

Impact of low vision services on the quality of life of low vision patients in Ghana



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Patients' perspectives on the impact of clinical interventions have been recognised as critical elements in patient care. Quality-of-life instruments are designed to measure these perspectives. We used the National Eye Institute's 25-item Visual Function Questionnaire (NEI VFQ) to measure the impact of optical low vision devices on the quality of life of 22 low vision patients who obtained and were using low vision devices from a secondary low vision clinic in the Eastern Region, Ghana. The study employed a pre- and post-intervention technique. We found statistically significant improvements in measured visual acuity and NEI VFQ scores in 8 of the 10 domains evaluated. We conclude that optical low vision devices have a positive impact on the quality of life of low vision patients in Ghana.

Introduction

Efforts have been made to implement programmes to eradicate preventable blindness by the year 2020.¹ Low vision is one of the problems being targeted by the Vision 2020 programme. Individuals are said to have low vision if, after surgical and medical treatment and refractive correction, the individual has a distance visual acuity of 6/18. In many developing countries, there is a paucity of low vision services amongst eye care providers. Many reasons have been suggested for this paucity.^{2,3,4} A large number of eye care providers consider low vision services to be time-consuming, and some have a poor perception of the impact of rehabilitation services on the quality of life of low vision patients.

The effects of visual impairment on the individual, family and community have been well documented,^{2,5} and include visual, functional, psychological, social and economic consequences. These effects on the individual include limitations in performing certain tasks that require vision, and in educational, occupational and recreational activities.^{6,7,8,9,10,11} These limitations tend to reduce the quality of life of the individual affected by low vision. There is the additional psychological consideration of not being able to care for oneself and/or dependants. Stevenson et al.¹² have reported that the ability to care for oneself or dependants is related to self-reported visual function and quality of life.

Quality of life measures the impact of a disease on the affected individual. The measures have also been applied to determine the influence of medical interventions on disease processes. Several quality of life instruments have been developed. Whilst the majority measure the impact of the disease on the total health of the individual (e.g. the health-related quality of life [HRQoL] questionnaire), others are organ specific, such as the National Eye Institute Visual Function Questionnaire (NEI VFQ). The 25-item NEI VFQ has been validated¹³ and found useful in measuring the impact of visual impairment on the quality of life of the individual affected.

Low vision services encompass assistance offered to individuals who have some residual vision through the use of low vision devices (LVDs), training in the effective use of residual vision, and advice on environmental modification to make the environment more accessible to patients with low vision. Such services also link eye care with education and rehabilitation services to ensure a comprehensive eye care service.¹⁴ Success of low vision services has been defined as reducing the level of difficulty in performing a visual task or goal.¹⁵ Various authors have advocated in addition that the effectiveness of low vision rehabilitation services be measured in terms of improvement in a person's quality of life.^{16,17} Traditionally, the outcomes of low vision services were objectively measured through improvements in tests of visual function (such as visual acuity).^{18,19} However, studies^{15,16} have indicated that mere improvement in clinically measured visual acuity and other visual function tests does not adequately determine the success or effectiveness of low vision services. It has long been established that visual acuity measurements in the clinic do not correlate well with the actual performance of low vision patients, following rehabilitation services;¹⁹ this is because of

differences between the clinical setting where the visual acuity is measured and the patients' environment (e.g. differences in contrast and illumination levels). Moreover, several factors beyond visual acuity and other visual function test scores affect the quality of life of individuals with low vision.¹¹

Consequently, there is a general consensus that patient perspectives on the utility of devices and other rehabilitation interventions be considered in measuring the effectiveness of low vision services. In a review of the outcome of low vision rehabilitation, Stelmack¹⁷ concluded that self-reported quality of life is a significant measure of the impact of low vision rehabilitation. Therefore, subjective reports of less difficulty in performing visual tasks and the attendant socio-psychological effects are more appropriate in measuring the outcomes of low vision services.

To measure the impact of low vision rehabilitation, several instruments have been developed that use subjective responses from patients. These include the 48-item Veterans Affairs Low Vision Visual Function Questionnaire (VA LV VFQ),^{20,21} the Low Vision Quality of Life Questionnaire (LVQOL)²² and the Impact of Vision Impairment (IVI) Questionnaire.²³ These instruments were designed to measure the impact of low vision and other eye diseases on the quality of life of affected subjects. By comparing pre-rehabilitation and post-rehabilitation responses from patients, the impact of low vision interventions can be measured using visual function questionnaires. We used the NEI VFQ to assess the impact of low vision services on the quality of life of low vision patients attending a secondary low vision clinic in Koforidua, Ghana.

Method

We conducted a pre- and post-low vision intervention interview of patients visiting the Low Vision Clinic of the Eastern Regional Hospital, Koforidua. A pre- and post-rehabilitation method was employed in measuring the outcome of low vision rehabilitation in a number of research studies.^{16,24,25,26} A non-probabilistic sampling technique was employed in our study because (1) it was operationally difficult to obtain a random sample of patients obtaining low vision services from the centre concerned, (2) the inclusion criteria employed in the study (meeting World Health Organization [WHO] criteria²⁷ for low vision [i.e. best corrected visual acuity of less than 6/18 to light perception, visual field of less than 10° from the point of fixation, the subject should be able to use vision

for planning and execution of tasks or potentially able to do so]) meant that only a few participants would be recruited if we were to have employed random sampling and (3) the low uptake of low vision services would have also led to a low sample size, thus reducing the effect size.

All the patients aged 14 years and above presenting for low vision services who met the inclusion criteria as per the WHO definition of low vision were interviewed using the 25 item NEI VFQ. Three months after accessing the low vision service and obtaining a LVD, the questionnaire was re-administered to those who were using their devices. A total of 62 participants completed the questionnaire prior to accessing the low vision service. Of these, 25 (40.3%) participants obtained optical LVDs after the low vision assessment. At follow-up interview, 22 (88%) of these participants were available for interviews.

Ethical consideration

Ethical approval to conduct the study was obtained from the Department of Optometry, University of Cape Coast, Ghana. The study was also conducted in accordance with the Declaration of Helsinki on the use of human subjects in medical research. Eligible participants gave informed consent before participating in the study.

Data analysis

Participants' responses were scored using the accompanying manual²⁸ to the 25-item NEI VFQ. They were classified into 10 subscales as provided in the manual. Paired *t*-tests were used to compare the scores before and after low vision intervention, and appropriate tables and charts were used to report the pertinent findings of the study.

Results

Participants

A total of 62 patients presenting for low vision services from February 2011 to April 2012 were enlisted for the study. They comprised 40 (64.5%) male subjects and 22 (35.5%) female subjects. They were interviewed at presentation and administered the questionnaire. Three months after low vision assessment, 25 (40.3%) had obtained their LVDs. Of these subjects, 22 were available for interviews to assess the impact of using LVDs on their quality of life. Table 1

TABLE 1: Demographics of the participants with age group indicated in years (*N* = 62).

Age group	Initial presentations						Low vision devices users					
	Male		Female		Total		Male		Female		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
11–30	13	32.5	11	50.0	24	38.7	6	42.9	7	87.5	13	59.1
31–50	2	5.0	1	4.5	3	4.8	0	0.0	0	0.0	0	0.0
51–70	13	32.5	7	31.8	20	32.3	4	28.6	1	12.5	5	22.7
71–90	11	27.5	3	13.6	14	22.6	4	28.6	0	0.0	4	18.2
91–110	1	2.5	0	0.0	1	1.6	0	0.0	0	0.0	0	0.0
Mean age	52.95	-	40.68	-	48.60	-	47.57	-	23.38	-	28.77	-
s.d.	26.60	-	26.00	-	26.83	-	29.19	-	19.10	-	28.13	-
Total	40	100.0	22	100.0	62	100.0	14	100.0	8	100.0	22	100.0

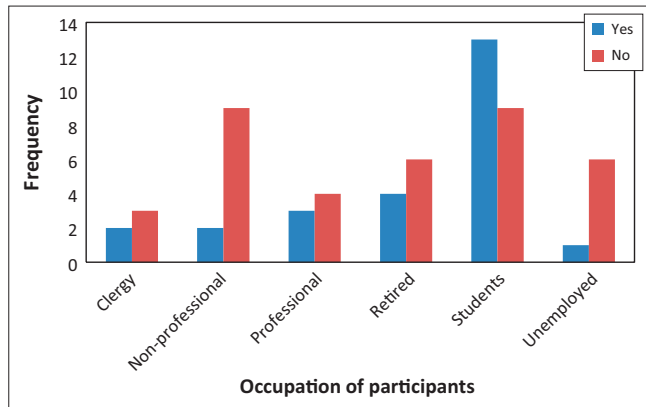


FIGURE 1: Distribution of occupation of participants showing the proportion of those who obtained their devices and those who did not obtain a low vision device ($N = 62$).

TABLE 2: Category of visual impairment.

Category†	Before low vision assessment		After low vision assessment	
	<i>n</i>	%	<i>n</i>	%
Moderate	32	51.6	46	74.2
Severe	24	38.7	14	22.6
Profound	6	9.7	2	3.2
Total	62	100.0	62	100.0

†, Based on World Health Organization category of visual impairment.

presents demographic characteristics of the 62 study participants, and Figure 1 the participants' occupation categories.

Visual acuity

The distance visual acuity in the better seeing eye of the 62 participants before low vision intervention ranged from 0.60 – 1.68 logMAR with a mean visual acuity of 1.04 (s.d. = 0.26). After low vision assessment, the distance visual acuity of the 62 participants ranged from 0.40 – 1.68 logMAR with a mean of 0.83 (s.d. = 0.28). This change represented a visual acuity improvement of 0.21 log units (about two rows of letters on the logMAR chart). The difference between visual acuity before and after assessing low vision service was significant ($p < 0.0001$). There was a corresponding shift in the category of visual impairment following low vision assessment (Table 2).

Impact of low vision services

Participants who obtained and were reportedly using their LVDs for 3 months reported improvements in the various tasks assessed (Figure 2). Twenty-five (40.3%) participants had extreme difficulty performing vision-related tasks before assessing LVDs. Of the 22 participants who were interviewed after obtaining their devices, 13 (59.1%) reported extreme difficulty performing vision-related tasks at presentation. After using their devices, only 2 (9.1%) reported extreme difficulty for the same vision-related tasks ($\chi^2 = 12.24$, $p = 0.00047$). There was also an increase amongst subjects reporting little or no difficulty performing these tasks after obtaining and

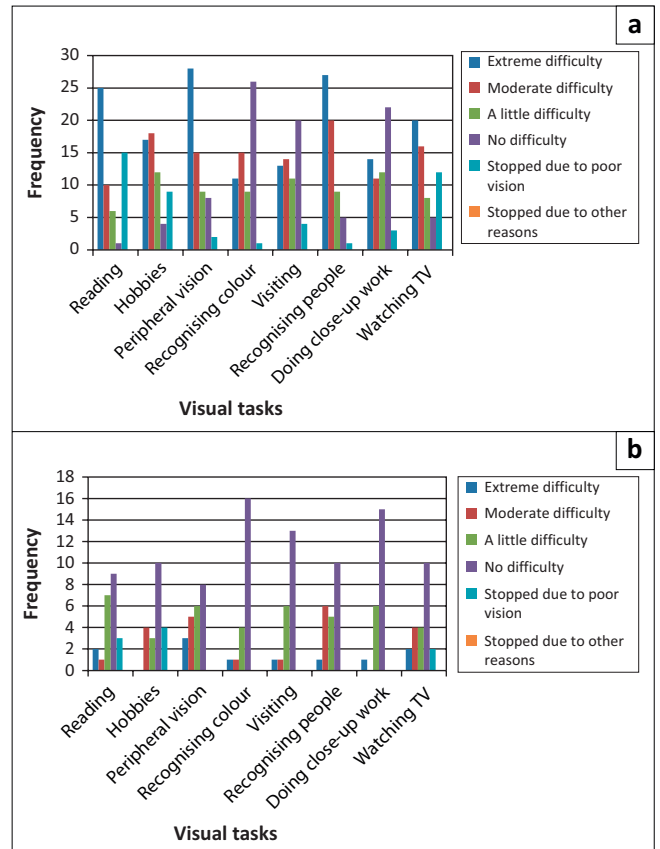


FIGURE 2: Difficulty performing task: (a) before low vision assessment ($N = 62$), (b) after obtaining and using low vision devices for 3 months ($N = 22$).

TABLE 3: Comparison of effect of low vision devices.

Subscale	<i>n</i>	Before LVD mean	s.d.	After LVD mean	s.d.	<i>p</i>
General vision	22	46.33	16.78	68.18	15.93	< 0.0001
Near vision	21†	54.37	20.52	76.59	27.08	< 0.0001
Distance vision	22	46.59	25.05	73.86	25.85	< 0.0001
Peripheral vision	22	56.82	28.01	71.59	27.05	0.002
Colour vision	22	84.09	23.84	89.77	19.91	0.096
Ocular pains	22	67.05	28.22	72.73	18.76	0.348
Role difficulty	22	39.77	20.28	62.50	20.77	< 0.0001
Dependency	22	51.36	23.10	62.27	22.87	0.001
Mental health	22	46.59	21.80	60.23	18.75	0.002
Social function	22	72.73	31.73	128.36	195.47	< 0.0001

LVD, low vision device; s.d., standard deviation.

†, One subject had stopped performing more than one of the activities in the near vision subscale.

using their LVDs (3 [13.6%] vs. 16 [72.7%], $\chi^2 = 15.65$, $p = 0.0001$).

Quality of life improved amongst those who had obtained devices. There was a significant improvement in 8 of the 10 subscales investigated following low vision services (Table 3). Colour vision ($p = 0.096$) and ocular pains ($p = 0.348$) were not significantly affected by low vision services, as reported by study participants.

The change in 10 domains is shown in Figure 3. Greatest improvement was reported in the social function domain, with a 76.6% improvement in score following low vision intervention.

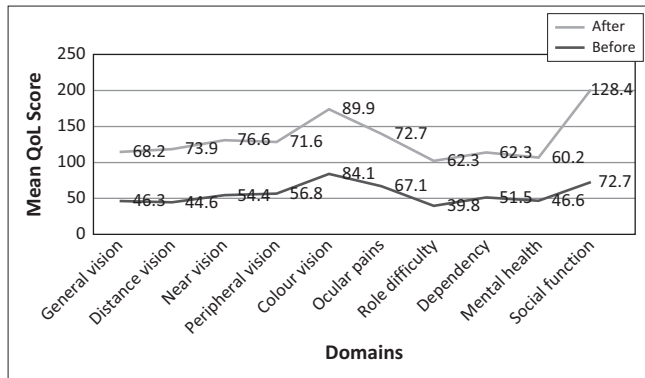


FIGURE 3: Change in quality of life measures after low vision intervention (with optical low vision devices).

Discussion

The mean age of participants in this study is low (i.e. younger) compared with similar studies.^{25,26,29,30} The study's relatively younger age group may reflect the poor and uncoordinated nature of low vision services in Ghana. Parents and guardians of children and young adults with low vision may tend to assist their wards in obtaining LVDs because the effect of reduced vision on academic studies is immediately felt by children and their parents. Elderly subjects with low vision may also have other chronic health conditions requiring the attention of caregivers. In Ghana, low vision services are not covered by the National Health Insurance Scheme and consequently individuals have to pay for these services themselves. Generally the elderly, who are reported to be most affected by low vision,^{31,32,33} cannot afford these services. Another factor may be the population dynamics in Ghana: life expectancy has only recently been reported³⁴ to be 64.2 years, up from 57 years. The mean age of subjects obtaining LVDs is also considerably low at 28.77 ± 28.13 years. Given the literacy level in Ghana, reported³⁵ to be 71.5% in 2012, we can only suggest that those who obtained LVDs were more likely to be educated, with a desire to be able to read, which is further supported by the fact that 13 (59.1%) of those who had obtained the LVDs in this study were students and aged ≤ 30 years. The uptake of LVDs after accessing low vision services was not influenced by the occupation of the patients, although 66% of those who obtained their LVDs after assessment were either students or professionals ($\chi^2 = 2.22, p = 0.1364$).

Impact of low vision services

Traditionally, clinical improvement in visual acuity is used as a measure of a successful low vision service. There was a significant improvement in measured visual acuity following low vision assessment, which was further evidenced by a shift in the category of visual impairment following low vision assessment (Table 2). There was an increase in the proportion of participants with moderate low vision with a corresponding decrease in the proportion of those with severe and profound low vision.

As stated in the introduction, patients' perspectives are important in assessing the impact of low vision services

beyond improvements in clinically measured visual acuity. In the present study, whereas 4.5% of the 22 participants (i.e. 1.6% of the initial 62 participants) reported not having any difficulty with reading at presentation, 41% of those 22 who were using their devices reported not having difficulty reading. Similarly, the proportion of those who had extreme difficulty reading was 59.1% at presentation compared with 9.1% after using their device. A smaller proportion of respondents who had been using their devices for 3 months reported extreme difficulty performing visual-related tasks. There was also a marked increase in the proportion of those reporting no difficulty performing visual tasks after obtaining and using LVDs for 3 months (Figure 2).

Respondents reported significant improvement in 8 of the 10 subscales. These were general vision, near vision, distance vision, peripheral vision, role difficulty, dependency, mental health and social function. No significant improvements in colour vision or ocular pains were reported, which is indicative of the fact that provision of LVDs does not markedly affect these domains. The most significant effect of low vision services was reported in the social function domain, which gives credence to the fact that, beyond mere visual functioning, there are other aspects of life of the low vision patient that are affected by low vision intervention.

From our investigations, we suggest that the quality of life of people with low vision is improved by LVDs. It should be noted, however, that the present study evaluated the impact that the intervention of optical LVDs had on the quality of life of patients with low vision. It should be expected that when other aspects of low vision intervention including environmental modification, orientation and mobility training are evaluated, the overall impact might be even more marked.

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Competing interests

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article.

Authors' contributions

G.O.O.-O. (University of Benin) study conception, study design, data analysis, initial draft of manuscript. H.O.-A. (Eastern Regional Hospital) study conception, data collection, reviewed draft manuscript. R.E.U.A. (University of Benin) data analysis, reviewed draft manuscript. J.A. (Eastern Regional Hospital) study conception, data collection. E.O.O. (Central Hospital) data analysis, draft manuscript.

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