Prevalence of Convergence Insufficiency (CI) Among Secondary School Students in Southwest Nigeria

Ijaduola M.A, Fasina O, Olusanya B.A and Ugalahi M.O

Department of Ophthalmology, University College Hospital, Ibadan.
Corresponding author: Ijaduola M.A,
Email: modupeijaduola@gmail.com

Background: Convergence insufficiency (CI) is a binocular vision disorder characterized by exophoria greater at near than at distance, a receded near point of convergence, and reduced positive fusional vergence (convergence amplitudes) at near.[1,2,3] Convergence insufficiency (CI) is a common binocular vision disorder affecting 4-6% of the population. [1,4,5] Some studies have reported a prevalence as high as 33% with an average of about 5%.[6] Convergence insufficiency has been shown to have a negative impact on the quality of life and school performance in school-age children.[7] The child's academic performance in secondary school is an important criterion in determining progress and choice of course of study into a tertiary institution, this may have life-long effects in determining the socioeconomic status and well-being as a full-grown adult. The purpose of this study is to determine the prevalence of convergence insufficiency (CI) among secondary school students in southwest Nigeria.

Methods: This was a descriptive cross-sectional study conducted among 8-21year old students in September/March 2016. A multistage sampling was used to pick a representative sample of students in public senior and junior secondary schools in Ido Local Government Area Ibadan. Eligible students with Visual acuity $\geq$ 6/9 in both eyes, normal ocular findings with no strabismic or non strabismic binocular disorders were recruited. NPC was measured with RAF rule line. Positive fusional vergence and heterophoria measurements were done using prism bars and Von Graefe method respectively. Students with receded NPC $\geq$ 7.5 cm break or $\geq$ 10.5 cm recovery, Exophoria at near $\geq$ 4 " greater than far, and insufficient Positive fusional vergence were classified as having CI according to the Convergence insufficiency Reading Study group (CIRS) classification.

Results: A total of 1393 students participated in the study. Mean age was 14.54 ± 2.11 years. The mean positive fusional vergence for break and for recovery were 23.3 and 19.7 prism diopters respectively. The prevalence of Total convergence insufficiency(CI) was 13.2%. Using the CIRS classification, 8.3% were classified as low suspect CI, 4.5% high suspect CI, 0.5% definite CI and clinically significant CI 5.0%.

Table 1: Prevalence of convergence insufficiency among students

Convergence Insufficiency(CI)	Frequency	Percentage (%)
Low suspect	116	8.3
High suspect	63	4.5
Definite CI	6	0.5
No CI	1208	86.7

Conclusion: The prevalence of clinically significant and total CI was found to be 5% and 13.3% respectively which is lower than previous studies by Rouse[1] and Borsting[7] that also used the same CIRS grouping system, this was however lower compared to a similar study conducted among school children in south Africa aged 13-19yrs by Waughian and Hansraj[8]. Perhaps the geographical location, different target used and nutritional level of the students may be responsible for this disparity. Ovenseri-Ogbomo[9] in Benin found a prevalence of 3.8% among first year university students.

This study has established the prevalence of Convergence Insufficiency amongst secondary school students in our environment. We suggest that students should be encouraged to have screening before being enrolled into schools and regular ophthalmic examinations while in school in order to detect and institute early treatment of this disease.

References

1. Rouse MW, Borsting E, Hyman L, Hussein M, Cotter SA, Flynn M, et al. Frequency of convergence insufficiency among fifth and sixth graders. The Convergence Insufficiency and Reading Study (CIRS) group. Optom Vis Sci [Internet]. 1999 Sep [cited 2015 May 21];76(9):643–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/10498006

2. Rouse MW, Hyman L, Hussein M, Solan H. Frequency of convergence insufficiency in optometry clinic settings. Convergence Insufficiency and Reading Study (CIRS) Group. Optom Vis Sci [Internet]. 1998 Feb [cited 2015 Jul 7];75(2):88–96. Available from: http://www.ncbi.nlm.nih.gov/pubmed/9503434

3. Scheiman M WB. Clinical Management of Binocular Vision. In Philadelphia: Lippincott, Williams and Wilkins; 2002.

4. Deshpande SB, Ghosh RK. Study of primary convergence insufficiency. Indian J Ophthalmol [Internet]. 1991 Jan 1 [cited 2015 Jul 13];39(3):112–4. Available from: http://www.ijo.in/article.asp?issn=0301-4738;year=1991;volume=3 9;issue=3; spage=112;epage=114 ;aulast=Deshpande

5. Scheiman M, Mitchell GL, Cotter S, Cooper J, Kulp M, Rouse M, et al. A randomized clinical trial of treatments for convergence insufficiency in children. Arch Ophthalmol (Chicago, Ill 1960) [Internet]. 2005 Jan [cited 2015 Jul 13];123(1):14–24. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15642806

6. Cooper J, Jamal N. Convergence insufficiency-a major review. Optometry [Internet]. 2012;83(4):137–58. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23231437

7. Borsting E, Rouse MW, Deland PN, Hovett S, Kimura D, Park M, et al. Association of symptoms and convergence and accommodative insufficiency in school-age children. Optometry [Internet]. 2003 Jan [cited 2015 Jul 13];74(1):25–34. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12539890

8. Wajuihian SO, Hansraj R. Near vision anomalies in Black high school children in Empangeni, South Africa: A pilot study. 2014; 73(1):21–32.

9. Ovenseri-Ogbomo GO, Eguegu OP. Vergence findings and horizontal vergence dysfunction among first year university students in Benin City, Nigeria. J Optom. 2016