

The efficacy of video-based health education on knowledge about the dangers of smoking among students in private middle schools in Bandung city, Indonesia: A quasi-experimental investigation



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Abstract Adolescence is a crucial transitional phase in the life of a child, often accompanied by challenges in adapting to their environment. For a child, this period of change prompts exploration, which may include behaviors such as smoking. The prevalence of smoking is on the rise annually, with one contributing factor being a lack of knowledge about its dangers. To address this, efforts are made to increase awareness through health education. Therefore, this research aimed to analyze the impact of video-based health education on knowledge regarding the dangers of smoking, focusing on students at private Middle School in Bandung City. The research design was a quasi-experimental one-group pretest-posttest approach. A total of 156 respondents were selected using simple proportional stratified random sampling. The instruments used included a knowledge questionnaire and video media. Data were subjected to analysis using the Wilcoxon Signed Rank test. The analysis results showed that the majority of respondents (51.3%) had sufficient knowledge about the dangers of smoking before receiving the intervention. After receiving the intervention, almost all respondents (76.3%) had good knowledge about the perils associated with the habit. Statistical analysis using the Wilcoxon Signed Rank test indicated a p value of 0.0001, which was less than the significance threshold of 0.05. This showed the rejection of the null hypothesis (H₀), allowing for the conclusion that providing education had a substantial impact on knowledge regarding the dangers of smoking. In conclusion, the analysis results underlined an enhancement in knowledge regarding the dangers of smoking achieved through health education using video media. The effectiveness of video-based health education in augmenting the understanding of students of the dangers associated with the habit could be attributed to its ability to engage multiple senses, including sight and hearing.

Keywords: based video, education, knowledge, smoking

1. Introduction

Adolescence is the phase in the life of a child when they transition into adulthood, a period marked by significant physical and psychological changes (Herawati et al., 2020). The transition introduces a range of challenges, both personal and environmental, leading a child to seek new experiences, one of which is smoking. The more a child considers the habit to be an intrinsic part of their identity, the greater the risk of increased smoking rates (Abidin, 2022). Teenagers' curiosity about smoking is not solely because of themselves, rather, the association with smoking friends is a strong motivating factor (Almaidah et al., 2020). The tendency of teenagers to try smoking can cause health problems. Adolescence is a time when teenagers want to try new things and are easily influenced by their social environment. Among today's teenagers, smoking can be considered a normal habit, and they are considered losers if they do not smoke. Because of this incorrect statement, many teenagers are influenced and choose to smoke (Mirnawati et al., 2018).

Smoking poses severe health hazards because cigarettes contain more than 4,000 types of harmful chemicals, including nicotine and carcinogenic substances capable of causing cancer. In addition to being carcinogenic, cigarette smoke, which is filled with carbon monoxide, progressively inflicts damage to important organs, thereby impairing the functionality of internal systems such as the heart, blood vessels, and respiratory system. The dangers of smoking are not limited to smokers but also to those exposed to secondhand smoke, often referred to as passive smoking (Depkes, 2015).

In Indonesia, the cigarette industry poses a unique dilemma. While cigarettes have a significant impact on the national economy, they also take a toll on public health. Smoking involves the consumption of smoke containing nicotine, sugar compounds, additives, and others. Smoking is a public health problem in Indonesia, because smoking is one of the main risk



factors for several chronic diseases that can cause death. Smoking is also a major risk factor for noncommunicable diseases, in addition to unhealthy eating habits, lack of physical activity and alcohol consumption. This shows that smoking is a serious public health problem (Winarto et al., 2020). The habit has proliferated both in Indonesia and globally. According to the Global Youth Tobacco Survey (GYTS), 43.3% of boys started smoking at the age of 12-13 years, with 26.7% in the 10-11 age group. The prevalence of this habit among children aged 10-18 years increased from 7.2% in 2013 to 9.1% in 2018 (Widyawati, 2021), with a consistent increase from 20.30% in 2010 to 23.10% in 2016. Smoking becomes more of a problem as we get older. The initiation of smoking usually begins at the age of 12–15 years (Wojtyła-Buciora et al., 2017). The increase in smoking prevalence during adolescence is correlated with the level of smoking intensity during childhood (Hu et al., 2020).

Most adolescents are at risk for smoking. The results of research on 422 male high school students in Urmia, Northwest Iran, showed that 10.42% of the students were active smokers, and 40.75% of them had ever smoked. The research results also show that there is a positive and significant relationship between problem-solving skills, self-efficacy, self-esteem and attitudes and smoking prevention behavior (Didarloo et al., 2023). A study of 134 high school students in 8 public schools and 3 private schools in Riyadh, Saudi Arabia, showed that 27.8% were smokers. Of these students, 20.3% smoked cigarettes, while 13.3% smoked a combination of cigarettes, e-vapes, hookahs, pipes, cigars, and khat/kyat. Of the 134 students who smoked, 58.9% started smoking before the 15 years of age. A total of 76.1% could buy cigarette products from the nearest shop without help. A total of 89.6% admitted to smoking every day, while 41.0% admitted to smoking at least half a pack of cigarettes per day. The most common reasons these students smoke, drink alcohol or consume drugs and illegal substances are loneliness, happiness, curiosity, peer influence and forgetting problems (Alenazi et al., 2023). Greater attention is needed to reduce smoking behavior among school adolescents, especially among those with other behavioral risk factors, including mental health problems, frequent sexual activity, truancy, exposure to bullying, and alcohol consumption (Van Minh et al., 2022).

In Indonesia, more than 75.5% of deaths are caused by noncommunicable diseases; one of the risk factors is smoking. Smoking contributes to a number of diseases, most notably ischemic heart disease, which causes approximately 645 DALYs for every 100,000 people (TCSC-IAKMI, 2020). Smoking has also been reported to almost double the risk of severe COVID-19 infection (Zhao et al., 2020).

Smoking is influenced by various factors, including peer groups, mass media, family, knowledge, and attitudes (Liem, 2014). The perception that smoking is cool and interesting is one of the factors that influences smoking behavior (Lin et al., 2023). Research conducted by Iriyanti Nur Yudha (Iriyanti & Mandagi, 2022) indicated that 26.7% of children still possessed inadequate knowledge about the dangers of smoking. Therefore, there remains a crucial need to enhance awareness, and one effective avenue is through health education that conveys the dangers associated with the habit. An analysis of knowledge about smoking among 3,430 students aged 13-15 years in Vietnamese schools showed that 67.2% had insufficient knowledge (Huong et al., 2016).

Health education can be effectively delivered through video media. Video media offers several advantages, including rapid message delivery, ease of retention, the ability to describe events in a concise timeframe, repeatability, and the ability to stimulate the thoughts and perspectives of students (Tafonao, 2018).

Based on the results of a preliminary analysis with 20 students from a private middle school in Bandung city, with an equal distribution of 10 males and 10 females, conducted through interviews, a clear picture is revealed. Of these participants, 12, comprising 8 males and 4 females, acknowledged that they had smoked. The reasons given for the habit are simple, such as "Just trying it out" or "Peer influence." In addition, when questioned about the meaning of cigarettes, their, the causes of smoking hazards, and methods used, to prevent smoking, only 9 students were able to respond accurately to all the queries. On the other hand, a total of 11 students struggled to provide correct answers to all the questions. The results underscore the urgency of conducting investigations on the knowledge of a child regarding the dangers of smoking through health education. Therefore, this research aims to analyze the impact of video-based health education on the knowledge about the dangers associated with habits within private middle schools in Bandung city.

2. Materials and Methods

2.1. Study design

This research adopted a quantitative approach, utilizing a quasi-experimental one-group pretest-posttest design. (Arikunto, 2014) defined the one-group pretest-posttest design as a method that incorporated an initial assessment (pretest) before administering any treatment, followed by a final assessment (posttest) after the treatment. In this analysis, the independent variable was health education, which was a deliberate effort aimed at cultivating health-promoting behaviors within a community. The chosen health education method included lectures using video media to convey information about the dangers of smoking. Furthermore, the dependent variable under examination was knowledge, which denoted the understanding of a child regarding an object acquired through their senses, including hearing, sight, smell, and touch (Notoatmodjo, 2018). The research protocol comprised the administration of a pretest to the respondents, followed by the integration of the intervention. The intervention, consisting of a 30-minute lecture with video content, was delivered after the pretest, and the posttest was carried out on the following day.

Population and sample: Respondents The research sample comprised all 7th- and 8th-grade junior high school students. A sample size of 156 students was selected using Slovin analysis. The method adopted was simple proportional stratified random sampling. The selection criteria for the sample included both inclusion and exclusion criteria. The inclusion criteria included students in the 7th and 8th grades who willingly participated in the analysis. The exclusion criterion included students who had already received information on the dangers of smoking. After identifying potential samples that met these criteria, random selection was performed based on calculated representations from each class level. Those who became class representatives were approached to explain the research objectives, benefits, and procedures, as well as the rights and responsibilities of being a respondent. Subsequently, the analysis sought informed consent from potential respondents who were willing to participate.

Intervention: The intervention provided in this research centered on health education, which was conveyed through lectures featuring video media. The intervention session had a duration of 60 minutes, consisting of 5 minutes for the opening and objectives, 20 minutes for the questionnaire completion, 30 minutes for health education, and 5 minutes for the conclusion. In the first step of the intervention session, a pretest was administered in the form of a knowledge questionnaire. The questionnaire contained 20 questions, covering various aspects of smoking, including its meaning, associated hazards, cigarette ingredients, health implications, and preventive measures. Completing the questionnaire typically required 20 minutes. In the second step, an intervention was conducted with the students, specifically health education delivered through a lecture method using video media. The health education video was modified to specify various aspects of smoking, including its meaning, associated dangers, cigarette ingredients, health consequences, and preventive measures. The duration of the intervention was set at 30 minutes. Moving on to the third step, a posttest was administered, mirroring the knowledge questionnaire used during the pretest. This posttest activity was carried out on the second day and incorporated the same set of questions. The respondents were allocated approximately 20 minutes to complete the questionnaire. In the fourth step, the completeness of the completed questionnaires, including the confirmation of the respondent code, age, gender, class, and question checklist form, was verified. Once the verification was completed, the questionnaires were collected, and the data analysis stage was initiated.

Instrument: The primary instrument used in this research was a questionnaire titled "knowledge questionnaire about the dangers of smoking". The questionnaire was developed by the analyst and comprises 20 questions structured as a Guttman scale. Furthermore, it was subjected to preliminary testing for both validity and reliability. Validity testing was carried out on 30 respondents from Bandung City Private Middle Schools who shared similar characteristics. The criteria for establishing the validity of the questionnaire were met when each item effectively measured the intended content. An indicator was considered valid when its calculated *r* value exceeded the *r* table. When the validity value for each item exceeded 0.3, item was considered valid (Sugiyono, 2016). To test the validity of the knowledge questionnaire, the biserial correlation coefficient was used. The validity test showed *r* values within the range of 0.467 to 0.705, all exceeding the threshold of 0.361, indicating that the knowledge questionnaire was valid. Reliability testing was essential to ensure that the research instrument consistently measured the intended factors. To assess the reliability of the knowledge questionnaire, a KR-20 analysis was conducted. When a variable demonstrated a KR-20 value exceeding 0.60, it was considered reliable or consistent. The obtained result was 0.924, indicating high reliability. The educational media used in this research was a video addressing the dangers of smoking. Expert validation was performed to assess the quality of the video (Akbar, 2013). Two language experts participated in the validation process. The validation category for the video media achieved a score of 3.8, confirming its validity.

Data collection and data analysis: Respondents who voluntarily participated in the research completed a questionnaire containing their demographic information and knowledge. All respondents were then assembled in a single large class, and the pretest was administered. After the pretest, they received a 30-minute intervention involving health education about the dangers of smoking through video content. On the second day, the respondents convened once more for the posttest, which comprised completing a questionnaire. All the questionnaires were thoroughly examined for data completeness, and they were collected for subsequent data analysis. **Analysis:** Data analysis consisted of both bivariate and univariate tests. The univariate tests used frequency distribution analysis of respondent characteristics, such as age, gender, and knowledge. Bivariate tests were carried out to compare knowledge levels before and after the intervention using the Wilcoxon signed-rank test ($\alpha = 0.05$).

Ethics: This research was conducted over the course of 2 days in 2023 at a private junior high school in Bandung city. Ethical considerations were diligently addressed, with approval granted by the Health Research Ethics Commission of the Immanuel Health Institute, as reflected in Ethics Pass Certificate Number: No.-062/KEPK/IKI/VI/-2023. The analysis maintained the confidentiality of all the data obtained from the questionnaire. To ensure anonymity, the names of the respondents were excluded from the questionnaire. Data sharing was strictly restricted to uphold the principle of non-maleficence.

3. Results and Discussion

3.1. Results

Table 1 presents the demographic characteristics of the respondents. The majority of the respondents (51.3%) were females. In terms of age distribution, it was evident that the largest group fell within the age range of 11-14 years, with 94 respondents; constituting 60.3% of the total sample.

Before receiving the intervention, the majority of respondents, accounting for 51.3%, had sufficient knowledge about the dangers of smoking, as shown in Table 2.

Table 3 indicates that after the intervention, almost all respondents (76.3%) had enhanced knowledge regarding the dangers associated with the habit.

Table 4 provides the results of the statistical analysis using the Wilcoxon signed-rank test. The analysis resulted in a p -value of 0.0001, which was less than the significance level of 0.05. Consequently, the null hypothesis (H_0) was rejected, leading to the conclusion that the provision of health education significantly improved the knowledge of students at Bandung City Private Middle Schools about the dangers of smoking.

Table 1 Characteristics of respondents who were Bandung City Private Middle School students (n=156).

Characteristics of respondents	Frequency	Percentage %
Gender		
Female	80	51.3
Male	76	48.7
Total	156	100
Age		
11-14 Tahun	94	60.3
15-17 Tahun	62	39.7
Total	156	100

Table 2 Frequency of knowledge before being given education to Bandung City Private Middle School students.

Knowledge	Frequency	Percentage %
Less	10	6.4
Enough	80	51.3
Good	66	42.3
Total	156	100

Table 3 Frequency of knowledge after being given education to Bandung City Private Middle School students.

Knowledge	Frequency	Percentage %
Enough	37	23.7
Good	119	76.3
Total	156	100

Table 4 Analysis of the influence of education on knowledge of the dangers of smoking among Bandung City Private Middle School students.

Knowledge	Pretest		Post Test		P_value
	N	%	N	%	
Less	10	6.4	0	0	0.0001
Enough	80	51.3	37	23.7	
Good	66	42.3	119	76.3	
Total	156	100	156	100	

3.2. Discussion

The research results clearly showed a significant shift in the knowledge of students about the dangers of smoking before and after receiving health education. This indicated a substantial influence of education on awareness of the danger associated with the habit among Bandung City Private Middle School students. Health education, as a purposeful effort to inculcate health-promoting behaviors within communities, plays a crucial role in empowering most children with knowledge of how to safeguard their health, mitigate health risks, seek appropriate medical attention, and others (Notoatmodjo, 2018). The enhancement of knowledge could be attributed to several factors, including age, educational background, personal experiences, and the sources of information to which a child was exposed. The influence of information sources, such as health education initiatives, could be particularly influential in increasing knowledge. Children endowed with a large amount of information were more likely to perceive new ideas based on their psychological characteristics.

The media adopted in delivering health education also held sway over knowledge enhancement. This research leveraged animated video media to provide education on the dangers of smoking. Video-based education has several advantages, such

as stimulating both sight and hearing senses during information delivery (Sinundeng et al., 2020). The combination of audio-visual elements often fostered a heightened sense of realism, efficiently conveyed content, conserved time, and could be replayed when needed, which had the benefit of consistently capturing and retaining viewers' attentions.

Audio visual media has elements of sound, images and various variations that are conveyed through tools such as television, computer/laptop disks (VCDs) and digital multipurpose disks (DVDs) [6]. Providing education via video is very effective and can be applied in health services because the audio-visual combination is more interesting, the content delivered can be standardized, and the video can be repeated if someone forgets it (Darmawati et al., 2023).

Increasing the knowledge of a child is a promising strategy for promoting health and reducing the prevalence of smoking. Providing education on the dangers of smoking held immense importance because it equipped a child with the knowledge necessary to appreciate the potential consequences of smoking. This knowledge empowered a child to make informed choices, and its acquisition could reduce smoking rates. Teaching aids about the dangers of smoking describe the smoking process that, which can damage organs in the body, resulting in increased self-efficacy not to smoke. High-efficacy persuasion and threats will produce a high level of fear, and convincing research has shown that the threat of smoking can be dangerously avoided, and that knowledge will shape self-efficacy-/self-confidence regarding smoking behavior. A teenager with high self-efficacy will refuse to smoke, while teenagers with low self-efficacy will be more interested in smoking (Feriyanti et al., 2020).

Interventions to reduce underage smoking must consider differences in behavior, attitudes, knowledge and perceptions of society between urban and rural areas. Research on 358 students in public schools on Efate Island, Vanuatu, including 217 students in urban areas and 141 students in rural areas, showed that the problems of smoking and underage drinking were different between students living in urban and rural areas. Students in rural areas showed significantly lower self-efficacy in refusing tobacco and alcohol than did students in urban areas (Nakaseko et al., 2022).

The analysis results were in line with the observations of Widyasari & Windyastuti entitled "The Influence of Health Education Using the Mind Mapping Method on Knowledge about the Dangers of Smoking in a Child" (Widyasari & Windyastuti, 2022). The research corroborated a significant influence, as evidenced by a calculated p -value of 0.000 ($p < 0.05$). Prior to receiving health education, only one respondent possessed good levels of knowledge, but after the intervention, the figure rose dramatically to 26.

Similarly, research at SMK Negeri 2 Purwokerto, Indonesia, comprising 54 students, showed that health education using leaflets and video media significantly improved knowledge about the dangers of smoking. After the intervention, 77.8% and 88.9% of the students who were exposed to leaflets and video media, respectively, had good knowledge. The Wilcoxon test indicated a p -value of $\leq \alpha$ ($0.001 \leq 0.05$) for leaflet media and $\leq \alpha$ ($0.000 \leq 0.05$) for video media, confirming the difference in knowledge before and after health education (Anggraeni et al., 2020).

The findings of 42 students in SMP Negeri 2, East Halongonan District, North Padang Lawas Regency, Indonesia, showed the significant influence of audiovisual media ($p < 0.05$) in enhancing the knowledge and attitudes of a child concerning the dangers of smoking. In conclusion, audiovisual media was found to be more effective at increasing adolescents' understanding of and attitudes toward the dangers associated with these habits. This indicated the importance of school management collaborating with parents to address the academic and behavioral development of students and the need for healthcare providers to intensify health education programs focused on smoking hazards (Siregar et al., 2019).

The results of research on 33 teenage respondents. The research shows that videos on the dangers of smoking influence students' smoking perceptions, as evidenced by an increase in the average score between the pretest and posttest. The average score increased from 61.44 (pretest) to 64.84 (posttest). Furthermore, this research was proven by performing bivariate parametric analysis with the dependent t test, obtaining a p -value = 0.018 (< 0.05). Video media involves the senses of hearing and sight to provide a more realistic picture and encourage changes in perception (Darmawati et al., 2023).

4. Conclusion

In conclusion, research conducted on 156 students in both 7th and 8th grade classes within private junior high schools in Bandung city revealed the significant influence of video-based health education on knowledge regarding the dangers of smoking. Therefore, it was recommended that educational institutions, such as schools, take proactive measures to improve the health of students, specifically; to prevent and reduce smoking habits, by utilizing appropriate media channels. Raising awareness among students about the dangers associated with habits could improve and reduce their interest in consuming cigarettes.

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Ethical consideration

Ethical considerations were diligently addressed, with approval granted by the Health Research Ethics Commission of the Immanuel Health Institute, as reflected in Ethics Pass Certificate Number: No.-062/KEPK/IKI/VI/-2023.

Conflict of interest

The author declare that they have no conflicts of interest.

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