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Ocular Screening among Pupils in Public Primary Schools in Edo State of Nigeria

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Abstract: This study was designed to investigate the visual status of pupils in public primary schools in Edo State of Nigeria aimed at obtaining visual acuity database for instituting intervention programmes. The population of the study was 871,523 pupils (475, 565 or 54.5% males and 395,958 or 45.5% females). The sample size of 360 pupils made up of 50% of each sex was selected from 1074 primary schools in Edo State using multistage procedure. The data were collected using structured interview guide and a visual analog scale-the Snellen chart. The data were analyzed using frequency counts, percentages and bar graphic presentations. The results revealed that 322 (89.5%) pupils had normal vision and 38 (10.5%) had impaired vision binocularly while 311 (86.3%) had normal vision and 49 (13.7%) had monocular impaired vision. It was recommended, that testing of pupils' visual acuities on their admission into primary schools (to provide visual baseline data as part of the child's school health record), should be in vogue. Special sitting positioning of pupils based on their acuities (to enhance clearer vision in the classroom) should be in practice and pupils in the schools with visual abnormalities be referred and followed up for specialist care.

Key words: Ocular screening, visual acuity, primary school children

INTRODUCTION

The seeing ability or vision can be classified as emmetropia (normal vision, symbolized with 6/6-6/4); ametropia, (abnormal vision or visual impairment signified as a vision of 6/9) and Non-perception of Light (NPL)/(BLINDNESS) visual acuity of worse than 3/60 with the best optical correction, or visual field not greater than 20 degree in the better eye (Vaughan and Riordan-Era, 1999 and Emmette *et al.*, 2001). Most of these problems can be prevented; hence, the World Health Organisation (WHO) set a global initiative tagged vision 2020. "Right to Sight" for the elimination of avoidable visual problems, especially blindness. In line with this, the World Health Assembly (2003) passed a resolution for the elimination of avoidable blindness and urged member states to commit themselves to the support of this global initiative by setting up, not later than 2005, a National Vision 2020 plan, in partnership with WHO and in collaboration with non-governmental organization and the private sector. In the past few years, childhood blindness has become a priority to vision 2020 programme with subsequent ongoing discussions and research for strategies to address the problems. The need to know the causes of visual impairment in children in order to control childhood blindness and low vision is gaining grounds in blindness prevention programmes. Primary school setting serves a good basic ground for such an intervention.

Visual status of pupils can be assessed through expert diagnostic screening procedures involving such tests as: visual acuity test, color test, visual field test and

ocular mobility test (Arthur and Ian, 2001). Among all these tests, visual acuity test is the most appropriate in a school setting because it is simple and portable as well as has the ability to classify the status or position of vision in the eye. Moreover, the teachers can easily administer it. There is a dearth of information and research efforts in Edo State, Nigeria regarding screening for pediatric ocular morbidity, which primarily aims to prevent vision loss that can be permanently disabling (Praveen *et al.*, 2004). Early detection of visual abnormality or defects in such a state therefore becomes pertinent in order to achieve the goal of vision 2020 relating to the "right to sight" as initiated by World Health Organisation.

MATERIALS AND METHODS

This study adopted the descriptive survey design, which is non-experimental describing "what was" at on time resulting in data being used to explain and predict phenomena (Hassan, 1995; Polit, 2003) as they pertain in this case to children's visual problems or status. The target population of the study comprised all the public primary schools in Edo State Nigeria, made up 871,523 (54.5% males and 45.5% females) as reported by records and statistics Division of Edo State Ministry of Education (2007). A sample size of 360 pupils consisting of 50% males and 50% females from three senatorial districts served as the study sample. The schools selected were stratified into classes 1-6. Using table of random numbers, 10 pupils were selected from each class, giving a total of 60 pupils per school

(60 x 6 = 360). The instrument (Snellen chart) was composed of the literate section for the senior primary pupils and diagrammatic section for the junior primary pupils who might not recognize the letters on the Snellen chart. A pen torch light for the inspection of the eye structures and meter rule to measure the distance between the screening pupil and snellen chart were also used.

Validity and reliability of the instruments: The second instrument, the Snellen chart, produced by Deepak Enterprises brand/Make, Delhi, 110049, India, has been tested over the years as a standard Universal test/screening scale. However, it was pilot tested on five Nigerian pupils, not included in the screening test, using test-retest method of two weeks interval, which yielded an r of 0.86 after being subjected to a Pearson product moment co-efficient of correlation analysis. The validity and reliability of the instruments were therefore, assured and guaranteed.

Administration of the instruments: The structured interview guide was used to elicit the pupils biodata regarding their age and sex. The researcher adapted Ophthalmic Nursing Procedure (1997) of screening visual acuities at a distance of 6 meters. The pupil sat at 6 m away from the sullen chart and was instructed to read the letters of alphabet from top to bottom. If any was unable to read the top letter at a distance of 6 m, the distance was reduced to 3 m. If unable to read the top letter, the distance was further reduced to 1 m. The pupils with acute visual problems were further requested to count the investigator's fingers and indicate the [investigator's] hand movements and lastly, light perception was established. Each pupil's visual acuity status was judged on his/her level of responses to these varied screening perceptual requirements. The data collected were analyzed using frequencies counts and percentages as well as bar-graphic presentation.

RESULTS AND DISCUSSION

The results are presented in Table 1 and 2 as well as in Fig. 1-3.

Table 1 shows that 199 (55.3%) of the pupils had very good vision of 6/6-6/5 (150-120%) ranges. 123 (34.4%) pupils had 6/36-6/60 vision. This last category implies 17-10% of vision, indicating very poor vision or legal blindness in some countries. This binocular visual status (as per visual acuity) was further classified into normal and impaired vision as shown in the summation in which, 322 pupils (89.5%) had normal vision or adequate visual acuity while 38 (10.5%) had impaired or defective vision.

Figure 1 clearly shows these two varying binocular visual status which, depicts the distribution of pupils in the normal and impaired visual acuities.

Table 2 shows that 151 of pupils representing 41.95% had very good vision of 6/4-6/5 [150-120%] in either eyes, followed by 160 [44.4%] pupils with good vision of 6/6 or 100% in both eyes. The least category shows that 1 [0.3%] and 2 [0.6%] pupils had a hand movement to non perception of light in left and right eyes respectively. The monocular visual acuity status is further broken down into normal and impaired vision as shown in the summation in which, 311 pupils (86.3%) had normal vision or adequate visual acuity while 49 (13.7%) pupils had impaired or defective vision in both eyes, among these pupils 3 {0.8%} had unocular blindness, one in the right eye and two in the left eye.

Figure 2 shows the distribution of those pupils in the normal and impaired visual acuities in monocular vision. In order to articulate better and appreciate the dimensions of both the binocular and monocular status of the pupils, a comparative bar-graph is shown in Fig. 3.

The multiple bar graph which compared normal and impaired visions in both binocular and monocular visual acuities. The results implied that there were differences in the visual acuities of pupils in the study area. The

Table 1: Distribution of pupils according to their binocular visual acuities

Visual Acuity	f	%	Vision %	Vision Loss %	Interpretation	Type of Vision
6/4-6/5	199	55.3	150-120	Nil	Very good vision	Normal Vision Acuity
6/6	123	34.2	100	Nil	Good vision	
6/9-6/12	12	3.3	67-50	5 -15	Industrial vision	Impaired Vision
6/18-6/24	15	4.2	33.3-25	25 -40	Legal blindness	
6/36-6/60	11	3.1	17-10	50 -80	Legal blindness	
HM-NPL	-	-	5-0%	90-100%	Blindness	
Total	360	100				

Table 2: Distribution of pupils according to their monocular visual acuity (right and left) eyes

Visual Acuity	REF (%)	LEF (%)	Vision %	Vision Loss %	Interpretation
6/4-6/5	151 (41.9)	151 (41.9)	150-120	Nil	Very good vision
6/6	160 (44.4)	160 (44.4)	100	Nil	Good vision
6/9-6/12	25 (6.9)	24 (6.7)	67-50	5-15	Industrial vision
6/18-6/24	15 (4.2)	15 (4.2)	33.3-25	25-40	Legal Blindness
6/36-6/60	8 (2.2)	8 (2.2)	17-10	50-80	Legal Blindness
HM-NPL	1 (0.3)	2 (0.6)	5-0	90-100	Blindness
Total	360 (100)	360 (100)			

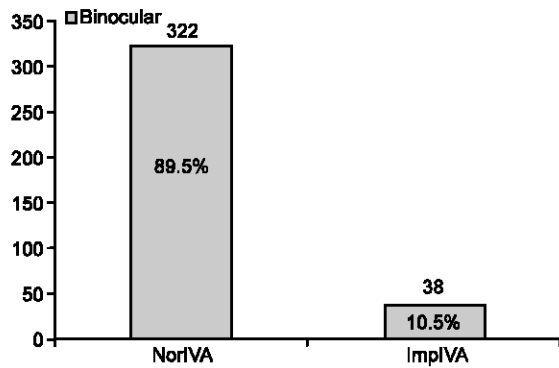


Fig. 1: Bar graph showing Binocular Vision of Pupils, Source: fieldwork

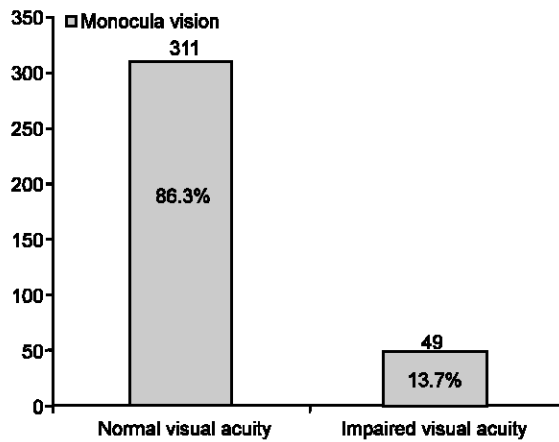


Fig. 2: Bar graph showing Monocular Vision of Pupils, Source: Fieldwork

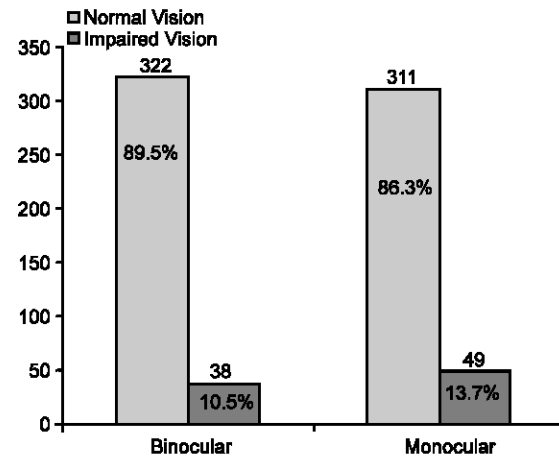


Fig. 3: Multiple bar graph Comparing Binocular and Monocular vision, Source: Fieldwork

binocular visual status had higher frequency of 322 as against 311 of monocular of normal vision and less frequency of 38 as against 49 of monocular of impaired vision.

In effect, there are differences in the visual status (as per visual acuities) of pupils in public schools in Edo State. In terms of binocular vision; 322 (89.5%) of pupils had normal vision-(6/6- 6/4) (100%-150%); while 38 (10.5%) had impaired vision. As regards monocular vision, 311 (86.3%) had normal vision- (6/6-6/4) (100%-150%) while 49 (13.7%) had impaired vision.

Conclusion and recommendations: The result of the study revealed that the majority of the primary school pupils in Edo State, Nigeria had visual acuity problems that are both binocular and monocular in nature. This therefore, calls for mass visual acuity screening of pupils in all the local governments of Edo State and all states of the federal republic of Nigeria.

Consequent upon the results of this study, the following recommendations were made:

Pupil's visual status should be tested on their entry into primary schools so that visual baseline data can become part of the child school health records.

Bi-annual routine visual acuity measurement should be conducted among primary school pupils during their school life; since visual acuity of children can either appreciate or depreciate as each child grows and develops into adulthood.

Teachers should utilize the visual acuity data in allowing pupils to their seats in class not mainly using pupil's height as a seat allocation factor.

There is need for nutritional education of parents and communities with regards to nutrients that promote good eye health. This can be achieved through the school programme of which the Parent-Teacher Association is an important forum.

There should be legislation on compulsory school eye screening in order to detect and prevent ailments among primary school children. This measure is in keeping with the vision 2020 objectives.

There is need to hold seminar/workshop for primary school teachers in Edo State and Nigeria in general on the modalities for conducting visual acuity screening of primary school pupils.

There should be proper referral regarding pupils with visual abnormalities.

Implications for health education: These findings have the following implications for health education:

Screening in actual practice is an aspect of health examination in the school health services, which is the domain of Health Education.

It provides opportunities to promote visual health and prevent or detect visual ailments among pupils.

It involves pupils carrying out the information of vision screening to family and community at large (i.e School-Community Eye Health Education).

It generates visual data of pupils, which will be recorded in the health record book. These data will serve as visual baseline data bank for consultation if the need arises.

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