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Video-Based Eye Health Education during the Pandemic in the Student Community of SMAN 1 Sukabumi

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Abstract

The COVID-19 pandemic is responsible for changing learning methods. Online learning during COVID-19 requires students to use electronic devices so that they are more exposed to computer screen radiation, which can cause dry eyes. This community service involves education about the importance of maintaining eye health for students. This activity aims to provide an overview of the impact of eye health during the pandemic on the high school student community, SMAN 1 Sukabumi. This activity was carried out from January 10 to January 22, 2022. Participants in this activity were all class XII students of SMAN 1 Sukabumi. This activity was part of the Field Learning Practice (Praktek Belajar Lapangan) activities for Block 21 students of the Faculty of Medicine, University of Muhammadiyah Semarang. The action in the form of online education began with counseling material on eye health and was followed by the screening of educational videos. This community services activity went smoothly. There was an increase in participants' knowledge of 55.8% from before (score of 35.84) and after a material presentation (score of 55.83). Health education messages conveyed in the form of videos are practical and quite effective as a means of disseminating information, as evidenced by the increase in participants' knowledge.

Keywords: eye health; health education; video based.

Introduction

The COVID-19 Pandemic started in March 2020 in Indonesia and is responsible for the change in the learning method. The Indonesian government, on behalf of the Ministry of Education and Culture, issued a circular of the Minister of Education and Culture, Number 36962/MPK.A/HK/2020, dated March 17, 2020, regarding online learning and working from home to prevent the spread of COVID-19 (Kementerian & Kebudayaan, 2020). Online learning is a learning process that allows the student and the teacher to meet through internet-based media. Students from the elementary to the university levels used online media during the learning process. Online media can be accessed using any electronic device, such as a computer, laptop, or other gadgets, enabling students to access information and learning material flexibly. The use of electronic devices for learning has its strengths and weaknesses.

The strength of this method is that it can improve cognitive skills and knowledge. It also positively encourages innovation and supports digital literacy among students. One of the positive effects of this method is improved learning enthusiasm due to the involvement of technology in the learning process (Nurul Fazriyah, Cartono, 2020). On the other hand, the online learning method used during the COVID-19 pandemic also had its weaknesses. Students are required to use electronic devices for longer periods, exposing themselves to more screen radiation than before. A study showed that 60% of school-aged children had used electronic devices for more than two hours (Rachmawati, 2020). It contributes to health problems like computer vision syndrome and dry eye complaints.

Computer Vision Syndrome (CVS) is a group of indications caused by a vision disorder due to near and prolonged exposure to a computer screen. Meanwhile, Dry Eye Syndrome (DES) is also known as dry eye surface and results in inconvenience, a visual disorder due to inadequate lubricant, an inflamed eye surface, and neurosensory abnormalities (Sheppard & Wolffsohn, 2018). These DES symptoms could be burns and itching, a feeling of something in the eye, a corneal injection, a red eye, or photophobia. Based on epidemiology research, the prevalence of DES in Indonesia is 27.5% (Argaheni, 2020; Kurtarto, 2017). The other research finding proved that in two middle schools in Kediri, students suffered from CVS at a rate of 93% (Zulkarnain *et al*., 2021). Meanwhile, there are 60 million people in the world who suffer from CVS (Waleed M. Alghamdi, 2020). Online learning during a pandemic by using gadget screens can increase the radiation of electromagnetic waves emitted through electronic devices, which has an impact on eye health. Besides that, looking at a computer screen with full concentration can be an eye stressor that awakens the parasympathetic nerves so that the ciliary muscles of the eyes will contract and cause eye fatigue. Asthenia caused by a failure to accommodate near-distance focus causes CVS. Focusing on a computer screen reduces the ability to blink the eyes by 6–8 times per minute, putting pressure on the ciliary muscle. Eventually, it reduces accommodation and leads to presbyopia (Arshad *et al*., 2019). To stop CVS, students who use technology to learn need to know how important it is to keep their eyes healthy.

During the COVID-19 pandemic, most people, especially students, stayed at home, did more activities at home, and used their gadgets more, from computers, laptops, and televisions to mobile phones. Students are required to engage in online learning. Such a condition causes the use of gadgets and computers during the pandemic to increase drastically, risking eye health conditions such as computer vision syndrome. Based on the explanation above, the researchers would like to establish a community service program that aims to educate about the effect of the use of gadgets in the learning process during the pandemic on the eye health of high school students, especially at SMAN 1 Sukabumi. The community of this school was chosen since it fully implemented online learning during the COVID-19 pandemic.

Research Methods

This community service program was conducted between January 10 and 22, 2022. The entire class of grade XII students at SMAN 1 Sukabumi took part in this program. The material and equipment used during the study were educational videos, learning material in the form of PowerPoint slides, and Google Meet applications. This program was conducted in collaboration with college students and lecturers as one of the components in the students' field study practice of community-based education presented by the Faculty of Medicine at the University Muhammadiyah Semarang. The program was started by exploring common health problems in the community by identifying the behavior, environment, healthcare, and genetic factors related to eye

health during the pandemic among the community of high school students. In the first stage, 34 students filled out a questionnaire about eye health problems for identification related to the health problem. Next, the focus of the problem and the problem-solving strategy were determined based on the analysis of the problem. The problem-solving intervention agreed upon in this program is video-based education to prevent eye health problems during the pandemic among high school students. This community service activity aims to promote health among target audiences, especially eye health, during the COVID-19 pandemic. Therefore, the stages of the community services program consist of the following:

1. Preparation

The preparation stage involved some programs, including a request for permission from the principal of SMAN 1 Sukabumi and discussing health problems experienced by the students. After permission was obtained, the learning materials were gathered, and an educational video about how to avoid health problems was made. The video was started by determining the theme, collecting the material, and recording the video. The researchers acted as educators in the educational video. Educational media used was online, so it was necessary to prepare a Google Meeting (Gmeet) link, virtual invitations, online attendance forms, and pretest and posttest forms. The questions given for the pre-test and post-test in the online form use multiple-choice questions by Kahoot. Furthermore, the team coordinated with the school to ensure that the target could participate in the activity. Teams of lecturers and students shared tasks to carry out activities at the preparatory stage.

2. Implementation

The education was delivered to the students of SMAN 1 Sukabumi via Google Meet on Saturday, January 22, 2022, from 10 a.m. to 12 p.m. Fourteen students participated in the online meeting. The education method was similar to the one applied by Kartini *et al*., (2021). The education program included some activities described below:

a. Before the materials were sent out, the service team opened the program and gave out a pre-test in the form of a questionnaire about eye health and how to avoid eye problems during the pandemic, which will be explained below.
b. The education program used lectures to explain what dry eye is, what its symptoms are, what causes it, and how to stop it.
c. The presentation of the educational video
d. Question and answer in a discussion session between the participants and the service team. The participants gained some new ideas and showed some enthusiasm as more questions were asked.
e. The program was closed with the distribution of a post-test questionnaire and feedback session.

3. Evaluation

Evaluation of the implementation of community service took the form of evaluating changes in participants' knowledge after online education by Kahoot. The post-test questions were equated with the pre-test questions to see how much the knowledge score increased or decreased. Evaluation was also carried out by distributing online educational feedback questions that have been implemented. The feedback data was used as a reference for improving further community service activities.

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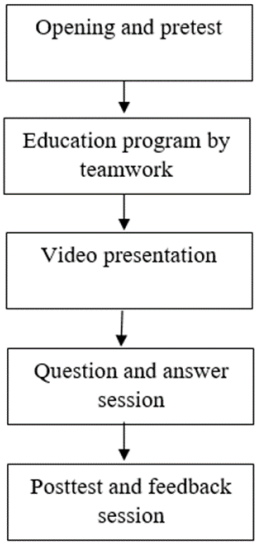

Figure 1. Flowchart of the Program

The contents of the material presented are as follows:

1. Definition of dry eyes
   Dry eye disease is a multifactorial disease of the tears and the surface of the eye that causes symptoms of discomfort, visual disturbances, and tear film instability with the potential to damage the eye surface. This situation can be followed by an increase in tear film osmolarity and inflammation of the ocular surface.
2. Signs and symptoms of dry eyes
   The main symptom of dry eyes is a dry and gritty feeling in the eyes. Additional symptoms include burning or itching, foreign body sensation, excessive tearing, pain and redness of the eye, and photophobia. It may be followed by visual disturbances and worsen when humidity is low and temperature is high.
3. Risk factor
   Risk factors for dry eye disease are environmental factors, such as dust, dryness, wind, and cigarette smoke; the use of contact lenses, activity using computer screens, TV, or gadgets for too long; a history of eye surgery; the presence of other diseases that can trigger dry eye; and the use of certain drugs, either oral medication or eye drops.
4. Prevention (Zulkarnain *et al*., 2021)
   a. Avoid pollution and irritants by avoiding rubbing the eyes, which can disrupt the tear film and transfer irritation to the eyes.
   b. Be careful when using contact lenses. Contact lenses can absorb fluid in the eye. Keep your lenses clean, and try not to wear them all the time.
   c. Use artificial tears to provide more moisture to the eyes.
   d. Try to blink every five seconds, especially when staring at a computer or gadget screen.
   e. Take a short break using the 20-20-20 rule method, which is to look at an object 20 feet (6 meters) away for 20 seconds every 20 minutes.

Results & Discussion

The education program was conducted online via Google Meet, with 14 students participating. The students got material from the service team, as elaborated in Figure 2. The service team distributed pretest and posttest questionnaires to evaluate students' comprehension before and after the education program (Figure 3). The education was also conducted by presenting a video,

hoping the students could have repeated viewings of the material. The video was linked to a YouTube channel, as presented in Figure 4. The activity went smoothly as expected, even though there were obstacles in the form of unstable signal interference that resulted in participants going in and out of the Gmeet room. However, this does not reduce the effectiveness of conveying the material. The participants were enthusiastic and eager to ask the presenter some questions. The questions can be submitted directly or conveyed through the chat room that has been provided. Overall, the education program was successful.

The material presented was an explanation of harmful activities using gadgets and their harmful effects on eye health. The presenter took turns presenting the material about the tired eye, dry eye, and ergonomic position required when using a computer, laptop, or gadget. The COVID-19 pandemic around the world, particularly in Indonesia, made online learning an alternative to learning methods commonly used at any education level. In this method, the students must operate gadgets during the learning process by using applications such as Kahoot and Quizizz. It encourages the realization of digital literacy among students in the class (Nurul Fazriyah, Cartono, 2020). However, some health problems arise from online learning, such as back pain, neck pain, eye pain, headaches, sleeping disorders, and anxiety. Prolonged exposure to the gadget screen during the online learning process may result in dry eyes (Kartini *et al*., 2021). Dry eyes are caused by the (excessive) use of gadgets (Karakus *et al*., 2018). It is different from another study conducted on students in the Faculty of Medicine, University Muhammadiyah Semarang, which found no significance between dry eye and the use of gadgets with a p-value of 1.00 (Swasty, 2021). The risk factors for CVS with dry eye as one of the symptoms are the duration of screen exposure, resting duration, use of eyeglasses and contact lenses, visibility, and refraction disorder. Some external factors are screen brightness, blinding light, the size of fonts and objects on the computer, and the use of air conditioners (Arshad *et al*., 2019). The brightness of the gadget screen that is too bright can also cause other eye health problems, namely eyestrain or tired eyes. This eye fatigue causes discomfort both in daily activities and learning activities, thus affecting students' academic achievement. Eye complaints cause students to be unable to concentrate on listening to learning material; hence, it can make them fall behind in lessons and even result in poor grades.

The eye is one of the five senses and is the organ of vision that is used to see, so it is necessary to take care of the health of the eyes. During the pandemic, when most people began to conduct their activities via computer screens, it caused visual disturbances in individuals. Computers, or laptops, are electronic devices that play a very important role in various fields, especially when it comes to education and learning. The use of computer technology during the COVID-19 pandemic in education and learning has two opposite sides: on the one hand, it aims to improve the quality and innovation of education, but unfortunately, on the other hand, the use of computers for long periods of time will cause various health problems, especially eye health.

The prolonged use of computers reduces the blink rate, which leads to dry eyes. The eye surface is protected by a thin liquid film produced by the blinking process. The reduced blink rate leads to discomfort, dryness, and blurry vision. The mechanism of eyelid movement is related to the Visual Display Terminal (a condition related to CVS) and is caused by more than four hours of computer use per day (Sheppard & Wolffsohn, 2018). The prolonged use of a computer or gadget at a close distance could increase the risk of myopia. Besides the ocular symptoms, it could also affect other symptoms such as neck pain, stiffness, and waist pain due to the sitting position and prolonged muscle contraction (Abudawood *et al*., 2020).

The prevention of the negative effects on the eye and physical health due to prolonged use of a computer could be done by resting between or after using the computer. In the education program, the presenter also suggested the prevention method of fixing the ergonomic position during the use of the computer and implementing the 20-20-20 rule of resting the eye for 20 seconds after the use of the computer for 20 minutes by looking away from 20 feet, or about six meters. The research

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found that the intervention using the 20-20-20 method was significant for the case of CVS among the workers at the Port Heath Office, Class 1 (Anggrainy, 2018). Other findings included reducing CVS cases among SMAN 1 Kediri and SMAN 3 Kediri students by implementing a 20-20-20 intervention despite an unachieved normal Tear Break Up Time Test (TBUT) (Zulkarnain *et al*., 2021). This program covers everything from the signs and symptoms of CVS to the prevention method. The result shows that the program successfully improves knowledge and further affects behavior and action related to preventing eye health problems during the pandemic.

Figure 2. Video of Program Materials Made by the Community Service Team for Participants.

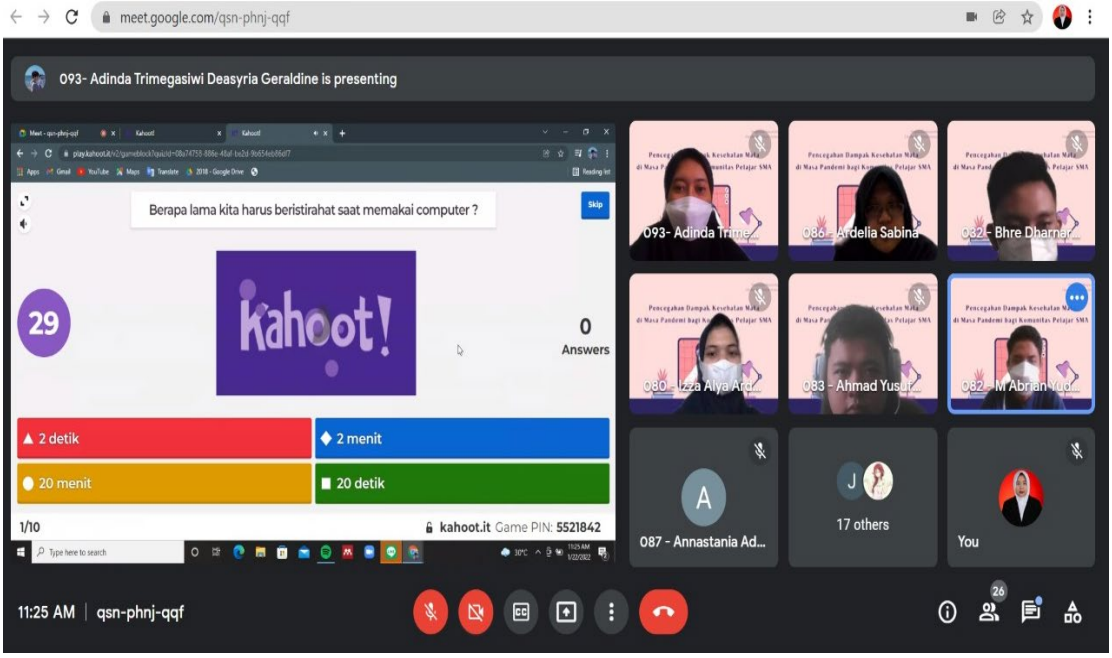

Figure 3. Pretest and Posttest to Evaluate Participants' Understanding

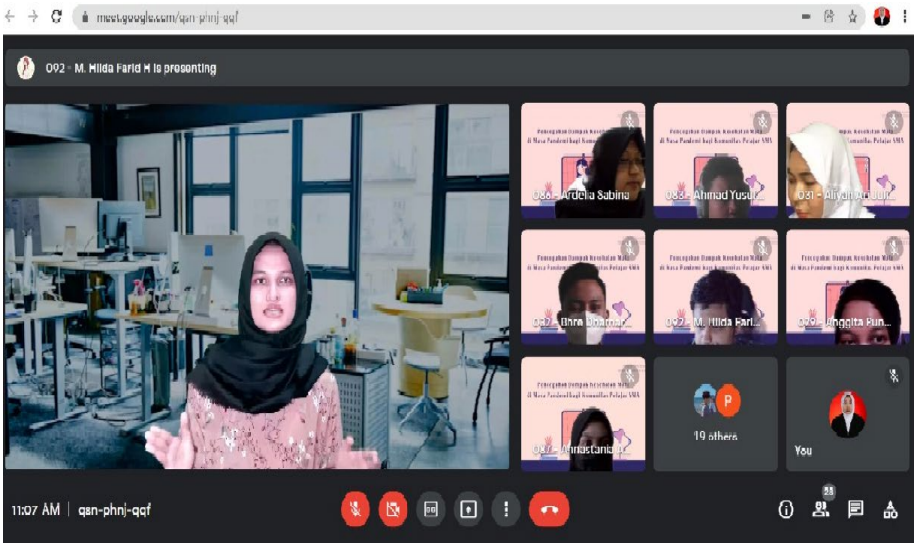

Figure 4. The Presentation of an Educational Video

The participants' comprehension was measured by question items in the pretest and posttest, which show the improvement of knowledge by 55.8% from the initial score of 35.84 and after the lecture program (score of 55.83), as presented in Figure 5. It proves that the education program is beneficial and effective in improving the participants' comprehension.

Sufficient knowledge about maintaining eye health becomes vital as a preventive effort for an eye disorder (Mark IG, Jay JM, 2022). The education in this community service program is proven to improve the participants' knowledge (Kartini *et al*., 2021). Before implementing the education, only 4.5% of participants in the community service had sufficient knowledge about eye health regarding online learning during the pandemic. However, after the implementation of the education program, the number increased to 60%. The other finding is also demonstrated by Universitas Muhammadiyah Jakarta's online student community service. The findings revealed that health promotion, particularly eye health promotion, was well received by SMPIT Darul Abidin students (Janati *et al*., 2021). The community service conducted by the students of MTS An-Nur also showed improved knowledge about using gadgets (Irayani et al., 2021). Also, the findings from a study about eye health education for students in Korea indicate that it is effective in improving knowledge about eye health (Park & Ahn, 2022). The improvement in knowledge and response shows that the information was well received.

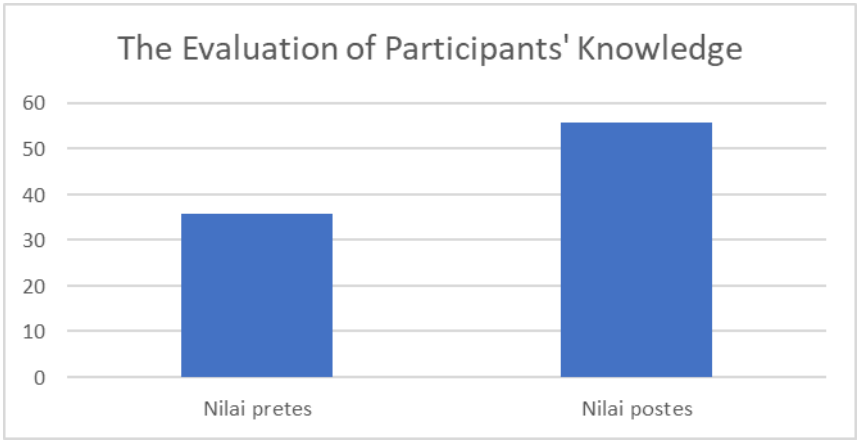

Figure 5. The Improvement of Participants' Knowledge Before and After the Education Program

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Conclusions

The video-based community service about preventing eye health problems during the pandemic in SMAN 1 Sukabumi students was completed. This educational activity has been carried out well and has received a good response from the target audience, namely the students of SMAN 1 Sukabumi. The education program that delivers messages in pictures and video animation is considered practical and effective in providing information. There was an improvement in participants' knowledge. Thus, the program suggested it could be done continuously with more innovation and creativity on a more varied topic.

Acknowledgment

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