

■ **Original article**

A profile of low vision among the blind school students in Lumbini Zone of Nepal

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Abstract

Introduction: There is an increasing awareness about the needs of students with low vision, particularly in developing countries where programs of integrated education are being developed. However, the appropriate low vision services are usually neither available, nor affordable.

Objectives: To study the profile of students with low vision in Lumbini Zone of Nepal.

Materials and methods: A cross-sectional study included students with low vision from 8 integrated schools. The reading performance was measured using their own text-books with optical low vision devices prescribed for near reading. The reading rates were measured on a range of print sizes. The Standard Clinical Low Vision Assessment Form and the National Low Vision Program protocol were used. SPSS software was used in data analysis.

Results: Of 46 students enrolled, 23 had a mild visual impairment, 18 had severe visual impairment and 5 were blind. Spectacles were needed for 29 (63 %) students. Of the 11 students who had been wearing glasses, the visual acuity improved in 4 with a change in prescription. 91 % of the students had near vision better or equal to 1.5 M with optical low vision services for near reading. The reading rate was 24 WPM at the age of 5 years, whereas at the age of 21 years, it was 55 WPM.

Conclusion: The majority of the students with low vision need optical low vision services. Accurate refraction is important in these students. The reading rate increases significantly with improved near visual acuity.

Keywords: low vision aids, low vision rehabilitation, low vision treatment

Introduction

A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field

of less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task for which vision is essential (WHO, 1992).

Functionally, low vision is described as irreversible visual loss and a reduced ability to perform many daily activities, such as recognising people in the street, reading blackboards, writing at the same speed as peers, and playing with friends (Van Dijk K, 2009).

Received on: 02.04.2010 Accepted on: 13.06.2010
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The importance of providing care for children with low vision is accepted by many initiatives, such as VISION 2020, the 2004 Oslo Workshop on Low Vision, (WHO, 2009) and the United Nation's global campaign "Education for All".

The importance of accurate refraction was illustrated in the study of low vision programs in Asia (Van Dijk K, 2005). It is important to recognise that any improvement in distant visual acuity for a child with low vision can make a big difference to his or her life. It can also improve near vision. This is particularly true for children with hyperopia, aphakia, or nystagmus. When providing low vision care for children, it is therefore vital to consider both distant and near vision.

The use of magnifying devices can be important for students whose near vision after refraction still remains insufficient to read print of the size used in their school books. At least 80 % of the world's visually impaired children live in low- and middle-income countries, where less than 10 % of them have access to education. This sad fact almost guarantees that these children face a lifetime of poverty and illiteracy (Campbell & Mani, 2007).

Once children with visual impairment have received all the ophthalmic, refractive, and low vision support they need, there are several models for delivering educational services to them. At present, there is a growing awareness of and movement toward inclusive education throughout the developing world. An inclusive approach to education calls for schools to make appropriate adaptations to the learning environment so that each classroom in a community school is able to address the learning needs of all children, including those with disabilities (Campbell & Mani, 2007).

The study was designed to determine the need for spectacles in students enrolled in blind schools, to assess their requirements for optical low vision devices, to determine visual outcome of the use of optical low vision services (both optical low vision devices and distance glasses) among students and to show the relationship between near visual acuity and reading rate among the visually impaired students who had optical low vision devices.

Materials and methods

Forty-six students (31 males and 15 females) aged between five and twenty-four years were recruited from eight integrated schools for the blind in Lumbini Zone, Nepal. The primary cause of low vision was diagnosed for each subject by a general ophthalmologist. The ophthalmologist performed anterior segment examination using magnifying loupe and torch, while posterior segment examination was carried out using Heine direct ophthalmoscope with dilated pupil wherever indicated. The distant and near visual acuities, best refractive correction and low vision assessment were performed by the optometrist trained in low vision. Distant visual acuity was recorded with Log MAR chart in external illumination at a distance of three meters. Distance visual acuity was measured separately for each eye and both eyes together. Near visual acuity was measured with Light house (letter) near visual acuity chart. All those with at least light perception of vision (PL) in one eye and who had navigational vision underwent refraction. Those whose distant vision in their better eye improved with refraction were prescribed spectacles. Those unable to read N10 were assessed for LVAs for near vision. Those with distant visual acuity of $< 6/18$ in the better eye were assessed for telescopes to aid distant vision. Optical low vision devices were provided free of cost. The reading rates were measured in those students who had been using optical low vision devices for near vision for one year on a range of print sizes (on their own text-books) with optical low vision devices in external illumination (window light). The students were selected for reading performance through the following criteria. An appropriate passage of 200 – 300 words in the students' primary reading medium was selected. The students were asked to read orally (using their own text-book, with devices). The time spent in reading was recorded. A minimum of 5 comprehensive questions were asked. Four (80 %) questions were needed to be answered correctly.

If 80 % was scored, the rate of reading was calculated using the following formula. No. of words in a passage divided by the number of minutes spent in reading = words per minute (WPM). For the reading performance, only 20 students were selected.

Data were collected on Standard Clinical Low Vision Assessment Forms of the National Low Vision Program and analyzed.

Results

A total number of 46 (15 female) students out of 54 enrolled in 8 integrated schools were examined. The age of the students ranged from 5 to 24 years. Lens-related causes like aphakia, pseudophakia, etc, were the most frequent abnormalities leading to visual loss, accounting for 41 %.

Table 1
Low vision category

Vision in best eye	Presenting	Improved with distant glasses	Improved with telescope
6/18	-		19
<6/18 - 6/60	15	23	10
<6/60 - 3-60	20	18	0
<3/60 - 0.1/60	11	5	0
PL / NPL	-	-	0
Total	46	46	29

Among the students, 50 % could achieve a distant visual acuity of 6/60 or better after receiving the correct spectacles (Table1). 63 % students had improvement with distant glasses. However, only 24 % students had spectacles when they presented (Figure1), but in 9 %, the visual acuity could be improved with a change in prescription, and in total, 48 % needed a new pair.

Table 2
Near Vision Category

Size	Presenting	Improved
<1-1.5M 10 cm or more	13	23
1-1.5M < 10 cm	3	19
>1.5-2.5 M 10 cm or more	12	1
>1.5-2.5 M <10 cm	2	3
>2.5 M	16	
PL		
Total	46	46

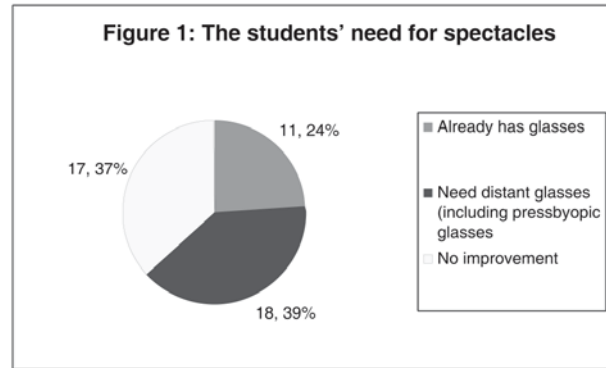
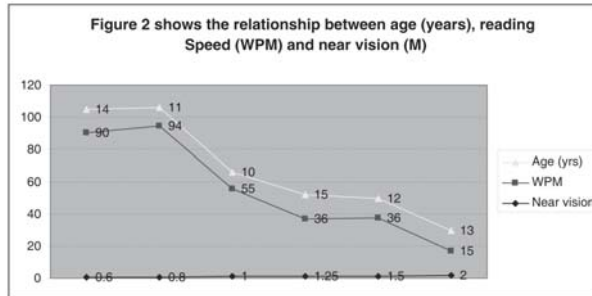


Table 2 shows that at presentation, there were 35 % students having near vision >2.5 M. After low vision assessment, all the students had a near vision of 2.5 M or better than 2.5 M. 91 % students were able to read 1.5 M at 10 cm or better than 1.5M print size. In the telescope trial, 63 % students improved distant vision with telescope. 41 % improved distant visual acuity 6/18 or (Table 1).

Table 3
Types of optical low vision devices

Description	Number(%)
Distant glasses given; (adequate improvement)	13
For near	
Spectacle magnifier	63
Hand-held magnifier	7
Stand magnifier	13
Total	83
For distant	
Telescope,3x	4
Telescope,4x	24
Total	28
Both magnifier + telescope	26

Table 3 shows that 13 % students were able to read 1M print size with distant spectacles. Near magnifiers were needed for 83 % students. Distant telescopes were beneficial to 28 % students.



94 WPM was recorded in a student with near visual acuity 0.8 M whereas 15 WPM was found in a student with near vision 2M. There was 94 WPM at the age of 11 yrs whereas at the age 15 years, reading rate was 36 WPM (Figure 2).

Discussion

50 % of the total students enrolled in the resource centers had distant vision <6/18 to 6/60, despite the admission criteria requiring a medical certificate of blindness. Most of the students came from small towns near the blind schools. Parents frequently sought admission of their children even though they were not blind, because the schools offered lodging and fooding, and often provided better education than other schools did.

In a study undertaken by Van Dijk K (2005), a retrospective study of low vision programmes in Asia analyzed data extracted from standardized clinical records of 1,823 children, aged from 0 to 15 years, attending six low vision programmes in India, Indonesia, and Nepal in 2002 and 2003 in Asia. Among the children, more than two-thirds could achieve a distance visual acuity of 6/60 or better after receiving the correct spectacles. For many children, this level of vision is sufficient to allow them to read blackboard letters from the front row in a classroom. These children generally only require minimal additional support.

Need for distant spectacles

In the study, corrective lenses improved distant visual acuity in the better eye in 63 % students; 24 % of the students already had spectacles when they presented, but in 9 % the visual acuity could be improved with a change in prescription and in total 48 % needed a new pairs of glasses.

Similarly, a retrospective study of low vision programmes in Asia done by Van Dijk K found that 36 % of the children already had spectacles when they presented, and half of those needed a new pair (Van Dijk K., 2007).

Need for optical low vision devices

83 % students of required optical low vision devices (LVDs) for near vision. After low vision assessment, all the students had near vision of 2.5M or better than 2M letter size. 91 % of students could read print size 1.5 of M or better than 1.5 M at 10 cm after refraction and/or magnification. Similarly, a retrospective study of low vision programmes in Asia done by Van Dijk K (2005) found that a total of 75 % of the children examined achieved a best corrected near vision of 1.25M (N10) or better, and an additional 18 % could read a large print size of 2–2.5M (N16–N20) after refraction and/or magnification. These students thus had sufficient near vision to read the print used in school books (sometimes with some assistance). None of them needed to learn Braille (although some had already been taught it), and they gained the ability to attend local mainstream schools with their fully-sighted peers (Van Dijk K, 2007).

There is a debate whether schools for the blind in developing countries should use enlarging photocopiers to produce educational materials for students with low vision. These machines are expensive to purchase and run, depend on electricity, need regular supplies of paper of good quality and standard size, and continued maintenance particularly in hot, dusty climate (Silver et al 1995). The findings of this study suggest that accurate correction of refractive errors and provision of appropriate LVDs for near vision would provide a flexible, cost effective, and sustainable alternative.

Reading performance

In a study done by Jan E et al (2001), it was found that the maximum reading rate increased significantly with age and near visual acuity. Kalloniatis & Johnston (1990) found that there was a significant correlation between reading rate and near VA for children with low vision. In our study, it was shown that the reading rate increased significantly with increasing near visual acuity but there was no significant relationship between reading rate and age.



Conclusion

The need for spectacles in students with low vision is 63 % - 83 %. The students need magnifiers for near vision. A significant number of them need telescopes for board work. 35 % of the students with low vision have near vision better or equal to 1.5 M at 10 cm, whereas 91 % of the students are able to read the same print size at 10 cm after refraction and /or magnification. The maximum reading rate increases significantly with near visual acuity.

Acknowledgement

We wish to acknowledge Karin van Dijk, CBM Low Vision Specialist, Low Vision Consultant to Dark & Light Blind Care for her valuable advice and to Kilimanjaro Centre for Community Ophthalmology, the Netherlands and Dark and Light Blind Care for support to National Low Vision program in Nepal. We are also very grateful to Dr Ken Basset, PhD, of Seva Service Society, Canada, for his valuable suggestions and guidelines for this study.

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Source of support: nil. Conflict of interest: none