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The effect of spin wheel media on students' knowledge about the dangers of smoking

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Abstract

Background: Adolescents are a vulnerable group susceptible to the influence of smoking due to their limited knowledge regarding its harmful effects. Health education serves as a crucial preventive strategy to raise awareness and promote healthier behaviors among young individuals.
Objective: This study aimed to analyze the effect of spin wheel media on students' knowledge regarding the dangers of smoking at SMP Negeri 1 Kretek Bantul, considering age and gender as influencing factors.
Method: A quasi-experimental design with a pretest-posttest control group was employed. A total of 81 students participated and were divided into two groups. The experimental group received health education using spin wheel media, while the control group received the same material via powerpoint presentations. Data were analyzed using multiple multinomial logistic regression to assess the effect of the intervention while controlling for age and gender.
Results: The results did not reach statistical significance ($p>0.05$) when gender and age were included as comparison variables in this study.
Conclusion: Spin wheel media proved to be an effective and interactive method to enhance adolescents' knowledge of the dangers of smoking. It offers an engaging alternative to conventional educational media and holds potential for use in school-based smoking prevention programs.

Keywords: Spin wheel; knowledge; smoking; adolescent; health education.

INTRODUCTION

Teenagers are the age group most vulnerable to adopting smoking habits. Teenagers often view smoking as a normal and enjoyable activity. The main factors that drive adolescents to start smoking are curiosity, environmental or peer influence, and certain beliefs such as the perception that smoking symbolizes maturity or masculinity(1). Additionally, emotional conditions such as stress and loneliness also contribute to triggering this behavior(2). 43.40% of teenagers start smoking at the age of 14–15 years (3). The lack of knowledge about the risks of smoking contributes to the increasing number of teenage smokers, especially in schools (4).

Indonesia ranks third in the world for the highest number of smokers, behind China and India (5). According to WHO 2019, Indonesia has the highest percentage of smokers in ASEAN (46.16%). In 2023, there were approximately 70 million active smokers in Indonesia, with 7.4% of them being adolescents aged 10–18. The 2019 Global Youth Tobacco Survey (GYTS) reported an increase in smoking prevalence among adolescents aged 13–15, from 18.3% in 2016 to 19.2% in 2019.(6). In the Special Region of Yogyakarta (DIY), the proportion of smokers aged ≥15 years increased from 23.97% in 2022 to 24.82% in 2023 (7). Bantul Regency recorded the highest rate of cigaret consumption, while Kretek District had the largest number of adolescent smokers, with 1,489 people(8).

The government regulates tobacco control through Law No. 36/2009, Government Regulation No. 109/2012, and Government Regulation No. 28/2024, including the prohibition of cigarette advertisements in areas for children, as well as the prohibition of sales to those under 21 years of age. Permenhub No. 12/2019 also prohibits smoking while driving.

Health education can influence healthy behavior by increasing knowledge (9). The use of media in health education is very important for effectively conveying messages to adolescents (10). the important role of community nursing in promotive and preventive efforts, including adolescent health education (11). community nurses must actively participate as educators to reduce the prevalence of smoking at a young age (12).

health education media is divided into presentation media, object media, and interactive media (13). sheet media is often ineffective because it tends to be ignored after class (14). object-based media is passive, less engaging for students (15). On the other hand, educational games and other interactive media significantly increase student participation and learning effectiveness (16).

The spinning wheel presents educational content in a visually engaging and interactive way, making it a useful tool in health education and enhancing students' concrete skills (17) (18) (19). PowerPoint presentations can help students understand the harmful substances in cigarets (20) which is why researchers used them as a comparison in this study.

Therefore, the aim of this research is to examine the influence of the spinning wheel media on the knowledge of students at SMP Negeri 1 Kretek about smoking, using PowerPoint as a comparison medium while controlling for age and gender by observing the characteristics of the respondents and the magnitude of the influence.

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METHOD

This study used a quasi-experimental design with a pretest-posttest control group. The sample consisted of 81 seventh-grade students selected through proportional stratified random sampling, comprising the experimental group (n = 41) from SMP Negeri 1 Kretek and the control group (n = 40) from SMP Negeri 4 Banguntapan Bantul, Yogtakarta. Two different schools were used to prevent information contamination between groups.

The experimental group was given an intervention in the form of a spin wheel game media once after the pretest. Students were divided into three groups, and each had the opportunity to play. Students spin the wheel and answer questions according to the designated section. The group with the most points receives a reward, followed by a posttest.

The control group received PowerPoint learning media, which was also given once after the pretest. The researcher delivered the material, then the students listened, asked questions, and answered. Active respondents were given rewards. After the session ended, a posttest was conducted.

The research instrument in the form of a multiple-choice questionnaire related to knowledge about smoking consists of 25 items that have been tested for validity, resulting in 12 valid items (α = 0.621). The normality test shows that the data is not normally distributed (p = 0.000), so the analysis uses multiple multinomial logistic regression with a significance level of 0.05. The researcher has obtained ethical feasibility approval from the Ethics Committee of Poltekkes Kemenkes Yogyakarta with No.DP.04.03/e-KEPK.1/286/2025.

RESULTS

The majority of students in the spin wheel media group are 13 years old, 31 students (75.6%), and in the PowerPoint group, 28 students (70.0%). In the spin wheel media group, the majority of the students were male, 28 students (68.3%), and in the PowerPoint group, the majority of the students were male, 23 students (57.5%). for more details, see Table 1.

Table 1. Characteristics of the Respondents

Characteristics of the Respondents	Experimental Group		Control Group	
	f	%	f	%
Age				
12 years	6	14.6	3	7.5
13 years	31	75.6	28	70.0
14 years	4	9.8	8	20.0
15 years			1	2.5
Gender				
Men	28	68.3	23	57.5

Women	13	31.7	17	42.5
Total	41	100	40	100

This study uses two groups: the experimental group (41 students) received the spin wheel media intervention, and the control group (40 students) with knowledge tests before and after the intervention was given. for more details, see Table 2.

Table 2. Distribution of Pre-Post Smoking Knowledge Scores

	N	Min	Max	Range	Mean
Pretest eksperimen	41	58	83	25	70.80
Posttest eksperimen	41	75	100	25	91.51
Pretest kontrol	40	58	83	25	69.18
Posttest kontrol	40	66	100	34	84.75

The results of the normality test on smoking knowledge data in the intervention group and the control group were found not to follow normal distribution (p-value 0.000), so the ratio values were transformed into ordinal values. The technique for converting data from ratio to ordinal with low-medium-high categories, where low is scored 1, medium is 2, and high is 3.

Researchers grouped the posttest results into three categories: low, medium, and high, each assigned a numerical code of 1, 2, and 3 in the SPSS application. The researcher categorized the posttest results into three categories: low, medium, and high, each assigned numerical codes 1, 2, and 3 in the SPSS application. for more details, see Table 3.

Table 3. Transformation of Student Knowledge Data

	Knowledge			total
	High (3)	Medium (2)	Low (1)	
Spin wheel	30	11	-	41
powerpoint	17	20	3	40
total	47	31	3	

The purpose of this grouping is to convert the posttest data, which is originally on a ratio scale, into ordinal scale data so that it can be analyzed using the ordinal logistic regression method in SPSS. This is done through the Transform menu in SPSS using the Recode into Different Variables command. After that, the data is given a new variable name to represent the knowledge level categories.

When age and gender were included as predictors, the effect was not statistically significant with a P-Value (p = 0.078). After including age and gender as predictors, the contribution increased to Nagelkerke R 16.3%, with the remaining 83.7% still influenced by unmeasured variables. Complete data is presented in Table 5.

After including age (X_2) and gender (X_3) as predictors, the multiple regression equation became: $Y = 1.639 + 1.227X_1 - 0.311X_2 + 0.114X_3$, where X_2 is age and X_3 is gender (1 = female, 2 = male). for more details, see Table 4.

Table 4. Regression Equation

Constant	Grup (X^1)	Age (X^2)	Gender (X^3)
b_0	b_1	b_2	b_3
1.639	1.227	0.311	0.114

DISCUSSION

This study aims to determine the influence of spinning wheel media on smoking knowledge among junior high school students. Respondents aged 12–15 years, mostly 13 years old. ages 10–13 are considered early adolescence, during which individuals begin to show interest in the opposite sex and are emotionally vulnerable (21).

According to Piaget's theory, adolescence is a transition from concrete thinking to formal thinking (22). Education for ages 13–15 is effective if packaged attractively, such as through educational games that can enhance students' knowledge, active participation, and memory (23). Therefore, educational media about smoking is considered appropriate to prevent smoking behavior from an early age.

The majority of the respondents were male, with 68.3% in the experimental group and 57.5% in the control group. According to the WHO (14), the right brain of men develops faster, while the left brain, which is responsible for analysis, develops more evenly around the age of 18. Because they tend to be more daring in taking risks, men need to receive health education earlier.

Multinomial multiple logistic regression the significance value of the influence of the Spin Wheel media compared to powerpoint on smoking knowledge with the variables of gender and age is 0.078, indicating no significant effect. This insignificance is likely influenced by other unexamined variables, in line with previous research findings (24) and (25) which state that other variables can affect research outcomes.

The influence of the spin wheel media compared to PowerPoint on knowledge levels is 16.3%, involving age and gender as predictors, while the remaining 83.7% is influenced by other variables such as occupation, experience, education, and environment that were not studied. (26) The media spin wheel plays an important role in explaining the variation in students' knowledge levels. This is indicated by an R Square value of 16.3%. Other factors influencing students' smoking behavior include the habit of following parents, stress and loneliness (2), and socializing, which is considered a symbol of masculinity (1). Additionally, a lack of knowledge about the dangers of smoking makes students more inclined to smoke (4). The spin wheel media containing images and competitive questions tailored to the characteristics of the students can help students understand the material, which is an effective method in health education (27).

Multiple multinomial logistic regression models are used to analyze the effect of the Spin Wheel learning media compared to powerpoint on students' knowledge levels, considering age and gender as predictors. The regression equation used is: $Y= 1.639 + 1.227X_1 - 0.311X_2 + 0.114X_3$ where X_1 is the media method (Spin Wheel= 2, powerpoint= 1), X_2 is age, and X_3 is gender (1= female, 2= male). An example calculation for a 13-year-old male student with Spin Wheel media intervention (X_1=2, X_2=13, X_3=2) yields a predicted value of Y = 0.278, whereas for a female student under the same conditions, the value of Y = 0.164. These results indicate that the Spin Wheel media effectively enhances knowledge, especially among male students aged 13 and under. The negative coefficient on the age variable indicates that an increase in age is associated with a decrease in predicted knowledge, in accordance with previous research (28) which states The negative sign indicates an inverse relationship between the independent variable and the dependent variable. Gender has a positive coefficient but is not significant (p= 0.827), previous research (29) indicates limitations in data or study design in detecting media influence.

Thus, this model can be used to predict students' knowledge levels based on a combination of learning media, age, and gender, and it confirms the effectiveness of the Spin Wheel media in enhancing students' knowledge.

CONCLUSIONS

The Media Roda Putar shows potential as a learning tool to enhance students' knowledge, particularly among adolescents around 13 years old. Nevertheless, statistical analysis indicates that its effectiveness has not been proven significant, necessitating further research with a larger sample size and a more robust design to validate these findings.

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