



**Research Article**

**THE PREVALENCE OF AMBLYOPIA IN THE SCHOOL CHILDREN OF A HILLY AREA IN SOUTHERN INDIA**

**Meenakshi Pathania., Nidheesh Kumar N and Pankaj P Rao**

Military Hospital, Wellington, Tamil Nadu, India

**ARTICLE INFO**

**Article History:**

Received 04<sup>th</sup> May, 2018  
Received in revised form 16<sup>th</sup> June, 2018  
Accepted 25<sup>th</sup> July, 2018  
Published online 28<sup>th</sup> August, 2018

**Key words:**

Amblyopia, prevalence, students

**ABSTRACT**

**Background/Purpose:** Amblyopia is one of the reasons for impairment of vision in children which also affects depth perception and binocular vision. Early diagnosis can help in early and effective treatment. Unawareness can cause delay in detection and visual loss can be irreversible.

This study was conducted to determine the prevalence of amblyopia in school students of Wellington which is a hilly area in Tamil Nadu of Southern India between age of 3 years and 17 years.

**Methods:** A prospective observational cross-sectional study was carried out in the school children of Wellington which is a hilly area in Tamil Nadu of Southern India between age of 3 years and 17 years. Visual acuity and torch light ophthalmic examination was carried out. Children who had reduced visual acuity were subjected to complete eye examination including refraction, pin hole test, slit lamp examination, orthoptic testing, fundus examination alongwith cycloplegic refraction and retinoscopy to find out the cause for defective vision.

**Results:** A total of 827 students were enrolled in this study. The age ranged from 3 years to 17 years. There were 418 males and 409 females with male to female ratio of 1:1.02. The mean age was 11.10 years  $\pm$  2.06 years (age range 3 to 17 years). Out of the 827 students, 11 were found to have amblyopia. The prevalence of amblyopia in a hilly area of southern India is 1.33%.

**Conclusion:** The prevalence of amblyopia in a hilly area of Southern India is 1.33%.

Copyright©2018 Meenakshi Pathania et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**INTRODUCTION**

One of the causes of impairment of vision in the school children is amblyopia which has a good response to treatment if diagnosis is done and treatment instituted at a younger age. In the population based studies, the amblyopia has been found in 1.14% to 4.7% and the studies which were conducted on school children showed the prevalence of 2%<sup>[1]</sup>. The worldwide prevalence has been reported as 2%<sup>[2]</sup>. Amblyopia causes defective visual acuity, binocular vision, depth perception<sup>[3]</sup>. Unawareness plays a major role in delay in treatment.

Early detection can help in effective treatment of the condition and the potential for correction and normal development of vision is inversely related to age of detection and institution of treatment<sup>[4]</sup>. One of the important tool is early detection of refractive error, squint and amblyopia is school screening as also one of the points of Vision 2020<sup>[5]</sup>.

This study aims to determine the prevalence of amblyopia in school children in hilly area of south India.

**METHODS**

This was a prospective observational cross-sectional study conducted on school children of age 3 to 17 years in Wellington which is a hilly area in Southern India. Consent was taken from atleast one parent of each child before examination.

The visual acuity was tested using the Snellen acuity chart. Picture acuity chart was used to test the visual acuity in the children who experienced difficulty in reading the Snellen s chart. The children with reduced vision were tested with pinhole, improvement indicating refractive error and no improvement indicating organic cause or amblyopia.

Ocular alignment was assessed using Herschberg light corneal reflex, cover test and cover-uncover test. Anterior segment torch examination was done. Cycloplegic refraction in required cases was done. Fundus examination was done after pupillary dilatation.

\*Corresponding author: **Meenakshi Pathania**  
Military Hospital, Wellington, Tamil Nadu, India

**Diagnosis of amblyopia was done on the basis**

1. Best corrected visual acuity in the particular eye being atleast two lines worse as compared to better eye.
2. Best corrected visual acuity not improving to 6/9 in either or both eyes.
3. Visual acuity improved as compared to previous visual acuity with single Snellen letters than conventional Snellen chart by atleast two lines (Crowding phenomenon present).
4. Normal dilated fundus examination
5. Any previous history of patching used.

**RESULTS**

A total of 827 students were enrolled in this study. The age ranged from 3 years to 17 years. There were 418 males and 409 females with male to female ratio of 1:1.02. The mean age 11.10 years  $\pm$  2.06 years (age range :3 to 17 years). Out of these 827 students 11 were found to have amblyopia. The prevalence of amblyopia was hence found to be 1.33%. This prevalence was not affected significantly by gender as there was no significant relation ( $P > 0.99$ ).

Eight students out of the ones with amblyopia had refractive error solely as the cause of amblyopia out of which six had hypermetropia and two had myopia as refractive error. Two of the students with amblyopia had strabismic and one had visual deprivation amblyopia.

**Table 1** Visual acuity in the better eye in the school students

| Visual acuity (Snellen) | Frequency | Percentage(%) |
|-------------------------|-----------|---------------|
| 6/5-6/6                 | 769       | 92.98         |
| 6/9-6/12                | 33        | 3.99          |
| 6/18-6/24               | 20        | 2.87          |
| 6/36-6/60               | 5         | 0.06          |
| <6/60-3/60              | 0         | 0             |
| <3/60-PL+               | 0         | 0             |
| PL-                     | 0         | 0             |
| Total                   | 827       | 100           |

PL: Perception of light

**DISCUSSION**

The prevalence of amblyopia is still not known in many parts of the world. This study aims at finding the prevalence of amblyopia in school children of age 3 years to 17 years in a hilly area of South India. The prevalence in this study was as per the generally reported rate of 1.0-3.6% in Caucasians and Asian populations.<sup>[2,6-10]</sup> The prevalence found in this study was also in concordance with the studies conducted in some parts of Nigeria, Jos and Ile-Ife in Africa with prevalence seen as 1.1% and 1% respectively.<sup>[11,12]</sup>

Amblyopia was not significantly associated with any gender as seen in other studies.<sup>[3,6-10,13,14]</sup> The commonest cause of amblyopia was refractive error as shown in other studies<sup>[10,15,16]</sup> This emphasises the need for effective school vision screening at early age. The correction of amblyopia is more effective when management is done at the critical period of development after which its not possible to achieve binocular single vision with its further effects.

**CONCLUSION**

The prevalence of amblyopia in the school children of a hilly area of Southern India is 1.33%.

**References**

1. Webber AL, Wood J. Amblyopia: prevalence, natural history, functional effects and treatment. *Clin Exp Optom* 2005; 88:365-375.
2. Solebo AL, Cumberland PM, Rahi JS. Whole-population vision screening in children aged 4-5 years to detect amblyopia. *Lancet* 2015;385:2308-19
3. DeSantis D. Amblyopia. *Pediatr Clin North Am* 2014; 61:505-18.
4. American Academy of Pediatrics Committee on Practice and Ambulatory Medicine. Vision screening and eye examination in children. *Pediatrics* 1986; 77:918- 9.
5. Gilbert C, Foster A. Childhood blindness in the context of Vision 2020 -the right to sight. *Bull World Health Organ* 2001; 79:227-32.
6. Hashemi H, Yekta A, Jafarzadehpur E, Nirouza F, Ostadimoghaddam H, Eshtrati B, *et al.* The prevalence of amblyopia in 7-year-old school children in Iran. *Strabismus* 2014; 22:152-7.
7. Faghihi M, Ostadimoghaddam H, Yekta AA. Amblyopia and strabismus in Iranian schoolchildren, Mashhad. *Strabismus* 2011; 19:147-52.
8. Fu J, Li SM, Liu LR, Li JL, Li SY, Zhu BD, *et al.*; Anyang Childhood Eye Study Group. Prevalence of amblyopia and strabismus in a population of 7th-grade junior high school students in Central China: The Anyang Childhood Eye Study (ACES). *Ophthalmic Epidemiol* 2014; 21:197-203.
9. Ganekal S, Jhanji V, Liang Y, Dorairaj S. Prevalence and etiology of amblyopia in Southern India: Results from screening of school children aged 5-15 years. *Ophthalmic Epidemiol* 2013; 20:228-31.
10. Caca I, Cingu AK, Sahin A, Ari S, Dursun ME, Dag U, *et al.* Amblyopia and refractive errors among school-aged children with low socioeconomic status in southeastern Turkey. *J PediatrOphthalmol Strabismus* 2013; 50:37-43.
11. Onyekwe LO, Ajaiyeoba AI, Malu KN. Visual impairment amongst school children and adolescents in the Jos plateau Nigeria. *Niger J Ophthalmol* 1998; 6:1-5.
12. Ajaiyeoba AI, Isawumi MA, Adeoye AO, Oluleye TS. Prevalence and causes of eye disease amongst students in south-western Nigeria. *Ann Afr Med* 2006; 5:197-203.
13. Ntim-Amponsah CT, Ofosu-Amaah S. Prevalence of refractive error and other eye diseases in schoolchildren in the Greater Accra region of Ghana. *J PediatrOphthalmol Strabismus* 2007; 44:294-7.
14. Noche CD, Kagmeni G, Bella AL, Epee E. Prevalence and etiology of amblyopia of children in Yaoundé (Cameroon), aged 5-15 years. *Sante* 2011; 21:159-64.
15. Polling JR, Loudon SE, Klaver CC. Prevalence of amblyopia and refractive errors in an unscreened population of children. *Optom Vis Sci* 2012; 89:e44-9.
16. Matsuo T, Matsuo C. The prevalence of strabismus and amblyopia in Japanese elementary school children. *Ophthalmic Epidemiol* 2005; 12:31-6.

\*\*\*\*\*