



Difference of effectiveness between educational video media and PowerPoint on sedentary lifestyle on students' knowledge

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ABSTRACT

Living a sedentary lifestyle entails engaging in minimal physical activity and getting insufficient exercise. One of the common repercussions of sedentary habits among adolescents is obesity. With the onset of the COVID-19 pandemic, students often studied online, spending prolonged hours in front of computer screens. This shift to remote learning exacerbated the sedentary behavior already prevalent among adolescents, potentially worsening the risk of obesity and other associated health issues. To mitigate the detrimental effects of a sedentary lifestyle, this research aimed to enhance students' comprehension of relevant information on a sedentary lifestyle. A quasi-experimental pre-test and post-test design was used in this kind of study. Using the purposive sampling technique, the study sample consisted of 72 students from class X: 36 respondents from class X-1 were assigned to the instructional video media group, while 36 respondents from class X-2 were assigned to the PowerPoint group. A pre-test questionnaire was distributed to each group, followed by interventions and a post-test questionnaire. The Mann-Whitney test was used to analyze the data between groups, while the Wilcoxon test was used to analyze each group's data. After using PowerPoint and video media as an intervention, there was a significant difference in the respondents' knowledge level, with p values being the same (p value=0.000). The treatment group that used educational video media and the group that used PowerPoint media differed in effectiveness (p value=0.015). After receiving an intervention using a PowerPoint and video, the respondents' level of knowledge increased. Compared to PowerPoint presentations, educational videos are a more effective way to enhance understanding of inactive lifestyles. A remarkable opportunity exists to enhance adolescents' understanding of the importance of leading an active lifestyle by harnessing the potential of video media as an instrumental tool.

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1. Introduction

Sedentary lifestyle is characterized by being less active and using little energy, such as watching television, accessing the internet using handphones and laptops, and playing games on



computers or handphones [1,2]. One problem to be prioritized during the pandemic was the decreasing physical activities among teenagers who tended to adopt a sedentary lifestyle [1,3]. This lifestyle has spread worldwide due to the lack of public space to exercise. In addition, the sedentary lifestyle increases in workplaces and schools [4]. The rate of the sedentary lifestyle in Central Java was 20.5%, dominated by the female population, with low education, unemployed, and living in urban areas [5].

The most frequent negative impact of a sedentary lifestyle is obesity [6, 7]. Besides obesity, the other negative impacts are diabetes mellitus, hypertension, risk of cancer, cardiometabolic, myopics, and other diseases [7, 8]. According to the RISKESDAS of Central Java, the prevalence of overnutrition among teenagers aged 13-15 was 9.5% with 7.1% overweight and 2.4% obesity [10]. The City of Semarang is one of cities in the Province in Central Java with nutritional status among teenagers of 13-15 years of age requiring attention since the prevalence of overweightness and obesity were 11% and 4.9% respectively. Meanwhile, the prevalence of overweightness and obesity among 16-18 years old teenagers were 7.6 and 2.7% respectively [3, 10].

Previous studies reveal that one of the factors related to a sedentary lifestyle is the lack of knowledge among teenagers on the health benefits of physical activities [9, 11]. Such a condition would cause the teenagers to adopt a sedentary lifestyle beyond their awareness [12]. This leads to the necessity for providing health information on sedentary lifestyle so that teenagers can prevent the effect as early as possible. One of the efforts to improve teenagers' knowledge on sedentary lifestyle is by providing information on health education. Information can be provided through various media, such as audiovisuals or other self-operated media [13, 14]. Previous studies have revealed that health education through audiovisual and visual media is more effective in improving teenagers' knowledge on sedentary lifestyle [15, 16].

According to a theory by Dale, 75% of an individual's learning experience is obtained through vision (eyes), 13% through audio (ears), and the remaining 12% through other senses. Someone can memorize things by reading at 10%, by listening 20%, by seeing 30%, by seeing and listening 50%, by what is said 70%, and by doing 90% [17]. Thus, the capability of audiovisual media is considered more effective since they are seen and heard at the same time [18, 19]. Some research results show that audiovisual media significantly affects the change in knowledge level [20, 21]. The number of receptive senses involved determines the effectiveness of the use of educational media. The more the senses are in use, the easier it will be to understand the delivered messages [17].

One of the audiovisual media that can be used is video. Videos are learning media which contain information not only in still pictures, but also moving pictures accompanied with sounds (audiovisual) [22]. Audiovisual media can induce students' interest [16]. Various studies have made the use of educational videos to be applied to people from early ages to senior adults. The results of the studies show that educational videos are effective media to improve knowledge for all ages [22, 23]. Beside audiovisuals, PowerPoint is also effective to deliver information systematically in texts or pictures in very interesting ways so that it is easy for students to understand, hence the education materials can be received well [24].

A preliminary study with 17 students of class X revealed that all students had not known the term sedentary lifestyle. Further, 12 out of 27 students mentioned they lack physical activities, especially during the Covid-19 pandemic. Based on the information from the school, there had been no studies or educational program regarding sedentary lifestyle using educational video or PowerPoint. Departing from this information, this study aims to determine the effectiveness difference between educational video media and PowerPoint to the knowledge of sedentary lifestyle among teenagers 12-17 years old.

2. Method

This study applied a quasi-experimental method with a quantitative approach to determine the effect of a certain treatment on another thing. The designs of the study were pre-test and post-test group designs. The decision on the number of samples, was done with a purposive sampling method. This was done due to the Covid-19 pandemic, so the researchers should follow the sample/class arrangement from the school administration. The samples were the students of first year group B and first year group A, totaling 72 respondents. Further, they were divided into two groups of 36 respondents where class first year group B was assigned as educational video group and first year group A as PowerPoint media group.

The study was started with the signing of informed consent by the respondents as a proof of their agreement to be involved in the study. Further, the respondents answered a pre-test questionnaire on sedentary lifestyle, continued with intervention on each group. The research was closed with the filling-in of a post-test questionnaire by the respondents. The research data were analyzed using Wilcoxon and Mann-Whitney tests. This study had gone through the Ethical Clearance (EC) phase by the Ethical Commission of Health Studies (ECHS or KEPK) of the Faculty of Public Health of Universitas Muhammadiyah Semarang. It had passed with the number 656/KEPK-FKM/UNIMUS/2022.

3. Results and Discussion

3.1. Results

The study was conducted in a public senior high school in Semarang City, Central Java. There were 72 respondents to be analyzed in the study. Validity and reliability tests were evaluated by two experts (expert judgment), i.e. the lecturers with knowledge in sedentary lifestyle. The objects of the test were the questionnaires prepared by the researchers.

Table 1. Respondent Characteristics of the Groups of Educational Video and PowerPoint Media

Respondent characteristic		Video media group		PowerPoint media group	
		<i>n=36</i>	%	<i>n=36</i>	%
Gender	Male	17	47.2	17	47.2
	Female	19	52.8	19	52.8
Age	14 years old	-	-	2	5.6
	15 years old	26	72.2	28	77.8
	16 years old	9	25	6	16.7
	17 years old	1	2.8	-	-

Table 1 shows that the characteristics of the respondents in this study were dominated by females by 19 respondents (52.8%) from the two audiovisual and PowerPoint treatment groups. Further, most of the respondents in both groups were 15 years old.

The pre-test and post-test questionnaires revealed the respondents' knowledge categories (knowledge levels) from each intervention group. The distribution of the respondents' knowledge categories is presented in the following Table 2.

Table 2. Distribution of the Respondents' Knowledge Levels Before and After Education Intervention Using Video and Powerpoint Media

Knowledge category	Video group				PowerPoint group			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
Good	20	55.6	32	88.9	29	80.6	31	86.1
Enough	10	27.8	4	11.1	6	16.7	5	13.9
Less	6	16.7	-	-	1	2.8	-	-
Total	36	100	36	100	36	100	36	100

Table 2 shows an improvement in the respondents' knowledge between before and after education treatment with video and PowerPoint media. During the pre-test, there were 6 students (16.7%) from the video group with less knowledge and 20 respondents (55.5%) with good knowledge. After the intervention, the number of those with good knowledge increased to 32 respondents (88.9%), and there were no more respondents from the video group with less knowledge. With the PowerPoint group, during the pre-test, there were 29 respondents (80.6%) with good knowledge and 1 respondent (2.8%) with less knowledge. During the post-test, no more respondents with less knowledge, and those with good knowledge increased to 31 respondents (86.1%).

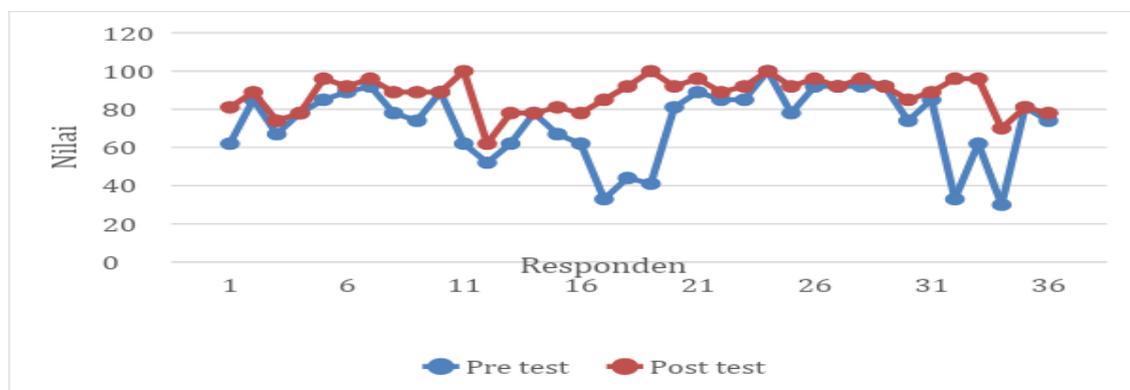
The results of the normality test showed that the data from the video and PowerPoint groups were not normally distributed, as can be seen in the following table:

Table 3. Comparison of pre-test and post-test results of the education groups

Group		N	Mean	Std. deviation	Median (min-max)	p-value
Video Media	Pre-test	36	72,92	18,735	78 (30-100)	0,000
	Post-test	36	87,75	9,034	89 (62-100)	
PowerPoint	Pre-test	36	84,81	12,824	89 (30-100)	0,000
	Post-test	36	90,67	8,173	92 (62-100)	

Table 3 shows that the results of paired difference test using *Wilcoxon* between the pretest and posttest of the video treatment group had generated the value of $p=0,000$ ($<0,05$), indicating that there was a significant difference in knowledge level between before and after the education on sedentary lifestyle using video media. Further, comparison using the values between the pretest and posttest results of the PowerPoint group resulted in the value of $p=0,000$, indicating a significant difference in the knowledge level between and after the education treatment using PowerPoint.

Figure 1. showing blue and red lines describe a significant difference in the knowledge between the pretest (blue) and posttest (red) among the respondents in the group with video intervention.

**Figure 1.** Diagram of pretest and posttest scores of the group with Video Intervention

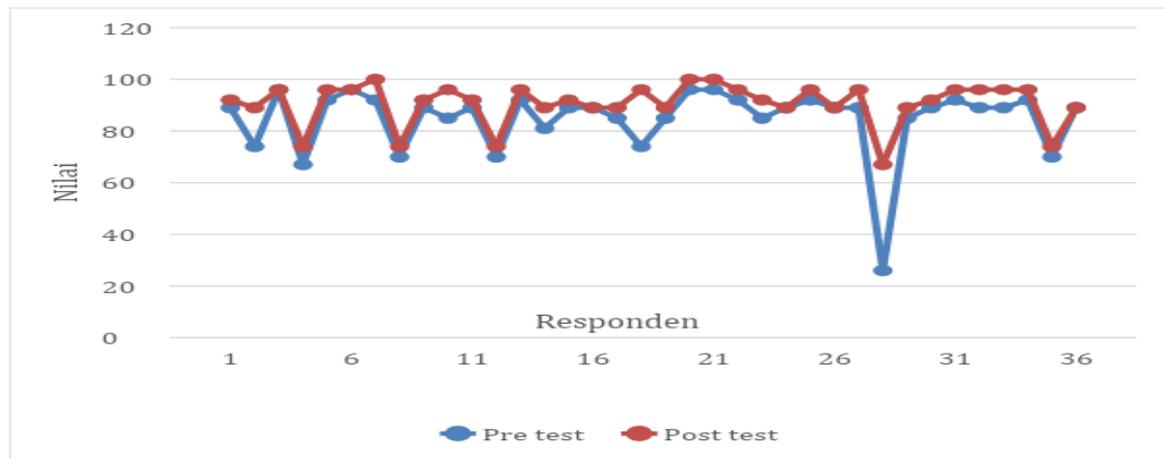


Figure 2. Diagram of pretest and posttest scores of the group with PowerPoint Intervention

In Figure 2, the blue and red lines show a significant difference in the knowledge between the pretest and posttest among the respondents in the group with PowerPoint intervention. The average score of the respondents was in the range of 60-100, but there was one respondent with the pretest score as low as 30.

The analysis of difference tests on the effectiveness of health education using video media and PowerPoint of both data revealed that they were not normally distributed. Knowledge gain can be measured from the difference in knowledge scores between before and after education using these two media.

Table 4. Effectiveness Difference of Health Education Using Video and PowerPoint in Improving Respondents' Knowledge of Sedentary Lifestyle

Group	N	Mean	Std. deviation	p-value
Video	36	4.03	4.778	0.015
PowerPoint	36	1.58	1.991	

Table 4 shows that the average knowledge among the respondents of the video group was 4.03, while that of the PowerPoint group was 1.58. In addition, video media was more effective than PowerPoint in improving the respondents' knowledge of sedentary lifestyles using the Mann Whitney test (p-value 0.015).

3.2. Discussion

There has been an improvement in the knowledge of sedentary lifestyles among the respondents in the video and PowerPoint groups, where the video group showed an increase in good knowledge level from 55.6% to 88.9%. In contrast, the PowerPoint group increased from 80.6% to 86.1%. This shows that video media and PowerPoint could increase the percentage of correct answers from the respondents. The statistical test results also showed a significant difference between before and after education intervention in both groups. Education using video and PowerPoint could improve respondents understanding of sedentary lifestyle since it is very attractive in delivering the education materials so that it is good to motivate and develop interest among the students in learning more enthusiastically and in better focus to make the learning more effective [13, 16, 21].

Even though there was an improvement in the knowledge and a significant difference between before and after the intervention with PowerPoint, the statistical test showed that the effectiveness was less than that of the video treatment. This also confirms the results from previous studies, which reveal that video media is more effective than PowerPoint in improving teenagers' knowledge [18, 21, 25].

The video media's advantage lies in its sound, pictures, and words combination. Such a combination would be more effective in retaining memories than visual media which use only pictures/texts or audio media which use only sounds [26]. Education using video media has proven to help improve respondents' understanding of sedentary lifestyles since it utilizes sound, motion, and special effects in delivering messages to clarify the learning process better and draw students' attention [22, 27]. Respondents can see motion pictures according to the delivered materials so that the learning is not boring [21]. Video media can stimulate multiple senses so respondents would find it easier to comprehend the information on a sedentary lifestyle. Hence, educational video media can motivate and induce respondents' interest in making learning more effective [25, 28].

This study has some drawbacks, such as the researchers' difficulty in conditioning the respondents to be well-mannered and follow the rules. For example, when answering the questionnaire, some tried to find the answers through Google. Therefore, inspection and firmness are required from the researchers. It is recommended that future researchers conduct further studies to complement this study with different research design and variables that have not been elaborated in this study.

4. Conclusion

The results of this study show an improvement in the knowledge of sedentary lifestyles among high school students upon the use of video media and PowerPoint. In addition, there was a significant difference between the health education using video and the one using PowerPoint regarding teenagers' knowledge improvement, where video media were more effective than PowerPoint. This research may eventually be the foundation for more successful teenage sedentary lifestyle teaching programs. Opportunities to improve their comprehension of the significance of an active lifestyle can be further expanded by employing video media as an instructional tool.

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Author contributions

The authors contributions in this study have been collecting and analyzing the research data.

Conflict of Interest

No conflict of interest exists in the writing of this publication article.

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