

Audiovisual media effectiveness in post-cataract surgery care education in National Eye Center Cicendo Hospital

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ABSTRACT

Currently, eye surgery is the only viable solution to reserve blindness in cataract patients. Nonetheless, post-cataract surgery care plays an important role in the effectiveness of cataract surgery. To ensure the success of post-cataract surgery, healthcare providers must support patients with adequate knowledge regarding post-cataract surgery care. In this study, we investigate the effectiveness of audiovisual media in post-cataract surgery care education on improving patients' knowledge. This quasi-experimental study is designed with one group pre-test and post-test approach. We recruited a total of 58 participants aged ≥ 40 years with senile cataract diagnosis who underwent cataract surgery by phacoemulsification in one eye using local anesthesia or neurolept, with visual acuity in the unoperated eye ≥ 0.08 , and without hearing loss. Participants were given complementary post-surgery education through audiovisual media for 7 minutes and participants were instructed to fill out the questionnaire about post-cataract surgery care prior to and after getting the complementary audiovisual media education. The collected data were analyzed using the frequency distribution analysis and Wilcoxon test. The findings suggest that the application of audiovisual media in post-cataract surgery care education significantly increases patients' knowledge ($p\text{-value} < 0.001$). This study concludes that providing education through audiovisual media is recommended for post-cataract surgery patients.

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1. INTRODUCTION

In October 2022, the World Health Organization (WHO) stated that at least 2.2 billion people around the world suffer from vision impairment. Among them, uncorrected refractive errors and cataracts contribute to the main cause of vision impairment [1]. This issue poses a large financial burden, with the estimated annual costs of productivity losses caused by vision impairment at more than US\$ 400 billion. Among them, there are at least 94 million people with visual impairment caused by cataracts [1]. A large-scale population-based study reported that the prevalence of cataracts increases with age, from 3% at age 55-64 years to 92.6% at age 80 years and over [2]. In addition, cataracts are associated with increased morbidity, as in the association between cataracts and systemic conditions such as type 2 diabetes mellitus [3], [4]. A data analysis study shows a prevalence of 73.7% in visual impairment due to cataracts in Indonesia [5]. This is in accordance with the *Rumah Sakit Mata Cicendo Bandung* (Cicendo Eye Hospital

Bandung) data, where the mentioned hospital recorded the ten most common diseases from January 1st to December 1st, 2018, and showed that cataracts were in the second position with around 10.72% of the total number of cases.

Until now, the main treatment to reserve blindness in cataract eyes is through surgery, depending on the severity of visual acuity impairment that interferes with daily activities [6]. Cataract surgery is a surgical procedure to remove the cloudy eye lens and replace it with an artificial lens. This is a common procedure all over the world [7], [8]. The goal of cataract surgery is to improve visual acuity with the implantation of an artificial lens [7]. One of the factors that influence the success of cataract surgery is the post-cataract surgery care which is delivered by the nurses or physicians. The post-cataract surgery care includes education for the patient to avoid bending, lifting heavy objects, straining, or sleeping on their side toward the operated eye. If the patient lives alone or does not have any assistance, arrangements can be made for someone to help with heavy household activities [9]. The post-cataract surgery care is intended to avoid complications and surgical failure due to ignorance and postoperative trauma to the eye.

Effective health education for the patients after cataract surgery using easy-to-understand educational media will have an impact on the successful results of the surgery. The effectiveness of the instructional program to increase the patients' knowledge about postoperative complications prevention plays a critical role in accelerating surgery recovery [10]. Nowadays, technological innovations and development induce a shift in how information is delivered in the healthcare sector. When compared to textual or spoken teaching, multimedia-based or "video-assisted" patient education is believed to offer certain advantages [11]. Several studies on video-assisted patient education have been published [12], [13]. A previous study investigating the effectiveness of a video-assisted discharge education (VADE) program after total hip replacement (THR) surgery revealed that VADE can be beneficial in raising patient satisfaction and mobility and lowering discomfort after THR [14]. Moreover, compared to the conventional methods (e.g., oral and text), appropriate audiovisual media are easier to understand and easier to remember.

Healthcare providers must support patients with adequate knowledge regarding diagnosis, prognosis, and treatment options to encourage rational and autonomous decision-making [15]. Based on our best knowledge, the health education provided to patients after cataract surgery, especially in Indonesia, mainly has only been through the distribution of pamphlets and oral explanations by nurses. Typically, cataract surgery is a fast-in-fast-out case, meaning that each patient does not have to stay in the clinic for a long period of time. Hence, postoperative monitoring became patients' responsibility since they have to do it at home. Considering that there is a relatively high cataract surgery incidence, the education given through oral interactions may be inadequate due to healthcare workers' fatigue and human error. Moreover, according to our clinical experience and our preliminary survey, many patients do not perform the designated postoperative care at home correctly due to forgetfulness or limited ability to digest information. Many of the patients forget the education given by the nurse, as soon as they leave the clinic. It is known that the majority of cataract patients are elderly. It is also known that the healing ability, as well as the ability to perceive and digest information, is reduced in older patients. Hence, it is necessary to improve patients' acceptance of information and patients' knowledge through interactive media, easy-to-understand, and easy-to-remember health education.

One of the efforts we made to tackle this issue is by creating audiovisual media about post-cataract surgery care through interactive video. This educational video is given to patients who underwent cataract surgery, as a complementary education. This study aims to assess the effectiveness of postoperative care education after cataract surgery before and after the patients were exposed to our interactive audiovisual media. The patients are assessed on how well their understanding of the postoperative care education that has been provided. By improving patients' knowledge of home-based postoperative care, it is hoped that any complications caused by patients' lack of knowledge can be minimized.

Finally, the rest of this paper is organized as follows. Section 2 describes the study methods used in this study. In Section 3, we present the findings and the results of our study. The discussion of our findings is presented in Section 4, and in Section 5, we present the conclusion of this study.

2. RESEARCH METHOD

This study was designed as a quasi-experimental study with one group pre-test and post-test approach. In this study, the dependent variable (i.e., the patient's knowledge level regarding post-cataract surgery care at home) before and after the intervention was compared. Written informed consent had been obtained prior to this study from all patients and/or their legal guardians. The ethical approval was given by the ethical committee of Universitas 'Aisyiyah Bandung (Ethical Approval No:54/ KEP.02/STIKes-AB/II/2020)

A purposive sampling technique was employed to select the participants. The minimal number of participants was calculated using Slovin's formula with a margin of error of 0.05. A total of 58 patients in the

outpatient clinic of the National Eye Center of Cicendo Eye Hospital Bandung were recruited as participants in our research. The inclusion criteria were patients aged ≥ 40 years with senile cataract diagnosis, who underwent cataract surgery by phacoemulsification in one eye using local anesthesia or neurolept, and had visual acuity in the non-cataract eye ≥ 0.08 . Patients with hearing loss were excluded from this study to avoid situational bias.

Patients who underwent cataract surgery were given conventional education through oral and text (pamphlet) media. Then, they are given a pre-test prior to receiving the complementary audiovisual education. After that, the patients retrieve post-cataract surgery care education through the designated audiovisual media. The audiovisual media in the form of videos regarding post-cataract surgery care were made by the research team with a duration of 7 minutes. The content of the audiovisual media was derived from the typical information that was routinely delivered to the patients via oral communications. This content was part of the standard operating procedures (SOP) of the hospital and has been approved by the corresponding healthcare stakeholders. The information included dos and don'ts after eye surgery, administering an eyedrop procedure, hand wash procedure, and procedure to make sterile cotton. The audiovisual media had obtained intellectual property rights issued by the Indonesian Ministry of Law and Human Rights. This educational procedure was carried out three times, with each session lasting seven minutes. The pre-test questionnaire was given to the patients right before the intervention. After the intervention, a post-test was directly performed using a questionnaire identical to the questionnaire given during the pre-test.

Instruments in the form of a questionnaire were directly distributed by the nurses to the research participants in the outpatient clinic of Cicendo Hospital Bandung. The questionnaire was designed to collect the research data to assess the patient knowledge level about post-cataract surgery care. The questionnaire consisted of 20 items and has been validated with quantitative methods (i.e., validity and reliability). The instrument's validity is calculated by correlating each item score with the total score using Pearson correlation analysis. Based on the instrument's validity testing results, it was found that all items in the questionnaire produced a correlation coefficient value greater than $r_{\text{table}}=0.1547$, indicating that the questionnaire is sufficiently valid. The instrument reliability test investigates the instrument's consistency as a measuring instrument. In this study, we used the Cronbach alpha coefficient as the metric. The Cronbach alpha coefficient for the questionnaire was 0.835, suggesting that the instrument is adequately reliable. In summary, a high total obtained score in the questionnaire indicates that the patient has a good knowledge and vice versa.

The data collected were analyzed using the frequency distribution analysis. In addition, Wilcoxon test was utilized to assess the mean difference in the patients' knowledge levels. A P-value of ≤ 0.05 was interpreted as statistically significant. The analysis was conducted using the SPSS software version 20.

3. RESULTS

As abovementioned, 58 patients participated in the study. The demographics (i.e., age, gender, education, and occupation) as well as clinical characteristics of patients are shown in Table 1. As depicted in Table 1, most of the participants were in the age range of 56-65 years old, contributing 34.5% of the total research population. The ratio between the number of male participants to female participants is 50:50. The majority of research participants' academic degree is high school graduate and most of the participants have been retired with a proportion of 36.2%.

Table 1. Summary of participants' characteristics

Characteristics	Sample (n)	Percentage (%)
Age		
40-45 years	8	13.8
46-55 years	17	29.3
56-65 years	20	34.5
>65 years	13	22.4
Gender		
Male	29	50.0
Female	29	50.0
Latest academic degree		
No formal education	5	8.6
Elementary school	17	29.3
Middle school	6	10.3
High school	19	32.8
College	11	19.0

Furthermore, as in Table 2, we obtained information on the duration of patients being diagnosed with cataracts and whether they have received any information about cataracts before. It is observed that more than 87% of the patients have been diagnosed with cataracts with a duration between one to five years. In addition, 55.2% of research participants have received information about cataracts.

Table 2. Patients' cataracts duration and patients' knowledge before participating in this study

	Sample (n)	Percentage (%)
Cataract duration		
1-5 years	51	87.93
6-9 years	6	10.35
>10 years	1	1.72
Having brief information about cataract		
Yes	32	55.2
No	26	44.8

3.1. Post-cataract surgery care knowledge dimensions

Table 3 presents the patients' post-cataract surgery care knowledge level on each dimension, before and after the intervention. Before retrieving our designed complementary post-cataract surgery education with audiovisual media, 30 participants (51.7%) already belong to a good knowledge level about post-cataract surgery care. Participants who are considered to have a good knowledge level about how to administer eye drops are 22 (37.9%). Further, a total of 23 (39.7%) participants has good knowledge of how to wash their hands. Then, about 48.3% or 29 participants in the study have poor knowledge about how to make sterile cotton.

Table 3. Knowledge level based on post-cataract surgery care knowledge dimensions

Knowledge	Pre-test	Post-test
Post-cataract surgery care		
Good	30 (51.72%)	58 (100%)
Sufficient	12 (20.69%)	0 (0.0%)
Poor	16 (27.59%)	0 (0.0%)
Administer eye drops procedure		
Good	22 (37.93%)	58 (100%)
Sufficient	14 (24.14%)	0 (0.0%)
Poor	22 (37.93%)	0 (0.0%)
Hand wash procedure		
Good	23 (39.66%)	58 (100%)
Sufficient	15 (25.86%)	0 (0.0%)
Poor	20 (34.48%)	0 (0.0%)
Making sterile cotton procedure		
Good	10 (17.24%)	58 (100%)
Sufficient	19 (32.76%)	0 (0.0%)
Poor	29 (50.00%)	0 (0.0%)
Overall knowledge score		
Good	14 (24.14%)	58 (100%)
Sufficient	23 (39.66%)	0 (0.0%)
Poor	21 (36.21%)	0 (0.0%)

Based on the overall score of the participant's knowledge level before the intervention was given, 24.1% of participants are considered to have a good knowledge level, 39.7% have sufficient knowledge, and the remaining 36.2% of participants have poor knowledge. This result is surprising since prior to being given the pre-test, the patients had already retrieved a standard oral and text education. However, the fact that only 24.1% of participants having a good knowledge level suggests that conventional education methods (e.g., oral and text) might not effective enough. Fortunately, after retrieving complementary education intervention using audiovisual media, 100% of research participants are considered to have a good level of overall knowledge about post-cataract surgery care. The data shows that the participant's knowledge of postoperative care, applications of eye drops, hand washing procedures, and the making of sterile cotton are better with an overall percentage of 100% after providing health education through audiovisual media three times, with each session lasting seven minutes.

3.2. The effectiveness of audiovisual media in post-cataract surgery care

The effectiveness of audiovisual media in postoperative care on changes in the participants' knowledge level can be seen in Table 4. As observed, Table 4 shows that we obtained $p\text{-value} < 0.001$ in each dimension of knowledge and overall knowledge score. This result implies that audiovisual media in post-cataract surgery care is effective in increasing participants' knowledge level on post-cataract surgery with a notable improvement. Note that the $p\text{-value}$ reported in Table 4 was not the actual value as the $P\text{-value}$ could never be 0. We set the decimal places for the reporting as 4, meaning that a $p\text{-value}$ less than 0.001 will be reported as 0. Nevertheless, a $p\text{-value} < 0.001$ is sufficiently small in the context of this study and could be safely assumed as in Table 4.

Table 4. The effectiveness of audiovisual media in post-cataract surgery care

Variable	Before (\bar{x} , SD)	After (\bar{x} , SD)	p-value
Post-cataract surgery care	65.52±33.04	100±0.00	0.000
Administer eye drops	58.28±25.21	100±0.00	0.000
Hand wash procedure	62.41±23.42	100±0.00	0.000
Making sterile cotton procedure	51.38±20.56	100±0.00	0.000
Overall knowledge score	59.40±18.94	100±0.00	0.000

4. DISCUSSION

Supportive educative intervention is critical for the success of clinical interventions, including surgery [16], [17]. Surgery is a personal crisis that may lead to a long recovery, physical or mental dysfunction, and even death. Postoperative education is beneficial in reducing postoperative complications, hospital stay length, and recovery time [18]–[21]. Postoperative education plays a vital role in minimizing postoperative complications, improving patient compliance, and reducing patient anxiety [22]. Effective strategies in patient health education are essential to prepare patients and families for postoperative care. Furthermore, the fast-paced outpatient nature of cataract surgery needs efficient transfer of information from healthcare providers to patients [23].

Good media or teaching tools should be able to be seen, heard, touched, felt, or smelled, to facilitate communication and transmit information [24]. Audiovisual media as health education media have both audio and visual forms and convey more information that can be captured by the human senses, which is heard by the ears and seen through the eyes. In this study, the information about post-cataract surgery care delivered in a 7-minute video can be easily understood even by patients with advanced age and limited vision. This result was supported by study [25], [26], which stated that audiovisual media is the most appropriate tool in health education. At the very least, 75% of information is acquired or transmitted to the brain through the senses of audio and visual [27].

Our study showed an increase in the participants' knowledge level in post-cataract surgery care after receiving complementary audiovisual education. The study was conducted at the outpatient clinic of the National Eye Center Cicendo Hospital Bandung. Our study also elaborated on some sub-variables such as postoperative care, administration of eye drops, hand washing procedures, and procedure to make sterile cotton. Although the participants had retrieved primary postoperative education through conventional media (i.e., oral and text), the pre-test results revealed that, prior to being given complementary education, many of the patients are still lacking postoperative knowledge. In addition, these patients are clueless about several critical factors such as how to make sterile cotton. This result suggests that conventional methods are not effective enough to deliver postoperative education for cataract patients. If not mitigated, this lack of knowledge might lead to a slower recovery rate, severe complications, and even failed surgery outcomes (e.g., blindness). Fortunately, after the complementary audiovisual education intervention was given, the participants' knowledge of postoperative care was significantly better. This conclusion was reflected by the post-test scores, which were notably higher compared to the pre-test. This result is consistent for all research participants. One of the most significant improvements can be seen in the variable of "how to make sterile cotton".

The results of this study are in line with a research [28], which affirmed that audiovisual media was more effective in providing health education compared to non-audiovisual media. Our result is also in accordance with the research done in 2016 which stated that multimedia devices were effective in improving patient understanding even for patients with limited knowledge [29]. The effectiveness of audiovisual media to deliver health education to preoperative patients had been studied. The authors concluded that well-prepared patients with detailed preoperative instructions agreement are more effective with their surgery and are better equipped to manage their pain, engage in appropriate self-care activities, and accelerate their recovery. Therefore, patients' postoperative knowledge is important to minimize postoperative complications, improve patient compliance and reduce patient anxiety [30], [31].

Providing patients with health education is intended to enhance their health knowledge, encourage them to adopt healthier habits, and raise awareness among others [32]. The theory proposed by Benjamin Bloom stated that knowledge or cognition is an important domain that formed one's actions [33]. Therefore, individuals' knowledge of a particular topic is very critical for the changes in their actions, especially in a complex decision-making process. Research by Bae and Baxter [34] showed that audiovisual videos about cataract care education made by the average medical organization were useful in practice. A person's behavior is influenced by their thoughts and emotions, which are expressed as knowledge, perceptions, attitudes, beliefs, and judgments about particular objects [35]. Behavior that is based on knowledge, indeed, is better than behavior that is not based on knowledge. In this case, the use of audiovisual as a medium for health education for post-cataract surgery patients to increase their knowledge level in post-cataract surgery care may change their behavior and attitudes to avoid complications due to the mentioned surgery.

In this work, audiovisual education was given as an adjuvant, complementing the primary education methods via oral and text education. In the clinic, the patients retrieve a complementary postoperative education through 7 minutes of audiovisual media. Although audiovisual media is known to be easier to understand and easier to remember, there is still a risk of it being forgotten, especially considering that the majority of cataract patients are elderly. When this paper was written, distributing audiovisual media to the patients (or their guardians) is still impractical due to the cost and operational overhead. Hence, text education via pamphlets still becomes the main educational media since it can be brought home, seen, and read at any time. However, in the future, it is not impossible to provide audiovisual media that can be brought home. Moreover, our audiovisual media are lacking two-way interactions, making it cannot replace the education given through oral explanations. In the future, it is possible to design audiovisual media with two-way interactions. Therefore, audiovisual education can replace the current conventional postoperative education techniques (i.e., oral and written).

Indeed, there are still several limitations in this study. First, the effectiveness of the proposed intervention is dependent on the prior knowledge of each patient. In a society where the patient is already well-educated, the effectiveness of audiovisual education in post-cataract surgery patients may deteriorate. Second, this study was only conducted in one hospital clinic with a limited number of patients. Therefore, this result cannot be generalized to other populations. Third, the instruments used in this study were not externally validated and had never been used in other related works before. Also, we only use one type of our own-designed audiovisual media, therefore we cannot validate whether the other audiovisual media will produce similar results. Lastly, the outcome of this study was derived from the patient's answer, therefore there is no way to verify the truth of the patient's response.

It is recommended to extend this study with a larger number of participants from numerous clinics and various types of audiovisual media. It is also recommended to conduct a randomized control trial study with samples from heterogenous backgrounds for future works. Hence, a more comprehensive result can be derived.

5. CONCLUSION

Based on the findings of this study, it is concluded that health education using appropriate audiovisual media is effective to increase patients' knowledge in post-cataract surgery care. Audiovisual media provides a better understanding of the discharge planning program for post-cataract surgery patients. In this study, we revealed that although all of the participants have retrieved post-surgery education through oral and text media, many of them still do not fully understand the received information, reflected by a poor score on pre-test evaluation. This result indicated that oral and text education alone may not effective and sufficient to deliver post-cataract surgery education. However, after receiving a complementary audiovisual education, all of the participants consistently achieved a significantly better score on the post-test evaluation, indicating that they have gained adequate post-surgery care information. Therefore, we believe that it is recommended to include audiovisual media for health education in the SOP of post-surgery education. Audiovisual media can be referred to as complementary education media other than the existing ones (e.g., oral education and text-based education). To ensure the effectiveness of audiovisual-based education, appropriate media should be carefully designed by considering several factors. These factors include deliverability, attractiveness, easy-to-digest, vital information containment, and sufficiently short duration. Both healthcare workers and hospitals play critical roles in the success of postoperative education.

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