

Utilization of Optical Devices by Low Vision Students at Ekwendeni Primary School, Northern part of Malawi

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Abstract

Proper use of low vision devices by students with low vision during their daily academic activities is very crucial to enhance residual vision and thereby promoting independence of the students. This study investigated how students with low vision used optical low vision devices during their day to day activities. The study was a qualitative and quantitative cross sectional study involving 19 students and nine teachers and used a non-probability convenience sampling technique. Questionnaires and observation guides were used to collect data from students, while an interview guide was used to record the response of teachers during face to face interview. The data was analyzed manually and using SPSS software together with Excel 2010. Most of the students (73.7%) with low vision did not know how to use a low vision device properly. Lack of knowledge on how to use LVDs also affected three out of nine teachers who said that they were not trained on how to use the devices. There were other students who misplaced or lost the devices while others shared or used scratched devices because there was no regular visit by eye care professionals for clinical assessment; let alone replacement of the devices. There is a need to enforce regular clinical assessment on all visually impaired students to train them on how to use devices and to conduct regular follow ups. The teachers should also be taught how to use low vision devices so that they are able to teach the students to use them.

Introduction and Background

Students with visual impairment in various schools face quite a number of visual challenges especially in the use of low vision devices. This may affect their immediate academic performance, future employment as well as social opportunities.

It is of critical importance in the educational process of students with visual impairment to achieve considerable literacy because reading is the first step in education and is a predictor of good academic success. In order to improve reading capability and subsequently their academic performances, students with low vision depend upon Low Vision Devices (LVDs) which enhance their functional residual vision. This can be achieved through proper and effective use of the prescribed optical devices. Basically, there are two main types of low vision devices; optical and non optical low vision devices. This study attempted to find out how students with low vision use optical low vision devices in their respective classrooms.

According to World Health Organisation, 2006, an estimated 19 million children are visually impaired world wide and 1.4 million out of these are irreversibly blind for the rest of their life and need visual rehabilitation. Visual impairment includes low vision and blindness. This is based on an assessment of the ability to discern letters on an eye chart at a specific distance. A normal vision is defined as visual acuity of 6/6 which means that a person sees at 6 meters details on an eye chart that are designed to be seen at 6 meters. A person with low vision has visual acuity of 6/18 or worse in a better eye. That is to say, a person sees at 6 meters details on an eye chart that are designed to be seen at 18 meters or more by someone with normal vision. Low vision per say, is the form of visual impairment that involves irreversible and significant reduced vision up to light perception while a person who is blind has no light perception. This definition identifies a person who would benefit from low vision services. This means that any child with non correctable reduced vision may have a wide range of problems.

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Definition of low vision by [1] Covers clinical and functional aspects of an individual "...has measurable vision but has difficulty accomplishing or cannot accomplish visual

task with prescribed corrective lenses but can enhance his or her ability to accomplish these tasks with the use of compensatory visual strategies, Low Vision Devices, and environmental modification”

According to Children with low vision in schools have specific visual needs; therefore, access to reading materials may be achieved through proper use of prescribed Low Vision Devices (LVD) [2].

Carried out a survey in all schools for the blind in Malawi. Among 16 million people in Malawi, 6 million are children and approximately one child in every 1,000 children has low vision. This would equate to 6,000 children with low vision. In their survey, they found out that some of the students with low vision were inappropriately enrolled as they hardly got a thoroughly clinical assessment from an eye care professional to establish real cause of the eye problem, and many more needed low vision devices [3].

A pilot study was conducted by from three selected integrated schools of Ekwendeni, Nsiyaludzu and Montfort in the northern, central and southern regions of Malawi respectively. All students with visual impairment were assessed in order to establish the cause of visual impairment, distinguish low vision from blind students then LVDs were dispensed to all students with low vision. Basic low vision training for the teachers drawn from these schools was conducted. Several follow up visits to these schools were made. It was established that some children needed more skills and practice in the use of LVD. So far there has been no main study to follow up on these finding from the pilot study [4].

Statement of the problem

In spite of all the efforts made to ensure that students with visual impairment acquire the optical LVDs, there is little progress in the way they effectively use these optical devices. In the pilot study conducted by Karin. Some of the students who were prescribed optical LVDs could not use them future bearing on the education of the students with visual impairment, because it is only the LVDs that enhance capability to use the residual vision, thereby providing them with better learning environment. It was for these reasons that the researcher investigated the utilization of LVDs prescribed to the students with low vision and their limitations as they use the devices, so that a lasting solution is found.

Main objective

To investigate how students with low vision use optical low vision devices at Ekwendeni Primary school.

Specific objectives

- To investigate the utilization of optical LVDs by students with low vision.
- To assess the common types of LVDs used by students with low vision
- To determine other factors that would limit the effective use of optical LVDs.

Significance of the study

Since the introduction of low vision services in Malawi,

there has been no study that has investigated if students with low vision use optical low vision devices effectively and appropriately. Therefore, the study has isolated major issues which students with visual impairment encounter when using optical low vision devices during their day to day activities, and necessary interventions have been developed. The results will help the teachers who handle students with visual impairment to understand the unmet challenges faced by these students. This in turn, will benefit the students themselves in many ways.

Literature Review

According to [4], little is known about use of optical low vision devices by students with visual impairment. This may be due to the fact that 90% of low vision researches focus on older adults than young adults.

A study to establish factors affecting the use of LVDs among students with visual impairment was done in Scotland by [5]. Data base was used as research tool; two sample groups were formed depending on whether the parents answered yes or no to the question ‘does your child use LVD?’ Comparisons were made on the basis of age, etiology, level of visual acuity and presence of additional disability. The results showed that approach on the training in the use of less complex LVDs exceeded the performance of other types of services that relied on the dispensing of more complex LVD; there was no evidence that gender had significant influence on LVD use; and age appeared to play a much greater role with older students using the LVDs more than younger ones. The most commonly used LVD was handheld magnifiers while other types were poorly represented. There was significant lack of knowledge on how to use LVDs. Additional physical or mental disabilities also contributed to the factors that led to students not using LVDs.

Investigated about the limitations of the continuous usage of LVDs by students during learning activities in the integrated school for the blind; 134 students of ages between 6 and 24 were assessed by interview one year after providing them with LVDs. The results showed that 35.8% of the students reported to be using the devices continuously for the stated period. Compliance with the use of the devices was reported to be lower in students of younger ages compared with students older than 10 years; 64% discontinued use due to damage or misplacement of the devices, while 18% discontinued use of LVDs due to inadequate instructions given on the use of the device, inappropriate lighting and sitting arrangement [6-8].

In their study looked at how vision improved with the use of LVDs. Information of the students were obtained from the records available in schools, each student’s name, age, gender, class, and the type of LVD being used was recorded. The results showed that LVDs for near were prescribed to 15.7% of students. The 5x illuminated stand magnifier proved to be user friendly among the students. By using the LVDs most of the students acquired improved near visual acuity of N10 to N12; and 5 out of 460 were able to read N6 letter size. The improvement in vision gave the students much greater access to educational information, wider range of recreational activities and improved independence [9].

In another cross-section study by done in 13 special education schools in Delhi, high additional plus lenses as spectacle magnifier for near, were preferred by 20.3% of the students. The

students who preferred the use of these were those with aphakia, coloboma, refractive error, and microphthalmos. This showed that preference in the use of LVD was determined by the ocular pathology [8].

Looked at several reasons why the students did not use or did not like to use LVD. Some of the reasons were that some students had lost their devices; some more did not know how to use it while others did not like using the devices all together. They found out that 54.1% preferred to use the hand held magnifiers; stand magnifier (27%) while spectacles were preferred by 12.5% of the students [2].

In Malawi found out that not all students who were prescribed low vision devices were using them; 18% could not use low vision devices while another 18% would use them occasionally [7].

Methodology

The study was conducted at Ekwendeni integrated primary school in Mzimba district. The study was non-experimental, and employed a cross-section type of research design. The researcher used a combination of qualitative and quantitative research methodologies. The qualitative part focused on the answers from the questionnaires and observation on the use of optical LVDs while the quantitative one analyzed these issues numerically.

Selection of the participants was made using purposeful criterion based sampling. Students with low vision who had optical low vision devices were purposively recruited into the study. There were a total of 27 students with low vision and only 19 of them had LVDs. The researcher used numbers 1 to 8 to select which class to start from. The head teacher selected the class by random sampling method. In each class, the students were selected following their register.

Other participants were the specialist teachers and classroom teachers who taught students with visual impairment. It was assumed that the inclusion of classroom teachers and specialist teachers would bring about balanced coverage of information and hence reliable results. The following exclusion criteria were applied; students who were not low vision, students who were low vision but did not have LVDs, and classroom teachers who did not have a child with low vision in their class. Data was collected through interviews, observations and questionnaires. The questionnaires were self administered to all students with low vision who were using optical LVDs.

The utilization of optical LVDs by the students was judged through the observation guide (a step by step guidelines on how to use LVDs). Classroom observation helped the researcher to note the type of LVD an individual student was using and explored whether the LVD was used appropriately and effectively or with some challenges while the class lessons were in progress.

The next step of data collection procedure was face-to-face interviews with specialist teachers and classroom teachers.

Data analysis was based on qualitative content analysis. The findings were calculated and analyzed by means of descriptive statistics. The data was cleaned, coded and entered using Statistical Package for Social Sciences (SPSS).

The limitation to this study was that the study findings could not be generalized to all integrated schools in Malawi; and focusing only on teaching personnel and students without

including the parents and other stake holders, could somehow affect the objectivity of the results.

Results

After the analysis of the text the following themes were identified; the level of knowledge on how students with low vision use LVDs; the views of the students and teachers on some of the limiting factors that affect proper use of LVDs and list of commonly used LVDs amongst the students. In the study 19 students and 9 teachers were included and were interviewed using questionnaire and one on one interview respectively (Tables 1-3).

Demographic profile of respondents

Table 1 indicate that there were more students within the age group of 15-17 years representing 63.2 %.

Distribution on how to use LVDs by age groups

The results show that students in the age range of 12-14 years were more knowledgeable (50%), followed by those in the range of 15-17 years (25%) while younger ones between 6-11 years did not know how to use LVDs Figure 1.

Knowledge on how to use LVDs distributed by gender

Figure 2 shows that male students were more knowledgeable on how to use LVDs than their female counterparts with 33.3% against 20% respectively.

LVDs offered to the students with low vision

The results revealed that hand magnifiers were offered to 11 out of 19 students. (57.9%) while 7 out of 19 students got stand

1Category	Description	Frequency	Percentage
Age	(6-8)	2	10.5
	(9-11)	1	5.3
	(12-14)	4	21.1
	(15-17)	12	63.2
Gender	Male	9	47.4
	Female	10	52.6
Grade	(1-4)	7	36.8
	(5-8)	12	63.2

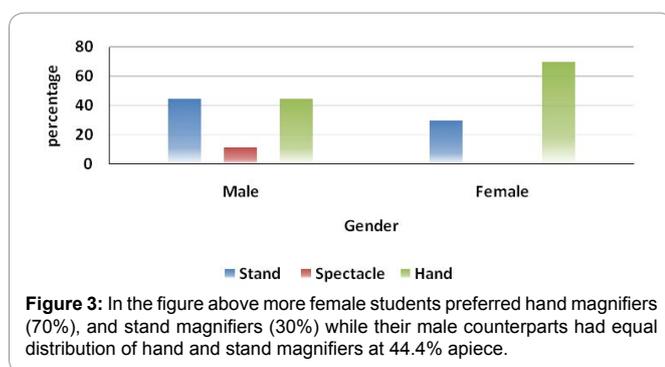
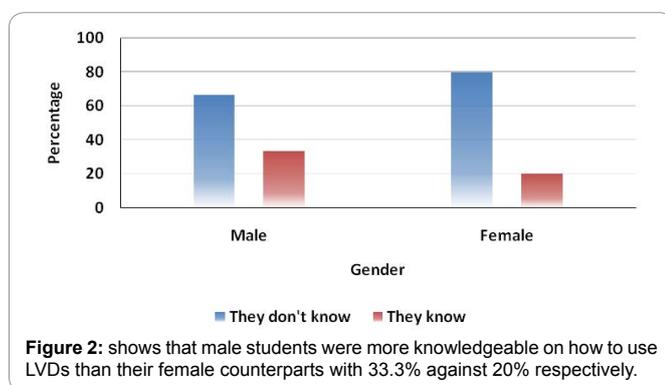
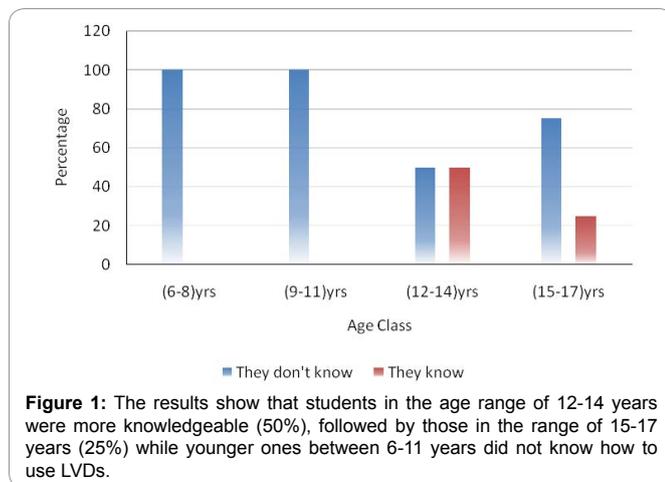
Table 1: Demographic profile of respondents.

Type of LVD	Percent	Frequency
Stand	36.8	7
Hand	57.9	11
Spectacle	5.3	1
Total	100	19

Table 2: LVDs offered to the students with low vision.

	Reason for not using LVD	Percent	Frequency
Valid	misplaced	10.5	2
	discomfort	10.5	2
	share	10.6	2
	Total	31.6	6
Missing	No Response	68.4	13
	Total	100	19

Table 3: Reasons for not using LVDs all the times.



magnifiers (36.8%) and spectacles were the least prescribed devices Table 2.

Types of LVDs distributed against gender

In the Figure 3 above more female students preferred hand magnifiers (70%), and stand magnifiers (30%) while their male counterparts had equal distribution of hand and stand magnifiers at 44.4% apiece.

Reasons for not using LVDs all the times

The table above shows that misplacement of LVDs (10.5%), feeling discomfort when using LVDs(10.5%), sharing of devices were some of the reasons for not using devices all the times while 68.4%, had no response as they were using the LVDs all the times (Table 3).

Discussions of Findings

Introduction

The purpose of the study was to investigate how students with low vision use LVDs during their day to day classroom activities; whether they use them properly or not. The findings in this cross section study have pointed out important aspects regarding the use of LVDs amongst students with low vision.

Utilization of low vision devices

The study revealed that 73.7% of students with low vision did not know how to use LVDs properly. In the study younger students of less than 10 years were the most affected group representing 85% of all those who did not know how to use the devices. These results were almost similar to the study conducted by [6]. which showed that 64.2% of the students with low vision did not know how to use LVDs and compliance was poor among the younger ones of less than 10 years. These were also in agreement with the findings by [5]. in Scotland, where age appeared to have been played much greater role; with older students using LVDs more and properly than younger ones. They concluded that this might be so because as students progress in grades the visual demand for reading increase.

The study results showed that among those students who use LVDs, 68.4% used the LVDs all the time; in agreement with [7]. But this was in contrast with the relationship to the study by [6]. in their study they indicated 35.8% used the LVDs all the time. Some issues emerged in this study as to why some of the students did not use LVDs regularly; 10.5% of the respondent revealed that they were feeling eye discomfort when using LVDs as a result they did not use it frequently. This might be due to wrong prescription of LVDs, as revealed by the teachers during the interviews, that some of the LVDs were issued to the students without them being examined by an optometrist or eye care practitioner. This was a worrisome development because similar sentiments were also reported in the study by [3] who carried out a survey in all schools for the blind in Malawi. In their survey, it was found out that some of the students with low vision were inappropriately enrolled as they hardly got a thoroughly clinical assessment from an eye care professional to establish real cause of the eye problem and get required prescription; and many more needed low vision devices.

Another reason for not using LVDs regularly was due to damaged or scratched LVDs which gave the students some eye discomfort after prolonged use. This came about because there was no regular replacement of worn out LVDs. Misplacement of LVDs also contributed to poor and irregular utilization of LVDs amongst the students. [2]. looked at other additional reasons as revealed by some students that, they seldom used LVDs because they did not like using the devices all together while others said they did not know how to use them; these reasons were also expressed by the teachers who had not undergone training in the use of the devices.

Commonly used types of low vision devices

The study also investigated the types of LVDs commonly used by students with low vision. It transpired that hand magnifiers were used by 57.9%(11) of respondents; while 36.8%(7) preferred stand magnifier and with only 5.3%(1) using

spectacles. The outcome of this study were similar with [2], in which 54.1% of the students preferred hand magnifiers; as well as [5], which showed that majority of students with low vision preferred hand magnifiers. The reasons given for preferring hand magnifier during focus group were that hand magnifiers gave students independence and social skills because they are small, easily concealed in the pockets. The results indicated that stand magnifiers were liked across all age groups with more preference to those in lower grades. Spectacles as high plus magnifiers, in all the studies, had low preference. In another cross section study by [8], spectacles magnification for near were preferred by 20.3% of the students. In their study, the students who preferred to use these were those with aphakia (absence of the lens), those with coloboma (absence of iris), refractive errors, and microphthalmos. This showed that in some cases preference in the use of LVDs could be determined by ocular pathology. Hand magnifiers were the most commonly used devices, appropriately used by students, and was able to significantly improve near vision. It is therefore essential that LVDs should be well selected, accepted, and appropriately used by students with low vision in order to facilitate their academic performance in schools.

Other factors that would limit effective use of low vision devices

In a study by to establish factors affecting the use of LVDs among students with low vision indicated that additional disabilities such as mental or physical disabilities contributed to the factors that led to the students not effectively use LVDs. This was in contrast with these findings because there were no cases of mental or physical disabilities amongst the respondents [5]. But other issues emerged like lack of knowledge on the use of LVDs by students as well as the teachers themselves. Similar sentiments were also noted from the responses made from the teachers in this study. Some of the teachers in their responses admitted that they did not know how to use the devices and yet they taught students with low vision. In their response they bemoaned lack of training in the use of LVDs. It was noted with regret by this researcher that students seldom got clinical low vision assessment by optometrist to ascertain the cause of low vision, prescription needed, and training in the use of LVDs. Taking time to give training in the correct use of LVDs prescribed is vital as only then will the client be able to experience the benefit of magnification. [9-21].

Conclusion

The study presented the utilization of LVDs by students with low vision in which their knowledge regarding proper use of LVDs have been determined and all the objectives of the study have been achieved. Majority of students with low vision did not know how to use LVDs properly; even some of the teachers struggled to use them. It transpired that the younger students were mostly affected. Some of the students indicated that feeling of discomfort when using LVDs made them not to continue using the devices while others said they misplaced the devices and they ended up sharing with their friends. Some teachers have had no opportunity to under go training on the use of LVDs. It was also discovered that majority of the students preferred using hand magnifiers.

Recommendations

It is highly recommended that students with low vision should

use LVDs properly during their daily school activities. This will increase the overall efficiency and effectiveness of educational process and in turn improve their academic performance as well as their independence.

There is need to conduct training on how to use LVDs. This training should be offered to the students with low vision and teachers by the optometrists on the day the devices are issued. The Government and other partners should support low vision programs in schools so that LVDs can continuously be supplied to the students.

Area for Further Studies

There is need to conduct a survey to review teachers training curriculum so that issues of low vision care can be incorporated.

Another study could be done on the knowledge and attitudes of optometrists towards students with low vision, challenges in refraction and prescribing LVDs.

Since this study only focused on Ekwendeni primary school, further studies should be carried out to other schools across the country for better representation.

References

1. Corn, A. L., & Lusk K. Perspective on low vision. In A. Corn & J. Erin (Eds). Foundation of low vision: *clinical and functional perspective*. 2010;(pp 4-5) NY: AFB press.
2. Omar R, Mohammed Z, Knight VF, Basrul MH. Profile of low vision children in the special education schools in Malaysia. *Med J Malaysia*. 2009;64(4):289-293.
3. Msukwa G, Njuguna M, Tumwesigye C, Shilio B, Courtright P, Lewallen S. Cause of severe visual impairment and blindness in schools for the blind in Eastern Africa; changes in the last 14 years. *Ophthalmic Epidemiol*. 2009;16(3):151-155.
4. Van Dijk K, Kishiki E, Courtright P. Low vision care in Africa: Practical Approaches to clinical services, educational engagement and planning. 2014.
5. Skillen J, Bradshaw B, O'Hare A, Cresswell L, Clegg S. Factors Influencing Low Vision Aids use amongst visually impaired children in Scotland: *British Journal of visually impairment*. 2008;26(2):170-189.
6. Gnyawali S, Shrestha JB, Bhattarai D, Upadhyay M. Optical needs of students with low vision in integrated school of blind in Nepal; *Optometry and vision science*. 2012;89(12):1752-1756.
7. Van Dijk K, Courtright P. Vision- related needs of children in 3 resource centres in Malawi. 2012.
8. Pal N, Titiyal JS, Tandon R, Vajpayee RB, Gupta S, Murthy GV. Need for Optical and low vision services for children in schools for the blind in North India. *Indian J ophthalmol*. 2006;54(3):189-193.
9. Albert T, Gogate M, Kulkarni V, Shinde A. Low Vision Aids for schools for blind students, *Journal of clinical Ophthalmology and Research*. 2014;2(2).
10. Chilisa B, Preece J. Research methods for adult educators in Africa. 2005.
11. Gay LR, Mills GE, Airasian P. Educational research: competencies for analysis and applications (8th Edition). Upper saddle River, NJ: Pearson Education, Inc. (2006).
12. Gilbert C, Foster A, Negrel AD, Thylefors B. Childhood Blindness: A new form of recording causes of vision loss in children. *Bull World Health Org*. 1993;71(5):485-489.
13. Goodrich, Arditi A. (2004). A trend analysis of low vision literature. *The British Journal of visual impairment*. 2004;22(3):105-106.
14. Kalua K. Patel D and Courtright P. Causes of blindness among children identified through key informants in Malawi. *Can J Ophthalmol*. 2008;13(4):425-427.

15. Lathan K, Tabiet DR. Guideline for predicting performance with low vision devices. *Optom vision science*. 2012;89(9):1316-1326.
16. Muecke J, Hammerton M, Aung YY, Warriar S, Kong A. A survey of visual impairment and blindness in children attending seven schools of blind in Myanmar. *Ophthalmol Epidemiology*. 2009;16(6):370-377.
17. Stelmack JA, Tang XC, Reda DJ, Rinne S. Outcome of Veterans Affairs low vision intervention Trial. *Arch Ophthalmol*. 2008; 126(5):608-617.
18. Tumwesigye C, Msukwa G, Njunguma M, Shilio B, Courtright P and Lewallen S. Inappropriate enrolment of children in schools for the visually impaired in Eastern Africa. *Ann Trop Paed*. 2009;29(2):135-39.
19. World Health Organisation: Magnitude and causes of visual impairment (2004).
20. World Health Organisation: Global Initiative for the elimination of avoidable blindness. Geneva.
21. World Health Organisation. Blindness & visual impairment priority eye disease (2006).