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Ajit Kumar Thakur, Purushottam Joshi, Himal Kandel and Subhash Bhatta

British Journal of Visual Impairment 2011 29: 215
DOI: 10.1177/0264619611414990

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THE BRITISH JOURNAL OF VISUAL IMPAIRMENT
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(Los Angeles, London, New Delhi, Singapore and Washington DC)
Vol 29(3): 215–226
DOI: 10.1177/0264619611414990
RESEARCH REPORT

Profile of low vision clinics in eastern region of Nepal

A retrospective study

AJIT KUMAR THAKUR *Mechi Eye Hospital, Anarmani-7, Jhapa, Nepal*

PURUSHOTTAM JOSHI *Mechi Eye Hospital, Anarmani-7, Jhapa, Nepal*

HIMAL KANDEL *Institute of Medicine, Maharajgunj, Kathmandu Nepal*

SUBHASH BHATTA *Institute of Medicine, Maharajgunj, Kathmandu, Nepal*

ABSTRACT The entire low vision patients' file that underwent low vision examination in 2009 in two major eye hospitals was retrospectively reviewed. Out of 1547 cases, 1140 (73.69%) were male and 407 (26.31%) were female. The mean age of presentation was 31.04 ± 20.63 years, of which 89.1 percent were from a rural community, 39.10 percent had avoidable blindness. Refractive error and amblyopia (24%) and retinitis pigmentosa (22.4%) were the most common causes of low vision. Refractive error and amblyopia (30.33%), retinitis pigmentosa (29.03%) and age related macular degeneration (ARMD) (36.5%) were the major causes of low vision in 0–15, >15–60 and >60 years age group respectively. The number of patients 1107 (71.55%) improved significantly with refractive correction. Eighty-eight (5.68%) were prescribed telescopes. For near vision, only 359 (23.2%) patients were prescribed magnifiers. There was a significant improvement of functional vision after provision of low vision devices, particularly for patients with residual vision better than 20/1200.

KEY WORDS *avoidable blindness, causes of low vision, refractive error, retinitis pigmentosa, age related macular degeneration (ARMD)*

A person with low vision is someone who has an impairment of visual functioning despite treatment and/or standard refractive correction. The World Health Organization (WHO) has classified the visual status of a person in four categories (WHO, 2009):

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- a person having best corrected vision, in better eye, better than or equal to 6/18 is said to have normal visual status;
- a person with best corrected vision, in better eye, <6/18 to 6/60 is said to have visual impairment;
- a person having best corrected vision, in better eye, <6/60 to 3/60 is said to have severe visual impairment;
- a person having visual acuity <3/60 is said to be blind.

Visually impaired people are those who have visual acuity of less than 6/18 to light perception and/or a visual field of less than 10° from the point of fixation and who are using or are potentially able to use their vision for planning and/or execution of a task (WHO, 1993). 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 (Siddiqui, Bäckman and Awan, 1997). Further, 75 percent of this visual impairment is estimated to be avoidable (preventable or curable) (WHO, 2004). 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 (Thylefors, 1998). 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 (WHO, 2005).

Nearly 87 percent of the world's blind people live in the developing countries (Siddiqui et al., 1997). More than half of them live in Asia and a vast majority of them are in rural communities (Nepal Facts and Figures, 2010). Many reasons have been 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.

Nepal is one of the poorest countries of Asia situated between India and China. The prevalence of blindness is 0.84 per 100 inhabitants. Cataract (66.8%) and its sequelae (5.3%) are the major causes of 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 (Brilliant et al., 1988). The higher percentage of avoidable blindness reflects the poor health access of the community due to poor health education and poor financial conditions due to the political instability (Nepal Facts and Figures, 2010). 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 (NNJS, 2002). NNJS launched the National Low Vision Program in Nepal in 2005 with the aim of helping people who

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have incurable eye conditions with some residual vision to make best use of their vision. It also aims to bring them into the mainstream of society by helping them to use the residual vision to the best possible extent with the use of low vision devices. This program has given priority to pick the low vision patients from the community. The focus groups who were trained for low vision screening were school teachers, Community based rehabilitation, and eye care personnel.

No nationwide study has been conducted in low vision to date. A report from Lumbini, in the western part of the country, showed lens related conditions (e.g. cataract and its sequel) as the main causes of low vision (35.55%) followed by refractive errors/amblyopia (19.23%), retinitis pigmentosa (7.24%) and other retinal causes (6.64%) (KC et al., 2007). In a report from Kathmandu, the capital, situated in the central region of the country, the major cause of low vision was diabetic retinopathy (15.8%), followed by macular diseases (13.2%), age related macular degeneration (10.5%), retinitis pigmentosa (9.6%) and amblyopia (8.8%) (Paudel, Khadka and Sharma, 2005). Hence the distribution of the causes for low vision in this country appears to vary significantly from place to place. No data on low vision services has been published from the eastern part of the country.

This study was aimed to determine the most common causes of low vision in different age groups which would help in the national low vision planning. This study also aimed at determining the improvement of visual acuity after the provision of low vision services. This information would give an idea about the status of the low vision services in eastern Nepal. Hence, it would help in the planning of newer programs to address the lacuna in the model of the current service. It will also provide a guideline to develop low vision services in other developing countries as well.

METHODOLOGY

A retrospective study was carried out in two major eye hospitals of eastern Nepal: Sagarmatha Choudhary Eye Hospital, Lahan and Mechi Eye Hospital, Jhapa. The medical records of all the cases who visited these hospitals in the year 2008 and 2009 were reviewed. The data included by whom they were referred, consisted of age, sex, 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.

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Distance visual acuity was recorded in logMAR unit and was converted into Snellen fraction. Similarly near visual acuity was tested at their working distance with preferred light conditions for reading and was recorded in M notation. Objective and subjective refraction was carried out in all cases. Proper refractive correction was prescribed in spectacle form. A trial of telescopes was carried out for suitable patients, and the visual acuity with telescopes was noted. Similarly, 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 analysed using SPSS 14 software.

RESULTS

Demographic distribution

The total number of low vision cases included in the study period was 1547, of which 1361 (87.98%) of cases were referred from the eye care professionals, 134 (8.66%) were referred from school teachers, 42 (2.71%) were referred from Community based rehabilitation and 10 (0.65%) from eye camps and other medical personnel.

Out of 1547, 1140 (73.69%) were male and 407 (26.31%) were female. The mean age of presentation was 31.04 ± 20.63 years ranging from 3–87 years. There were 501 (32.38%) patients in the 0–15 years age group, 868 (56.10%) of patients were in the group >15–60 years age group and 178 (11.52%) patients were in the group >60 years age group. There were 1379 (89.1%) patients from rural communities and only 168 (10.9%) patients were from urban society.

Causes of low vision

Out of 1547 cases presented to the low vision clinics, 605 (39.10%) had avoidable causes for visual impairment. Out of 605, 485 (80.1%) were preventable and 120 (19.90%) were curable.

The causes of low vision in patients attending the low vision clinics are shown in Figure 1. Refractive error and amblyopia (24%) and retinitis pigmentosa (22.4%) were most common causes of low vision. Other causes were globe anomalies (9.57%), optic atrophy (8.9%), congenital cataract (8.7%), heredo macular degeneration (7.69%), age related macular degeneration (5.7%), corneal opacity (5.1%), nystagmus associated with unknown causes (4.1%), glaucoma (2.2%), albinism (1.1%) and others (1.2%).

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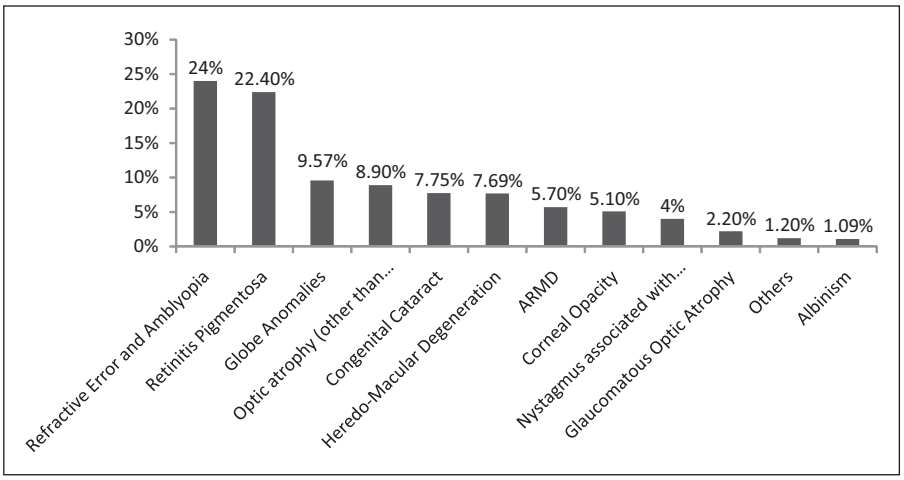


Figure 1. Causes of low vision in patients attending low vision clinics.

Table 1. Table showing causes of low vision in different age groups.

Causes of Low Vision	0–15 years (*n* = 501)	>15–60 years (*n* = 868)	>60 years (*n* = 178)	Total
Congenital Cataract	59 (11.8%)	56 (6.45%)	5 (2.80)	120 (7.75%)
Albinism	10 (2%)	7 (0.8%)	0 (0%)	17 (1.09%)
Globe anomaly	76 (15.1%)	69 (7.94%)	3 (5.93%)	148 (9.56%)
Corneal opacity	40 (7.98%)	31 (3.57%)	8 (4.49%)	79 (5.1%)
Glaucomatous optic atrophy	3 (0.59%)	24 (2.76%)	8 (4.49%)	35 (2.26)
Refractive error and Amblyopia	152(30.33%)	205 (23.61%)	14 (7.86%)	371 (23.98%)
Macular disease (except AMD)	14 (2.79%)	88 (10.13%)	17 (9.55%)	119 (7.69%)
Nystagmus associated with unknown causes	36 (7.18%)	26 (2.99%)	1 (0.06%)	63 (4.07%)
Optic atrophy	38 (7.58%)	76 (8.75%)	24 (13.48%)	138 (8.92%)
Retinitis pigmentosa	70 (13.97%)	252 (29.03%)	25 (14.04%)	347 (22.43%)
ARMD	0 (0%)	23 (2.64%)	65 (36.51%)	88 (5.68%)
Others	3 (0.59%)	11 (1.26%)	8 (4.49%)	22 (1.42%)

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In the 0–15 year age group, the most common causes of low vision were refractive error and amblyopia (30.33%), retinitis pigmentosa (13.97%) and globe anomalies (15.1%) and congenital cataract (11.8%). Similarly, retinitis pigmentosa (29.03%), refractive error and amblyopia (23.61%) and heredo macular degenerations (10.13%) were the most common causes of low vision in >15–60 years. Age related macular degeneration (36.5%), retinitis pigmentosa (14.04%) and optic atrophy (13.48%) were the most common causes in the age group >60 years.

Visual status

Out of 1547 low vision patients, 819 (52.9%) were bilaterally blind and only 725 (47.1%) had residual vision better than 3/60 in the better eye. Out of 725, 418 (57.66%) were visually impaired and 307 (32.34%) were with severe visual impairment according to WHO classification of visual status (WHO, 2009).

Low vision services

The chief visual complaints for distance were recognizing faces ($n=1195$) and reading the chalk board letter ($n=435$). For near, the chief visual demands were reading print ($n=678$) and coin identification ($n=171$). Other visual problems included mobility problem ($n=314$), glare problem ($n=208$) and problem in night vision ($n=389$).

Mean visual acuity was 0.08 (6/72) in Snellen notation that ranged from (0.004–0.33) 6/1500 to 6/18. The mean visual acuity with refractive correction was 0.14 (6/42). The improvement of visual acuity from baseline with refractive correction was statistically significant ($p<0.05$, paired t test). The visual acuity with telescopes ($n=303$) was 0.43 (6/14). When the patients whose residual vision was better than 0.05 (3/60) were only taken into account, the mean presenting visual acuity was 0.13 (6/45) which improved to 6/30 with refractive correction. Mean visual acuity with telescopes in this group ($n=159$) was 0.48 (6/12.5). The improvement of visual acuity with both refractive correction and telescopes were statistically significant $p<0.05$, paired t test)

The mean presenting near visual acuity was 2.12 ± 1.49 M units which improved to 1.63 ± 1.2 M units with different magnifiers. Similarly when only the patients whose residual vision was better than 0.05 (3/60) in the better eye were taken into account, the mean near visual acuity was

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Table 2. Table showing the prescribed devices for near.

Magnifiers	Number of patients	Percentage
Spectacle magnifier	246	68.52%
Hand Held Magnifier	29	8.07%
Stand magnifier	76	21.16%
Bar magnifier	7	1.94%
Tele-microscopes	1	0.27%
CCTV	4	1.11%

1.77±1.22 M unit which improved to 1.29±0.77 M units with low vision devices. The improvement of near visual acuity with magnifiers was statistically significant ($p<0.05$, paired t test) and improvement was even more when the low vision persons had residual vision better than 0.05 (3/60).

There were 1107 (71.55%) patients who improved significantly with refractive correction alone and were prescribed glasses. Eighty-eight (5.68%) were prescribed telescopes. For near, only 359 (23.2%) patients were prescribed magnifiers. Spectacle magnifiers was the most frequently prescribed device for near.

DISCUSSION

Community based rehabilitation (CBR) is a home and community based program for the blind people of the community, successfully running in 14 districts of Nepal. The main function of CBR is to identify the incurably blind people and initiate suitable programs, such as early intervention, education, orientation, mobility and vocational trainings. Teachers in the developing country are best suited to provide health education to the community. In our study, only 134 (8.66%) subjects were referred by school teachers, 42 (2.71%) were referred by Community based rehabilitation to the low vision clinics. This highlights the need of active participation of teachers and rehabilitation workers in this sector. The CBR program is successfully running in the Jhapa District where Mechi Eye Hospital is situated but not in Siraha, where Sagarmatha Choudhary Eye Hospital, Lahan is situated and this might be the cause for the fewer number of patient referrals from CBR seen in this study. The remaining patients were referred from the eye care professionals that included ophthalmologists, optometrists and ophthalmic assistants. Nepal is a country where the majority of people

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live in rural communities and they have traditional beliefs in faith healers. There may be advantages in training these faith healers to identify the cases of possible visual impairment and encourage them to visit the low vision clinics.

In this study, male to female ratio was 2.80. The male preponderance was also seen in the study done by Mohidin and Yusoff (1998) where the ratio was 2.21. It indicates that low vision was more prevalent in males in Nepal, although it might also be linked to males having more access to hospital care. In Nepal, gender-based discrimination is widespread and extends to ownership of productive assets (such as cattle), access to resources like land and other properties, access to health and educational opportunities, work burden, access to public decision-making positions, mobility, and overall cultural status. As a result the structured dependence of women on men is high. Despite progressive policy reforms, human development indicators of Nepali women and girls, especially from marginalized castes and ethnicities, living in remote areas, remain low (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.

The mean age of presentation was 31.04±20.63 years ranging from 3–87 years. There were 501 (32.38%) patients in 0–15 year age group, 868 (56.10%) of patients were in >15–60 years age group and 178 (11.52%) in the >60 years age group. The majority of the patients were from younger age groups which was similar to the result shown by Mohidin and Yusoff (1998). In their study, 73.8 percent of patients were younger than 60 years. The fewer number of patients in the age group >60 years might be due to lower life expectancy (65.81 years) of the country (Nepal life expectancy at birth, 2010). In our study, 1379 (89.1%) patients were from rural areas and only 168 (10.9%) patients were from urban areas. In Nepal, more than 80 percent of the population live in villages and the hospitals where the study was conducted are in close proximity to villages.

Refractive error and amblyopia (24%) and retinitis pigmentosa (22.4%) were the most common causes of low vision in the study population. Other causes included globe anomalies (9.57%), optic atrophy (8.9%), congenital cataract (8.7%), heredo macular degeneration (7.69%), age related macular degeneration (5.7%), nystagmus due to unknown causes (4.1%), glaucoma (2.2%), albinism (1.1%) and others (1.2%).

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Mohidin and Yusoff found structural and functional defect of globe (13%), retinitis pigmentosa (13%) and heredo macular dystrophy (10%) as causes of low vision in their study (Mohidin and Yusoff, 1998). An exceptionally high percentage of refractive error and amblyopia reflects the burden of refractive error in this part of the world. It might be due to nuclear sclerosis which was not operated upon due to lack of facilities and had visual acuity better than 6/36 with spectacles. In this region, surgery is usually indicated only when the improvement with spectacles was not better than 6/60.

Causes of low vision were analysed separately in different age groups. The most common causes of low vision were refractive error and amblyopia (30.33%), retinitis pigmentosa (13.97%) and globe anomalies (15.1%) and congenital cataract (11.8%) in the 0–15 years age group. In a study done by Elfadul Mohamed and Binnawi, retinitis pigmentosa was the commonest (16.7 %) followed by congenital cataract (14.2 %) (Elfadul Mohamed and Binnawi, 2009). In a study by Bamashmus and Al-Akily, the commonest causes of bilateral blindness were cataract (20.0%), glaucoma (17.8%), retinal disorders (13.3%) and corneal non-traumatic opacities (13.3%) (Bamashmus and Al-Akily, 2010). Again the high percentage of refractive error and amblyopia as a cause of low vision seeks attention of the eye care planners to initiate much more pre-school and school screening programs to reduce the visual impairment in the paediatric age group.

Similarly, retinitis pigmentosa (29.03%), refractive error (23.61%) and heredo macular degenerations (10.13%) were the most common causes of low vision in >15–60 years age group. Age related macular degeneration (36.5%), retinitis pigmentosa (14.04%) and optic atrophy (13.48%) were the most common causes of low vision in the age group >60 years. Similar results were shown by Mohidin and Yusoff (1998). The fewer number of age related macular degeneration patients in the study population was probably due to relatively fewer number of patients in the elderly age group.

Out of 1547 low vision patients, 819 (52.9%) were bilaterally blind and only 725 (47.1%) had residual vision better then 3/60 in the better eye in contrast to the study by Elfadul Mohamed and Binnawi (2009) where a higher number of bilateral blind persons reflects the poor health awareness and accessibility to health services in this part of the country. A large number of patients (39.10%) had avoidable causes for visual impairment. This reflects the lack of awareness and inaccessibility of

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primary eye care to the patients in this area. This may benefit from both governmental and nongovernmental organization attention.

The improvement of visual acuity for near and distance was significant after provision of low vision devices. Even refractive correction alone had resulted in significant improvement in visual acuity while telescopes improved visual acuity to make their visual status near to normal. The improvement of visual acuity was more when only the patients were taken into account whose vision was better than 3/60 at presentation. Hence the low vision service has better impact when the patient has better residual vision. This result emphasizes the strengthening of the primary eye care program so that cases of low vision can be detected at an earlier stage where the impact of the service is greater. There were 1107 (71.55%) patients who improved significantly with refractive correction alone and were prescribed spectacles. Telescopes were prescribed to 88 (5.68%) patients.

Mohidin and Yusoff have shown that 60 percent of low vision clients were prescribed at least one low vision device (Mohidin and Yusoff, 1998). For near, only 359 (23.2%) patients were prescribed magnifiers. More than 90 percent of the optical devices like spectacles, hand held magnifiers, spectacle magnifiers, were simple to use and are easily available in the eye hospitals.

CONCLUSION

The low vision service through the low vision clinics in the eastern region of Nepal is satisfactory in terms of the number of patients attending the clinics. A good number of patients visit low vision clinics. But the patients presented to the clinics usually are bilaterally blind. So there needs to be a screening program for low vision patients in the community which can identify patients earlier. The services provided at the low vision clinics in this part of the country are satisfactory, as after the provision of the devices, the visual functions have improved significantly. The majority of devices are available in the local low vision clinics at the hospital. The National Low Vision Program is supporting the patients by providing the low vision devices at a 10 percent subsidy.

Only providing low vision services to the people with low vision does not solve the problem. There should be a proper monitoring on the use of devices and the impact they have upon patients after the provision of low vision services. Nevertheless, such follow-up work is expensive and currently limited. Close work with school teachers and community

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blind rehabilitators may offer more affordable ways of undertaking this evaluation. Greater communication between low vision services and other community-based services therefore seems a priority.

The higher incidence of avoidable blindness draws attention to the need to strengthen primary eye care and emphasize early detection and the necessary action. Uncorrected refractive error has been one of the major causes of visual impairment. There should be improved planning to reduce the burden of refractive error by health education, school screening and community screening. Early diagnosis of the refractive errors with easy availability of spectacles at affordable prices appears to be the most effective method to address the problem of low vision for many people. Other causes of visual impairment like corneal opacities and glaucoma can also be reduced by proper screening in eye camps. In conclusion, we would argue that in Nepal (with its relatively low health awareness) this aspect of eye care activity in low vision needs to be strengthened and prioritized by policymakers.

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AJIT KUMAR THAKUR
Optometrist, Mechi Eye Hospital, Anarmani-7, Jhapa, Nepal.
Email: ajitfriend2002@yahoo.com, ajitfirend2002@gmail.com

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