Vision Screening of Individuals with Mild Intellectual Disability

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ABSTRACT

A pilot vision screening of secondary school students with mild intellectual disability was conducted as part of the La Trobe University orthoptic clinical education program. The screening included a visual acuity assessment, cover testing, examination of ocular motility, stereo acuity and convergence near point. Two hundred and nineteen participants (n = 219) aged 12 - 18 years participated. Of these, 73 (33.3%) failed the screening on the basis of reduced vision, strabismus and or nystagmus. This suggests a great prevalence of ocular disorders in children with mild intellectual disability and highlights the importance of vision screening within this community.

Keywords: vision screening, vision impairment, intellectual disability

INTRODUCTION

It is well documented that individuals with intellectual disability have a higher risk of vision impairment or blindness[1]. However, the literature cannot easily be compared as different populations of individuals with intellectual disability have been studied. The age of the individual, degree of intellectual disability, and the associated syndrome have all been reported to influence the prevalence of vision impairment[2-4]. For instance, a large Dutch epidemiological study of adults with intellectual disability recently reported that the prevalence of vision impairment ranges between 2.2% and 66.7%, and for blindness between 0.7% to 38.9% depending on age, syndrome, and degree of intellectual disability[2].

In adults with intellectual disability, a high prevalence of refractive error, strabismus, lens opacity, and keratoconus have been reported[1 5-9]. Furthermore, in relation to refractive error, studies have found extreme values contrasting the general population[5-6,10]. Epidemiological studies on vision disorders and impairment in children and teenagers with intellectual disability are less common[2]. However, recent studies have reported that children with intellectual disability have a significantly greater incidence of various ocular conditions, the most common being strabismus and refractive error[11-12]. As with adults, the presence of a syndrome and the degree of the intellectual disability influences the prevalence of vision impairment[11].

Despite the increased risk of vision impairment or ocular disorders for children with intellectual disability, vision screening programs rarely include high risk children. This most likely relates to the need for specially trained clinicians to assess children with intellectual disability and the fact that many of these children are under medical care. This paper reports the findings of a vision screening program piloted in a Victorian school for students with mild intellectual disability.

METHOD

As part of the orthoptic clinical education program at La Trobe University, final year students became involved in a program for vision screening of children with special needs. In 2008 and 2009, vision screening was undertaken at a school in Melbourne's eastern suburbs for secondary aged students with mild intellectual disability. Classification of students' disability had previously been determined at the time of enrolment and was based on criteria set by the Victorian Department of Education and Early Childhood Development, which relate to World Health Organisation guidelines.

Parents of students enrolled at the school were provided an information sheet and only those with completed consent forms participated in the screening. In 2008, all enrolled

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students were invited to participate, and in the following year only newly enrolled students were invited.

The vision screening was conducted at the school by senior orthoptic students under the supervision of a University academic and registered orthoptist. The screening was not a comprehensive ocular dilated examination, but included an ocular motility examination in addition to vision assessment. Visual acuity was tested using a Lea chart at 3 metres with each eye randomly occluded. Refractive correction was worn if available. A cover test to detect ocular misalignment was performed at both near and distance using both accommodative and non-accommodative targets depending on the cooperation and ability of the participant. Ocular movement, convergence near point and stereoacuity using the Lang II stereotest were also assessed.

Participants were deemed to fail the vision screening if they demonstrated one or more of the following: (i) less than 6/9 vision in either eye (ii) greater than a 2 line difference in vision (iii) intermittent or constant manifest strabismus (iv) an ocular movement disorder (e.g. nystagmus). Participants with reduced stereo acuity who passed all other aspects of the screening were deemed to pass, as this was likely to relate to their cooperation or understanding of the test or task. In addition, participants with a convergence near point more remote than 10cm but who passed other aspects of the assessment were not considered a fail since asthenopic symptoms could not reliably be determined for the diagnosis of convergence insufficiency. At completion, parents were provided with a letter outlining the result of the screening. Participants whose vision failed the standard were recommended for a comprehensive ocular examination by an ophthalmologist, orthoptist or optometrist.

RESULTS

Two hundred and nineteen participants (n = 219) aged 12 - 18 years were included in the vision screening. Visual acuity measurement of each eye was attainted for all except one who would not tolerate occlusion. This ranged from 3/1.9 to 3/30 and one participant demonstrated 'hand-movements vision' only in one eye. The participant whose vision was performed with both eyes open achieved 6/24.

Fifteen (6.8%) had visual acuity worse than 6/12 in their better eye and 44 (20.1%) had visual acuity worse than 6/12 in the poorer eye; vision less than 6/12 often defining vision impairment. During the screening, it was not determined if the impairment was due to refractive error and correctable with glasses. At the time of assessment, 14 (6.4%) participants wore glasses for refractive error, half failing the vision screening despite their being 'corrected'. A further 29 participants (13.3%) demonstrated a convergence near point more remote than 10cm (up to 20cm).

Of the 219 participants screened, 73 (33.3%) failed. The most common finding was reduced visual acuity, followed by strabismus and nystagmus (Table 1). Twenty-six of these participants had more than one condition (Figure 1). In relation to strabismus, esotropia was fractionally more prevalent than exotropia (Table 2).

Table 1. Findings of participants who failed the screening.

Reason for failed screening	Number	Percentage of those (n=73) who failed screening	Percentage of total (n=219)
Reduced Vision	56	76.7%	25.6%
Strabismus	27	37.0%	12.3%
Nystagmus	7	9.6%	3.2%

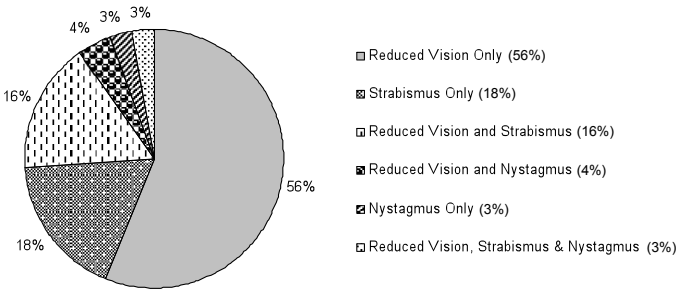

Figure 1. Pie graph representing the proportion of participants who failed the vision screening and respective causes.

Table 2. Ocular motility findings

Type of Strabismus	Number (and %) of participants
Esotropia	14 (6.4%)
Exotropia	11 (5%)
Hyper/Hypotropia	4 (1.8%)
Browns syndrome	1 (0.5%)
Duanes syndrome	1 (0.5%)

DISCUSSION

This paper reports on the findings of a pilot vision screening program conducted in a school with students who have mild intellectual disability. Whilst the vision screening did not include a comprehensive ocular examination for the diagnosis of disease, it was found that one-third of participants failed a component of the screening and were referred for further assessment. The most common reason for referral was reduced vision, followed by strabismus.

It is difficult to compare the referral rate in our study with prevalence rates of ocular disorders reported in the literature. Whilst reduced vision was the greatest reason for referral, we did not establish the cause or determine the specificity

and sensitivity of our testing. Furthermore, although all participants were considered to have mild intellectual disability we did not record the cause of intellectual disability or any co-morbidities. As mentioned, prevalence rates are affected by a number of factors including degree of intellectual disability and associated syndrome[2-4,9].

Referral criteria for vision screening programs vary and are in part dependent on the age of the individual screened. However, most screenings are conducted when children are of pre-school age and or primary school and commonly use the referral criteria of less than 6/9 vision. A large scale Australian study by Junghans et al1[3] reported a 25% referral rate for children aged between 3-12 years without disability. However, the referral criteria in this study was based on the presence of one or more of the following: stereoacuity less than 70", accommodative facility of less than 8 cycles per minute, convergence near point more remote than 9 cm, near exophoria greater than 10 prism dioptres, or near esophoria greater than 5 prism diopters, shift in phoria between distance and near greater or equal to 4 prism diopters, astigmatism of at least 1D, myopia greater than 0.75D, or hypermetropia greater than 1.5D. The referral rate in this study was substantial given that the criteria were extremely rigorous, and thus questionable as to whether reflecting likely functional impairment. Despite their very high referral rate, we found a greater proportion of children with intellectual disability to have ocular disorders with more conventional referral criteria. In addition, there was a clear difference in the presence of strabismus between the two studies with Junghans et al[13] reporting a 0.3% prevalence, whilst we found a 11.4% prevalence.

Interestingly, another Australian population based study of 12 year old children reported vision impairment in 5%[14], where vision impairment was defined as acuity less than 6/12 in the worse eye. In contrast, we found that 20% of children with mild intellectual disability demonstrated vision impairment at the time of assessment, though we did not determine whether this was correctable with glasses. Whilst both Australian studies[13-14] have assessed a younger population of children and perhaps not directly comparable, there appears to be a trend towards a higher prevalence of ocular disorders in our participants with intellectual disability, consistent with the literature.

In conclusion, the vision screening referral rate in a secondary school population with mild intellectual disability was 33.3%. In comparison with other Australian general population studies, it is suggested that ocular defects are more common in individuals with mild intellectual disability. This emphasises the importance of vision screening for this group. Whilst vision has the potential to be overlooked in children with other medical needs, ultimately vision can play an important part in social interaction, academic performance and quality of life. Future research should focus on epidemiological studies on vision impairment in Australian children with intellectual disability and developing further programs for the early detection and management of ocular disorders in this population.

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