

VISUAL SCREENING IN A NEPALESE COMMUNITY

CATHERINE DEVEREUX, DipAppSci(Orth), BEd, MAppSci(Orth)
LUCINA BENICH, DipAppSci(Orth)
ANDREA DRUM Orthoptic student

Abstract

Health and vision screening is not routinely undertaken in Nepal. The control of severe ocular dysfunction such as vitamin A deficiency and cataract blindness is understandably of great concern to both local health authorities and non government organisations. In January 1994, a screening program was conducted in two orphanages in the Kathmandu district. A total of 220 children were examined who ranged in age from 5-17 years. The failure rate on tests of vision and ocular motility was 23.6% as defined by the examiners' criteria for this project. A variety of reasons including the lack of public health programs, low socio-economic status, and the influences of adolescent myopia and inadequately trained convergence are discussed as possible contributors to this high referral rate.

Keywords: screening, vision, convergence insufficiency, exotropia, xerophthalmia.

INTRODUCTION

Nepal is considered to be an economically depressed country with few natural resources. Forty percent of government health expenditure is externally financed from overseas aid and annual per capita expenditure is less than A \$2.00¹. An estimated 2.8% of the Nepalese population are partially blind². Xerophthalmia, the ocular manifestation of Vitamin A deficiency is measured to be responsible for 18-43% of cases of childhood blindness^{3,4}. Chronic under nutrition affects up to 80% of children and life

expectancy is very low (52 years)². Health screening is not conducted in this country. It is vital that vision screening programs be undertaken as extensively as possible to curtail preventable vision disorders. Blindness and vision defects, associated diet problems, and myopia and amblyopia are preventable, but at present are not screened for.

While in Nepal to undertake clinical placement and conduct ophthalmic assistant training our group from La Trobe University in Melbourne, had the opportunity to under-

Address for correspondence: School of Orthoptics, La Trobe University, Bundoora, 3083. Victoria. This paper was presented in part at the 51st Annual Orthoptic Association of Australia Scientific Conference, NSW 1994. Submitted: January 1995. Accepted for publication: April 1995.

take a vision screening program. With the assistance of the orthoptists and administrators of the Kathmandu Eye Hospital screening for vision and ocular motility disorders was conducted in 2 separate orphanages in the Kathmandu district. The main aim of this project was to gain some insight into the incidence of visual problems in the child/adolescent community and allow those who failed the screening the opportunity to have further ocular assessment.

METHOD

Subjects and Location

Two hundred and twenty Nepalese children were involved in 2 screening programs, one of which was conducted at a city orphanage (Balmundir) where 136 male and female children ranged in age from 5-17 yrs, and the other at a rural boys orphanage (Panchkhal) where 84 boys ranged from 11-17 years. The largest number of children possible were examined during the allocated time with language and administrative difficulties arising at times. Balmundir orphanage was supported by Nepalese Royalty and the Children's Foundation and located in central Kathmandu while Panchkhal was in a small town 2 1/2 hours by road north of Kathmandu. Here funding was provided by the National Foundation of Boys Orphanages. The poor facilities indicated a shortage of funding in comparison to Balmundir.

Procedure

The examiners involved in the screenings included 2 Australian orthoptists, 2 La Trobe University final year orthoptic students, 2 Nepalese orthoptists and 1 Nepalese ophthalmic assistant.

Testing was conducted in the open air at

Panchkhal as suitable indoor facilities with adequate illumination did not exist. Testing at Balmundir was conducted in a hall with vision charts placed next to open windows for maximum natural illumination.

A criteria for pass or fail was designed prior to the screening and was used at both orphanages. This criteria was:

- Vision of 6/12 or worse in either eye or a difference of more than one line between each eye;
- Convergence insufficiency of 15cm or greater associated with exophoria and/or symptoms;
- Manifest or significant intermittent strabismus;
- Mechanical defect;
- Other significant ocular conditions such as iris coloboma, entropion, conjunctivitis.

All children being screened completed a form with their name, age and sex prior to examination. The tests completed in the screening examination were as follows:

- Visual acuity of the right and left eye using linear chart where possible;
- Cover test at 1/3 and 6 metre distances;
- Extra ocular muscle excursions;
- Convergence near point;
- Stereoacuity if the examiner needed to confirm the presence of binocular single vision;
- Examination of the conjunctiva for signs of xerophthalmia.

Any children with evidence of xerophthalmia in the form of Bitots spots (stage 1B) were given oral Vitamin A tablets¹⁻⁴.

The supervisors at the orphanage were given a list of those children who failed the screening examination.

RESULTS

Table 1 gives an overview of the overall

failure rate at the 2 orphanages. A larger number of the children at the city orphanages failed the screening test.

	Fails	Total	%	Sex
Balmundir	37	136	27.2	24F 13M
Panchkhal	15	84	17.8	15M
Total	52	220	23.6	

Specific ocular defects have been categorised in Table 2 with the incidence rates of each defect. It should be noted that 4 children who had a vision defect also had convergence insufficiency, but reduced vision was considered to be the more significant problem.

Defect	No	% of Fails	% of Total
Vision	30	57.7	13.6
Convergence Insufficiency	13	25.0	5.9
Mechanical	2	3.8	0.9
Inter/Manifest Squint	3	5.8	1.4
Other ocular	4	7.7	7.7
Totals	52	100%	23.6

Table 3 outlines the number of children with ocular defects in particular age groups. There is a high number (11 of 12) failing the vision test at age 8 with 3 of 7 failing at age 12 and 4 of 7 failing at age 14 years.

Age	No. with defect	% of total defects
5	1	1.9
6	1	1.9
7	1	1.9
8	12	23.1
9	2	3.8
10	6	11.5
11	4	7.7
12	7	13.5
13	0	0
14	7	13.5
15	5	9.6
16	3	5.8
17	3	5.8
	52	100%

DISCUSSION

The referral rate obtained from screening 220 Nepalese children was 23.6% as defined by the criteria for this screening project. This criteria for fail would be considered to be less strict than in other screening programs. The examiners justification for this was to encourage those with significant ocular defects to be referred for further assessment. If more rigid criteria were applied, an even higher referral rate in this population would be expected.

In comparison, the combined prevalence of strabismus and amblyopia has been reported to be significantly lower, around 5%⁵. Other studies have reported the incidence of pre school amblyopia as between 1.2% and 5.6% as documented by De Becker et al⁶.

It is important to hypothesise regarding the reasons for such a high referral rate in the Nepalese orphanages. One of the probable reasons for the large difference in

referral rates would be the lack of visual assessment of young Nepalese children at an age where the visual system is still immature and visual improvement would be possible with appropriate intervention. This is particularly appropriate in cases of refractive error and amblyopia. The importance of detection of visual problems in pre-school children was evident from a Lancet study which found 50% fewer visual problems in children who had undergone screening⁷. In the Western world a generally lower referral rate has been attributed to public health and screening programs.

Other contributing factors may include malnourishment (stunted growth observed in some of the children), poor socio-economic status and inadequate facilities in comparison to Western conditions. Even in Australia, recent studies indicate that the state of a person's health is influenced by the socio-economic group to which an individual belongs⁵⁻⁸. Xerophthalmia with resultant visual disturbance is directly related to inadequate nutrition. A population of orphans may also have an increased number of disabilities which may in turn be associated with a higher incidence of ocular disorders as has been documented by Pitt and Jesse⁸.

It is interesting to observe that all of the children with squint were exotropic, either intermittent or manifest. Jenkins⁹ reported in an IOA study that Nepal was found to have the highest incidence of exotropia (76%) as compared to esotropia. A significant relationship was found to exist between the prevalence of exotropia and light intensity and Asian subjects were found to have higher prevalence of exotropia than Caucasians or Africans⁹. All children with significant squint in this study were found to be exotropic with many of those with convergence

weakness possessing large exophorias. It has been postulated by Donders¹⁰ that Asian countries have a higher incidence of myopia, exotropia and decompensating exophorias. In a country such as Nepal where schooling is non-intensive the accommodation/convergence relationship would not be maximally stimulated from an early age. These factors may impact on each other increasing the incidence of convergence weakness.

This screening also failed 30 (57.7%) children for reduced vision in one or both eyes. Some of this is definitely attributable to uncorrected refractive error, possibly myopia in the older age groups although this is not apparent from the dispersion of age related defects in Table 3.

There are a number of limitations to this project. Testing conditions at both of the orphanages were far from ideal. There was no direct lighting for vision charts and children were cramped and could easily have been distracted by others excitedly waiting their turn for examination. Several different examiners with varied levels of training conducted the testing simultaneously which may induce some inter-examiner error. Not every child underwent every test, some examiners failed children as soon as they did not pass one test giving no indication of whether the child possessed multiple visual problems. Language may have been a barrier with some of the children, slowing the examination and making it more difficult. The small sample size can also be criticised as not being a representative sample of Nepalese children and adolescents. However the study was not designed to be methodologically rigorous but was to be a benefit to participants and to provide information regarding the incidence of visual defects in this community. When

this program was designed, time constraints, limited resources and facilities were taken into account.

CONCLUSION

This screening project examined 220 Nepalese orphans aged from 5-17 years in the Kathmandu district in 1994. These results gave Nepalese authorities information regarding the incidence of vision and ocular motility disorders in this community. As discussed, a variety of factors could contribute to the very high referral rate of 23.6% observed in this population. Many of the defects found would be considered preventable and screening would be of great value in detecting these problems. Local health authorities should be encouraged in future to undertake preventative screening rather than allocate all resources to the less cost efficient treatment of vision and health problems.

ACKNOWLEDGEMENTS

The authors would like to thank the ophthalmologists of the Kathmandu Eye Hospital for the initiation of, and assistance with, this screening program.

REFERENCES

1. World Bank. Nepal social sector strategy review. Report No. 7498-NEP. New York: World Bank, 1989.
2. World Bank. Nepal policies for improving growth and alleviating poverty. Washington D.C.: World Bank, 1989; 53-55.
3. Upadyhay, MP. et al. Xerophthalmia among Nepalese children. Amer J. of Epidemiol. 1985; 121: 71-76.
4. Brilliant GE. The epidemiology of blindness in Nepal. Chelsea, MI. SEVA Foundation, 1988, 331-75.
5. Ehrlich M, Reinecke R, and Simons K. Pre-school vision screening for amblyopia and strabismus. Surv. Ophthalmol, 1983; 28 (3): 145-163.
6. DeBecker I, MacPherson H, LaRoche R, Braunstein J, Cottle R, McIntyre L and Kozousek V. Negative predictive value of population - based pre-school

vision screening programme. Ophthalmol, 1992; 99(6): 998-1003.

7. Feldman W, Milner R, Sackett B and Gilbert S. Screening - Effects of pre-school screening for vision and hearing on prevalence of vision and hearing problems 6-12 months later. The Lancet. Nov 8, 1980; 1014-1016.
8. Pitt, A and Jesse, K. The incidence of visual dysfunction and effectiveness of orthoptic intervention in intellectually impaired children. A report of a study in the North Eastern Region. Melbourne. 1987.
9. Jenkins R. Demographics: Geographic variations in the prevalence and management of exotropia. Amer. Orth. J. 1992; 42: 82-87.
10. Donders FC. An essay on the nature and consequences of anomalies of refraction. Oliver Ca, Ledl Blaiston and Son, Philadelphia 1899.