

Case-control Study: The Effect of Exposure to Cigarette Advertisements on Smoking Behavior in School-Age Children in Batu

Rizky Aditya Hutomo^{✉1}, Santi Martini¹, Sri Widati¹

¹ Faculty of Public Health, Universitas Airlangga Surabaya, Surabaya East Java, 60286
✉Email: rizky.a.hutomo@gmail.com

ABSTRACT

Background: Cigarette smoking is a danger that threatens the world community. Cigarette advertising content that is often aired on electronic media can provide opinions and shape the perceptions and actions of someone who sees it. **Objective:** This study aims to analyze the effect of exposure to cigarette advertising on smoking behavior in school-age children. **Methods:** This study used a case-control design. The case sample is a portion of school children aged 10-14 years who smoke in the Batu Health Office work area recorded in school-age smoking screening data as many as 81 samples. The control sample is a portion of school children aged 10-14 years who do not smoke in the Batu Health Office work area and who are schoolmates of the 81 case samples. The sampling technique was carried out by simple random sampling. **Results:** There is an effect of exposure to online cigarette advertisements on smoking behavior in school-age children (pvalue:0.016; OR:2.718;95%CI 1.258-5.872). Exposure to cigarette advertisements through offline media and idol figures did not show a statistically significant effect, however, based on the results of the study, showed that students who have been exposed to cigarette advertisements tend to smoke. **Conclusion:** Students who are exposed to cigarette advertisements through online media have a risk of becoming a smokers.

Keywords: Cigarette ads, Children, Smoking.

INTRODUCTION

Cigarettes are a danger that threatens the world community. Data from The Global Tobacco Epidemic states that the prevalence of the world's smoking population is 17% (WHO, 2023). World Health Organization (WHO) states that around 8 million people die each year from smoking or other tobacco-related diseases. Cigarettes are also deadly to non-smokers, exposure to secondhand smoke causes 1.2 million deaths each year, 65,000 of which are children who are passive smokers. (WHO, 2023). Cigarette consumption is one of the main risk factors for non-communicable diseases such as coronary heart disease, stroke, cancer, chronic lung disease, and diabetes mellitus, which are the leading causes of death in the world, including Indonesia. (WHO, 2020). Data presented by The Global Youth Tobacco Survey (GYTS) shows that 19.2% of students in Indonesia are smokers. 35.6% are male students and 3.5% are female students.

The proportion of the age of first smoking in Indonesia is highest when it is in the age group 15 - 19 years at 48.2%, while when it is in the age group 10 - 14 years at 10.6%. This means that the average smoker in Indonesia has started smoking while still in elementary school to high school, even as much as 10.6% have started smoking while still in elementary school and junior high school. (Kemenkes RI, 2019a).

The proportion of adolescent smokers aged 10 - 18 years in East Java based on Riskesdas data in 2018 was 9.84%. This is in line with the data on the proportion of the highest age of first smoking in East Java when it was in the age group of 15-19 years, which amounted to 47.33%, while when it was in the age group of 10-14 years it was 11.03%. This means that the average smoker in East Java has started smoking while still in junior high school and even elementary school. (Kemenkes RI, 2019b).

Batu City has a proportion of adolescent smokers in 2022 of 6.60% (Dinas Kesehatan Kota Batu, 2023). This is reinforced by Riskesdas data in 2018

which shows that the proportion of the age of first smoking in Batu City is highest when in the age group 15-19 years, which is 56.29%, while when in the age group 10-14 years it is 11.43%. (Kemenkes RI, 2019b). *Global Youth Tobacco Survey 2019* stated that 76.6% of students bought cigarettes from grocery stores, street vendors, or kiosks, and among students who were smoking who tried to buy cigarettes, 60% were not prevented from buying cigarettes even though their age was still not enough. This makes it easier for adolescents to gain access to cigarettes so it provides a great opportunity for adolescents to smoke freely. (WHO, 2020).

The content of substances in cigarettes can harm school-age children. Smoking behavior in school-age children can reduce learning focus, learning disorders, impaired attention, decreased energy, anxiety disorders, and mild depression. When someone is addicted to cigarettes, the nicotine contained in cigarettes stimulates the brain to release substances that provide a sense of comfort. Nicotine addiction can result in discomfort, irritability, and difficulty concentrating.

The nicotine contained in cigarettes can cause addiction and disrupt brain development in adolescence. This can cause damage to almost all organs such as breathing, and heart, and even cause stroke and lung cancer (Kusumawardani et al., 2018). In addition, smoking at a young age has the potential to increase the risk of becoming a smoker for life. The age of first smoking affects a person's sustainability in smoking in adulthood. The younger the first age of smoking, the more likely a person is to become a heavy smoker in adulthood.

People who smoke for > 10 years have a significant relationship to the occurrence of various diseases. Based on data from the Indonesian Ministry of Health in 2023, 59.6% of trachea, bronchus and lung cancer, 59.3% of Chronic Obstructive Pulmonary Disease (COPD), then 28.6% of heart disease, 20.6% of diabetes mellitus (DM), and 19.7% of stroke were caused by cigarettes or tobacco products. (Kemenkes RI, 2023).

Based on research conducted by Martini et al (2020) smoking duration > 20 years has the potential to suffer from lung

cancer disease (Martini et al., 2020). There is a much higher risk of developing COPD when starting smoking at the age of <15 years. Smoking habits that start at age < 15 years have a 12 times greater risk of developing COPD compared to age ≥15 years because smoking in childhood and adolescence can slow lung growth and development, thus increasing the risk of COPD in adulthood. (Safitri et al., 2021). The burden of smoking-related diseases in East Java in 2018, stroke and lung cancer patients occurred mostly in productive age, namely between 17-55 years. This means that the patient has started smoking under the age of 17 so by the time he is 17 years old he has suffered from diseases caused by smoking. (Martini et al., 2018).

Exposure to cigarette smoke at an early age can also contribute to growth inhibition (WHO, 2020). Increased Body Mass Index (BMI) and weight deficit are also associated with cigarette smoke exposure (Nadhiroh et al., 2020).

Research conducted by the *Tobacco Control Support Center- Ikatan Ahli Kesehatan Masyarakat (TCSC-IAKMI)* in 2018 stated that children and adolescents under 18 years of age are more exposed to cigarette advertisements through TV. (TCSC-IAKMI Tobacco Control Support Center- Ikatan Ahli Kesehatan Masyarakat Indonesia & The Union International Union Against Tuberculosis and Lung Disease, 2018).

Cigarette promotions carried out in the media are used by cigarette manufacturers to attract consumers. Various kinds of cigarette advertisements are usually presented in the form of billboards, posters, and advertisements in electronic media. Cigarette advertising content that is often aired on electronic media can provide opinions and shape the perceptions and actions of someone who sees it. Opinions that are made as if by smoking a person looks mature and confidence increases (Istifaizah, 2018).

Cigarette advertisements are made as attractive as possible by raising the theme of friendship, friendship, and togetherness. Cigarette advertisements made with creativity will touch the psychological side of adolescents who show an image of brave, maco, trendy, cool, togetherness, optimistic, unyielding, manly, adventurous, creative, critical, and various other things that are proud

and represent the inner voice of young people and adolescents. This is shown to effectively influence teenagers to smoke. Cigarette advertisements are found on television, and the highway in the form of banners, and posters using youth idols (Fransiska & Firdaus, 2019).

Adolescence is the most impressionable target for tobacco product manufacturers. As many as 75% of school students have seen advertisements for tobacco products. With this exposure, school students have a high potential to become active tobacco users into adulthood. (Islami et al., 2019). The importance of conducting promotions to the public regarding the impact of exposure to cigarette advertisements that are deliberately targeted at teenagers.

Based on the above problems, it is important to research the effect of exposure to cigarette advertising on smoking behavior in school-age children. The importance of researching children aged 10-14 years who are elementary and junior high school level children in Batu City is because the prevalence of the age of first smoking at the age of 10-14 years continues to increase so there needs to be an early prevention effort to reduce the number of novice smokers by increasing health promotion efforts to the community regarding the impact that will result from exposure to cigarette advertisements to school-age children.

METHODS

This study used a case-control design. This research design is an epidemiological study that begins by identifying case groups and control groups, then examined retrospectively for influencing factors. This study was used to analyze the factors influencing exposure to cigarette advertising on smoking behavior in school-age children in Batu City. The location in this study is the work area of the Batu City Health Office, East Java. The case population in this study were all school children aged 10-14 years who smoked in the Batu City Health Office work area recorded in the school-age smoking screening data at the Batu City Health Office in 2023. The control population in this study were all school children aged 10-14 years who did not smoke in the Batu City Health Office work area and were schoolmates of the case

population. The case sample is a portion of school children aged 10-14 years who smoke in the Batu City Health Office work area recorded in the school-age smoking screening data at the Batu City Health Office in 2023 while the control sample is a portion of school children aged 10-14 years who do not smoke in the Batu City Health Office work area who are schoolmates of the case sample.

The sample calculation in this study is to use the odds ratio (OR) of previous studies on variables that influence smoking behavior in school-age children. Thus, in this study, the largest minimum sample size calculation was taken, namely the variable of the effect of ease of access to cigarettes. The sample size calculation uses the StatCalc feature contained in Epi info 7.2.5.0. The variable obtained a minimum sample size of 72 samples.

The sampling technique in this study was to use probability sampling techniques with a simple random sampling approach. Simple random sampling was conducted from a population list of cases based on school-age smoking screening data available at the Batu City Health Office. To avoid samples that drop out because at the time of data collection, the sample does not attend school, the number of case samples taken in this study is 81 samples and 81 control samples, so the total sample in this study is 162 samples. Sampling in this study was carried out proportionally from the population of adolescent smokers who were in elementary and junior high schools recorded in school-age smoking screening data at the Batu City Health Office. selection of case groups and control groups based on school-age smoking screening data.

RESULTS AND DISCUSSION

Respondent Characteristics

Table 1. Characteristics Distribution of Respondents by Case Group and Control Group

Characteristic	Smoking		No Smoking	
	n	%	n	%
Gender				
Men	75	92,6	65	80,2
Women	6	7,4	16	19,8
Total	81	100,0	81	100,0
Age				
13-14 y.o	64	79,0	48	59,3

10-12 y.o	17	21,0	33	40,7
Total	81	100,0	81	100,0

Based on Table 1 in this study, the majority of school-age smokers were male, namely 75 children (92.6%). Whereas in the control group or the non-smoking group, the majority of respondents were male, namely 65 children (80.2%). Table 1 shows that the majority of respondents who smoke are in the age group 13-14 years as many as 64 people (79.0%).

The Effect of Cigarette Advertising Exposure on Smoking Behavior in School-Age Children in Batu City

The factor of exposure to cigarette advertisements will measure the influence of exposure to cigarette advertisements on smoking behavior in school-age children in Batu City both from exposure to offline cigarette advertisements (cigarette advertising banners, cigarette advertising billboards, cigarette promotions in sports activities (sponsorship), and television advertisements), online such as cigarette promotional advertisements on social media (youtube, TikTok, and Instagram) and from the presence of idolized figures.

Table 2. Analysis of the Effect of Cigarette Advertising Exposure on Smoking Behavior in School-Age Children in Batu City

Cigarette Advertising Exposure Variable	Smoking		No Smoking		OR (CI 95%)
	n	%	n	%	
Offline					
High exposure	22	27,2	21	25,9	1,065 (0,530 - 2,140)
Medium exposure	59	72,8	60	74,1	
Total	81	100,0	81	100,0	
Online					
High exposure	26	32,1	12	14,8	2,718 (1,258 - 5,872)
Medium exposure	55	67,9	69	85,2	
Total	81	100,0	81	100,0	
Idol Figures					
High exposure	18	22,2	11	13,6	1,818 (0,798 - 4,144)
Medium exposure	63	77,8	70	86,4	
Total	81	100,0	81	100,0	

Table 2 shows that in the case group or smoking group who had high exposure to cigarette promotional advertisements on offline media were 22 people (27.7%), while in the control group or non-smoking were 21 people (25.9%). Of students who had moderate exposure to offline media 59 people (72.8%), while in the control group, there were 60 people (74.1%). The variable exposure to cigarette advertisements offline has a p-value of 1.000, which means that the variable exposure to offline media does not have a significant influence on smoking behavior in school-age children in Batu City.

Students who had high exposure to cigarette promotion from online media in the case group or smoking group amounted to 26 people (32.1%), while in the control group, it was 12 people (14.8%). Students who had moderate exposure to cigarette promotion in the case group amounted to 55 people (67.9%), while in the control group, it amounted to 69 people (85.2%). The p-value on the online media exposure variable is 0.016 and the odds ratio value is 2.718 with a 95% confidence interval of 1.258 - 5.872. So that online media exposure has a significant influence on smoking behavior in school-age children in Batu City. Table 2 shows that exposure with high intensity through idol figures in the case group amounted to 18 people (22.2%), while in the control group, it was 11 people (13.6%). Exposure with moderate intensity through idol figures in the case group amounted to 63 people (77.8%), while in the control group, it amounted to 70 people (86.4%). The variable exposure through idol figures has a p value > 0.05, which is 0.219 so exposure through idol figures does not have a significant influence on smoking behavior in school-age children in Batu City.

Advertising is a medium for conveying information to the public about a product and advertising has a function to convey information, persuade, or remind the public of the product. Cigarette advertisements are increasingly intensively carried out by the cigarette industry. Cigarette promotions carried out in the media are used by cigarette manufacturers to attract consumer interest. Various kinds of cigarette advertisements are usually presented in

the form of billboards, posters, and advertisements in electronic media. Cigarette advertising content that is often aired on electronic media can provide opinions and shape the perceptions and actions of someone who sees it. Opinions that are made as if by smoking a person looks mature and confidence increases (Istifaizah, 2018).

In this study, it is known that media exposure influences smoking behavior in school-age children in Batu City, especially on media exposure through online media or online with the p-value of online media exposure being 0.016. The OR result in this study is 2.718 so students who are exposed to cigarette promotions through online media with high intensity have a 2.718 times greater risk of smoking behavior compared to those exposed to cigarette promotions through online media with moderate intensity.

The results of this study are in line with research conducted by Puspitawati & Widyanthini, (2021) in Denpasar City in 2020 revealed that adolescents use social media more to find information. This is evidenced by the percentage of adolescents who use electronic cigarettes and have seen advertisements amounting to 35.6% and 39.0% of these advertisements were found on social media.

In previous research conducted by Batubara, (2018) A study conducted on students in Pematang Siantar City in 2017 found that there was a relationship between exposure to cigarette advertisements and smoking behavior among students in Pematang Siantar City. In general, cigarette advertisements are made as attractive as possible by raising the theme of friendship, friendship, and togetherness. Cigarette advertisements are made very creatively to touch the psychological side of adolescents who show an image of brave, dashing, trendy, cool, togetherness, optimistic, unyielding, manly, adventurous, creative, critical, and various other things that are proud and represent the inner voice of young people and adolescents. (Fransiska & Firdaus, 2019).

To attract more consumption, cigarette manufacturers have a reliable way. Various advertisements in the form of billboards, posters and advertisements in the electronic media are displayed to stimulate consumers to try the products

they advertise. Various terms such as *low*, *light*, *mild* are used by manufacturers to make it seem as if cigarettes are safe and the amount of substance content is lower. As a result, smokers feel that they can smoke and even consume more because they think that the cigarettes they consume only contain a small amount of substances (Manafe et al., 2019).

Cigarette advertisements have a role in the desire and behavior of smoking. Cigarette advertisements have a significant influence on adolescent smoking behavior. Adolescents feel that cigarette advertisements are true and can influence their point of view in making decisions about smoking behavior. (Fadhila et al., 2021).

Whereas in offline exposure to cigarette advertisements and exposure through idol figures, this study revealed that there was no significant influence on smoking behavior in school-age children in Batu City. This is in line with the results found in the study by Solihin et al., (2023) This is in line with previous research which revealed that not all adolescents pay attention to and capture the message of cigarette advertisements even though they have seen them repeatedly. This is in line with previous research which revealed that not all adolescents pay attention and capture the message of cigarette advertisements even though they have seen them repeatedly (Fadhila et al., 2021).

CONCLUSION

Exposure to cigarette advertisements affects smoking behavior in school-age children in Batu City, especially exposure to cigarette advertisements through online media. Although statistically exposure to cigarette advertisements through offline media and idol figures does not show a significant effect, children who have high-intensity exposure tend to have smoking behavior.

This study is inseparable from various limitations. This study used a case-control research design that allows for recall bias due to the limited memory of respondents. Designing clear and specific research objectives is a step taken to minimize the bias that occurs.

It is suggested that concerned institutions and local governments

eliminate cigarette advertisements both in conventional media and internet-based media. The elimination of cigarette advertising starts from the promotion of cigarette products, showing people smoking, showing cigarettes or e-cigarettes, cigarette smoke, cigarette packs or e-cigarette liquid bottles or those related to other tobacco products.

Every person is prohibited from broadcasting and describing in the form of pictures or photographs, broadcasting, displaying or showing people smoking, showing cigarettes, cigarette smoke, cigarette packs or related tobacco products, and all forms of tobacco product information in print media, broadcasting media, and information technology media related to commercial/advertising activities or making people want to smoke. Implementation has been ongoing for outdoor advertising and commercial media but has never been implemented for advertising and content that is broadcast or displays the form and activity of smoking in internet-based media.

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