

Impact of low vision services on functional status and vision related quality of life in adults

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Abstract

Introduction: Low vision (L. Vn) rehabilitation for adults is a part of our service oriented eye hospital. We studied changes in visual function (VF) & vision related quality of life (VQL) of adults with low vision at least three months after providing them rehabilitative services.

Materials and Methods: This was a prospective study conducted in H V Desai Eye Hospital, Pune during 2010-2011. L. Vn disabled aged 16 years and older attending clinic were Our study population. Their distance and near Visual acuity presented and best corrected (BCVA) were noted. Other VF included contrast sensitivity, colour perception, dark adaptation and glare effects. The L Vn rehabilitation services (both optical and non-optical) were provided. Six months after intervention, the participants were interviewed using close ended questionnaire to determine their VQL and HQL. VF were also reassessed to estimate the impact.

Result: We assessed 67 L Vn disabled. The distance vision improved by using L Vn devices in 48 (72%) disabled. The near vision improved with help of LVn devices in 57(85%) disabled. VF of all 59 (88%) participants with contrast defect improved by using filters, illumination changes and environmental changes in their workplaces. The participant's perspective suggested that marked improvement in VQL were for the outdoor and indoor activities, reading and Writing. There was decline in emotional distress due to the Visual impairment.

Conclusion: Low vision rehabilitation improved VF, VQL and HQL of adult six months after use of low vision services.

Introduction

Low vision is defined as impaired visual function despite treatment and/or standard refractive correction, a visual acuity of less than 6/18 to light perception, or a visual field less than 10° from fixation.⁽¹⁾ Prevalence of low vision in India is 1.1%.⁽²⁾ National 'Vision 2020 The Right to Sight' initiative that aims to eliminate avoidable visual disabilities by the year 2020. Individuals with low vision are depressed due to poor vision-related quality of life.⁽³⁾ Scott et al⁽⁴⁾ reported that low vision services improved the quality of life. The low vision interventions on the objective task-specific measures of functional abilities, such as reading speed, reading duration, and ability to read a certain print size have a positive impact.⁽⁵⁾ Patient satisfaction of low vision services is also promising.⁽⁶⁾ To the best of our knowledge, information on (Visual Function) VF, vision related quality of life (VQL) and health related quality of life (HQL) following low vision services from the western states of India is not available. We present the VF, VQL and HQL six months after providing low vision services to adults.

Materials and Methods

The ethical committee approval of our institution was obtained. An informed verbal consent was obtained. All patients older than 16 years with <6/18 best corrected distance visual acuity (BCVA) that did not improve with standard refractive correction or surgery were included in the study. Mentally challenged

low vision disabled unable to provide feedback were excluded.

To calculate sample size, we assumed that 85% or more low vision disabled will have a positive impact after using the low vision devices for at least 3-6 months.⁽⁷⁾ To achieve 95% confidence interval with an acceptable margin of error 10%, design effect of '1' and an increase in sample size to compensate the loss to follow up 10%, we required at least 67 low vision disabled adults in our study.

Two ophthalmologists and two optometrists were our field staff. They examined participants using a standard data collection (WHO/PBL) form.⁽⁸⁾ This form collects information on patient demographics, visual acuity, visual function (contrast sensitivity, colour vision) detailed ocular examination and type of low vision aid accepted. The charts used for distance and near visual acuity in LogMAR was Bailey Lovie visual acuity, Contrast sensitivity was 'Lea contrast flip chart', Colour vision was Ishihara chart, Amsler grid for central visual field, Automated perimetry for visual field (VF) in selected cases.

Appropriate aids - optical (for near and distance) and non-optical were prescribed to an adult only if there was a demonstrable improvement in VF. The final acuity or working distances were compared to the pre-intervention status.

The low vision disabled were trained and explained to them and their relatives. In addition, illumination and environmental modifications were suggested to enhance their working capabilities. If the patient could read and

write his name in the local language or Braille he/she was considered 'literate'.

A questionnaire was used to test vision and quality of life that was adopted from earlier publication of Wolfsan et al.⁽⁹⁾ The response for each question was divided into 3 levels of difficulties; No difficulty (score of 5), mild to moderate (score of 2 to 4) and great difficulty (score of 1). This questionnaire was applied before and six months after providing low vision services.

The participants were instructed to bring the prescribed low vision aids. The assessment included measurement of BCVA, VQL, HQL and satisfaction with the device. Non-compliance causes were assessed. The VQL was based on the changes in mobility, recognition and other outdoor, routine and vocational activities.

The data were analyzed using Statistical Package for Social Sciences (Version 17) (IBM Corp., Armonk, NY, USA). Frequencies and percentage proportions were calculated for qualitative variables and mean and standard deviations were calculated for quantitative variables. Wilcoxon sign rank test was used for estimating a two-sided *p* value of the association. A *p* value less than 0.05 was considered statistically significant.

Results

Of the 67 individuals recruited, seven (10%) were lost to the follow up. Patient demographics are 75% males and two (3%) participants could read in braille.

Visual disabilities in 8 (12%) participants were due to congenital and acquired in 59 (88%) participants. Among congenital, neurological diseases were the principal causes in four (50%) participants. Among those with acquired, retinal pathologies were responsible for disabilities in 40 (68%) participants.

Status of distance vision and near vision of low vision disabled at the time of presentation and 6 months later is presented in Table 1 and 2.

Table 1: Improvement for distance

	Pre LVD		Post LVD		P-Value
PL-1M	48	71.64%	24	35.82%	p<0.05
1M-O.8 M	19	28.35%	28	41.79%	
0.8M-0.7 M			13	19.40%	
0.7 M-0.5 M			1	1.49%	
<0.5M			01(1.49%)		

Table 2: Improvement for near

	Pre LVD		Post LVD		P-Value
<8M	01	1.49%	0		P<0.05
8M-4M	33	49.25%	05	7.46%	
3.2M-2M	27	40.29%	08	11.94%	
1.6M-1M	06	8.95%	54	80.59%	

Low vision optical aids for distance viewing were dispensed to 48 (72%) participants. Low vision services including devices for near work were dispensed to 57 (85%) participants. The main low vision devices prescribed for distance were spectacle mounted telescopes 24(50%), binocular telescopes 17(35%) and monocular telescopes 7(15%). For near work 28(49%) accepted stand magnifier and 18(32%) preferred magnifying spectacles. Impaired contrast sensitivity was noted in 63(94%) participants and they improved with non-optical aids such as the use of focused illumination of table lamp and spectacle mounted telescope. Night vision difficulties were noted in 13(19%) participants and they were dispensed a pocket torch. Tinted glasses were used to reduce photophobia and glare in 19(28%) participants. Table lamp was the most common non-optical device that was accepted by 47(70%) participants.

The QL improved statistically significantly 6 months after using low vision services compared to pre-intervention (*p* <0.001) (Table 3). Thirty-nine(65%) participants had no difficulty in outdoor activities after using low vision devices compared to 14(21%) participants who had great difficulty and 53(79%) had moderate difficulty prior to the use of LVDs. For indoor, 15(22%) participants had great difficulty and 52(78%) had moderate difficulty before using low vision devices, and 39(65%) had no difficulty in indoor activities 6 months after using low vision devices. Reading and writing abilities improved in 41(68%) participants having no difficulties in near work after the use of LVDs while in the same participants, 38(57%) had great difficulty and 25(37%) moderate difficulty before using low vision services. Prior to using low vision devices, 7(10%) participants had great difficulty and 59(88%) had moderate difficulty in daily activities. Six months after using low vision services, 39(65%) persons had no difficulties in daily activities and reduced emotional distress.

Table 3: Vision related Quality of Life (VQL) of adults with low vision

	Pre LVD			Post LVD-2 nd Follow-up			P-Value
	Great Difficulty	Moderate Difficulty	No Difficulty	Great Difficulty	Moderate Difficulty	No Difficulty	
Outdoor Difficulty	14(20.9%)	53(79.1%)	0	7(11.7%)	14(23.3%)	39(65%)	<0.001
Indoor Activities	15(22.3%)	52(77.7%)	0	8(13.3%)	13(21.7%)	39(65%)	<0.001
Reading and Writing	38(56.7%)	25(37.3%)	4(6%)	8(13.3%)	11(18.3%)	41(68.4%)	<0.001
Emotional stress and daily Activities	7(10.5%)	59(88%)	1(1.5%)	4(6.7%)	17(28.3%)	39(65%)	<0.001

Discussion

In the present study, both quantitative and qualitative impact of low vision rehabilitation was evaluated and the outcomes were very encouraging. The quantifying measures of improvement in visual function included visual acuity, contrast sensitivity and photophobia/glare. The qualitative impact included changes in vision related quality of life and emotional, psychological and occupational behavior perceived by end-users.

The majority of participants were between 16 to 30 years of age. A study by Gyawali et al⁽¹⁰⁾ also enrolled young adults with low vision. However, the majority of studies on low vision in adults enrolled an elderly population.⁽⁴⁾ Aetiologies of such divergent study groups are likely to differ. Hence, caution is urged when comparing these studies. It also reflects significant visual demands of young adults in our study population compelling them to seek low vision services compared to an elderly population.

Retinal pathologies were common causes of low vision. Gyawali et al⁽¹⁰⁾ with a younger study group reported similar etiologies. However studies enrolling an elderly population had differing causes including ARMD, diabetic retinopathy and other macular diseases.^(4,7)

Our study demonstrated the positive impact of low vision services. For distance and near work, low vision optical devices were the main aids dispensed and accepted by patients. Quantitative measurement as well as end-user perception of improved quality of life suggested that outcome of these studies could be an advocacy tool to increase uptake of low vision services and increasing resources for low cost low vision devices. A German study also reported improved of near reading for newspaper-sized print from 13% to 90% following adoption of low vision services.⁽¹¹⁾ A study from the United States reported over 98% of participants had a subjective improvement and 53.2% reported low vision services as "very useful".⁽⁴⁾ After receiving low vision care, ability to read newspaper-sized print increased from 1% to 98% of low vision

disabled and 72% of the patients who were forced to stop working due to their visual disabilities returned to work.⁽¹¹⁾ A significant improvement in visual functions and working capabilities was also seen in other studies.⁽¹²⁾

An association between depression and reduction in daily activities due to visual disability has been previously established.⁽¹³⁾ However, the impact on depression following low vision services has been not been thoroughly evaluated.

In our study, the compliance for using low vision devices was high, mainly for reading and writing on 1st follow up scheduled at 1 month after rehabilitative services. Benefit and compliance seems to be strongly interlinked as noted by Leat et al.⁽¹⁴⁾ We found compliance further improved six months after intervention. Additionally, satisfaction with use of devices increased to 81%. This was greater than 76% satisfaction noted by Shaaban et al.⁽¹⁵⁾

In summary, our study confirmed the positive impact of low vision services on improving visual functions vision and health related quality of life in young adults with low vision disabilities in a western region of India.

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