
The Influence Of Health Education On The Impact Of Electronic Cigarettes (Vape) With Audiovisual Media On Knowledge Of The Dangers Of Electronic Cigarettes Among Youth Communities In The Depok Area In 2025

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Abstract

The prevalence of e-cigarettes in Indonesia increased by 3% in 2021 according to the Ministry of Health's GATS, with a high knowledge gap among adolescents in Depok due to modern lifestyle trends. This study aims to determine the effect of health education on the dangers of vaping using audiovisual media on adolescent knowledge. A quasi-experimental one-group pretest-posttest design was conducted on a population of 50 adolescents in RT 07 Sukamaju Depok, with a sample of 20 respondents via purposive sampling. The Guttman scale questionnaire instrument was analyzed using univariate frequency and bivariate Kolmogorov-Smirnov post-normality t-test ($p=0.072$). The results showed a decrease in knowledge from less than 60% to 30%, an increase from sufficient to 40% to 55%, and good from 0% to 15%, with $p=0.013$. Audiovisual education is effective in significantly increasing adolescent knowledge.

Keywords: *Audiovisual Media, Electric Cigarette, Health Education, Knowledge Level, Vaping Risks.*

INTRODUCTION

The phenomenon of increasing smoking prevalence in Indonesia is increasingly worrying, with the 2021 GATS survey by the Ministry of Health recording a tenfold increase in e-cigarette users, from 0.3% to 3%. In West Java, data from the Central Statistics Agency (BPS) shows that 26.93% of the population is a smoker, with the proportion of men reaching 48.12% compared to 0.91% of women, with areas such as Cianjur recording the highest figure at 30.26% (Rizaty, 2021). Furthermore, more than 43 million children in Indonesia are exposed to secondhand smoke as passive smokers (Putri et al., 2023; Ministry of Health, 2011).

Adolescents, defined by the WHO as 10-19 years old and by Minister of Health Regulation No. 25/2014 as 10-18 years old, are vulnerable to the trend of e-cigarettes as part of a modern lifestyle and social identity through social media (Rahmat et al., 2024; Devin & Maburur, 2023). A preliminary study in Depok in August 2025 found that 70% of 10 adolescent vape users considered it safer and followed the trend, reflecting a knowledge gap.

Although e-cigarettes are considered safer, their aerosols contain formaldehyde, vitamin E acetate, and diacetyl, which damage the lungs, causing EVALI, inflammation, and COPD, especially in adolescents with developing brains (Simanjuntak et al., 2023; Kesehatan et al., 2024). These effects include nicotine addiction, depression, shortness of breath, lung cancer, irritation, asthma, as well as impaired concentration, memory, academic performance, and deviant behavior such as truancy.

Conventional health education efforts such as lectures are less effective for digital native youth, while audiovisual media has been shown to improve knowledge and attitudes through engaging and memorable visual-emotional elements (Notoadmodjo, 2020; Aprilia, 2020). However, specific research on the influence of audiovisuals on knowledge of the dangers of vaping among youth in Depok remains limited, despite the high usage trend in this city with significant digital access.

This study aims to measure the impact of health education about the dangers of e-cigarettes and vaping using audiovisual media on the knowledge of adolescents in Depok in 2025, including before-after comparisons and differences. The urgency lies in the increasing trend of vaping in Depok, which triggers physical and mental health risks and decreased academic performance. Audiovisual

media offers a contextual and interactive solution aligned with adolescent characteristics. Its novelty lies in the focus of vaping-specific audiovisual interventions on the Depok community, complementing previous general studies and supporting local preventive strategies based on health literacy.

RESEARCH METHODS

Types and Methods of Research

This study used a quasi-experimental design with a one-group pretest-posttest approach, in which one group of subjects was measured before (pretest) and after the intervention without a control group to assess the effect of audiovisual health education on knowledge of the dangers of e-cigarettes and vapes among adolescents in Depok (Arikunto, 2018). This design is suitable for controlling for limited external variables while measuring changes in knowledge due to the treatment, as described in the non-randomized quasi-experimental framework that emphasizes causality testing in a real-world context (Sugiyono, 2021). The design schematic is shown in Table 3.1, with T1 as the pretest, X as the audiovisual education, and T2 as the posttest, ensuring efficient paired measurements for a limited community population (Creswell & Creswell, 2023).

The research was conducted at the Microbiology Laboratory of the Undergraduate Pharmacy Study Program, Faculty of Health Sciences, Duta Bangsa University, Surakarta, for 4 months (March-June 2025), with plant determination at UPF Hortus Medicus RSUP Dr. Sardjito Tawangmangu and ethical clearance at Muhammadiyah University of Purwokerto. [Creswell & Creswell, 2023] The independent variables include extract concentration, the dependent variable is antioxidant activity (IC50 DPPH), and the control variables include pH (4.2-6.5), homogeneity, skin irritation, and humidity. [Rafika, 2021].

Data Analysis Instruments and Techniques

The main instrument was a validated Guttman scale questionnaire (true/false) to measure respondents' knowledge about the dangers of e-cigarettes and vapes. The data were edited, coded, entered, and cleaned using SPSS to ensure quality (Salim & Haidir, 2020). The instrument's validity and reliability were tested through content analysis and statistical tests such as Cronbach's alpha, while univariate analysis used frequency distributions to describe pre- and post-intervention knowledge (Nursalam, 2020). Bivariate analysis applied the non-parametric Wilcoxon test for non-normal ordinal data, with a significance level <0.05 indicating a significant effect; if normal, switched to the paired t-test, in accordance with standards for quantitative health data analysis (Sudaryono, 2022; Nugroho, 2020).

Population and Sample

The study population included 50 adolescents aged 12–19 years in RT 07, Sukamaju Village, Cilodong, Depok, West Java, who met inclusion criteria such as literacy, local residency, willingness to participate, and commitment until the end of the study (Rizki & Nawangwulan, 2018). A sample of 20 respondents was selected through purposive sampling based on the research objectives to represent the characteristics of the population, with exclusion criteria including illness, communication disorders, or unwillingness (Emzir, 2021). This approach ensures representativeness while minimizing selection bias in quasi-experimental community-based studies (Sugiyono, 2021).

Research Procedures

The procedure began with an institutional permit application to Universitas Indonesia Maju and the Depok neighborhood association (RT/RW) authorities, followed by a preliminary survey, respondent selection, and e-flyer distribution via WhatsApp, after passing ethical review number 378/Sket/Kat (Nursalam, 2020). Core stages included informed consent, sending a Zoom link for a 10-minute pretest via Google Form, a 30-45 minute audiovisual educational intervention on the

dangers of vaping (nicotine, formaldehyde, etc.), and a similar posttest, ending with data processing (Arikunto, 2018). The study was conducted online in January 2026, with ethical principles guaranteeing anonymity, confidentiality, voluntariness, and beneficence to protect respondents (Creswell & Creswell, 2023; Sudaryono, 2022).

RESULTS AND DISCUSSION

Frequency distribution of knowledge levels before being given health education

Table 1. Frequency distribution of knowledge levels before being given health education

level of knowledge	Frequency (f)	Percent (%)
Not enough	12	60
Enough	8	40
Good	0	0
Total	20	100%

Based on table 1, from 20 respondents, it shows that before being given Health Education, 60% of respondents had insufficient knowledge and 40% had sufficient knowledge.

Frequency distribution of knowledge levels after being given health education

Table 1. Frequency distribution of knowledge levels after being given health education

level of knowledge	quency (f)	ercentage (%)
Not enough	6	30
Enough	11	55
Good	3	15
Total	30	100%

Based on table 2, from 20 respondents, it shows that before being given Health Education, 30% of respondents had a low level of knowledge, 40% of respondents had a sufficient level of knowledge and 15% of respondents had a good level of knowledge.

Normality Test

Table 3. Normality test of knowledge level

Kolmogorov-Smirnov		
Variable	MeanStd dev	Sig
Level of Knowledge	1.850.671	0.072

Based on the normality test at the level of knowledge, the data obtained was $0.072 > 0.05$, which means that the data on the distribution of knowledge levels in adolescents is normally distributed, so that the next bivariate test will be carried out using the t-test.

The influence of the level of knowledge before and after being given Health Education

Table 4. Distribution of average knowledge level scores before and after being given Health Education

Variable	Percentage Before	Presentation After	P-value
Not enough	60	30	
Enough	40	55	0.013
Good	0	15	
Total	100%	100%	

From the results of the data processing, the analysis results show that the p value is 0.013 < (0.05) and it can be concluded that $p < \alpha$, so H_0 is rejected. From these results, it can be concluded that there is a difference in the level of knowledge before and after being given Health Education.

Discussion

1. Level of knowledge before Health Education

Based on Table 1, out of 20 respondents, it shows that before being given health education, 60% of respondents had insufficient knowledge and 40% had sufficient knowledge. This condition indicates that the majority of respondents did not have an adequate understanding of the health material provided. Knowledge is an important domain in the formation of health behavior because it is the basis for someone to understand information, make decisions, and determine appropriate actions regarding health problems. According to Health Behavior Theory, increasing knowledge is the initial stage that influences changes in health attitudes and practices. Knowledge gained through the learning process will form awareness, then give rise to positive attitudes, and finally result in real action. This is in line with Bloom's cognitive domain concept which states that the learning process begins with knowing, understanding (comprehension), and to apply (application).

In line with research conducted by Nivita Nanda Gabrela Tosubu et al. (2024), based on pre-test data, the treatment group obtained a minimum score of 41 with a percentage of 5.9% and a maximum score of 73 with a percentage of 5.9%. There were 2 respondents. obtained a score of 55, 2 respondents scored 59, 2 respondents scored 62 (11.8%), and 3 respondents score of 57 (17.6%). The average pre-test score was 57.29 with a standard deviation of 7.951. These results indicate that before the health education intervention, respondents' knowledge levels were still in the moderate to low category. This finding strengthens empirical evidence that without structured education, public understanding of health information tends to be suboptimal. Therefore, a systematic and sustainable health education program is needed to significantly improve knowledge scores (Tosubu et al., 2024).

This is in line with research conducted by Siti Rahmawati et al. (2022), which showed that providing health education using interactive lectures and leaflets significantly improved patients' knowledge scores from poor to good after the intervention ($p < 0.05$). The results of this study confirm that the combination of verbal and visual methods helps respondents more easily understand and remember health information. Systematically delivered education has been shown to be effective in improving cognitive understanding and patient readiness to implement correct health behaviors (Rahmawati et al., 2022).

Researchers also assume that health education is an effective intervention to improve respondents' cognitive domains, because the learning process allows for a gradual increase in

understanding, starting from knowing, understanding, and being able to apply information in everyday life. Therefore, the better the health education provided, the higher the likelihood of positive behavioral changes in respondents. Furthermore, researchers assume that the use of appropriate health education methods, such as a combination of lectures, discussions, leaflets, and audiovisual media, can increase respondents' information absorption because it involves more than one sense in the learning process. This strategy is expected to strengthen memory retention and increase learning motivation, resulting in more optimal educational outcomes. Therefore, researchers believe that after being provided with health education, there will be a significant increase in respondents' knowledge levels compared to before the intervention.

2. Level of knowledge after Health Education

Based on Table 2, of the 20 respondents, before receiving health education, 30% of respondents had poor knowledge, 55% had sufficient knowledge, and 15% had good knowledge. This distribution indicates that the majority of respondents were still in the sufficient and poor knowledge categories, resulting in suboptimal understanding of health information. This condition indicates that respondents did not yet have adequate cognitive abilities to recognize, understand, and apply health information appropriately in their daily lives.

After receiving health education, there was a change in the distribution of respondents' knowledge levels. The percentage of respondents with poor knowledge decreased, the number of respondents with sufficient knowledge remained relatively stable, and there was an increase in the good knowledge category. The increase in knowledge levels after the intervention can also be explained through Benjamin Bloom's cognitive domain theory, which states that knowledge is in the cognitive realm and can develop through stages of knowing, understanding, and applying. Health education delivered in simple language, interactive methods, and supporting media allows respondents to more easily receive and remember information. The repetitive learning process involving more than one sense will improve memory retention, making the material easier to apply in daily practice. Thus, the change in the distribution of respondents' knowledge levels reflects the success of the educational process.

In line with research conducted by Tosubu et al. (2024), the post-test results showed a minimum score of 71 and a maximum of 128, with an average of 110.29 and a standard deviation of 15.312. This significant increase in the average score compared to the pre-test indicates that health education significantly improved respondents' knowledge. The data show that most respondents experienced an increase in scores after the intervention, thus statistically and clinically demonstrating that health education is effective in improving health literacy.

Based on these overall results, the researchers assume that health education is an effective intervention in increasing respondents' knowledge levels because it provides systematic information, clarifies unfamiliar concepts, and encourages active learning. The researchers believe that the more appropriate the method, media, and frequency of education provided, the greater the increase in knowledge achieved. However, to achieve optimal results, health education needs to be tailored to the characteristics of the respondents and implemented continuously so that changes in knowledge can be sustained and followed by positive changes in health behavior.

3. The influence of the level of knowledge before and after being given Health Education

Based on the results of the data analysis that has been carried out, a p-value of 0.013 was obtained, which is smaller than the α value (0.05). This result indicates that H_0 is rejected, so it can be concluded that there is a significant difference between the level of knowledge of respondents before and after being given health education. These findings prove that the health education provided in this study has a significant effect on increasing the level of knowledge of respondents. Statistically, educational interventions are able to improve respondents' understanding of the health information conveyed, resulting in changes in cognitive aspects after the learning process.

The results of this study align with Lawrence W. Green's theory in the PRECEDE–PROCEED Model, which states that knowledge is a predisposing factor influencing changes in a person's health behavior. Knowledge forms the basis for attitudes and actions, so increasing knowledge through health education can encourage individuals to make more informed decisions regarding their health. Through the educational process, respondents gain new information, correct misconceptions, and increase awareness of health risks, resulting in significant changes in knowledge levels.

Furthermore, this finding is also supported by Albert Bandura's Social Cognitive Theory, which explains that the learning process occurs through interactions between individuals, the environment, and learning experiences. Health education serves as an environmental stimulus that facilitates cognitive processes, enabling individuals to receive, understand, and retain the information they acquire.

The researcher's assumption, based on all the analysis and discussion results, is that health education has proven effective in significantly increasing respondents' knowledge levels. The researcher believes that this increase in knowledge occurs because respondents receive clear, relevant, and easy-to-understand information, which fosters awareness of health risks, particularly the dangers of smoking. This awareness forms the basis for developing positive attitudes and a tendency to reduce or even stop smoking. Therefore, health education can be used as a strategic intervention in promotive and preventive efforts, as well as strengthening the role of nurses as educators in improving public health.

CONCLUSION

This study successfully proved that health education regarding the harmful effects of e-cigarettes using audiovisual media significantly increased the knowledge of adolescents in the RT 07 community of Sukamaju Village, Depok, with a decrease in the less than 60% category to 30%, an increase in the sufficient category from 40% to 55%, and the emergence of the good category of 15%, supported by a t-test ($p=0.013 < 0.05$) after the data was normally distributed. This one-group pretest-posttest design intervention confirmed the effectiveness of audiovisuals in addressing the knowledge gap due to modern lifestyle trends, in line with previous findings that visual media improves cognitive information retention in digital native adolescents.

Although the results show a positive effect, limitations include the small sample size (20 respondents), the absence of a control group, the online implementation prone to digital distractions, and the measurement of only cognitive domains without long-term attitudes or behaviors. Suggestions for future research include a randomized controlled trial design with a larger sample size, a 3-6 month follow-up, and the integration of attitude-behavior variables using the Theory of Planned Behavior. Practically, these results recommend the implementation of audiovisuals as a preventive intervention in Depok community health centers, schools, and adolescent communities to reduce the prevalence of vaping and support national health literacy.

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