

Low vision rehabilitation can improve quality of life

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Introduction

The loss of a part or all of a person's sight can be both devastating and disorienting, however there are many ways of coping with visual impairment. Vision impairment means that a person's eyesight or vision cannot be corrected to a normal level. It can occur when the eye does not see objects as clearly as usual or when the eye cannot see as wide an area as usual without moving the eyes or turning the head. Hence vision impairment will make it harder or impossible to do daily tasks without specialized adaptations. This condition is called low vision.

Low vision and blindness

There are many ways to describe the severity of a person's vision impairment. In Malaysia "Low vision" is defined as visual acuity between 6/18 and 3/60, with the best possible correction being used or a visual field of 20 degrees or less. While "Blindness" is defined as a visual acuity which is worse than 3/60, with the best possible correction being used, or a visual field of 10 degrees or less (The World Health Organization: International Statistical Classification of Diseases and Related Health Problems - ICD-10). Normal vision is commonly described as 6/6 (WHO 2001; Chaudhry 2006). This means that a person looking at an object 6 meters away is able to see it clearly. Someone with a visual acuity of 6/60 on the other hand means that he or she can only see an object at 6 meters while someone with normal vision would be able to see the same object at a distance of 60 meters. Normal visual field or how much you are able to see, is about 160-170 degrees horizontally looking horizontally (Henson 2000).

Visual acuity or visual field measurement alone cannot tell you how much a person's life will be affected by their vision impairment. For instance, two persons with similar level of visual acuity may not be able to do the same things, one person may be able to use his or her vision better in order to do daily activities compared to the other. Therefore, it is important to assess how well a person uses their remaining vision to see how well they are able to cope with their daily activities.

A majority of low vision patients have at least some usable vision that can help them move around in their environment and do their daily activities such as reading, writing, bathing going to work etc (Omar et al, 2007; Dickinson 1993; Leat & Karadsheh 1991). A person's functional vision can be evaluated by observing them in different settings to see how they use their vision. Hence low vision rehabilitation is an important assessment to determine their ability to cope with their daily activities. Low vision rehabilitation can answer questions such as can the person scan a room to find someone or something? What lighting is best for the person to do different tasks? Or how does the person use his or her vision to move around in a room or outside?

Clinically, functional vision can be defined as vision from 6/6 to light perception. Functional vision can be classified according to ability to read reading material – that is normal to near normal vision, mild low vision, moderate low vision, severe low vision and blind. Table 1 describe the functional vision categories and the ability to read reading materials. This table is a useful guide for to general practitioners, ophthalmologists, optometrists, social welfare officers and other allied health professionals when assisting low vision and blind patients in coping with their daily activities. Hence, a complete low vision rehabilitation assessment is recommended to all visually impaired patients so that appropriate recommendations can be made.

Table 1: Category of functional vision according to ability to read reading materials

Category	Visual acuity (VA)	Ability to read reading materials
Normal to Near Normal Vision	<6/18	Person is able to read normal print
Mild Low Vision	$6/18 \leq VA \leq 6/48$	Person able to read normal print without optical low vision devices; but might need a close reading distance and good light
Moderate Low Vision	$6/60 \leq VA \leq 6/120$	Person can read normal print with low vision devices; able to function with some skill training or use large print.
Severe Low Vision	$6/150 \leq VA \leq 6/300$	Person uses braille for reading and uses vision for mobility and activities of daily living
Blind	No useful vision	Uses tactile or audio

(Colenbrander, 2003)

Prevalence of low vision and blindness

The prevalence of low vision is more common in older persons compared to children. Worldwide, there are currently about 180 million persons who are visually impaired. Of these, 45 million are blind and approximately 9 million of them have no perception of light. These latter persons require mobility training and other forms of rehabilitation. Out of a remaining 171 million people, which comprises of 135 million persons with 'low vision' (ICD-10) and 36 million blind with residual vision, (i.e., with light perception or better but less than 3/60), an estimated 60% can be improved with surgical treatment, mainly for cataract and some for corneal opacity. This accounts for an estimated total of 103 million persons who would benefit from treatment. The remaining estimated 68 million persons require low vision care and are likely to benefit from the provision of low vision care (Pararajasegaram 2004).

In Malaysia, The National Eye Study 1996 estimated that there were about 540,000 low vision people and about 50,000 blind people in Malaysia. For children it was estimated that there were about 50,000 low vision and 5,000 blind (Zainal et al. 2002). The number of visually impaired is expected to grow in the years to come due to the continuing improvements in our healthcare system. Low vision patients can benefit from low vision rehabilitation. This was proven in a study entitled 'The Effectiveness of Low Vision Devices in Special Education Schools' where by 85% of the students that were referred to the low vision rehabilitation clinic benefited from low vision devices (Omar et al. (2009). In another study looking at a low vision clinic population found that 84% of the patients attending low vision rehabilitation received low vision devices to improve their near or/and distance vision (Omar et al. 2008).

Causes of low vision

Some changes occur in our eyes and vision as we get older and is a part of the aging process. These changes usually do not lead to low vision. However, people aged 65 and older are at higher risk in developing low vision (Grosvenor 2007; Robyn 2003). A variety of diseases, disorders, injuries and birth defects that affect the eye can be the cause of low vision. The most common causes of low vision are age-related macular degeneration, cataract, glaucoma, or diabetic retinopathy.

Age-related macular degeneration affects the part of the retina that is responsible for sharp central vision. Cataracts are a condition where the eye's crystalline lens becomes cloudy or even opaque. Glaucoma is increased fluid and pressure within the eye that leads to damage to the optic nerve head and eventually will cause peripheral visual field loss to patient. Diabetic retinopathy is a common

complication of diabetes in which the blood vessels in the retina break down, leak, or become blocked, leading to vision impairment (Grosvenor 2007; Robyn 2003; Arthur 1999; Barry 1999). In many cases these problems are worsened when the underlying disease is not treated or poorly controlled.

In the developed countries such as the United States of America, United Kingdom, Canada and Australia, age-related macular degeneration accounts for almost 45% of all cases of low vision. However, in Malaysia uncorrected refractive errors (48%) and cataract (36%) are the major causes of low vision (Zainal et al. 2002). The risk of vision loss from many of these conditions can often be reduced if the condition is detected early and treated. Eye care professionals will be able to advice on the difference between normal changes in aging eye and those caused by eye diseases. Therefore getting an annual eye examination is recommended.

Signs and symptoms of low vision

Symptoms of low vision include difficulty recognizing faces of friends and relatives; having to move up close to see during activities such as reading, cooking, sewing or fixing things around house. Picking out and matching the colour of clothes become more difficult. Doing things at work or at home become more and more challenging to cope with because the room lights seem to get dimmer than they used to be. Reading street signs and bus numbers also may become difficult tasks (Dickinson, 1993). Any one of these symptoms could be an early warning sign of eye disease, which can lead to low vision. Therefore the sooner the low vision problem is diagnosed, the better the chance of successful low vision rehabilitation and keeping the remaining vision.

Low vision assessment

Assessment of vision and prescription of low vision devices are part of a comprehensive low vision service. The optometrist usually conducts the low vision assessment. First the optometrist will determine how the impaired vision has affected the person's quality of life. Next the patient's requirements will be determined and lastly the optometrist will tailor the low vision rehabilitation plan for the patient accordingly. All rehabilitation plans need to be specific to the person as each person's requirements are not the same.

Low vision rehabilitation

Low vision devices (LVD) help low vision patients to maximise their remaining vision and live independently. LVDs can be divided into optical or non-optical devices. Optical devices have one or more lenses to modify or enlarge object of interest. Non-optical devices do not have any lens system but will make it easier to see objects.

Optical devices are placed between the eye and the object to be viewed and it will be magnified. This will increase the size of the image of the object on the

retina. Magnifiers are used for near tasks and can be prescribed as hand-held or stand magnifiers with or without illumination. Spectacle magnifiers are the most commonly prescribed magnifiers and can come as full aperture, half-eye, or bifocal with it's base in prisms for binocular viewing. Telescopes are used to improve the ability of low vision patients to observe distance objects. The magnification powers range from 2X to 14X. Types of telescopes include hand-held, clip-on, spectacle mounted and bioptic designs (Keeffe, 2004; Minto & Butt, 2004).

Non-optical devices are items designed to promote independent living. They alter environmental perception through enhancing illumination, contrast and spatial relationships. A useful slogan to remember and the key to non-optical devices is "Bigger, Bolder, Brighter". Devices may include illumination devices such as lamps and reading stands, check registers, typoscopes, writing guides, bold-lined paper, needle-threaders, magnifying mirrors, high contrast watches, and large print items such as books, talking calculators, speech and braille conversion systems (Minto & Butt, 2004, Dickinson 1993).

For severe low vision patients, electronic devices are good option to enhance the ability to do near tasks. Electronic devices such as a zoom television camera to magnify materials onto a television screen called a closed circuit television (CCTV) can be suggested. The advantage of a CCTV compared to a magnifier is in the magnification capabilities which can reach up to 60X with a normal working distance and reversed polarity e.g. white on black background is possible (Minto & Butt, 2004). However, the disadvantages are the cost and the bulk of the system that makes it not portable. However, with recent improvements in technology, a portable CCTV has become available.

Other components of the low vision rehabilitation service includes training the person affected by low vision in the use of vision and other senses, mobility, activities of daily living, and support for education, employment or leisure activities. Specialist vision rehabilitation agencies are available in Malaysia such as Social Welfare Department; Optometry Clinic at Hospitals under the Ministry of Health; schools under the Special Education Department, Ministry of Education; National Council for the Blind (NCBM); Malaysian Association for the Blind (MAB); and the St Nicholas Homes have services that provides access to information (libraries) and activity centres for groups of people with impaired vision.

Conclusion

People with low vision will experience physical, economic, and psychological changes that diminish their quality of life if neglected. Low vision affects daily routines such as walking, going outside and cooking. It can also affect leisure activities such as reading, sewing, travelling or sports. When a person with low vision is not able to perform job-related functions at the work place, this can lead

to a loss of income. At any time if any of the above signs and symptoms occurs, an immediate appointment with an eye care professional for an eye examination should be made. If vision cannot be treated by conventional methods, such as glasses, contact lenses, medication, or surgery, then low vision rehabilitation should be suggested. These services may include eye examinations, a low vision evaluation, training on how to use visual and adaptive devices, support groups, and training on how to perform everyday activities in new ways. Low vision assessment and vision rehabilitation will be able help low vision people to learn adaptive techniques and skills that let them maintain an independent lifestyle and improve their quality of life.

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