



The Effectiveness Of *The Reader Magnifier* (CCTV) As An Aid For Low Vision Patients With Inoperable Cataracts

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ABSTRACT

Abstract: The case study conducted shows the effectiveness of the Reader Magnifier (CCTV) as an aid in low vision patients with inoperable cataracts. Patients with *low vision* due to cataracts often have difficulty in carrying out daily activities, especially reading and recognizing details. Low vision aids, namely *the reader magnifier* or CCTV, are one of the main alternatives that can improve reading speed, comfort, and quality of life for *low vision patients*. The goal is to be able to determine the effectiveness of *the reader magnifier* (CCTV) as an electronic-based optical aid in *low vision* patients. The research method used is a research method with a qualitative approach in a single case study or one person with *low vision* patients with inoperable cataracts using a *Reader Magnifier* (CCTV) as an auxiliary tool. The results of this study show that the effectiveness of the *Reader magnifier* as an electronic-based optical aid has proven to be effective in improving reading ability in patients, both in terms of the number of letters that can be read, comfort when reading, and reading speed. *The reader magnifier* is equipped with magnification, contrast, distance, and lighting adjustment features that allow adjustments according to the conditions and visual needs of *patients with inoperable cataracts*. In *low vision patients* with inoperable cataracts, an approach to vision rehabilitation that focuses on vision function is effective in improving the patient's independence and quality of life.

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1. INTRODUCTION

The eyes are one of the most important senses in human life, functioning not only as a visual tool but also as a means of communication. Globally, at least 2.2 billion people have near-term or long-distance vision impairment. Of all people with visual impairments, almost half, or about 1 billion people, are visual impairments that can be avoided, both prevented and treated. The results of the 2013 Basic Health Research (Riskesdas) show that the prevalence of blindness in the population aged ≥ 6 years in Indonesia reaches 0.4%. About 80% of people with visual impairment and blindness can be prevented or treated.

The World Health Organization (WHO) defines a person with *Low Vision* as a person who has decreased vision function even after standard administration and/or refraction correction and has a visual acuity of less than 6/18 (20/60) including light perception or vision area less than 10 degrees from the fixation point.

Low vision is a vision condition where a person finds it difficult to carry out daily activities even though they have used glasses, contact lenses, medicines or even undergone eye surgery (Suprihatin, 2022).

According to a 2019 WHO report, around 2.2 billion people worldwide have visual impairment, and cataracts are one of the main causes of blindness. In Indonesia, cataracts are the main cause of blindness. Based on the *Rapid Assessment of Avoidable Blindness* (RAAB) survey in 2014-2016, the prevalence of blindness in Indonesia reached



3%, with cataracts as the main cause (81%). Data from the Ministry of Health in 2018 also showed that 1.9% of the Indonesian population over 50 years old experienced blindness due to cataracts.

Cataracts are a degenerative process in the form of cloudiness in the lens of the eyeball that causes a decrease in vision ability to blindness. If left untreated for a long time, it is not uncommon for cataracts to cause total blindness. Inoperable cataracts generally refer to cataracts in which lens surgery (cataract removal and insertion of intraocular lenses) is not recommended or is very risky.

Patients with *low vision* due to cataracts often have difficulty in carrying out daily activities, especially reading and recognizing details. *Low vision* aids, namely *reader magnifiers* or CCTV, are one of the main alternatives that can improve reading speed, comfort, and quality of life for *low vision patients*.

Desktop Video Magnifier CCTV is a type of CCTV enlargement with the most common and stable design, which consists of a camera mounted on a reading table and a monitor screen as a display medium. This type of CCTV is designed to be used on a table surface, where the object to be observed is placed on a base table (X-Y) that can be moved vertically or horizontally. The image is then displayed on the monitor screen through the lens system *Zoom*, so that users can adjust the magnification level according to their visual needs. (Coenig, 1996)

Some of the points that will be used as a formulation of the problem in this study are (1) What is *Low Vision* & its epidemiology? (2) What is meant by inoperable cataracts & its epidemiology? (3) What is the impact of cataracts on vision? (4) What are the types of CCTV/*Reader magnifiers*? (5) How is the administration of CCTV/*Reader magnifier* to inoperable cataract patients?

The purpose of writing this final project is to Understand more about *low vision* and cataracts. Knowing the effectiveness *reader magnifier* (CCTV) as an electronic-based optical aid in patients *low vision* with inoperable cataracts. As one of the requirements for graduating from Diploma III (DIII) at the Kartika Indra Persada Optical Refractive Academy.

Benefits of research on effectiveness *Reader Magnifier* (CCTV) as an electronic-based optical aid in patients *Low Vision* With inoperable cataracts is a relevant topic and can be an education for readers to take action to treat individuals with this condition.

2. METHODS

The research method with a qualitative approach is a single case study or one person with an examiner or Optometrist active and the patient is also active. The measurement results are usually more accurate with the diopter differentiation given by the Optometrist and the patient can distinguish objects much better or not. It is comprehensively discussed about the science of Optometrist. It corresponds to (Hodgetts & Stolte, 2012) explaining that case studies of individuals, groups, communities help to show important things of concern, social processes of society in concrete events, stakeholder experiences. Cases can illustrate how problems can be addressed through research. The case study approach is widely used in clinical cases, with an interpretive or qualitative narrative approach to support a more quantitative and systematic single case (Krampen & Krampen, 2016). Case studies have a focus on one specific unit, which can be individuals, groups, organizations, communities.

Table 1

History

Name	Mrs. E S
Gender	Women
Age	30 years
Jobs	Private Employees
Diagnosis	Cataracts are inoperable due to paralysis of the optic nerve
References	RSCM
Case History	According to the patient's statement, the patient's vision was blurry for both eyes since the age of 2 years, it was difficult to read clearly and see like there was fog. The patient had checked with an ophthalmologist, and in both eyes the patient had cataracts, but the doctor said that the cataract that the patient experienced could not be done medically because there was a problem with the paralysis of the eye nerve which was thought to have occurred for a long time but the patient was not aware of it. Then the patient was referred to <i>the Kartika Low Vision Clinic</i> , Jakarta

Table 2

Subjective Refractive Results	
1.	Sin Correction:
a.	Long distance:
	OD: 3/60
	OS: 6/60
	SDG: 6/60
	Size Scale: 62/60mm
b.	Short distance:
	Reading 10cm/2.5M
2.	Other inspections:
a.	The pupil is relatively still reactable, but the fundus is difficult to assess because the cataract is quite dense.
b.	Examination on Ophthalmoscopy
	1) Both eyes appear to be nuclear cataracts and cortical matures.
	2) The cornea is clear, but there are few signs of neuropathy in the anterior segment.
3.	Cum Correction
	Subjective refraction:
a.	Long distance:
	OD: S-7.00 3/30
	OS: S-7.00 6/21f2
	ODS 6/21 (according to the patient's description it is clearer but the vision still looks foggy)
b.	Short distance:
	Glasses size + ADD 3.00 D read to 10cm/2M
	CCTV (Reader Magnifier) 25cm/0.8M (patients are very happy to use it)

Table 3

(Foundation of *Low Vision* editor Randall T. Jose)

Categories of vision impairment according to WHO standards and functional definitions of 1992

Category	Sharp vision after correction	WHO Standards Definition	WHO Functional Definition in 1992
0	6/6 – 6/18	Normal	Normal
1	<6/18 – 6/60	Vision damage	<i>Low Vision</i>
2	<6/60 – 3/60	Severe vision damage	<i>Low Vision</i>
3	<3/60 – 1/60	Blind	<i>Low Vision</i>
4	<1/60 – light perception	Blind	<i>Low Vision</i>
5	No light perception	Blind	Buta Total

Elements of vision:

Table 2. 1 There are 7 elements of vision function problems and their interventions

Elements of Vision	Vision Function	Intervention
Distance	Visus	- Getting the distance closer - Writing/reading in close proximity - Ask a friend
Size		
Contrast	Contrast sensitivity	Test with <i>Hiding Heidy/Lea Screnner</i>
Color	Color vision	- Name, match and group bright colors - Restore/restore/equalize the concept of color with children
Wide range of vision	Wide range of vision	- Knowing the central vision - Knowing peripheral vision



Elements of Vision	Vision Function	Intervention
Light	Lighting	- Natural light = nature/sun → sitting near the window - Artificial light = lamp - Glare → use hats, <i>sunglasses</i>, hands, plastic filters
Position	Position	- Sitting position - Reading too hunched over using a <i>standing book</i>

3. RESULTS AND DISCUSSION

1. *Sin Correction*:
 - a. Long distance:
 - OD: 3/60
 - OS: 6/60
 - SDG: 6/60
 - Size Scale: 62/60mm
 - b. Short distance:
 - Reading 10cm/2.5M
2. Other inspections:
 - a. The pupil is relatively still reactable, but *the fundus* is difficult to assess because the cataract is quite dense.
 - b. Examination on *Ophthalmoscopy*
 - 1) Both eyes appear to be nuclear cataracts and cortical matures.
 - 2) The cornea is clear, but there are few signs of neuropathy in the anterior segment.
3. *Cum Correction*
 - Subjective refraction:
 - a. Long distance:
 - OD: S-7.00 3/30
 - OS: S-7.00 6/21f2
 - ODS 6/21 (according to the patient's description it is clearer but the vision still looks foggy)
 - b. Short distance:
 - Glasses size + ADD 3.00 D read to 10cm/2M
 - CCTV (*Reader Magnifier*) 25cm/0.8M (patients are very happy to use it)
4. Other vision function checks:
 - Contrast rating : 5% (medium contrast)
 - Color rating : Patients can still recognize the primary color even if it is a little longer
 - Lighting : A little photophobia
 - Field of view & position : No problem

C. Results and Evaluation



Image 1 Patients use Reader Magnifier

Source: (Kartika Low Vision Clinic)

Results of reading ability evaluation/effectiveness analysis without and with CCTV/ Reader Magnifier :

1. The standard reading test without a device was in slow reading speed and the patient could only read 2M letters even though the patient's glasses had been added to Addisi +3.00D, and the patient still complained of getting tired quickly.
2. Reread test with CCTV/Reader magnifier, the patient can read very quickly and the patient's reading distance is also longer
3. Patients can set up CCTV (magnification, contrast, distance, lighting) according to the patient's needs.
4. What patients must pay attention to in the use of CCTV/Reader magnifier is that patients must always practice the use (*eye-hand-head coordination*) and *text scanning strategies* .

4. CONCLUSION

Low vision is a decrease in visual function where this condition cannot be corrected optimally with medication, lens use or surgery with sharp vision less than 6/18 (20/60) or 0.3 decimal to light perception or visual area less than 10 degrees from the point of fixation and can still use the rest of vision to perform certain activities with *low vision* aids.

Cataracts are one of the causes of *low vision* that cause a person to experience vision problems such as a sharp decrease in vision, decreased contrast, and near vision function, thus interfering with daily activities. Vision correction using glasses or conventional near-vision aids does not always provide optimal results, especially for near-distance vision.

Reader magnifier as an electronic-based optical aid has proven to be effective in improving reading ability in patients, both in terms of the number of letters that can be read, comfort when reading, and reading speed. *Reader magnifier* is equipped with magnification, contrast, distance, and lighting adjustment features that allow adjustments according to the conditions and visual needs of *patients with inoperable cataract*. In *low vision* patients with inoperable cataracts, a vision rehabilitation approach that focuses on vision function is effective in improving the patient's independence and quality of life.

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