

## Profile of Low Vision in Peripheral Eye Hospital in Nepal: A Short Term Study

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### Abstract

The main purpose of this study was to access the cause of low vision and the different types of low vision devices prescribed for patients visiting Biratnagar Eye Hospital for the duration of one month. The retrospective study of 13 patients visiting the low vision clinic was conducted. The age, gender, profession, education, cause of low vision was assessed. The refractive error, best corrected visual acuity in both eyes at near and distance was assessed using logMAR chart. The best accepted low vision device for near and distance as per the need of the patients were noted. Majority of the patients were male (76.9%) and 46.15% of the patients represented the pediatric age group and elderly patients >60 years represented the smallest age group. The main causes of low vision in patients attending the low vision clinics are retinitis pigmentosa (30.7%), refractive error and amblyopia (23.1%), choroidal coloboma (15.4%). The visual acuity with telescopes (n = 5) was (0.28 ± 0.19) logMAR. 8X telescope was used in all cases. Spectacle magnifiers for near was used in a single case where the near vision was improved to 3M with OU: +10.00DS aspheric spectacles. However, retinitis pigmentosa was the main cause of low vision and pediatric age group was the major age group seeking low vision. Males were predominant for visiting low vision clinic.

**Keywords:** Low vision; Retinitis Pigmentosa; Telescope; Spectacle Magnifier

### Introduction

Low vision is defined as permanent loss of vision which makes it difficult for a person to perform many daily activities, presents all three of the following characteristics:

1. impairment of visual functioning even after treatment and/or standard refractive correction
2. visual acuity ranging from light perception to <6/18 (0.3 logMAR), or a visual field smaller than ten degrees from the point of fixation
3. the person uses, or is potentially able to use, vision for the planning and/or execution of a task [1].

Globally, about 314 million people are visually impaired and 45 million of them are blind. However, correctable refractive error as a cause of visual impairment is not included in that number, which implies that the actual global magnitude of visual impairment is greater [2]. Further, 75 percent of this visual impairment is estimated to be avoidable (preventable or curable) [3]. In 1999, the WHO Prevention of Blindness Program launched 'VISION 2020: The Right to Sight Initiative' with the objective of assisting member states in eliminating avoidable blindness by the year 2020 [4]. The global target is to ultimately reduce blindness prevalence to less than 0.5 percent in all countries, or less than 1.0 percent in any community [5]. Nearly 87 percent of the world's blind people live in the developing countries [2]. More than half of them live in Asia and a vast majority of them are in rural communities [6]. There are many reasons identified for the rising tide of blindness and low vision. Prominent among them is the increase of the world's elderly population, particularly in developing countries. The prevalence of blindness is 0.84 per 100 inhabitants. Cataract (66.8%) and its sequelae (5.3%) are the major causes of

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blindness. Other causes are retinal disease (3.2%), glaucoma (3.2%), and trachoma (3.2%). Of the total blind population, 92 percent live in rural areas [7]. The prevalence of low vision is 1.0 percent as estimated by Nepal Netra Jyoti Sangh (NNJS), a leading NGO in eye care in Nepal [8]. NNJS launched the National Low Vision Program in Nepal in 2005 with the aim of helping people who have incurable eye conditions with some residual vision to make best use of their vision.

**Rationale**

The prevalence of low vision is increasing and by the use of low vision devices and rehabilitation techniques we can still make the life of patients with low vision easier. The population over age 85 years is expected to increase by 107% by the year 2020. So the prevalence of diseases like Age Related Macular Degeneration, Glaucoma, Diabetic Retinopathy will continue to rise dramatically.

**Objectives**

The general objective of this study was to see the profile of low vision in Biratnagar Eye Hospital assessing age, gender, education, profession, best corrected distance visual acuity, best corrected near visual acuity, main cause of low vision and the improvement in VA with low vision devices.

**Materials and methods**

This was an analytical and cross sectional study. The place of study of study was Biratnagar Eye Hospital (BEH). Target population was all the patients with low vision criteria as described by WHO visiting the Low vision clinic. Study duration was 30 days. The data included consist of age, gender, profession, education level, their chief visual demands and difficulties, presenting distance and near visual acuity, visual acuity with refractive correction, types of refractive error, visual acuity with low vision devices and their preferences, and the most commonly prescribed low vision devices. Distance visual acuity was recorded in logMAR unit. Near visual acuity was tested at their working distance and was recorded in M notation. Objective and subjective refraction was carried out in all cases. Proper refractive correction was prescribed in spectacle form. Trial of telescopes was carried out for suitable patients, and the visual acuity with telescopes was noted. The near magnifiers of appropriate magnification were tried, and the near visual acuity with magnifiers was noted. Preference of magnifiers was also documented. Data was recorded and analyzed using SPSS version 19 software.

**Results**

The total number of low vision cases included in the study period was 13. Out of 13, 10 (76.9%) were male and 3 (23.1%) were female.

**Gender**

Gender	Percentage	Number
Male	76.9%	10
Female	23.1%	3

*Table 1*

**Profession**

Out of 13 patients, 8 patients (61.54%) were students, 3 patients (23.08%) were involved in agriculture, 1 patient (7.69%) was a shopkeeper and 1 patient (7.69%) worked abroad.

Profession	Percentage	Number
Students	61.5%	8
Agriculture	23.1%	3
Shopkeeper	7.7%	1
Works abroad	7.7%	1

*Table 2*

**Age**

The mean age of presentation was  $27.82 \pm 22.99$  years ranging from 8-80 years. There were 6 (46.15%) patients in the 0-15 years age group, 5 (38.46%) of patients were in the group >15-60 years age group and 2 (15.38%) patients were in the group >60 years age group.

**Education**

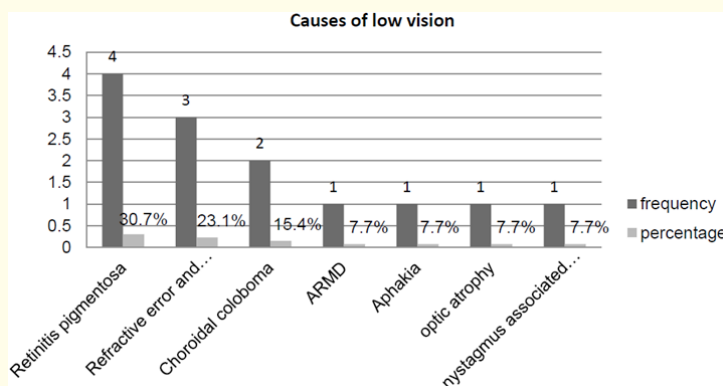
Out of 13 patients, 7 patients (53.9%) had primary level education, 3 patients (23.1%) were in lower secondary class and 3 patients (23.1%) were illiterate.

Educational level	Percentage	Number
Primary	53.9%	7
Lower secondary	23.1%	3
Illiterate	23.1%	3

**Table 3**

**Causes of low vision**

The causes of low vision in patients attending the low vision clinics were retinitis pigmentosa (30.7%), refractive error and amblyopia (23.1%), choroidal coloboma (15.4%) as the most common causes of low vision. Other causes were optic atrophy (7.7%), aphakia due to congenital cataract (7.7%), age related macular degeneration (7.7%), and nystagmus associated with Retinal Detachment (7.7%).



**Graph**

**Low vision services**

The chief visual complaints were decreased distance vision (n = 11) including recognizing faces, distance objects and identifying number of vehicles. For near, the chief visual demands were reading print (n = 2) and coin identification. Other visual problems included mobility problem (n = 4), glare problem (n = 3) and problem in night vision (n = 3).

**Visual status**

Mean distance visual acuity of RE ( $1.39 \pm 0.49$ ) in logMAR notation that ranged from (0.50-2.00). The mean distance visual acuity of LE ( $1.21 \pm 0.52$ ) in logMAR notation that ranged from (0.70-2.00). The mean near visual acuity of RE ( $3.29 \pm 4.85$ ) in M notation ranging from (NPL- 18)M. The mean near visual acuity of LE was ( $3.52 \pm 4.75$ ) in M notation ranging from (NPL-18) M. The average near vision testing distance was ( $20.61 \pm 4.82$ ) cm. The near vision testing distance ranged from (13.00- 30.00) cm. Spherical equivalent objective refractive error of RE was ( $+1.19 \pm 7.32$ ). The spherical equivalent objective refractive error of RE ranged from (-16.00 to + 16.50).

Spherical equivalent objective refractive error of LE was  $(+2.90 \pm 5.19)$ . The spherical equivalent objective refractive error of LE ranged from  $(-1.25$  to  $+15.50)$ .

The improvement of distance visual acuity from baseline with refractive correction in RE was  $(0.49 \pm 0.45)$  logMAR. The improvement of distance visual acuity from baseline with refractive correction in LE was  $(0.53 \pm 0.49)$  logMAR. The improvement of near visual acuity from baseline with refractive correction of both distance and near in BE were  $(1.94 \pm 1.46)$  M. The visual acuity with telescopes ( $n=5$ ) was  $(0.28 \pm 0.19)$  logMAR. 8X telescope was used in all cases. Spectacle magnifier for near was used in a single case where the near vision was improved to 3M with OU: +10.00DS aspheric spectacles.

## Discussion

Biratnagar Eye hospital is an Eastern Regional Eye Care Programme (EREC-P) hospital located in Biratnagar, Nepal. Since its foundation Biratnagar Eye Hospital has grown from 100 beds to 450 beds currently. Since its start in September 2006, Biratnagar Eye Hospital has progressed into an eye hospital widely recognized for delivering affordable high quality eye care services to the economically poor and under-privileged people of the community. Located in Eastern Nepal close to the Indo-Nepal border, this hospital has been serving thousands of patients, in particular, people from Eastern Nepal and Northern parts of India including Bihar, Uttar Pradesh, and West Bengal, with the highest quality of eye care. The distribution by gender was different from previous studies done 9-10 where females were predominant but in our study males (76.32%) were predominant. It indicates that the low vision is more prevalent in males than females in Nepal although it might also be due to the accessibility of males to the hospital more than females. In developing country like Nepal, there is prevalence of gender based discrimination where major decision making in home is made by the males including the ownership of productive assets like cattle, productive agricultural land and resources like health facilities, educational opportunities and participation in community mobilization activities. The males are thought to be the bread owner of the family so priority is given to them in matter of health facilities. Despite progressive policy reforms, human development indicators of Nepali women and girls, especially from marginalized castes and ethnicities, living in remote areas, remain low [11] (UNFPA Nepal, 2011). This suggests that Nepal may benefit from a low vision screening camp in the community which could give health education along with screening services which particularly emphasizes the needs of female patients.

In many previous studies carried out in the arena of low vision, the majority of the patients are elderly i.e  $>60$  years but in our study the majority of the patients (46.15%) were in the 0–15 years age group, which includes the school going children. This shows that those children with low vision might have difficulty in learning process in schools. They might have poor academic performances in school due to visual disability. So the children should have their eyes check up before every year academic enrollment and school should have arrangement for special children like these for their better academic performances. This should be carried out by the school administration in association with NGOs and INGOs working for the global visual improvement. On the other hand, in studies from developed countries, Leat and Rumney [12] (United Kingdom) found 77% of their patients to be aged 60 years and above [13]. (Canada) reported that 66% of the patients were 70 years or older; while in Australia, Wolffsohn and Cochrane [14] observed that 87% of the patients were 60 years and above. This difference in the pattern of the age distribution may be a reflection of the older general populations in developed countries [15] and low life expectancy in developing countries [17]. 38.46% of patients were in the group  $>15$ –60 years age group which is the population of active working age group. The prevalence of low vision might have impact on their economic activities. The vocational trainings should be provided to these age group patients for income generation and better quality of life. 15.38% patients were in the group  $>60$  years age group who had mobility problems, face identification. Elderly home services should be promoted for making their life better.

The causes of low vision in patients attending the low vision clinics are retinitis pigmentosa (30.7%), refractive error and amblyopia (23.1%), choroidal coloboma (15.4%) and were most common causes of low vision. Other causes were optic atrophy (7.7%), aphakia due to congenital cataract (7.7%), age related macular degeneration (7.7%), nystagmus associated with Retinal Detachment (7.7%). In a similar study done by, Thakur, *et al.* [16] (2011) in the same hospital settings had refractive error and amblyopia (24%) as the major

cause of low vision. Apart from this, the study showed retinitis pigmentosa (22.4%), globe anomalies (9.57%), optic atrophy (8.9%), congenital cataract (8.7%), heredo macular degeneration (7.69%), age related macular degeneration (5.7%), nystagmus associated with unknown causes (4.1%) and so on. Both of the studies show the high prevalence of genetically predisposed diseases like retinitis pigmentosa, congenital cataract, nystagmus etc. This might be high prevalence of consanguinity in different tribes of people living in this area. In a study done by Hornby, *et al.* [18] of a total of 168 children who were recruited to the larger study, 24 had unilateral or bilateral anophthalmos or remnant microphthalmos are reported. Clinical anophthalmos was found in 24 eyes of 15 patients (seven females, eight males), and remnant microphthalmos in 14 eyes of nine patients (three females, six males). The high rates of consanguinity among parents of children in this series, normal intelligence and, bilateral involvement suggest a genetic aetiology, which is likely to be autosomal recessive for a significant proportion of children but no definite conclusion can be drawn due small sample size and there was no control group for comparison.

The improvement of distance visual acuity from baseline with refractive correction in RE was ( $0.49 \pm 0.45$ ) logMAR and in LE was ( $0.53 \pm 0.49$ ) logMAR. The improvement of near visual acuity from baseline with refractive correction of both distance and near in BE were ( $1.94 \pm 1.46$ ) M. The visual acuity with telescopes ( $n=5$ ) was ( $0.28 \pm 0.19$ ) logMAR. 8X telescope was used in all cases. Spectacle magnifier for near was used in a single case where the near vision was improved to 3M with both eyes +10.00DS aspheric spectacles. There is significant improvement of vision at both near and distance with the low vision devices so the patients should be given proper counseling regarding the adjustment of the focal length and the of working distance.

### Conclusion

Since this study was carried out for a short period of time, there is significant number of low vision patients attending the low vision clinic. The majority of the patients are of school going age group so rehabilitative approach should be made for academic development of the children. The high prevalence of genetically predisposed disease may be due to environmental factor and consanguinity but the solid conclusion cannot be drawn as the numbers were small and no control for comparison.

### Conflict of interest

The author has no conflict of interest to declare.

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