

Original Article

Visual acuity testability of children in Bama and Banki towns of Borno State, Nigeria: The need to adopt HOTV protocol in school health programmes

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ABSTRACT

Despite the importance of visual acuity testing in children, no standard testing protocol was found for primary school pupils. Visual acuity screening was conducted on 400 primary school pupils in Nigeria using the HOTV protocol, nearly all the pupils 390/400 (97.5 %) had good binocular vision, only 10/400 (2.5 %) had poor vision which were monocular. Of those with poor monocular vision, 6/10 (60 %) involved the right eye while 4/10 (40 %) the left eye; these pupils were referred to the ophthalmologist for further evaluation. Because of its easy usage, the HOTV protocol can be adopted by school health programmes especially for the primary school pupils.

Key words:

Visual acuity; HOTV; School children; Borno State; Nigeria.

INTRODUCTION

Visual acuity (VA) is the most commonly used clinical measure for determining whether visual impairment is present in children or not. Because it is sensitive to many abnormalities that affect the eye and visual pathways, its quantification is an integral part of the diagnosis and management of eye disorders [1]. While the need to obtain an accurate and reliable measurement of VA in young children has long been recognized and various methods of assessment are available, there is no recognized standard for testing VA especially in children [1]. Eye abnormalities which include strabismus, amblyopia and refractive error among others can lead to poor visual acuity coupled with poor school performance in children. The diagnosis and management of visual disorders in children are dependent upon an accurate and reliable determination of VA.

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Visual acuity is also the most common measure used in vision screening to identify children who may require comprehensive eye examinations. While VA of 20/20 is widely considered to be normal, deviation from normal is common in children, even in the absence of refractive error or other vision disorders [2]. For this reason, vision screening and referral are often based on poor VA. Gap of knowledge on VA norms for population-based samples of children still exists; thus, it remains imperative to define normal range of VA test performance in healthy school children, for the purpose of comparison [2].

Holmes et al, in 2001 [3], suggested the use of HOTV optotypes VA testing protocol to screen and to detect visual deviation from normal in some children. The protocol was developed to test visual acuity using the 4-letter set "H," "O," "T," and "V." This paper aimed at:

1) Reporting testability rates for VA measurements using the HOTV letter testing protocol in primary school pupils. 2) Providing information that would have public health significance and relevance to policy development and programme implementation, as it relates to the overall school health programme. To our knowledge, no such survey was performed before in Bama local government area of Borno State.

MATERIAL AND METHODS

Screening of VA was conducted on 400 primary school pupils in Nigeria using the HOTV letter testing. The pupils with poor monocular vision were referred to the ophthalmologist for further evaluation.

RESULTS

Measurement of VA was attempted on 400 primary school children from eight schools in Bama and Banki towns of Maiduguri. These pupils were aged 6 to 12 years and were enrolled using cluster random

sampling method. One hundred and forty four pupils (36%) were males and 256 (64 %) were females. The male to female ratio is 1:1.7. All the children attempted with the HOTV protocol (n=400, 100 %) were testable. Successful testing occurred in nearly all the examined children 390/400 (97.5 %); and only 10/400 (2.5 %) had monocular poor vision. Of those with monocular poor vision, 6/10 (60 %) occurred on the right and 4/10 (40 %) on the left eye; they were referred to the ophthalmologist for further evaluation and management.

DISCUSSION

We found high testability rates overall for VA testing using the HOTV testing protocol in our pupils. Only (2.5%) of our participants had monocular poor vision and were referred to ophthalmologist for further evaluation and management. A similar high testability rate was presented in a large multi-ethnic population-based study, where the authors affirmed that ethnicity may not affect VA testing [1].

Age could be an important factor responsible for the high visual acuity testability rate recorded in our pupils. One study has demonstrated that the number of children able to complete VA testing was age-dependent, the majority of younger children were not able to complete testing; although nearly all children older than four years of age were testable [4]. The percentage of pupils able to complete VA testing in our cohorts was generally better than that reported previously by others [3]. They reported VA testability rates of 94% in 32 children aged 5 years using the same protocol. The difference in testability may simply be related to the small size of their sample as well as the age group of their studied children being younger than those in our sample.

Moke et al [5], reported VA testability rates of 100% in a sample of children aged 5 to 7 years. Many of their children had been tested previously using the

HOTV letters and therefore one might anticipate better performance biasing the results. Nonetheless, their testability rates are similar to the rate found in our 6-12 year old participants who were naive to the HOTV test optotypes. Indeed, prior experience and practice appear to enhance VA performance for some school children. Most of them who attempted the testing protocol more than once had better performance.

Both boys and girls had high VA testable rates in our subjects. However, girls were generally observed to have better VA than boys in most of under five children [1]. This gender related difference might be due to slight behavioral and maturational differences which are in favor of girls. Girls tend to achieve sustained attention and cooperation that is necessary for successful completion of VA testing earlier than

boys [1, 6]. Indeed, differences between boys and girls in terms of mental development and maturity can be identified as early as one year of age and remain up to the age of 4 years [6].

We conclude from our findings that the HOTV VA testing protocol may be used successfully as a screening tool in the majority of children, as demonstrated in this population-based cohort report. As a highly useable testing protocol for VA determination in children, the HOTV protocol is not only suitable for use in screening and epidemiologic studies; but also for clinical management of vision disorders in children seen in clinical practice. There is a need to inculcate this VA screening protocol in school health programmes to track down children with visual problems, intervene medically in appropriate time to improve their school performance and to maximize their potentials.

REFERENCES

1. Cotter SA, Tarczy-Hornoch K, Wang Y, Azen SP, DiLauro A, Borchert M, et al. Visual Acuity Testability in African-American & Hispanic Children: The Multi-Ethnic Pediatric Eye Disease Study. *Am J Ophthalmol* 2007; 144(5): 663–67.
2. Pan Y, Tarczy-Hornoch K, Cotter SA, Ge-Wen BS, Borchert MS, Azen SP, et al. Visual Acuity Norms in Preschool Children: The Multi-Ethnic Pediatric Eye Disease Study. *Optom Vis Sci* 2009; 86(6): 607–12.
3. Holmes JM, Beck RW, Repka MX, Leske DA, Kraker RT, Blair RC, et al. The amblyopia treatment study visual acuity testing protocol. *Arch Ophthalmol* 2001;119:1345–53.
4. Fern KD, Manny RE. Visual acuity of the preschool child: a review. *Am J Optom Physiol Opt* 1986;63:319–45.
5. Moke PS, Turpin AH, Beck RW, Holmes JM, Repka MX, Birch EE, et al. Computerized method of visual acuity testing: adaptation of the amblyopia treatment study visual acuity testing protocol. *Am J Ophthalmol* 2001;132:903–9.
6. Nordberg L, Rydelius PA, Zetterstrom R. Psychomotor and mental development from birth to age of four years; sex differences and their relation to home environment. Children in a new Stockholm suburb. Results from a longitudinal prospective study starting at the beginning of pregnancy. *Acta Paediatr Scand* 1991;378:1–25.