



Effectiveness of Digital Media-base on Smoking Cessation Program toward Empowerment among Adolescent in Indonesia

Wini Hadiyani*^{ORCID}, Nisha Nambiar^{ORCID}, Faridah Binti Mohd Said^{ORCID}

Department of Community Nursing, Faculty of Nursing, Lincoln University College, Selangor, Malaysia

Abstract

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***Correspondence:** Wini Hadiyani, Faculty of Nursing, Lincoln University College, Selangor, Malaysia. E-mail: winhad@yahoo.com
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BACKGROUND: There is a critical need for effective health education techniques for smoking cessation in adolescents. The use of digital media is a promising strategy to address adolescent health.

AIM: This study aimed to determine the effectiveness of digital media-base on smoking cessation programs toward empowerment among adolescents in Indonesia.

METHODS: This was a quasi-experimental design with pre- and post-instruments employing the youth group member survey. Quantitative data were evaluated using the Mann-Whitney U-test to examine changes in participants' degree of adolescent empowerment toward smoking cessation between the control and intervention groups.

RESULTS: A total of 170 adolescent smokers agreed to join this study, with 85 participants in each group. There is a significant difference in adolescent empowerment between the control group and the intervention group, as shown by $p < 0.05$.

CONCLUSION: Digital media-based smoking cessation programs are promising techniques (with potential benefits) for increasing adolescent empowerment. The future studies should employ more rigorous procedures and a larger sample size to support this finding.

Introduction

At present, smoking behavior in adolescents is common; the prevalence of adolescent smokers in the world today has reached 1.1 billion people [1]. In Indonesia, the trend of more children and adolescents smoking appears to be more substantial [2]. The percentage of smokers aged 15 and older in Indonesia increased from 28.69% in 2020 to 28.96% in 2021, with 9.98% of smokers between the ages of 15 and 19 [3].

The issue of adolescent smoking must be addressed immediately to prevent adverse physical and psychological effects on adolescents. Smoking negatively affects public health, especially for adolescents in a period of growth and development, such as difficulty concentrating, aging, or poor body shape, the lungs stop developing, can cause heart and blood vessel disease, which can cause bone loss, which can lower the body's resistance, and cause dependence [4]. In addition, the adverse effects of smoking can be more severe for adolescents who become long-term smokers, whose health consequences are permanent [5], [6].

Several methods have been implemented to reduce smoking, including accessible smoking areas in healthcare, educational, university, and government

institutions, health warnings on tobacco products, and pricing restrictions [1]. Indonesian adolescents appear more interested in adverts promoting their boldness and virility than smoking's harms [7], [8]. Consequently, smoking cessation intervention must consider the smoker's developmental traits in terms of seeking the right stimuli and engaging in enjoyable tasks with the appropriate amount of difficulty. Social media can give new channels to promote tobacco cessation initiatives, such as mobile platforms where individuals and groups can share, cocreate, or exchange information, ideas, images, or videos across virtual networks [9]. Providing interventions through videos and brief messages can boost smoking cessation motivation, lead to changes in smoking status, reduce smoking intentions, and increase abstinence [10]. Smoking cessation health promotion uses short messages of support, encouragement, and behavior modification. Adolescents' involvement in spreading these messages has a more significant impact. Smartphone apps that promote smoking cessation can be used by everyone and save the health system money [11] and the WHO endorses short tobacco control message [12].

Empowerment is another crucial aspect that needs to be addressed in smoking prevention and cessation programs to help better adolescents become leaders in tobacco control [13], [14]. Empowerment,

decision, and determination to maintain a new smoke-free lifestyle are one of the cornerstones of successful smoking cessation [15]. Adolescent empowerment is a good adolescent health promotion, including preventive and smoking cessation programs [16], [17]. Several previous studies have stated that adolescent empowerment can prevent an increase in adolescent smoking cases. Adolescent empowerment is a good adolescent health promotion, including preventive and smoking cessation programs [10], [14], [18], [19], [20]. In addition, adolescent empowerment is the process of empowering adolescents to overcome issues, extend their resources, and modify their awareness through beliefs, values, and attitudes [10]. Adolescent empowerment must be increased to prevent increasing smoking cases among adolescents in Indonesia, but research on adolescent empowerment is still limited.

Digital media can empower adolescents due to the numerous potential benefits of digital media, namely, as an active instructional tool in smoking prevention because video production acts as an appealing delivery model for school-age groups [19]. The use of digital media can create a forum for the rapid development of communication skills, identity exploration, and adolescent creativity [21]. Adolescent promotion for smoking cessation and prevention programs can be based on social media use [22]. Therefore, this study aimed to determine the Effectiveness Digital Media-Base on Smoking Cessation Program Toward Empowerment Among Adolescent in Indonesia.

Methods

Study design

This study used a two-group pre-test and post-test quasi-experiment. Intervention and control groups were formed. The intervention group received the module for adolescent empowerment without smoking, a video about the harms of smoking, and social media messaging. The intervention was carried out for 3 weeks. The control group received the module without smoking and a post-test 1 week after the intervention.

Protocol intervention

The initial assessment was conducted 1 week before the study. The module for adolescent Empowerment without smoking was prepared based on a literature review [23], then videos and short messages were produced based on the module and expert discussions. Five experts confirmed the video material with a CVI of 0.89. The video contains information about adolescent characteristics, adolescent smoking, types of smokers, the harms of tobacco, how to avoid

smoking, and how to quit smoking. The intervention group participant was divided into small groups of 6–7 people each. A facilitator showed a video on adolescents without smoking to the first participant. Participants received anti-smoking social media messages every 3 days for 2 weeks, which they then forwarded to two non-participating friends. A post-intervention test was conducted 1 week after the intervention.

Sample

The study was conducted at four high schools in four different areas in Bandung, Indonesia (north, east, west, and south). Schools were selected randomly in each location. One school was randomly picked to represent each area. Then, chosen randomly male students from each selected school, with inclusion criteria including students who reside with their families, students aged 15–19 years, and students who smoke, with a total of 200 participants. However, 30 students dropped out in the 1st week due to becoming infected with COVID-19.

Instrument

Demographic data in this study are described by age, smoking status, ethnicity, and education level. The youth group member survey (YGMS) [24] was used as an assessment tool to assess psychological empowerment (PE) for tobacco control. The YGMS instruments were converted into Bahasa Indonesia and small-scale pilot testing for research purposes. This questionnaire was translated in a forward and backward translation process, then tested for its content validity by an expert. The validity test was then performed by three experts, including nurse practitioners and academic nurses, with i-CVI values ranging from 0.70 to 1.00 and s-CVI values ranging from 0.6 to 1.00. The Cronbach's alpha coefficient for each subscale of the YGMS Total Scale is between 0.929 and 0.941, indicating that all domains are reliable, with a reliable value limit more significant than 0.6. Cronbach's alpha coefficient for the total score was 0.937. The survey uses a Likert-type scale comprising 15 items with intrapersonal and interactional subscales.

Data collection

Ethical approval: No.III/101.1/KEPK-SLE/STIKEP/PPNI/JABAR/XII/2021. The review board institution was received from STIKep PPNI West Java (No ethic), where the study was affiliated. Permission to conduct the study was acquired from the high school's principal, where the study took place. All participant information is acquired from the student body. Eligible potential participants were informed of the research aims, methodology, and ethical clearance. Written informed consent was obtained from all participants before data collection. All participants were separated into intervention (n = 85) and control (n = 85) groups. All surveys were

given to participants by the research team by an online form. The time to finish the questions is about 10–15 min.

Data analysis

The demographic data and study results were described by descriptive statistics (mean, standard deviation, and frequency). As the normal distribution was not met, we applied the Mann–Whitney U-test to the quantitative findings. All statistical tests were conducted using version 25 of IBM SPSS Statistics. $p < 0.05$ indicated a statistically significant difference.

Results

This study's findings include participant demographics, a comparison of each group's scores before and after the intervention, and the comparison between intervention and control groups.

Demographics

The total sample consisted of 170 adolescent smokers divided into 85 intervention and 85 control groups, aged 16–19 years. Table 1 presents comparison of demographics between intervention and control groups of adolescent smokers, including religion, ethnicity, education level, smoking initiation, and smoking status.

Table 1: Comparison of demographics between intervention and control groups (n = 170)

Variables	Intervention group (n = 85)%	Control group (n = 85)%	p-value
Age (years), Mean \pm SD	17.12 \pm 1.04	17.10 \pm 1.01	0.821
Religion			
Islam	77 (90.6)	79 (92.9)	0.501
Christianity	8 (9.4)	6 (7.1)	
Ethnic			
Sundanese	67 (78.8)	69 (81.2)	0.482
Javanese	7 (8.2)	8 (9.4)	
Batak	5 (5.9)	3 (3.5)	
Others	6 (7.1)	5 (5.9)	
Level education (grade)			
First	32 (37.6)	25 (29.4)	0.531
Second	25 (29.5)	21 (24.7)	
Third	28 (32.9)	39 (45.9)	
Start smoke			
Primary school	5 (5.9)	6 (7.1)	0.500
Junior high school	41 (48.2)	38 (44.7)	
Senior high school	39 (45.9)	41 (48.2)	
Smoking status			
Rarely smoke	10 (11.8)	16 (18.8)	0.565
Don't smoke every day	41 (48.2)	43 (50.7)	
Smoke everyday	34 (40.0)	26 (30.6)	

Table 1 shows that the intervention group included 85 adolescent smokers with a mean age of 17.12 (SD = 1.04). The majority (90.6%) are Muslim and Sundanese (78.8%). Almost half of those in third grade (32.9 %) started smoking while in high school (48.2 %t), and their smoking status do not smoke every day (48.2%). While the average age of the control group was 17.1 (SD = 1.01), practically all (92.9%) were

Muslim and Sundanese (81.2%). Almost half of the smokers (45.9%) started smoking in senior high school (48.2%), and more than half do not smoke every day (50.7%). There was no significant difference between the intervention and control groups ($p > 0.05$).

Adolescent empowerment before and after intervention

Table 2 presents the statistical results of the comparison of adolescent empowerment before and after the intervention and the control group, which support the findings for each area (intrapersonal and interactional).

Table 2: Comparison of adolescent empowerment of pre- and post-intervention

Variables	Intervention			Control		
	Range	Mean \pm SD	p-value	Range	Mean \pm SD	p-value
Adolescent empowerment						
Pre-test	32–53	44.32 \pm 5.13	0.00	36–40	40.29 \pm 2.05	0.53
Post-test	47–67	57.27 \pm 4.12		36–46	40.40 \pm 2.09	
Interpersonal domain						
Specific efficacy						
Pre-test	3–5	8.24 \pm 2.68	0.00	3–6	4.47 \pm 0.97	0.59
Post-test	5–7	10.4 \pm 2.7		3–6	4.53 \pm 0.97	
Perceive sociopolitical control						
Pre-test	7–9	12.74 \pm 2.49	0.00	13–17	14.75 \pm 0.92	0.63
Post-test	8–20	15.19 \pm 2.86		13–17	14.68 \pm 0.92	
Participatory competent						
Pre-test	2–10	6.62 \pm 1.79	0.00	5–7	6.01 \pm 0.72	0.317
Post-test	6–10	8.49 \pm 1.04		5–7	6.00 \pm 0.71	
Interactional domain						
Knowledge of resources						
Pre-test	1–4	3.08 \pm 0.77	0.00	2–4	2.67 \pm 0.64	0.317
Post-test	1–5	3.93 \pm 1.13		2–4	2.68 \pm 0.64	
Assertiveness						
Pre-test	5–13	9.94 \pm 1.64	0.00	6–10	8.14 \pm 0.99	0.25
Post-test	7–15	12.03 \pm 1.84		7–10	8.20 \pm 0.96	
Advocacy						
Pre-test	2–9	3.68 \pm 1.79	0.00	3–6	4.20 \pm 0.80	0.59
Post-test	3–10	7.22 \pm 2.17		3–6	4.30 \pm 0.83	

Table 2 shows that the intervention group had a significant difference between pre and post ($p < 0.05$), while the control group did not ($p > 0.05$).

Table 3 shows that before the intervention, there was no significant difference ($p > 0.05$) between the two groups, but after the intervention, there was a significant difference ($p < 0.05$) between the two groups.

Table 3: Comparison of adolescent empowerment to smoking cessation between the intervention and control groups

AE (adolescent empowerment)	Z	p-value
Pre-intervention	-0.39	0.71
Post-intervention	-11.280	0.00

Discussion

This study shows how the smoking cessation health promotion strategy through digital media and participation can be used to promote anti-smoking messages through social media. Research findings encourage the utilization of technology in adolescent health education, particularly the dissemination of

adolescent health promotion by social media. Using technology in the form of health promotion through video can raise adolescents' attention to health education, emphasizing the dangers of smoking and how to stop smoking. Adolescents can start sending health messages to their family or other friends.

Adolescent empowerment before and after intervention in the control group

The findings of the statistical comparison before and after intervention from the domain (intrapersonal and interactional) are reported in Table 4. In this study, all adolescent empowerment areas increased significantly in the intervention group. In contrast, only three sub-variables increased in the control group: specific efficacy, knowledge of resources, and assertiveness.

Table 4: Digital media-base on smoking cessation program

Session	Contents	Strategies
Session 1: To enhance the interpersonal domain	Adolescent characteristics, adolescent smoking, types of smokers, the harms of tobacco, how to avoid smoking, and how to quit smoking	Participants are created in small groups of 5–6 individuals, given video shows, and discussions about the difficulties of quitting smoking
Session 2: To enhance interactional domain	The harms of smoking, how to avoid smoking, and how to quit smoking	Participants received anti-smoking social media messages every 3 days for 2 weeks, which they then forwarded to two non-participating friends

Intrapersonal domain

Intrapersonal domain in adolescent empowerment is believing having control in their lives that makes it different, including views of self-efficacy, motivation, competence, and perceived control with the sociopolitical area [13], [24], [25]. Specific efficacy findings in the intervention group with a mean of 8.24 before and 10.4 after the intervention, an increase of 2.16, whereas in the control group, they averaged 4.47 before and 4.53 after the intervention, an increase of 0.06. Specific efficacy is a type of adolescent self-confidence in changing others' smoking cessation behavior [24]. Participants had enhanced ability and confidence to persuade others to give up smoking. Using digital media for active learning in health education and smoking prevention programs can improve adolescents' self-efficacy and self-competence [14]. The statistical results of perceived sociopolitical control in the intervention group increased by 2.45 with a mean of 12.74 and 15.19 before the intervention.

In contrast, in the control group, there was a decrease. Perceived sociopolitical control is beliefs about one's capabilities and efficacy in social and political systems [24]. Statistics findings from participatory competence with an increase in the mean of 1.87 in the intervention group, whereas in the control group, there is a decrease. Participatory competence is the perceived ability to engage in and contribute to the

group or organization's operations, such as speaking at meetings and working on a team. [24] At the interpersonal level, ability involves having the essential capacity to influence people; hence, it is necessary to acquire skills such as problem-solving, self-efficacy, self-control, and self-esteem [26]. In regulating tobacco use, the adolescents were able to suggest methods to help others not to smoke and to make their community a smoke-free environment [14]. Empowerment at the individual level includes removing personal inabilities and establishing a sense of emotional strength and self-efficacy [26]. The intrapersonal domain covers an individual's thoughts about their potential to influence, including their family, friends, surrounding environment, and sociopolitical context [15].

Interactional domain

The interactional component relates to how people think about and links to their social environment, and understanding how to mobilize and manage resources effectively is crucial to attaining one's goals [13]. The interactional component comprises specific information and skills that are particularly significant for this setting, such as the knowledge of available resources and assertiveness and advocacy (the abilities most used in this situation) [13], [24], [25]. The statistical results of the interactional component in the intervention group showed an increase in the mean knowledge of resources: 0.85, assertiveness: 2.36, and advocacy at 3.54, while in the control group, slightly increased knowledge of resources and assertiveness, while in advocacy it decreased somewhat. The existence of knowledge can be a starting point for the use of empowerment [27]. Knowledge of resources refers to knowing whether resources exist to help the group and how to obtain them [24]. Knowledge is a tool created during the empowerment process [28]. Thus, knowledge is essential to increase adolescent empowerment. Assertiveness is the ability to express your feelings, opinions, beliefs, and needs immediately, openly, and honestly while not compromising the personal rights of others [24]. Friends' beliefs and behavior will shape adolescents' intentions to engage in certain behaviors, and this normative information can be obtained through exposure to health messages. It can have a significant impact on the effect of the following statement [29]. The interactional domain refers to an individual's insight into the difficulties faced by their society and their assertiveness [14]. Activity groups and advocacy can be the basis for empowerment [28]. Advocacy is the pursuit of influencing results, especially public policy and resource allocation decisions within political, economic, and social systems and organizations that directly affect people's lives [24]. Thus, the increase in the mean results in the intervention group indicates an increase in the interaction domain before and after the intervention.

Adolescent empowerment

Adolescent empowerment in this study is PE based on explicitly operationalized for adolescents and tobacco control [24]. According to the collected study results, the mean indicator of adolescent empowerment was 44.32 before and 57.27 after the intervention, representing an increase of 12.95. In the control group, the adolescent empowerment score was 40.29 before and 40.40 after the intervention, a 0.11 point increase. Individual empowerment can be acquired by education in knowledge, skills, and ethics, enhancing family processes, upgrading family and school educational institutions, and providing health care [26]. Youth empowerment promotes positive developmental outcomes and minimizes negative behaviors [30]. Empowerment programs in adolescents impact risky behavior such as reproductive health, HIV prevention, drug/alcohol, and smoking by increasing reinforcement of knowledge, peer collaboration, and opportunities for self-development [17].

Comparison of adolescent empowerment to smoking cessation between the intervention and control groups

The findings of this study showed significant results in the intervention group with indicated $p < 0.05$, whereas the control group did not exhibit any change before and after the intervention. They gave modules to both groups before the intervention did not demonstrate anything meaningful if it was not continued with the supply of video showings about the harms of smoking and how to stop smoking in adolescents. Intervention continues with then boosted by giving short messages in the form of text and visuals backed by the participation of disseminating messages by participants. Administration of the intervention indicated a positive thing marked by an increase in the overall mean after administration and a significant difference between before and after the intervention. In addition, there were significant differences between the control and intervention groups. Before the intervention, there was no significant difference between the two groups, but after the intervention, there was a difference between the two groups. This study shows the positive impact of health promotion through digital using video viewing, giving short messages, and participant participation to spread the message to others. Technology can be an option for health education by incorporating pedagogical strategies [14]. The use and availability of social media can provide new channels to help smoking cessation efforts, such as mobile platforms where individuals and groups can share, cocreate, or exchange information, ideas, images, or videos in a virtual network [9]. Text messaging-based smoking cessation initiatives can affect adolescent stop rates [31], [32], [33]. Giving messages is supported by several previous studies that positively impact smoking cessation. This study

can also increase adolescent empowerment toward smoking cessation.

Conclusions

The most significant rise in the employability score was in the intrapersonal domain in the intervention group with the perceive sociopolitical control indication with a score of 2.45 and the interactional domain in the intervention group with the advocacy indicator with a score of 2.36. The intervention group was given modules, videos, and short messages through social media, then supported by the participants' participation in improving the short messages. At the same time, the intrapersonal was played in the control group with the highest increase in the specific efficacy indicator with a value of 0.06 and the interactional domain on the assertiveness indicator with a value of 0.06 K. The control group was only given the module.

There is a difference in empowerment in the intervention group ($p = 0.00$) and the control group ($p = 0.53$). Moreover, the two-group difference test was significant after the intervention, with $p = 0.05$. These results were assessed from the significance value of the two groups. Certainly, the intervention group given the Digital Media-Base on Smoking Cessation Program is significant compared to the control group.

Suggestion

From the discussion described above that the indicator of knowledge of resources has the lowest increase value, it is hoped that the smoking cessation program can emphasize, the content provided is more exciting and understood by teenagers. For further researchers, it is hoped that further research can be carried out with different content (other than videos on the dangers of smoking) to find out more about its effect on adolescent knowledge.

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