

ORIGINAL ARTICLE

Causes of Visual Impairment and Types of Low Vision Aids Prescribed in Low Vision Clinic, Sibul Hospital, Sarawak

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ABSTRACT

This study was to determine the causes of visual impairment and to identify the low vision prescribing pattern among Low Vision Clinic (LVC) patients in the Sibu Hospital. This study was conducted retrospectively among 41 patients attending the LVC, Sibu Hospital. Patients' demographic characteristics, causes of low vision and blindness, and types of low vision devices prescribed were recorded and analysed for 21 (52.5%) males and 19 (47.5%) females. The mean age was 39.38 ± 17.98 years. The main causes of visual impairment were retinal dystrophies in 12 cases (30.0%) followed by neurological causes in 9 cases (22.5%), glaucoma in 8 cases (20.0%), and acquired macular disorders in 4 cases (10.0%). A total of 27 low vision devices were dispensed, 85.2% ($n = 23$) were near devices and 14.8% ($n = 4$) were distance devices. The most frequently prescribed low vision devices (LVD) were video magnifiers (37.0%), followed by hand magnifiers (22.2%), spectacle magnifiers (14.8%), telescopes (14.8%) and stand magnifiers (11.1%). The main leading causes of visual impairment in LVC Sibu Hospital were retinal dystrophies. Video magnifiers were the most common type of low-vision device prescribed. A prompt comprehensive screening is urged for family members with retinal dystrophies to detect the diseases early and hence timely exposure to low vision care and rehabilitation. Familial counselling on

inherited retinal diseases and better screening by primary eye care providers are required. Low vision services should be an integral part of the eye care systems in Malaysia.

INTRODUCTION

Visual impairment is known to affect an individual's visual system and functions (World Health Organization (WHO), 2019). Despite a decline in global visual impairment rates as shown in WHO data, low vision continues to be a significant public health concern requiring attention from all stakeholders (Ackuaku-Dogbe et al., 2016; WHO, 2019). Research indicates that vision rehabilitation can be beneficial for individuals with vision impairment (Binns et al., 2012; Ekpenyong & Ndukwe, 2010; John et al., 2021; Joshi et al., 2021; Omar et al., 2008). Since 2010, the Low Vision Clinic (LVC) at Sibul Hospital has provided services to patients referred by the Ophthalmology Department Sibul Hospital which covers the central region of Sarawak. This region includes Sibul, Kanowit, Selangau, Mukah, Dalat, Daro, Matu, Tanjung Manis, Kapit, and Song. Furthermore, LVC Sibul Hospital also received referrals from other suburban towns such as Julau, Machan, and Pakan. These patients would be assessed thoroughly and managed according to the Ministry of Health (MOH) Standard Operational Procedure (SOP) for low vision care service and undergo necessary visual rehabilitation in the LVC.

Previous studies on low vision and blindness in Malaysia were mainly conducted in the peninsular region and predominantly focused on Malay, Chinese, and Indian ethnic groups (Ibrahim & Razif, 2022; Mohidin & Yusoff, 1998; Omar et al., 2008; Omar, 2010; Rahman et al., 2020). Although some studies have explored the visual impairment among preschool and school-aged children, as well as among patients visiting the Ophthalmology Department in the southern and northern regions, there were no studies described visual impairment in the central region of Sarawak

(Abu Bakar et al., 2012; Huong et al., 2022; Ting et al., 2021; Premseenthil et al., 2013). Moreover, no studies were done to investigate the low vision prescribing pattern in East Malaysia, which has unique and different ethnic compositions. This study aimed to identify the main causes of visual impairment and investigate the types of low vision aids that were frequently prescribed among patients who had attended LVC in Sibul Hospital.

MATERIALS AND METHODS

This study is a retrospective cross-sectional, observational study. All existing medical files in the Low Vision Clinic (LVC) Sibul Hospital were reviewed and retrieved from 1 January 2019 to 30 April 2022. The new referrals of low vision patients regardless of age that attended full low vision assessment by an optometrist and ocular diagnosis recorded and verified by an ophthalmologist were included in the study. Data retrieved were patient demographics that included age, gender, ethnicity, best-corrected visual acuity (BCVA) of the better eye, visual field (VF), main ocular diagnosis, and types of low vision devices (LVD) prescribed. The data were recorded in Data Collection Form which was adapted from the MOH Low Vision and Blind Registry Form and then transferred electronically into Microsoft Excel Spreadsheet. These data were anonymous with each patient being given a coded number identification with non-identified names/details.

Patients who fulfilled low vision and blindness definition according to the World Health Organization with irreversible and permanent visual impairment were included in this study (WHO, 2010). In our study, the severity of visual impairment and the causes of low vision and blindness were classified in accordance with the categories of the International Classification of Diseases Update, version 2010 (ICD-10). In this regard, visual impairment either moderate visual impairment (VA 6/18 to 6/60) or severe visual impairment (VA 6/60 to 3/60) was grouped

under the term “low vision” (WHO, 2010). Our patients’ best corrected visual acuity (BCVA) was measured using the Early Treatment of Diabetic Retinopathy Study (ETDRS) chart and Snellen Chart. Visual field loss was assessed concurrently to categorize the visual impairment in our study, in which low vision was defined as the BCVA in the better eye was less than 6/18, but equal to or better than 3/60, or a visual field loss less than 20° while blindness was defined if the BCVA in the better eye is worse than 3/60 or visual field less than 10°. The visual field was assessed using the Humphrey Visual Field Analyzer. The main ocular diagnosis referred to the particular disease that contributed to the irreversible and permanent visual impairment in a patient with various ophthalmic diseases that was verified by the ophthalmologist.

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 27 for descriptive analysis. Subjects’ demographic data and clinical low vision data such as causes of visual impairment and types of low vision devices (LVD) prescribed were presented in a frequency and percentage table, bar graph, and pie chart, respectively. The study adhered to the principles of the Declaration of Helsinki and was approved by the Medical Research and Ethics Committee (MREC) of MOH Malaysia [NMRR ID-22-01742-XG9 (IIR)].

RESULTS

A total of 41 clinical records of patients attending LVC, Optometry Unit, Hospital Sibul were obtained in this study. Out of these, one was excluded as the subject showed visual acuity improvement which was better than 6/18 after glasses correction.

Age, Gender and Ethnicity Distribution

The mean age was 39.38 ± 17.98 years with a range of 7 – 75 years. Among the 40 subjects, more than half (n = 21, 52.5%) were male. This

study showed that Native Iban (45.0%) was the predominant ethnicity among the LVC subjects, followed by Chinese (30.0%), Malay, and Melanau which contributed 12.5% each respectively (Table 1). Fifty-five per cent (n = 22) of LVC patients had low vision and the others (n = 18) were legally blind based on the aforementioned ICD10 definition (Figure 1).

Table 1 Demographics of the study sample

| Variables | Number (n) | Percentage (%) |
|-----------|------------|----------------|
| Gender | | |
| Male | 21 | 52.5 |
| Female | 19 | 47.5 |
| Ethnicity | | |
| Iban | 18 | 45.0 |
| Chinese | 12 | 30.0 |
| Malay | 5 | 12.5 |
| Melanau | 5 | 12.5 |

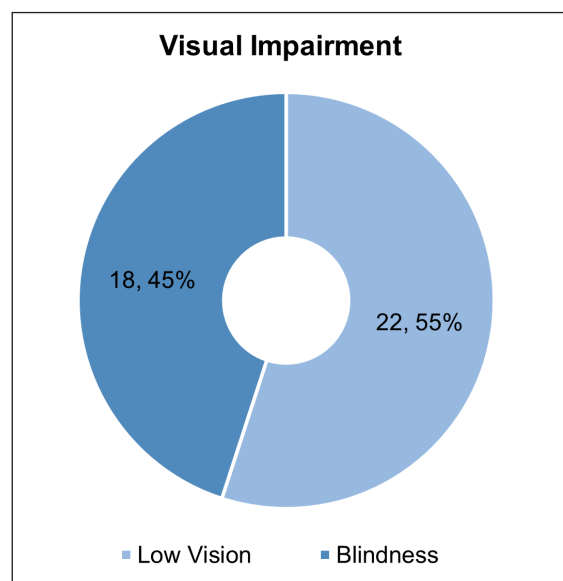


Figure 1 Category of visual impairment based on distance best corrected visual acuity (BCVA) and visual field (VF) in the better eye among the subjects

Ocular Pathology

The leading cause of low vision and blindness of our LVC was retinal dystrophies (n = 12, 30.0%); which included retinitis pigmentosa, Stargardt disease, albinism and macular scar. The second biggest cause was neurological causes (n = 9, 22.5%); which comprised visual impairment secondary to underlying neurological disorders, optic disc atrophy and

congenital nystagmus. The third major cause was glaucoma (n = 8, 20.0%). It was followed by acquired macular disorders (n = 4, 10.0%); which consisted of age-related macular degeneration, pathological myopia and other macular disorders. Other causes were diabetic retinopathy (n = 3, 7.5%), retinal detachment (n = 3, 7.5%) and cornea opacity (n = 1, 2.5%) (Figure 2).

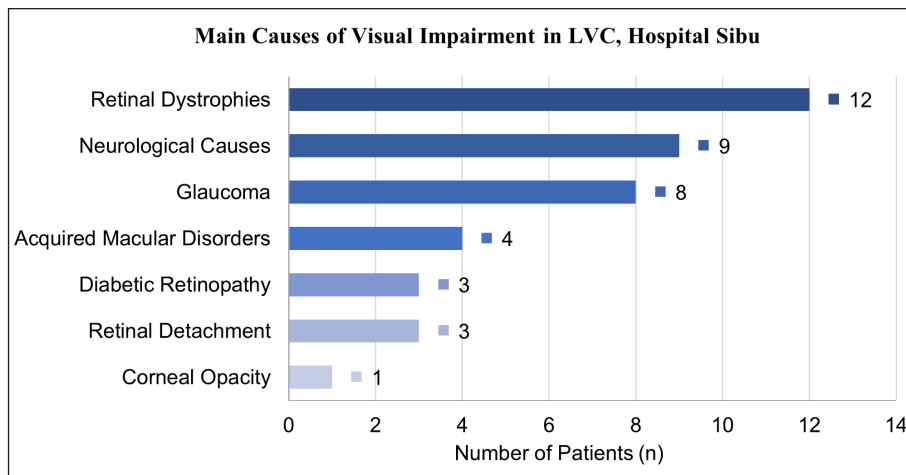


Figure 2 Main causes of low vision and blindness in LVC, Sibul Hospital

Low Vision Aids Prescribed

The data analysis showed that 23 LVC patients (57.5%) were prescribed LVD during the low vision assessment. Ten per cent of patients (n = 4) required more than one device to perform their daily tasks comfortably, hence they were prescribed more than one LVD. The most frequently low vision aids prescribed in LVC, Sibul Hospital were video magnifiers (n = 10, 37.0%), followed by hand magnifiers either illuminated or non-illuminated type (n = 6, 22.2%), spectacle magnifiers (n = 4, 14.8%), telescopes (n = 4, 14.8%) and stand magnifiers (n = 3, 11.1%) [Figure 3]. A total of 27 low vision aids were dispensed, 23 (85.2%) were

near LVD and four (14.8%) were telescopes, the only distance LVD. Nevertheless, one-quarter of visually impaired patients (n = 10, 25%) were referred to an occupational therapist for orientation and mobility training. For comprehensive and optimal care of patients with low vision or blindness, our LVC collaborated with other disciplines such as the Department of Social Welfare Malaysia, a specialized school for visually impaired individuals, and also offered visual rehabilitation techniques including null point, eccentric viewing, Peli-prism prescription, and cerebral visual impairment therapy.

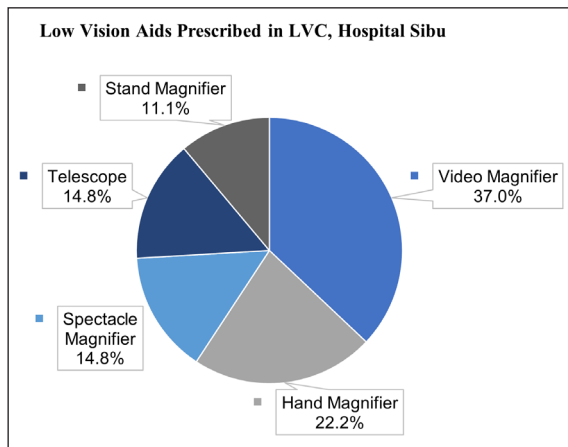


Figure 3 Low vision aids prescribed in LVC, Sibü Hospital

DISCUSSION

Gender and Ethnicity among LVC Patients

Males were predominant in LVC Hospital Sibü, which is in accordance with the literature (Huong et al., 2022; Ibrahim & Razif, 2022; Kim et al., 2010; Mohidin & Yusoff, 1998; Omar et al., 2008; Sapkota & Kim, 2017). This was possibly due to a lack of social support among females and they may have limited access to eye clinics in view of financial constraints and logistic issues. Similar results were revealed in developing countries such as India and Nepal (Olusanya et al., 2016; Xulu-Kasaba et al., 2020). On the contrary, a study by Chong et al. (2018) in Australia recorded a reverse result where female citizens were more likely to access low vision clinics. This indicated that efforts may need to be stepped up to enlighten the importance of low vision service and benefits among visually impaired patients, especially the female population. Regarding ethnicity, our study finding was close to the ethnic distribution of the central region of Sarawak as recorded by the Official Portal of Sarawak Data where Iban was the majority race (41.9%), followed by Chinese (25.3%), Melanau (16.1%), Malay (7.6%) and other local natives (1.9%) (Sarawak State Secretary Office, 2018).

We found that more of our patients in LVC suffered from low vision rather than blindness. Chotikavanich et al. (2018) reported the same finding with us that 54.1% of their patients had low vision while 27.4% of the patients were blind. A similar outcome was also described by other studies in the literature and the finding was in sync with the world’s prevalence of visual impairment and blindness (Ackland et al., 2017; Joshi et al., 2021; Stevens et al., 2013).

The Aetiology of the Low Vision and Blind in LVC, Sibü Hospital

Retinal dystrophies contributed to the principal cause of low vision and blindness among our patients, followed by neurological causes and glaucoma. The result was compatible with the study of Omar et al. (2008) which reported that the main cause of low vision of their patients was retinal diseases (55.5%), followed by optic nerve diseases (23.1%). This high proportion of retinal disease was consistent with many previous studies conducted in either developing countries (Thailand, Iran and Jordan) or developed countries (Australia and the United Kingdom) (Abu-Yaghi et al., 2022; Chong et al., 2016; Chotikavanich et al., 2018; Pardhan & Mahomed, 2002; Qutishat et al., 2021; Ramezani et al., 2012).

Contrarily, UiTM Low Vision Clinic claimed that the leading cause of visual impairment among low vision patients was cataracts, which was a reversible and treatable ocular condition (Ibrahim & Razif, 2022). This observation discrepancy had been attributed to different visually impaired patients’ entry criteria because LVC Sibü Hospital only accepted referrals of patients with irreversible and permanent ophthalmic diseases. Besides, a recent study by Huong et al. (2022) reported that the four leading causes of low vision and blindness in Miri Hospital, Sarawak were diabetic retinopathy (24.91%), glaucoma (24.54%), followed by retinitis pigmentosa (10.04%), and age-related macular

degeneration (6.32%). The study was a hospital-based study to investigate the prevalence and causes of low vision and blindness, however, our study was not population-based and only represented a small proportion of visually impaired patients who attended LVC in Sibul Hospital. Hence, we concluded that the result variations depended on geographic location, sampling or entry methods and clinic settings.

Provision of Low Vision Aids and Rehabilitation

The low vision aids were the essential gadget for the visually impaired patients to make use of the remaining functional vision to perform daily activities and consequently improve their quality of life. These were well documented in the literature (Binns et al., 2012; Ekpenyong & Ndukwe, 2010; Joshi et al., 2021; Kim et al., 2010; Omar et al., 2008). A small number of patients were referred to LVC Sibul Hospital possibly due to a lack of confidence in counselling regarding low vision care among the eye care personnel. They may have less exposure to low vision specialised fields and thus lack awareness of the available low vision service and their benefits. To date, most of the low vision care services were only available in government hospitals or provided via non-government organisations such as the Malaysia Association for the Blind (MAB), Sarawak Society for the Blind (SSB), Sabah Society for the Blind (SHSB) and St Nicholas Home, Penang. Nevertheless, there were very limited or almost no low vision services in the private eye centres. The LVC service often required extra consultation time and expenditure of low vision devices, thus the cost of practice was deemed as prevailing over the benefits. All these factors were speculated to influence the rate of LVC referrals.

Almost three-fifths of our LVC patients (57.5%) received low vision aids. Unfortunately, those not prescribed with low vision aids are due to the unfavourable residual vision. This was attributed to the majority of the patients being referred to LVC only if their vision was severely impaired due

to advanced ocular conditions. Some of our patients were unsettled with LVD learning and training because they were sceptical about its advantages and partly in denial of having irreversible, permanent visual impairment. Moreover, the patients who stayed in remote areas tended to default to the low vision follow-up session due to transportation issues. It was well known that Sarawak was one of the few states that had the poorest accessibility to eye clinics caused of the geographical terrain (Chew et al., 2018; Huong et al., 2022; Yong et al., 2016). This significant issue indicated a need for further expansion of ophthalmological and LVC services to manage patients promptly and reduce preventable low vision and blindness even further, especially in Sarawak.

Video magnifier was the most popular LVD prescribed by our LVC because it was well-developed with technological advancement and became more accessible in the market. The device enabled low vision patients who generally had reduced contrast sensitivity to fully exploit the residual vision to read prints effectively by manipulating contrast, brightness and print size. Therefore, LVC patients mostly were pleased and delighted to use it because reading, writing and the performance of near tasks were their main concerns (Chotikavanich et al., 2018; Kim et al., 2010). Contrarily, many previous studies claimed that spectacle magnifiers were the most commonly used among their LVC patients as they were the cheapest and highly available in the market (Chong et al., 2016, 2018; Ekpenyong & Ndukwe, 2010; Ibrahim & Razif, 2022; Omar et al., 2008). Although utilisation of a basic and cheaper range of LVDs such as spectacle magnifiers, handheld and stand magnifiers was adequate for the visually impaired patients to maintain and improve their quality of life, they still might need a more advanced LVD to perform a different range of tasks daily (Omar et al., 2008).

Video magnifiers were generally more expensive and harder to access, especially among the socio-economic disadvantaged

population. However, the electronic magnifier prescription rate was unexpectedly found low in developed countries such as Australia and the United Kingdom although video magnifier was cheaply loaned or supplied at no charge to low vision and blind patients (Chong et al., 2018; Taylor et al., 2017). Yet the reasons for the low uptake of electronic devices regardless of their benefits of digital magnification, remained uncertain (Chong et al., 2018). Generally, near LVD was preferred among LVC patients especially those with a restricted visual field such as patients with retinitis pigmentosa, glaucoma, or diabetic retinopathy instead of a telescope for distance viewing due to its limited field of view and lighting (Chotikavanich et al., 2018). However, according to Kim et al. (2010), telescopes (39.2%) were the most prescribed LVD in South Korea compared to other types of LVD which were spectacle magnifiers (27.8%), hand-held magnifiers (22.7%), stand magnifiers (7.2%), and electronic magnifiers (3.5%) although overall more near LVD were prescribed (60.8%).

The issue of financial constraint indeed restricted low vision patients to utilise the pricey and yet extremely useful LVD. Therefore, the subsidization or any properly planned insurance scheme helped ameliorate the utilization of LVD and subsequently amplified the benefits of low vision care services among visually impaired patients (Dandona & Dandona, 2001; Ekpenyong & Ndukwe, 2010; Huong et al., 2022). In our centre, we tried to provide the appropriate LVD to our LVC patients with prioritization of their visual function and needs. For the social-economic disadvantaged patients, we tried to help by requesting funds from NGOs or some local politicians in Sibiu. The sponsorship of the device was undoubtedly and tremendously helpful especially for school-age patients because it would improve and allow them to catch up with learning at school.

Besides, it is crucial and essential to improve public transportation and road conditions in extremely remote areas

and suburban towns such as Kapit, Song, Matu, Daro and Dalat to promote access to ophthalmological and LVC services. Community programmes and awareness campaigns are important to educate the public on the significance of seeking early intervention for low vision and exposure to LVC services. Thereby, this allows more individuals with low vision and blindness to improve their quality of life and independence.

The management of visually impaired patients requires a multidisciplinary approach to achieve a better quality of life besides periodic review of ocular conditions by ophthalmologists and low vision care by optometrists (Chong et al., 2018; Joshi et al., 2021) Appropriate referrals to other disciplines were made available via LVC, for instance, review of activities of daily living, adaptive techniques and technology, orientation and mobility training by occupational therapists, referral to social welfare workers for financial assistance, a special school for Braille training, some non-government organisations such as Malaysian Association of the Blind (MAB) or Sarawak Society of the Blind (SSB) for white cane, handicraft and massage training. In addition, Baarah et al. (2018) suggested that pre-marriage medical counselling and guidance should be conducted concurrently to prevent visually impaired genetic diseases, and to manage patients with inherited ocular diseases.

We believe that our study is able to provide invaluable information to improve low vision care service and rehabilitation, national healthcare policies and insurance schemes on the provision of low vision aids. Enhancing visual rehabilitation and personalized care that meets the unique needs and circumstances of visually impaired patients enables them to perform daily routines effectively and independently.

Our study was primarily limited by its retrospective cross-sectional nature, the fact that the analysis is hospital-based and

the small number of patients. This may have resulted in a biased sample that might not be representative of the general population of patients with low vision. However, this report provides reliable and credible information about the causes of low vision and blindness and the LVD prescribing patterns as well-documented records and diagnoses by ophthalmologists nailed the accuracy of the data presented in this study. Additionally, consistency in low vision care services is guaranteed with standardized and reliable low vision assessments by optometrists. Overall, our study highlights the significance of screening for low vision and the need for appropriate interventions to improve the quality of life for the low vision and blind.

CONCLUSION

We concluded the predominant causes of low vision and blindness of our LVC patients were retinal dystrophies followed by neurological causes and glaucoma. Video magnifiers were the most frequently prescribed devices. More comprehensive screening is urged promptly for family members with retinal dystrophies to detect the diseases early and hence timely referrals to low vision care and rehabilitation services. We emphasized the importance of familial counselling and education on inherited retinal diseases and the need for better screening by primary care service providers, particularly in the context of rural and underserved populations. Moreover, policymakers and healthcare providers should prioritize integrated low vision and blind care services as part of comprehensive eye care systems to ensure optimal outcomes for visually impaired patients. A further multi-centre study can be carried out in Sarawak to investigate the quality of life among visually impaired patients with low vision device interventions.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

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