0.001(0.99)	0.03(0.87)	
CI	0.28-1.50	0.78-3.48	0.24-1.12	0.03-1.01	0.05-1.62	0.98-1.06	

**Table 4: Association between the sociodemographic characteristics and various ocular morbidities in primary school children in Inyishi**

**DISCUSSION**

The prevalence of binocular (mild and moderate) visual impairment (8.4%) in this study was higher than that recorded by

Okoye et al<sup>7</sup> (0.5%) and Ayanniyi et al<sup>10</sup> (2.2%). However, a school-based study in Edo State, Nigeria by Okoro et al<sup>13</sup> reported a higher

prevalence of binocular visual impairment of 10.5%. The different values could be due to the differences in the study area and methodology. This study was conducted in a rural south-eastern region while Okoro et al<sup>13</sup> conducted the study in south-south region. In addition, Okoro et al<sup>13</sup> assessed visual acuity with a Snellen chart composed of two sections – a literate section for the senior primary pupils and a diagrammatic section for the junior primary pupils. It is possible that some junior primary pupils who could not identify the diagrams even though they can see, may have been wrongly labelled as visually impaired. The study by Okoro et al<sup>13</sup> was also conducted more than 7 years ago so it is possible that there is a decline in the prevalence of visual impairment. Ayanniyi et al<sup>10</sup> recorded a prevalence of binocular blindness of 0.4% in contrast to the 0.3% noted in this study. It could be that the binocularly blind pupils that could have been noted in the present study may have been enrolled in schools for the blind or may be at home.

Majority of the children 275 (74.93%) had normal ocular findings on examination. The prevalence of ocular morbidity in this study was 25.07%. Other studies in Nigeria<sup>6,9</sup> and beyond<sup>14</sup> recorded similar values (22.6%, 32.1% and 29.82% respectively). The similarly high prevalence values could be due to comparable methodology, definitions of terms, inclusion and exclusion criteria even though the study areas were different. In contrast, Okoye et al<sup>7</sup> in South-eastern Nigeria and Rushood et al<sup>15</sup> in Sudan reported low prevalences of ocular morbidity (6.1% and 3.03% respectively). The differing values in the prevalence of ocular morbidity could be due to the varying sample sizes, the varying age ranges of children examined, the location of the studies and the number of

schools sampled in each study. Higher values were noted in studies with smaller sample sizes. For instance, the present study examined 367 pupils and the prevalence of ocular morbidity was 25.1%. In contrast, Rushood et al<sup>15</sup> examined 671,119 pupils and the prevalence of ocular morbidity was 3.03%. In addition, the present study sampled 3 schools while Rushood et al<sup>15</sup> sampled 1418 schools.

Majority (70%) of the pupils with suspicious disc findings had parents that were either blind or on eye medications. Consequently, there is need for continuous follow-up for these children because of the implication of glaucoma in terms of their education and future livelihood. The prevalence of glaucoma suspect in this study is higher than that reported in Northern and South-western Nigerian studies<sup>6,13</sup> (3.7% and 1.4% respectively) even though similar inclusion criteria were used in the definition of glaucoma/glaucoma suspect by all the studies. The previous studies<sup>6,13</sup> were conducted at least 5 years ago compared to the present study so it could be that there is a true rise in the prevalence of glaucoma suspect as suggested by Abah et al.<sup>6</sup> The different prevalence values could also result from the dissimilar definitions of glaucoma/glaucoma suspect used in the studies.

Prevalence of refractive error in this study was 7.63% (n=28). A similar study on school children in Chile by Maul et al<sup>16</sup> reported a prevalence of 15.8%. In contrast, Mohamed et al<sup>17</sup> reported a higher prevalence of 66.9%. This was similar to 78% reported by Misra et al<sup>18</sup> in western India. However, several school-based studies in Nigeria<sup>6,7,10,19-22</sup> and elsewhere<sup>14,15,23,24</sup> also recorded very low prevalence values ranging from 0.7%- 9.33%.

The differing values of the prevalence of refractive error could be due to the VA level used in defining refractive error and sample sizes studied. Studies that used a VA level of < 6/9 (the present study and that by Misra et al<sup>18</sup>) had higher prevalence because more pupils would have fallen into that group while studies that used a VA level of < 6/12 (Wedner et al<sup>23</sup> and Rushood et al<sup>15</sup>) had lower prevalence values. However, studies with larger sample sizes combined with a VA level of < 6/9 recorded lower prevalence values for refractive error as in the study by Okoye et al.<sup>7</sup> Refractive error is a significant cause of visual impairment in our environment and all efforts have to be made to eliminate or reduce this through timely intervention. Majority of the studies recommended routine, regular eye examination for new intakes and other primary school children.

The prevalence of Allergic conjunctivitis (6.27%) is lower than that reported in some Nigerian studies<sup>6,10,19</sup> but higher than other Nigerian<sup>7,20</sup> and African<sup>15,23</sup> studies. The differing values may be due to the time/season in the year when the studies were conducted. The current study was carried out in May-July which was within the first peak of the rainy season (the first peak being March to July)<sup>25,26</sup> and allergic reactions are likely to be higher due to release of pollen grains.<sup>19,26</sup> Rushood et al<sup>15</sup> conducted the study between December and June which is made up of dry season and commencement of scanty rainfall. In addition, South-eastern Nigeria where the study was conducted has a dusty environment. Allergy is a common cause of school absenteeism even though it is not a common cause of blindness.<sup>19</sup>

The prevalence of amblyopia in this study was higher than that obtained in some studies in Nigeria<sup>10,19</sup> and elsewhere.<sup>23</sup> The reasons for the different values could be the different study definitions of amblyopia and different age ranges of participants.

Corneal opacity, which was from trauma, had a prevalence of 0.54% (n=2). The 2 pupils were both males and trauma resulted from both blunt and penetrating stick injury. Singh<sup>12</sup> in India recorded a higher prevalence of corneal opacity (0.85%). Kehinde et al<sup>20</sup> and Ajaiyeoba et al<sup>19</sup> in Nigeria also recorded lower values of 0.08% and 0.3% respectively. There is therefore need to enlighten the pupils and teachers on the need to prevent ocular trauma and reduce the prevalence of corneal opacity from trauma which could be a cause of visual impairment.

Strabismus was uncommon with a prevalence of 0.27%. Higher values were documented in India<sup>12,14</sup> while lower values were documented in African countries<sup>6,10,23,27</sup> so regional variations could account for the different prevalence values. It could be that strabismus was under-diagnosed in the African studies. It is also possible that African children with strabismus may have dropped out of school due to low self-esteem and associated stigma. Generally, strabismus is believed to be uncommon in Nigeria probably because previous studies did not focus on the condition thereby underestimating its prevalence.<sup>27</sup>

All the children sampled were from the same race and ethnicity. The preponderance of ocular morbidities within 6-11 years' age range could be because this age range had the highest number of participants in this study. Okoye et al<sup>7</sup> had more participants within the 10-13years age range. Both studies were conducted in the south-eastern Nigeria.

Wedner et al<sup>23</sup> in Tanzania documented a preponderance of participants within the 11-12years age group. Abah et al<sup>6</sup> had more participants within the 6-10years of age range. While Abah et al<sup>6</sup> was conducted in an urban area and in Northern Nigeria, the present study was conducted in a rural community and in south-eastern Nigeria. Children within the age range of 6-11 and 10-13years are more likely to have been enrolled into primary schools. It is also possible that most of the ocular morbidities manifest at this age because of increasing school responsibilities. The prevalence of ocular morbidity was higher in males (32.7%) than females (18.6%) even though there was a female preponderance in this study. This finding was statistically significant ( $p = 0.003$ ). This higher prevalence in males could be because males are more active and engage more in contact sports than females. Glaucoma suspect, corneal opacity and amblyopia were seen more in males than females while allergic conjunctivitis, refractive error and strabismus were seen more in females than males. In contrast, Ajaiyeoba et al<sup>19</sup> noted a higher prevalence of ocular morbidity in females. His study was on both primary and secondary school students in contrast to this index study, hence different population demographics. It could also be that some males may have dropped out of secondary school to engage in some form of trade leaving an apparent preponderance of ocular morbidity in females.

There is need for the establishment of school eye screening programmes in order to identify, treat or promptly refer cases for appropriate management. This would go a long way to improve academic performance and reduce school absenteeism.

## REFERENCES

1. United Nations Children Education Fund. The United Nations convention on the rights of the child. London: UNICEF UK; 1990. Available from: URL: [http://www.unicef.org.uk/Documents/Publication-pdfs/UNCRC\\_PRESS200910web.pdf](http://www.unicef.org.uk/Documents/Publication-pdfs/UNCRC_PRESS200910web.pdf) [accessed on Feb 29, 2016]
2. The World Bank. Official entrance age to primary education (years). Available from: URL: <http://data.worldbank.org/indicator/S.E.PRM.AGES>. [accessed on Feb 28, 2016]
3. African Economic Research Consortium. The determinants of child schooling in Nigeria. Nairobi: The African Economic Research Consortium; 2011.
4. Ogbonnaya C, Ogbonnaya L, Okoye O, Ezeanosike E. Prevalence of refractive errors in primary school children in a rural community in Ebonyi state of Nigeria. *Int J Med Health Dev*. 2013; 18:17-34.
5. Pratab VB, Lal HB. Pattern of paediatric ocular problems in North India. *Indian J Ophthalmol* 1989; 37: 171-172.
6. Abah ER, Oladigbolu KK, Samalia E, Gani-Ikilama A. Ocular disorders in children in Zaria Children's school. *Niger J Clin Pract* 2011; 14:473-476.
7. Okoye O, Umeh RE, Ezepue FU. Prevalence of eye diseases among school children in a rural south-eastern Nigerian community. *Rural Remote Health* [serial online]. 2013 [accessed on March 10, 2016]; 13(3):[1-9]. Available from: URL:<http://www.ncbi.nlm.nih.gov/pubmed/24093438>

8. Ikeduru Local Government. Available from:URL:  
[http://www.ikeduruunion.org/gen\\_info.php](http://www.ikeduruunion.org/gen_info.php). [accessed on Feb 29, 2016]
9. Ekpenyong BN, Naidoo K, Ahaiwe K, Ezenwankwo O, Ndukwe O, Ogar E et al. Visual status and prevalence of eye disorders among school-age children in southern Nigeria. *Afr Vision Eye Health* [serial online] 2017 [accessed July 10,201]; 76(1): [1-6]. Available from;  
URL:<https://doi.org/10.4102/aveh.v76i1.377>
10. Ayanniyi AA, Mahmoud AO, Olatunji FO. Causes and prevalence of ocular morbidity among primary school children in Ilorin, Nigeria. *Niger J Clin Pract* 2010; 13:248-253.
11. Braverman RS. Introduction to amblyopia. [online]. 2015 [accessed 2017 May 30]; [1]. Available from: URL:<https://www.aao.org/disease-review/amblyopia-introduction>
12. Singh H. Pattern of ocular morbidity in school children in Central India. *Nat J Com Med*. 2011; 2:429-431.
13. Okoro FI, Okafor UF. Ocular screening among pupils in public primary schools in Edo state of Nigeria. *Pak J Nutr* 2009;8: 1446-1449
14. Sherpa D. Ocular morbidity among primary school children. *J Chitwan Med Coll*. 2014; 4:32-34.
15. Rushood AA, Azmat S, Shariq M, Khamis A, Lakho KA, Jadoon MZ et al. Ocular disorders among school children in Khartoum state, Sudan. *EMHJ* 2013; 19:282-288.
16. Maul E, Barroso S, Munoz SR, Sperduto RD, Ellwein LB. Refractive error study in children: results from La Florida, Chile. *Am J Ophthalmol* 2000; 129: 445-454.
17. Mohamed AG, Wasfi EI, Kotb SAM, Khalek EMA. Refractive errors among primary school children in Assuit district, Egypt. *Journal of Education and Practice* 2014; 5:101-113.
18. Misra S, Baxi RK, Damor JR, Prajapati NB, Patel R. Prevalence of visual morbidity in urban primary school children in Western India. *Innovative Journal of Medical and Health Science* 2013; 3:193-196.
19. Ajaiyeoba AI, Isawumi MA, Adeoye AO, Oluleye TS. Prevalence and causes of Eye Diseases amongst students in South-western Nigeria. *Ann Afr Med* 2006; 5:197-203.
20. Kehinde AV, Ogwurike SC, Eruchalu UR, Pam V, Samaila E. School eye health screening in Kaduna-Northern Nigeria. *Niger J Surg Res*. 2005; 7:191-194.
21. Chuka-Okosa CM. Refractive errors among students of a post-primary institution in a rural community in South-eastern Nigeria. *West Afr J Med* 2005; 24:62-65
22. Opubiri I, Pedro-Egbe CN. Screening for uncorrected Refractive error among primary school children in South-South, Niger. *Sierra Leone J Biomed Res* 2013; 5:23-28.
23. Wedner SH, Ross DA, Balira R, Kaji L, Foster A. Prevalence of eye diseases in primary school children in a rural area of Tanzania. *Br J Ophthalmol* 2000; 84:1291-1297.
24. Nepal BP, Koirala S, Adhikary S, Sharma AK. Ocular morbidity in school children in Kathmandu. *Br J Ophthalmol* 2003; 87:531-534.

25. Nigeria weather and climate. Available from: URL: <http://www.cometonigeria.com/about-nigeria/climate/> [accessed on Nov 26, 2016]
26. Malu KN. Allergic conjunctivitis in Jos-Nigeria. Niger Med J 2014;55: 166-170
27. Akpe BA, Dawodu OA, Abadom EG. Prevalence and pattern of strabismus in primary school pupils in Benin City, Nigeria. Niger J Ophthalmol 2014; 22:38-43