## Risk Factors Associated with Amblyopia Amongst Primary School Pupils in Kosofe Town, Lagos, Nigeria

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Introduction: Amblyopia is a disorder of the visual system that is characterized by a decrease in the best corrected visual acuity (BCVA) in an eye with no organic pathology[1,2]. Amblyopia is a cause of lifelong, avoidable visual impairment if not detected and managed at an early age[3]. There is paucity of studies on amblyopia in Nigeria. The effects of mother's socio-economic status, pregnancy and birth, developmental, family and past ocular histories on the pattern of amblyopia in our community need to be adequately studied. Therefore, this study aims to investigate the risk factors associated with amblyopia in primary school pupils in Kosofe town in order to provide baseline data that may facilitate establishment of routine school eye screening programs in primary schools in Lagos State.

Methods: This was a descriptive, cross-sectional school based study. Approvals for the study were obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital, Lagos State Universal Basic Education Board and the Kosofe Local Government Education Authority. A multistage random sampling technique was employed in recruiting the children. Data were collected using self-administered questionnaires by the parents or care-givers and from a detailed ocular examination. Data obtained were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0.

Results: A total of 1,702 children participated in the study, of which 899 (52.8%) were males and 803 (47.2%) were females. Over 90% of the children were within the age group 4-10 years and the mean age was 7.5 ± 1.6 years. Out of the 1,702 pupils examined, 24 (1.41%) met the criteria for amblyopia diagnosis (95% C.I = 0.610 - 0.914) (Table 1). There was no significant difference in amblyopia prevalence between boys and girls (p = 0.367). There was also no significant age trend evident in the study (p = 0.158) but all the types of amblyopia were significantly more common in children within the age group of 4-10 years (p = 0.039). No pupil was reported to have been treated for amblyopia previously.

**Table 1:** Prevalence of amblyopia by age and sex

| | N | Any Amblyopia n (%, 95% C.I) |
|---|---|---|
| **All children** | 1702 | 24 (1.41, 0.610-0.914) |
| **Age group** | | |
| 4-10 yrs | 1630 | 21 (1.29, 0.039-1.217) |
| 11-16 yrs | 72 | 3 (4.17, 0.316-0.936) |
| P (trend) | | 0.158 |
| **Boys** (all) | 899 | 13 (1.45, 0.789-0.912) |
| 4-10 yrs | 825 | 11 (1.33, 1.203-3.001) |
| 11-16 yrs | 74 | 2 (2.70, 0.911-1.702) |
| P (trend) | | 0.074 |
| **Girls** (all) | 803 | 11 (1.37, 0.654-0.992) |
| 4-10 yrs | 756 | 10 (1.32, 0.675-1.132) |
| 11-16 yrs | 47 | 1 (2.13, 1.521-2.665) |
| P (trend) | | 0.087 |

Multivariate logistic regression analysis showed that children whose mothers' had no formal education at child birth had a 11-fold greater risk of having amblyopia (O.R = 11.252, 95% C.I = 1.253 – 1.487), while those with birth weight less than 2500g were 10 times more likely to have amblyopia at the time of examination (O.R = 10.150, C.I = 0.693 – 0.903). Children with a positive family history of crossed eyes also had a 8- fold greater risk of having amblyopia (O.R = 8.137, 95% C.I = 0.236 – 0.463) (Table 2).

Discussion/Conclusions: The prevalence of amblyopia in this study was 1.41% and it falls within the range for amblyopia in Nigeria 0.1% - 3.1%[4-10]. Mothers' educational qualifications at child birth, low birth weight and a positive family history of crossed eye were found to be strongly associated with the development of amblyopia and these compare with results from other studies[11-16].

Limitations: Limitations to the study include recall bias from the care givers and the fact that only a finite number of potential risk factors were investigated. Lastly, findings from this study may not be applicable to preschool and secondary school students.

**Table 2:** Multivariate analysis (Logistic Regression) of risk factors for amblyopia

| Variable | B slope | S.E | Df | P value | O.R | 95% C.I Lower | Upper |
|---|---|---|---|---|---|---|---|
| Mothers' occupations at child birth. | 13.241 | 496.006 | 1 | 0.979 | 70.552 | 0.000 | |
| Mothers' educational qualifications at child birth. | 0.224 | 0.088 | 1 | 0.011* | 11.252 | 1.253 | 1.487 |
| Birth weight. | -0.051 | 0.161 | 1 | 0.033* | 10.150 | 0.693 | 0.903 |
| Developmental milestones. | 1.195 | 0.756 | 1 | 0.114 | 3.302 | 0.751 | 14.523 |
| History of past eye complaints. | 0.329 | 0.730 | 1 | 0.652 | 0.719 | 0.172 | 3.007 |
| History of past spectacles use. | -0.970 | 0.792 | 1 | 0.221 | 0.379 | 0.080 | 1.792 |
| History of past ocular surgeries. | 17.284 | 474.990 | 1 | 0.997 | 5.461 | 0.000 | |
| Family history of glasses wear. | 2.002 | 1.133 | 1 | 0.077 | 0.135 | 0.015 | 1.245 |
| Family history of eye surgeries. | 0.376 | 1.102 | 1 | 0.733 | 0.687 | 0.079 | 5.954 |
| Family history of crossed eyes. | 4.012 | 1.113 | 1 | 0.041* | 8.137 | 0.236 | 0.463 |
| Constant | 7.066 | 496.011 | 1 | 0.989 | 0.001 | | |

## References


1. von Noorden GK, Campos EC. Binocular Vision and Ocular Motility. In: Theory and Management of Strabismus. 6th ed. St. Louis: Mosby, 2001; 246-247.
2. Chuka-Okosa MC. Amblyopia: Types, presentation and treatment- A review. Niger J Ophthalmol 2003; 11:54-62.
3. Carlton J, Karnon J, Czoski-Murray C, Smith KJ, Marr J. The clinical effective and cost-effectiveness of screening programs for amblyopia and strabismus in children up to the age of 4–5 years; a systemic review and economic evaluation. Health Technol Assess 2008; 12:1–194.
4. Akpe AB. Strabismus and Amblyopia amongst Primary School Pupil in Egor Local Government Area, Benin City. Fellowship Dissertation. National Postgraduate Medical College of Nigeria, Lagos, 2010; 16-25.
5. Megbelayin EO. Prevalence of Amblyopia amongst Secondary School Students in Calabar, South-South, Nigeria. Niger J Med 2012; 21:407-411.
6. Ajaiyeoba AI, Isawumi MA, Adeoye AI, Oluleye TS. Prevalence and Causes of Eye Diseases amongst Students in South-Western Nigeria. Annals of African Medicine 2006; 5:197-203.
7. 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.
8. Nkanga DO, Dolin P. School vision screening programme in Enugu, Nigeria: Assessment of referral criteria for errors of refraction. Niger J Ophthalmol 1997; 5:30-40.
9. Adegbehingbe BO, Oladehinde MK, Majengbasan TO, Onakpoya HO, Osagiede EO. Screening of Adolescents for Eye Diseases in Nigerian High Schools. Ghana Med J 2005; 39: 138-142.
10. Onyekwe LO, Ajaiyeoba AI, Malu KN. Visual impairment amongst school children and adolescent in Jos, Nigeria. Niger J Ophthalmol 1998; 6:1-5.
11. Robaei D, Rose K, Ojaimi E *et al*. Causes and Associations of Amblyopia in a

Population-Based Sample of 6-Year-Old Australian Children. Arch Ophthalmol 2006; 124:878-884.
12. Mohammad M, Masoud A, Hamid M, Ramak R. Associations of refractive amblyopia in a population of Iranian children. J Optom 2012; 12:1-6.
13. Mohamed D, Yiong-Huak C, Gus G et al. Prevalence of Refractive Error in Singaporean Chinese Children: The Strabismus, Amblyopia, and Refractive Error in Young Singaporean Children Study (STARS). Invest Ophthalmol Vis Sci 2010;51:1348-1355.
14. Pai AS, Rose KA, Leone JF et al. Amblyopia Prevalence and Risk Factors in Australian Preschool Children: The Sydney Paediatric Eye Disease Study (SPEDS). Ophthalmology 2012; 119:138-144.
15. The Joint Writing Committee for the Multiethnic Paediatric Eye Disease Study and the Baltimore Paediatric Eye Disease Study Groups. Risk Factors for Decreased Visual Acuity in Preschool Children: The Multi-Ethnic Pediatric Eye Disease and Baltimore Pediatric Eye Disease Studies. Ophthalmology 2011; 118:2262-2273.
16. The Joint Writing Committee for the Multiethnic Paediatric Eye Disease Study and the Baltimore Paediatric Eye Disease Study Groups. Risk Factors Associated with Childhood Strabismus: The Multi-Ethnic Pediatric Eye Disease and Baltimore Pediatric Eye Disease Studies. Ophthalmology 2011; 118:225-2261.