



## Digital Media to Empower Adolescents in Smoking Prevention: A Literature Review

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### ABSTRACT

*Smoking is one of the leading causes of global morbidity and mortality, it harms every organ of the body and reduces the overall health of smokers. One of the actions taken to prevent smoking in adolescents is through digital media or social media. This study uses a literature review design that collects relevant data on the topic under study. In this literature review, databases will be searched to collect all potential relevant literature especially from 2017 to 2022. Databases including Pubmed, Scopus, Science Direct, and Google Scholar were combined with Manual Searching with the PRISMA approach. The terms or keywords used are Adolescents, Digital media, Smoking Prevention. The results of searching articles through databases, namely Pubmed totalling 100 articles, Scopus totalling 172 articles, Science Direct totalling 57 articles, Google Scholar totalling 28 articles and a total of all articles totalling 357 articles. Based on the results of Literature Review from 7 articles, it can be concluded that the influence of digital media on youth empowerment in smoking prevention is very influential.*

*Keywords: Adolescents; Digital media; Smoking Prevention*

## **ABSTRAK**

*Merokok merupakan salah satu penyebab utama morbiditas dan mortalitas global, hal ini membahayakan bagi setiap organ tubuh dan mengurangi kesehatan perokok secara keseluruhan. Tindakan yang dilakukan untuk pencegahan rokok pada remaja salah satunya adalah melalui digital media atau media sosial. Penelitian ini menggunakan desain literature review yaitu mengumpulkan data-data yang relevan mengenai topik yang diteliti. literature review ini data yang digunakan di peroleh dari database elektronik akan dicari untuk mengumpulkan semua potensi literatur yang relevan terutama dari tahun 2017 hingga 2022. Database termasuk Pubmed, Scopus, Science Direct, dan Google Scholar dikombinasikan dengan Manual Searching dengan pendekatan PRISMA. Hasil penelusuran artikel melalui database yaitu Pubmed berjumlah 100 artikel, Scopus berjumlah 172 artikel, Science Direct berjumlah 57 artikel, Google Schoolar berjumlah 28 artikel dan total dari semua artikel berjumlah 357 artikel. Berdasarkan hasil Literature Review dari 7 artikel dapat disimpulkan bahwa pengaruh media digital terhadap pemberdayaan remaja dalam pencegahan merokok dengan menggunakan video, dimana dapat meningkatkan pemahaman remaja tentang bahaya merokok melalui pesan yang disampaikan dalam video. Sebagian artikel lain juga menunjukkan penggunaan iklan melalui media sosial atau televisi dalam memberikan pesan anti rokok juga efektif untuk membantu remaja memahami tentang bahaya merokok.*

*Kata kunci: Remaja, Media digital, Pencegahan Merokok*

## **INTRODUCTION**

Smoking is one of the leading causes of illness and mortality worldwide since it harms all of the body's organs and reduces people's general health (Akel et al., 2022). Because they include substances like tar, nicotine, and carbon monoxide that are bad for the body, cigarettes have a negative effect on health (Sutrisno et al., 2022). Given the long-term consequences, there is a need for effective and pertinent smoking prevention strategies that are geared toward adolescents. Using digital media to spread anti-smoking messages is one strategy to stop teenagers from starting to smoke (Hutchinson et al., 2020). Every smoker will eventually pass away due to smoking-related conditions (Park et al., 2017).

The World Health Organization (WHO) stated that around 21 million adolescents aged 13-15 years became smokers in 2020, consisting of 15 million male adolescent smokers and 6 million female adolescent smokers, the average prevalence of male smokers in Southeast Asia reached 9.2%, followed by the European region reached 8.8% and the Americas 7.4% while the highest female smokers in the Americas region reached 7.1% followed by the European region 3.5% (Rizaty, 2020). The results of a survey conducted by the Central Statistics Agency (BPS) on the prevalence of the number of adolescent smokers in Indonesia aged 15 years and over from 2018 (32.20%), 2019 (29.03%), 2020 (28.69%), 2021 (28.96%), 2022 (28.26%) (Badan Pusat Statistik, 2022).

Adolescence is a time of transition when people start to attempt new activities because they know they will likely have an impact on their lives as adults. It is believed that between 25 million and 13 million boys and girls between the ages of 13 and 15 smoke or use smokeless tobacco products (Akel et al., 2022). Smoking in adolescence can reduce lung growth rate, maximum lung function, and overall fitness level and may increase the risk of respiratory problems (Mermelstein, 2003). Not only that, smoking in adolescence tends to affect brain to develop, experiencing interference in the use of other substances (Yoon et al., 2018).

Efforts to prevent smoking among adolescents are important things to do, one of which is through digital media or social media. Digital media is one of the tools used to provide smoking prevention

messages that can be targeted to adolescents (Toledo et al., 2021). Smoking prevention messages conveyed through digital media are known to be quite effective in positively influencing adolescent attitudes towards health-related issues (Shahi et al., 2021). Most teens access mobile phones (95%) and go online constantly every day (89%) making digital media (82%) a source of sharing information about achievements, emotions, and other social issues (Lazard, 2021). Smoking prevention messages targeting adolescents seek to reinforce targeted health beliefs and anti-smoking attitudes (Pei et al., 2019).

Many benefits are offered from digital media as a health education tool to promote about smoking prevention, one of the features offered is visual and sound which is very effective as a developmentally appropriate educational method because it attracts and motivates adolescents to participate in smoking prevention efforts (Park et al., 2017). Media messages about smoking influence smoking-related knowledge and norms at the individual and community level. The messages contained in digital media are expected to help prevent smoking in adolescents and encourage adolescents to quit smoking (Hwang et al., 2020). Smoking prevention messages through digital media as the main method in targeting adolescents and focusing on the negative impacts arising from smoking in the long term (Vereen et al., 2022). Smoking prevention messages conveyed through digital media must be interesting and can attract teenagers to think about the dangers of smoking so it needs to be optimized (Lazard, 2021). Exposure to smoking prevention messages through digital media can significantly prevent adolescents from the dangers of smoking (Primack et al., 2006).

The tactic of using digital media to empower teenagers in smoking prevention communicates the risks of smoking orally through imagery, which can assist deter teenage interest in smoking because textual messages are insufficiently effective (Ibrahim et al., 2022). Digital media is considered one of the strategies to reach effectively through health communication through online platforms tailored to the message of smoking prevention and adolescent interests (Sarkar et al., 2018). As well as being important to investigate the outcomes of smoking prevention messages through digital media, it is also important to look at the influence on adolescents who start dabbling in smoking (Reis et al., 2019).

Based on the above background on digital media in empowering adolescents in smoking prevention, the purpose of this literature review is how is the influence of digital media or social media used to empower adolescents in smoking prevention?

## **METHOD**

Research uses a literature review design, which collects relevant data on the topic studied. In this literature review, the data used in the electronic database will be searched to collect all potential relevant literature. Articles from 2017 to 2022, those written in English, those explaining how digital media can empower young people to quit smoking, full-text articles, and open access were the inclusion criteria used. Only review journals, abstract journals, and books or journal editorials that did not adhere to the requisite literature were excluded. Databases including Pubmed, Scopus, Science Direct, and Google Scholar combined with Manual Searching with PRISMA approach. The search for journal articles was conducted in December 2022. The terms or keywords used are *Digital media, Adolescent, Smoking prevention* which is tailored to the research question. This

literature review does not require formal ethical approval because all data comes from published material. The results will be disseminated through the reviewed publication.

Researchers conduct screening to determine the quality and relevance to the topic of the review, literature review questions. Researchers use Mendeley software to help organize search results articles. Researchers create special folders and are named based on the database used to store articles. Then the researcher conducts screening to check for duplication of articles and duplicate articles are issued and stored in a separate folder. Then the researcher conducts a screening of the title and abstract to determine the appropriate article and enter at the next stage. Furthermore, researchers read the full text of the article according to the criteria of inclusion and inclusion, articles that do not exist full text are issued. The appropriate articles are put in a separate folder for further review regarding the quality of the article.

## RESULTS AND DISCUSSION

### Selection Results

Article search results through the database are Pubmed with 100 articles, Scopus with 172 articles, Science Direct with 57 articles, Google Scholar with 28 articles and a total of 357 articles with keywords ((((((Digital media) OR (Social media)) OR (Social Medium)) AND (Adolescents)) OR (Teens)) OR (Teenagers)) OR (Youth))) AND (Smoking Preventions)) OR (Anti-Smoking Campaign)) OR (Anti-Smoking Education), TITLE-ABS(Digital media) OR (Social media) AND (Adolescents) AND (Smoking Prevention), "Digital media" OR "Social media" AND "Adolescents" AND "Smoking Preventions" OR "Anti-Smoking Campaign" OR "Anti-Smoking Education", (Digital media) OR (Social media) AND (Adolescents) AND (Smoking Prevention).

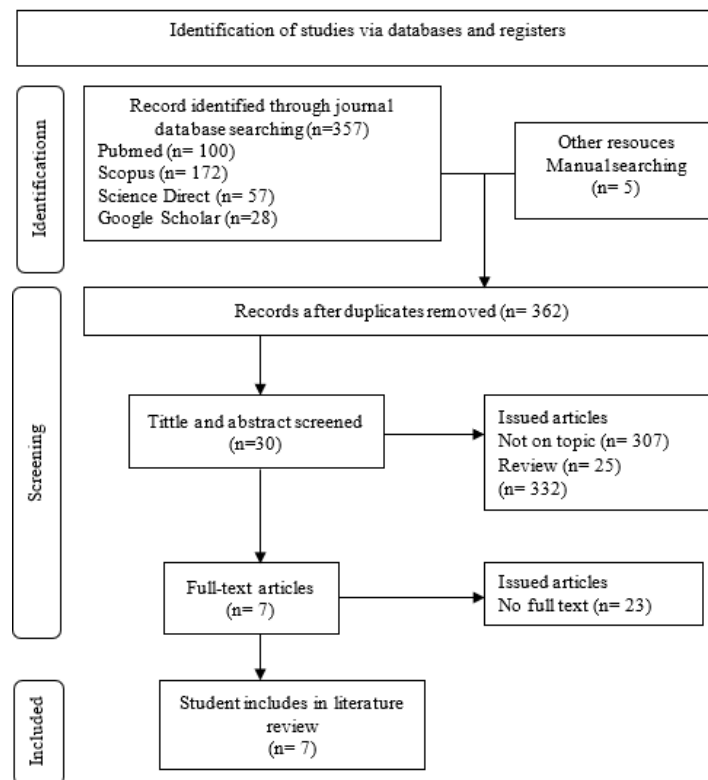


Figure 1: Flowchart based on PRISMA statement

No	Author and year	Country	Title	Aims	Method	Sample	Data analysis	Findings	Conclusion
1.	Park and Chang, 2020	United Stated	Using Digital Media to Empower Adolescents in Smoking Prevention: Mixed Methods Study	This study investigated the viability of a program to empower adolescents in tobacco control and smoking prevention through the coproduction of anti-smoking movies.	Mixed methods	23 participant	Quantitative and qualitative data being analyzed separately.	The results of the pre- and post-comparison showed that the psychological empowerment levels of the participants had considerably increased in all three categories of psychological empowerment (interpersonal, behavioral, and intrapersonal) (P<.05. Interviews verified that coproducing antismoking movies can empower people by endorsing nonsmoking practices and giving them a chance to contribute to the creation of a smoke-free community.	Both quantitative and qualitative evidence supported the coproduction of antismoking videos as a way to encourage teens to cut back on smoking. Making anti-smoking films with youngsters was a successful health education tactic.

2.	Lazard, 2020	North California, USA	Social Media Message Designs to Educate Adolescents About E- Cigarettes	Social media messaging can help educate young people about e- cigarettes, but it's not obvious which message topics and formats will have the greatest impact on message reception, reach, e- cigarette knowledge, and perceptions of risks.	Online experiment	928 participant Criteria inclusion 15- 18 years	A factorial (three forms, six topic) repeated measures analysis of variance (ANOVA) was performed on each outcome (PME, cognitive elaboration, and emotion) for message replies.	Across all formats, social media messaging increased knowledge (Cohen's $f$ $\frac{1}{4}.19$ ; $p < .001$ ) and beliefs ( $f$ $\frac{1}{4}.16$ ; $p < .001$ ) about the dangers of e- cigarettes. Nearly four out of five teenagers (79%) said they would tell friends and family about the social media messages, most likely in person (49%) and with friends (52%). Messages about missing out due to lung injury, being irrationally moody, and consuming certain dangerous chemicals caused more intended message emotions.	The dangers of e- cigarettes can be portrayed in social media posts. Young people can be directly reached by social media commercials that educate them about e- cigarettes, and they may also be shared among peers.
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3.	Noar et al, 2022	US	Impact of Vaping Prevention Advertisements on US Adolescents A Randomized Clinical Trial	To determine if the nationwide Real Cost campaign of the US Food and Drug Administration (FDA) affects adolescents' susceptibility to vaping by featuring vaping prevention messages	Randomized clinical trial	The sample consists of 1078 teenagers	Complete information maximum likelihood estimate research minimized the use of missing data assumptions by utilizing all data collected from recruited people, irrespective of trial attrition. The trial group's impact on the repeated primary and secondary outcomes was evaluated using generalized linear mixed modeling software, which incorporates random effects to accommodate individual variances. <sup>38–40</sup> The random effects associated with the visit number-related intercept and slope variables were regressed on a binary trial group indicator (Real Cost [coded as 1] vs. control [coded as 0]) after the unconditional	The visit 1 survey was completed by 1514 participants (1140 [75.3%] boys; mean [SD] age, 15.22 [1.18] years). Of these, 504 participants (33%) were assigned to the Real Cost health hazards group, 506 participants (33%) to the Real Cost addiction group, and 504 participants (33%) to the control group. At visit four, 91% of patients were retained. The assigned group was not related with missing data or attrition, and the major outcome had no missing data beyond participants lost to follow-	These results demonstrate that the FDA Real Cost anti-vaping campaign's television commercials reduced teenage susceptibility to vaping and had positive knock-on effects on outcomes associated with smoking cigarettes. Campaigns should be used to deter young people from using tobacco.
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						growth model for the repeated outcomes was constructed. The trial group's major effects show a difference between the groups at that time since the intercept was fixed at the most recent visit.	up, while the secondary outcomes had less than 1% missing data. The majority of participants (1067 participants [70.6%]) were currently enrolled in high school and were heterosexual (1432 participants [94.6%]).		
4.	Reis et al, 2018	Portugal	Fear or Humour in anti-smoking campaigns? Impact on perceived effectiveness and support for tobacco control Policies	In this study, the impacts of two anti-smoking ad types—fear or humor—were evaluated in relation to attitudes, perceived efficacy, support for tobacco control legislation, urges to smoke, and susceptibility to smoke.	Participants were asked to identify whether they smoked, had smoked in the past but had stopped at the time of the study, or had never smoked on a single item used to record their smoking status. Only individuals who admitted to smoking at the time of the survey	The sample consisted of 108 volunteers.	This project was authorized by the Institutional Review Board at the site of the study. Figure 1 depicts the flow diagram of participants through the experiment's several phases. Every piece of data was collected in a lab environment with controlled lighting and noise levels. After completing an informed permission form, participants	Participants in the fear condition chose fear (Welch's $t(55.49) = 4.30, p < .001$ ) and sadness (Welch's $t(51.78) = 11.01, p < .001$ ) significantly more frequently than they did in the humor condition. They also reported these two emotions for longer periods of time	This study demonstrated that fear-based advertising is more effective and can reduce smokers' desire to smoke. Feelings of terror and the smoking habit can help to explain this perceived effectiveness despite the different emotions it also elicits.

				<p>were taken into account as smokers. Of the 104 individuals, 30 were smokers and the remaining 104 (28 females) were not; <math>\chi^2(2; N = 108) = 0.52, p = .77</math>.</p>	<p>completed the first phase of the questionnaires, which included sociodemographic data, the Contemplation Ladder scale, and the Fagerström Test.</p>	<p>(Welch's <math>t(65.25) = 3.54, p &lt; .001</math> for fear, and Welch's <math>t(48.28) = 9.74, p &lt; .001</math> for sadness).</p>			
5.	Vereen et al, 2022	North California, USA	<p>Aided recall of The Real Cost e-cigarette prevention advertisements among a nationally representative sample of adolescents</p>	<p>In order to uncover potential differences based on participant characteristics, we tried to quantify the frequency of aided recollection of The Real Cost e-cigarette prevention advertisements.</p>	<p>Using address-based sampling with a known, non-zero chance of selection and area probability, NORC randomly selected US houses from the NORC National Sample Frame.</p>	<p>Parents from 1,002 households (74% of those eligible) provided informed consent, and 624 adolescents assented and completed the survey (62% of households whose parents consented; 46% of all eligible households). Criteria inclusion ages 13–17</p>	<p>The percentage of teenagers who reported recalling each The Real Cost e-cigarette prevention commercial was calculated descriptively. We also looked at recollection of each ad, stratified by participant characteristics. For categorical variables, N (weighted%) is used, while for continuous variables, mean (standard deviation) is used.</p>	<p>Recall percentages for the five The Real Cost e-cigarette prevention advertising ranged from 38.8% (for Magic) to 50.1% (for Narrative), with 71 percent of teenagers reported having seen them. Social media users who were Black and/or used it frequently had significantly higher recall (<math>p &lt; 0.05</math>),</p>	<p>The recall of The Real Cost's e-cigarette prevention campaign was evaluated in this study. A nationally representative sample of teenagers showed consistent and comparatively strong recall across demographic categories. The findings support the FDA's ongoing efforts to use digital media to spread anti-e-cigarette messaging to</p>

								according to adjusted estimates of assisted recall. Kids are still receiving preventative messages against e-cigarettes from the FDA through digital media, and the outcomes of this effort are encouraging.	young people. It is yet unclear how this campaign affects vaping behaviors and how exposure to these advertisements influences intermediate outcomes like attitudes and beliefs. It should be mentioned that The Real Cost is only one of several programs used to lower youth tobacco usage.
6.	Park et al, 2017	United States	Adolescent Smoking Prevention: Feasibility and Effect of Participatory Video Production	This study examined the viability and efficacy of a youth-participatory video creation program for smoking reduction.	Mixed method design	Twenty-three youths participant	Demographic data, including age, gender, race/ethnicity, academic achievement, and college aspirations, were also evaluated. Descriptive statistics were produced (means, standard deviations). Thematic analysis and an inductive descriptive qualitative technique were used to study the	Group projects required participants to create four anti-smoking video clips. The qualitative interview data revealed three primary themes: personal growth and healthy development, active involvement, and participation for community	This study proved an interactive digital media development method's usefulness and effectiveness for health education and youth health promotion. Engaging in the production of anti-smoking films as part of a community health promotion program reduced the participants' inclination to

						semi-structured interviews' qualitative data.	health. Seventy-five percent of the participants thought the program was great and that it fulfilled their expectations. Additionally, there were notable improvements in the intention to abstain from smoking from baseline to post-intervention.	smoke and strengthened their commitment to the non-smoking community.	
7.	Brennan, 2018	Australia	Promising Themes for Antismoking Campaigns Targeting Youth and Young Adult	Behavior modification campaigns often aim to alter the ideas that underlie behaviors, with the topic of the campaign being the targeted beliefs.	Survei online	The 18- to 25-year-olds were recruited only through SSI (valid data from N = 3031)	The effects of sample weighting were taken into account for each analysis in Stata 13.0,37. We determined three quantitative measures of the promise made by the campaign's message and theme, respectively, utilizing scales and individual beliefs.	The impacts of smoking on mood, social acceptance, and social popularity were repeatedly found to be the three themes with the highest likelihood of success across behavioral targets.	This study provides ad designers with empirical data to help them make wise and logical decisions on the most promising ideas. Insights from the endeavor to prevent initiation among young people were used to build the US Food and Drug Administration's "The Real Cost" campaign.

Table 1. Extraction Data

## Use of Social Media for Smoking Prevention

The adolescents who took part in these seven publications ranged in age from 13 to 25 on average. A three- to four-week intervention was typical, with 30 to 60 minutes spent in each session. Videos and commercials were among the strategies utilized in the papers to discourage teen smoking.

The use of video in digital media as a smoking prevention intervention has been demonstrated to be very effective in adolescents, producing three domains, namely the intrapersonal, interactional, and behavioral domains, which show the effectiveness of video in increasing motivation to prevent smoking, increasing awareness of smoking problems, as well as positive changes in small intentions to quit. from each domain, start smoking as specified (Park & Chang, 2020). And can facilitate young people's involvement in activities that promote tobacco control in their surroundings (Park et al., 2017). Aside from that, teens' knowledge and awareness of the risks associated with smoking are increased when anti-smoking movies are shown (Kosasih & Solehati, 2020). This is assisted by the creation of movies in local languages to promote young interest in learning information that is simple to accept and to increase their knowledge of the risks associated with smoking (Firmansyah et al., 2019).

The use of digital media has a great deal of potential for empowering young people to prevent smoking because, in this day and age, it is possible for them to access anti-smoking messages, be producers of those messages, and be encouraged to support anti-smoking campaigns (Adnani et al., 2021). This is due to the fact that social media is now closely associated with adolescent activities and provides a means of empowering youth to abstain from smoking (Raharjo et al., 2022). Youth empowerment with digital media which includes three stages of empowerment, namely the awareness stage which aims to make adolescents aware of the real negative impacts of smoking behavior by showing photos of someone who has been affected by smoking, the exposure stage empowers adolescents by increasing adolescent knowledge about the content of cigarettes and the dangers of smoking using educational videos, and the stage of empowerment or intellectual development (Ibrahim et al., 2022).

Digital media messages, like advertisements, can emphasize the fear side and are viewed as more interesting than those that show the humor side. This is because frightening advertisements increase memory levels after exposure, which in turn discourages smoking (Reis et al., 2019). The use of ads that include scary images can create fear in smokers and encourage smokers to become more aware of the dangers of smoking. The fear generated by scary images can trigger psychological distress that will continuously encourage a person to change his behavior or attitude (Negoro, 2017).

Because nearly eight in ten adolescents (79%) who encounter messages report doing so on social media, anti-smoking messaging disseminated through digital media might also enhance awareness among teenagers and motivate them to spread the word to their classmates or loved ones. Over two-thirds (67%) of teenagers interested in sending messages via social media only use one or two methods of contact, most frequently in person (49%) and with friends (52%) (Lazard, 2021). In addition, you could develop a website that you can use to share or socialize with teenagers in order to raise their level of education and awareness regarding the risks associated with smoking. One such website is SHARING AJA, which educates teenagers about reproductive health (Kristianingrum et al., 2022).

Digital media anti-smoking campaigns can reach a wider audience because they can graphically depict the negative effects of nicotine addiction, which is underappreciated by young people, found

in cigarettes (Noar et al., 2022). This demonstrates that youths who use social media heavily are more exposed to anti-smoking campaigns than youths who use it less (Vereen et al., 2022). It is vital to determine the subjects most likely to result in effective anti-smoking communications, such as the extremely promising Mood Effects issue. Three advertising are seen as being pro-smoking because of socially contagious themes from peers and social attitudes (smoking). Reducing juvenile tobacco use is just as important as paying attention to the anti-smoking themes in digital media. Despite the normally uninteresting themes of both initiation campaigns becoming less enticing, there was little consistency. Ingredients to avoid: Effects on Health Subject framing (Brennan et al., 2018).

According to the findings of a study that involved 31 participants between the ages of 18 and 24 who responded to examples of social media postings, adolescents who are exposed to social media or television advertisements about smoking can develop perceptions that consider this to be an event, so it is important to empower through digital media to educate kids about the risks of smoking from an early age (Alpert et al., 2020). Dependence on the social media as an effect of peers as a source of information potentially contributes to smoking vulnerability, uptake, and risk perception in adolescents who actively discuss the topic of smoking on social media (Mamudu et al., 2022). Exposure to many advertisements influences adolescents' interest in smoking so it is necessary to consider the role of advertising in empowering adolescents about the dangers of smoking (Robinson et al., 2018). Adolescents who do not have sufficient understanding of information about the dangers of smoking may be affected, so it is necessary to use advertising to provide information to increase adolescent understanding of the dangers of smoking (Virga, 2017). Another study's 87 participants reported an average of 1.1 anti-smoking media exposures per week, for a total of 281 exposures to anti-smoking media over the course of the three-week assessment period. Smoking status and exposure level were different,  $p=0.84$ . exposure via radio or television accounts for the majority (72%) of all exposure. In order to determine which anti-smoking messages were the most effective motivators, respondents were not asked to report the anti-smoking messages they had been exposed to. Assumptions about the relationship between exposure to anti-smoking messages and different messaging may change (Martino et al., 2018). Smoking prevention programs through digital media with a gender specific focus on smoking education need to take into account the media environment and its increasing impact. The content of smoking prevention programs is aimed at television, smoking in films and mass media, and cigarette advertisements. However, this study is distinguished by the mass media used (YouTube, Instagram, Webtoon, etc.) (Kim, 2021).

The results of a different study were equally positive, with up to 76 individuals participating and being divided into the intervention group and the control group, and revealing differences in knowledge scores ( $p=0.000$ ) after providing teenagers with health information based on the social media app WhatsApp (Aziz et al., 2019). WhatsApp is a social networking platform that can be used to help teens quit smoking because of its quick, affordable, user-friendly, and up-to-date features (Admasari et al., 2022). In addition to WhatsApp, you may use Zoom to improve the effectiveness of educating youngsters about the risks associated with smoking (Asih et al., 2022). Digital media influences teens' personal and social factors related to smoking, which in turn affected their smoking intentions. In conclusion, the effectivity of the media relies on family and school networks, making the impact of digital media on adolescents even stronger for delivering anti-smoking messages (Yang et al., 2019).

## LIMITATION OF THE STUDY

This Literature Review notes some limitations in the search for literature. The lack found from various databases. Some of the selected articles did not clearly explain the age of respondents and the duration of the videos used in the intervention, some did not explain the messages used for smoking prevention, some did not explain what kind of digital media was used.

## CONCLUSIONS AND SUGGESTIONS

Based on the results of the Literature Review of 7 articles, it can be concluded that the influence of digital media on the empowerment of adolescents in smoking prevention using videos, which can increase adolescent understanding of the dangers of smoking through messages conveyed in videos. Some other articles also show that the use of advertising through social media or television in providing anti-smoking messages is also effective in helping adolescents understand the dangers of smoking, so it is necessary to use advertising in providing smoking prevention messages. Researchers can further develop methods of empowering adolescents using digital media other than videos and advertisements or develop anti-smoking messages that effectively reduce adolescent interest in smoking prevention.

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