

School Screening – Referral Criteria & Incidence of Ocular Disorders in the Blacktown Local Government Area of Western Sydney

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Abstract

Students at kindergarten and Year 5 ($n=3,289$) underwent primary or secondary vision screening by the Community Orthoptist as part of the community health program for the Blacktown local government area during 1996 and 1997. This paper documents the visual screening standards used and the incidence of referral. The statistics demonstrate the need for school screening to continue and the importance of screening Year 5 as well as Kindergarten children with a total referral rate of 20.6%. Visual acuity accounted for 16.7% of this total, and ocular muscle defects rated at 3.9%.

Key words:

Vision screening standards, Kindergarten, Year 5, visual acuity, ocular muscle defects

Introduction

The necessity for visual screening of primary school age children is universally acknowledged and accepted.

The purpose of this study is to document the referral criteria used in school screening in the Western Sydney Area Health Service of children in

Kindergarten and Year 5 who are initially screened by generalist community nurses.

A further purpose is to report the statistical incidence of ocular disorders occurring in the Blacktown local government area for school students in both Kindergarten and Year 5.

National Health & Medical Research Council Rationale

The National Health and Medical Research Council (NH&MRC) acknowledges the usefulness of vision screening projects for detecting ocular disorders in children.¹

The NH&MRC have outlined the rationale for screening children at various stages of development including those of school age.

The NH&MRC and the Orthoptic Association of Australia, NSW Branch (OAA NSW)² recommend screening children in Kindergarten with the aim of detecting strabismus and refractive errors which both have potential to cause amblyopia. Vision screening of this age is performed virtually universally. It is therefore the role of school screening to identify any ocular problems that will interfere with children's abilities to perform at their best in school. However, the subject of whether to continue school screening has been open for discussion for some time by the various health areas and especially in regard to students in Year 5.

Visual screening of students in Year 5 is not primarily concerned with the detection of any strabismic or amblyopic defects although sometimes these are detected. Rather, screening is aimed at detecting reduced vision due to refractive errors as well as reduced convergence, both of which may lead to reading problems and poor concentration with close work. Subtle or developing symptoms can also be detected by early screening.

Myopic errors may have greater consequences in early adolescence due to the increasing academic demands on students. Repeating earlier screening is therefore useful in order to identify those students

with developing or increased symptoms other than those previously detected.

If screening is not carried out in Year 5 there is an increased reliance on the children, parents and teachers to determine if a visual problem exists and whether or not this is the cause of poor classroom performance.

The NH&MRC has noted³ that international studies indicated the usefulness of far more comprehensive programmes than those that appear to be generally employed in Australia.

Review of the literature illustrates the importance of school screening. Abolfotouh MA et al,⁴ conducted a study in which 971 schoolboys were screened on a random selection process and 1.85% were found to have amblyopia due to refraction or strabismus where visual acuity was worse than 6/9 with no structural disease of the eye. Auzemery A, et al,⁵ reported that 1081 children from 8-14 years were screened of which 4.7% were diagnosed with defects 2% refractive; 1.4% amblyopia either refractive or strabismic; 0.74% strabismus without amblyopia; and, 0.57% medical pathology. Brown S, Jones D,⁶ showed 5430 kindergarten children were screened and determined 6/6 to be the normal level of visual acuity in the Sydney Metropolitan Area. McKenzie L,⁷ reported that 638 children were screened and 8.3% were found to have previously undetected defects. Preslan M W, Novak A,⁸ screened 680 primary aged children with findings of amblyopia 3.9%, strabismus 3.1%, and refractive error 8.2%. Rodrigues M A, Castro Gonzalez M,⁹ selected a sample of 17,697 records. The results showed 48% had refractive defects and 1.2% amblyopia associated with greater refractive errors.

At present, Western Sydney Area Health Service generalist community nurses of Blacktown, Doonside and Mount Druitt are continuing to screen both age groups.

Therefore, Year 5 students need at least visual acuity and the convergence near point to be tested. These are the same tests noted in an unpublished study on Year Nine students (approximately 14 years of age) who found that such students had the largest proportion of defects in these areas.¹⁰ The Orthoptic Association of Australia (OAA NSW) recommends screening of children aged 10 to 12 years.¹¹

The Role of the Orthoptist in School Screening

The OAA NSW states that the role of the Orthoptist is to perform secondary screening.¹² That is, once nurses have completed primary screening of all the children, those for whom there are concerns should be seen by an Orthoptist. The role of the Orthoptist is then to decide if each child's visual condition needs to be, in their professional judgement, referred or reviewed according to the

established criteria.

The NH&MRC notes that Orthoptists are most effectively used when involved in secondary screening.¹³

The Orthoptist should carry out the appropriate action for each child concerned including liaising with parents and teachers. Other roles of the Orthoptist in the context of a community health setting include the education of parents, teachers and nurses by conducting inservice programmes on various subjects.

The aims of the established and published referral criteria are to aid in the early detection and therefore primary intervention of amblyopia or strabismus. This leads to treatment that gives the best achievable health outcomes - visual acuity and binocular functions - for the children involved.

Western Sydney Area Health Service (WSAHS) Visual Screening Standards

The Western Sydney Area Health Service (WSAHS) requires that a set of visual screening examinations be performed on specified students by nurses and orthoptists. Within the Blacktown local government area Generalist Community Nursing Teams (GCNTs) routinely screen vision for all Kindergarten and Year 5 children plus all new enrolments.

The standard visual screening tests performed are as follows:

Kindergarten (children of approximately 5 years of age) and new enrolments:

- Vision testing (distance only)
- Strabismus testing (near and distance, manifest and latent) using the cover test method
- Corneal reflections
- Ocular movements
- Convergence

Year 5 (children of approximately 10 years of age):

- Vision testing (distance only)
- Convergence

Near vision of year 5 students is tested only in cases of reduced convergence or upon request of a parent or teacher.

From the results of these tests nurses and orthoptists are expected to apply the following criteria in each case of potential review or referral as noted in the WSAHS Community Health School Screening Manual updated by the author in 1996.¹⁴ A summary of these standards is provided in Figure 1.

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Figure 1.
Summary of Western Sydney Area Health Service Visual Screening Standards.

Reason for Review or Referral	Criteria Applied
Vision - referral	under seven years of age with a visual acuity (VA) of 6/9 or less in one or both eyes
	over seven years of age with a VA of less than 6/6 in one or both eyes
	when there is a difference in VA between each eye of one or more lines
	nystagmus with binocular vision of 6/12 or less
	with glasses that have not been checked for more than 12 months
Vision - review within 12 months	5 years of age with 6/9 in one or both eyes
	permanently amblyopic in one eye (to ensure that the vision in the good eye does not deteriorate)
Strabismus - referral	with a manifest strabismus
	with a large latent strabismus
Ocular Movements - referral	whose eye movements are not symmetrical
Convergence	no action if 5 centimetres or better
	review within 12 months if between 5 and 10 centimetres and asymptomatic
	refer if convergence greater than 10 centimetres
Pathology referral	any pathology of external structures noted during eye examination

Results

School screening statistics were collated from the five local government areas within the Western Sydney Area Health Service (WSAHS) during 1996 and this was the third year that such records were maintained within:

- Auburn
- Blacktown
- Baulkham Hills
- Holroyd
- Parramatta

During 1995 the nurses' screening results for Year 5 students within the Blacktown local government area recorded defects of 7.75%.

Shown in Figures 2a and 2b are the Blacktown local government area generalist community nurses' statistics for 1996. The classifications employ the criteria previously shown. (Where "No Further Action" is shown this is when results are normal or the child is already under the care of a specialist).

Figure 2a.
Findings of Blacktown local government area generalist community nurses visual screening in 1996.

Screening Findings	Kindergarten	Year 5	Total
Total Screened	3,832 (100.0%)	2,514 (100.0%)	6,346 (100.0%)
New Defects	265 (6.9%)	220 (8.8%)	485 (7.6%)
Known Defects Reviewed	40 (1.0%)	56 (2.2%)	96 (1.5%)

Figure 2b.
Outcomes of Blacktown local government area generalist community nurses visual screening in 1996.

Screening Outcomes	Kindergarten	Year 5	Total
No Further Action	3,378 (88.2%)	2,213 (88.0%)	5,591 (88.1%)
Referred to Orthoptist	454 (11.8%)	301 (12.0%)	755 (11.9%)

As can be seen the incidence of new defects was significant among students in Kindergarten. Interestingly, the level of new defects in Year 5 students was even greater although this is a group of children for whom universal screening is somewhat more controversial.

Overall, almost one in every eight students assessed by nurses was referred to the Orthoptist for review.

The outcomes of students referred to the Orthoptist, plus those students seen by the Orthoptist in the course of primary screening during 1996 and 1997 appear in Figures 3 and 4 respectively. The reviews and referrals recorded as being for Visual Acuity relate to vision being 6/9 or less, whilst the Ocular Muscular Defects relate to strabismus (constant or intermittent) reduced convergence near-point and ocular movement syndromes.

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Screening Outcomes	Total: Kindergarten & Year 5
Total Screened (Referrals + Others)	1882 (100.0%)
No Further Actions	1310 (69.6%)
Reviews - Visual Acuity	154 (8.2%)
Reviews - Ocular Muscular Defects	35 (1.9%)
Total Reviews	189 (10.0%)
Referrals - Visual Acuity	326 (17.3%)
Referrals - Ocular Muscular Defects	57 (3.0%)
Total Referrals	383 (20.4%)

Figure 3.
Outcomes of
Orthoptist's visual
screening in 1996.

Screening Outcomes	Kindergarten	Year 5	Total
Total Screened (Referrals + Others)	782 (100%)	625 (100%)	1,407 (100%)
No Further Actions	528 (67.5%)	424 (67.8%)	952 (67.7%)
Reviews - Visual Acuity	82 (10.5%)	18 (2.9%)	100 (7.1%)
Reviews - Ocular Muscular Defects	15 (1.9%)	47 (7.5%)	62 (4.4%)
Total Reviews	97 (12.4%)	65 (10.4%)	162 (11.5%)
Referrals - Visual Acuity	131 (16.8%)	92 (14.7%)	223 (15.9%)
Referrals - Ocular Muscular Defects	26 (3.3%)	44 (7.0%)	70 (5.0%)
Total Referrals	157 (20.1%)	136 (21.8%)	293 (20.8%)

Figure 4.
Outcomes of
Orthoptist's visual
screening in 1997.

Of the students initially screened by or referred to the Orthoptist in the figures shown, more than 20% were, on the basis of the established criteria, referred on for specialist assessment. Of this group an average of 16.7% over the two years were referred as a result of their visual acuity.

It can be seen that the total referral rate for defects was consistent over the two years at 20.6%. Reviewing this overall trend against the figures split by student year in 1997 it is notable that the referral rate for students in Year 5 is slightly higher than average at 21.8%.

A further 10.7% of those screened by the Orthoptist were noted for review in 12 months and 72.4% of these were as a result of their visual acuity. Also significant was that in 1997 it can be seen that kindergarten students accounted for 66% of all reviews and referrals due to visual acuity.

Conversely, students in Year 5 comprise 68.9% of those reviewed or referred as a result of ocular muscular defects.

Conclusion

It is evident from the statistical data presented that the overall new defects detected in children in Kindergarten and Year 5 and the referral rate of the Orthoptist demonstrate the adequacy of and need for the existing review and referral criteria employed within the Blacktown local government area.

These conclusions are supported by recent literature which finds that the incidence of defects in school age children is up to 48% in some populations. By far the major category of ocular defects is visual acuity which in this study accounted for approximately 80%.

Most importantly the finding of a significant level of new defects in children in Year 5 indicates that this age group should not be neglected in relation to visual screening. This also highlights the need for school screening criteria to be standardised on a national basis in order to achieve the best long term national health outcomes.

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