

Determinants of Adolescent Smoking Behavior in Aceh: A Knowledge and Attitude Study

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Abstract. *Smoking is a serious public health problem in Indonesia. The prevalence of smoking among adolescents in Aceh is high, with 2.7% smoking daily and 3.2% smoking occasionally. Knowledge and attitude toward the dangers of smoking play an important role in adolescent smoking behavior. This study was conducted to analyze the relationship between knowledge and attitude toward smoking behavior among adolescents in Aceh. This cross-sectional study involved 304 junior high school students in grades 1 and 2 in Aceh Besar. Data were collected using a modified questionnaire from the Global Youth Tobacco Survey and analyzed using the chi-square test. Most respondents who smoked did not realize that smoking can cause lung disease, increase the risk of heart disease and stroke, nicotine in cigarettes can cause addiction, cigarettes contain more than 7000 chemicals, and adolescent smokers tend to have lower academic achievement compared to non-smokers. The attitudes of respondents who do not smoke are more positive towards the dangers of smoking, such as considering smoking harmful to health, very detrimental to themselves, and most likely to cause addiction. Better knowledge and attitudes are associated with lower adolescent smoking behavior. Efforts to increase knowledge and form positive attitudes toward the dangers of smoking need to be carried out through health education and health promotion in schools.*

Keywords: *knowledge, attitude, smoking behavior, adolescents*

1. Introduction

Smoking is the most common form of tobacco use worldwide. Tobacco accounts for up to half of its users. Each year, nearly 8 million people die, including about 1.3 million non-smokers exposed to secondhand smoke. About 80% of the world's tobacco users live in low- and middle-income countries. Tobacco use is higher among men (36.7%) than women (7.8%) (WHO, 2023). In the United States, more than 16 million people live with diseases caused by smoking, and more than 480,000 people die from smoking (CDC, 2024).

Smoking is also a serious public health problem in Indonesia. According to the 2018 Riskesdas, the prevalence of smokers aged ≥ 15 years was 33.8% (Riskesdas, 2018). Smoking behavior among these groups began to decline in 2023, which was 28.62%. However, this prevalence is still relatively high (Nurhayati-Wolff, 2024). According to the Indonesian Health Survey (IHS) in 2023, the prevalence of smoking among 10-18-year-olds in the last 1 month was 4.6% smoking every day and 2.8% smoking sometimes (Kemenkes RI, 2023).

In Aceh, 2.7% of the population aged 10-18 smoked daily in the past month, and 3.2 smoked occasionally. Daily smoking was higher among males (8.9%) compared to females (0.1%). In terms of education, the majority of smokers aged 10-18 years had a

high school education (12.9%) and junior high school education (9.4%) (Kemenkes RI, 2023). Efforts to control cigarette consumption have been made in various ways, such as health promotion with educational media (Pertiwi et al., 2018; Siregar, 2018; Yusuf et al., 2021), peer education (Suryanti & Hamzah, 2024; Yuan et al., 2023), implementation of smoking policies in schools (Glenstrup et al., 2021), social marketing mix interventions (Ismail et al., 2022), as well as the use of interventions using social cognitive theory, smoking cessation counseling, and text messaging programs for short-term cessation in young adults (Villanti et al., 2020). However, efforts to control cigarette consumption among Acehese adolescents face various challenges, including easy access to tobacco products and a lack of regulatory enforcement regarding the sale of cigarettes to minors.

Knowledge and attitudes about the dangers of smoking play an important role in adolescents' smoking behavior. Several studies have shown that there is a relationship between knowledge and attitudes and adolescent smoking behavior (Alsanosy & Santangelo, 2022; Astuti & Limbu, 2023; Budiyati et al., 2021; Sampe et al., 2022). Knowledge of the health problems caused by smoking and a more favorable attitude towards smoking restrictions were found to be higher in the non-smoker group compared to the smoker group (Haddad et al., 2020).

However, some studies show no relationship between knowledge and smoking behavior (Pertiwi, 2020; Siahaan et al., 2024). Likewise, attitudes are not significantly associated with smoking behavior (Akmal, 2020; Berlian et al., 2021). Based on the differences in the results of these studies, this study will analyze the relationship between knowledge and attitudes toward smoking behavior in adolescents in Aceh, with a more specific approach that analyzes each component of questions about knowledge and attitudes. This is expected to provide a deeper understanding of the particular aspects of knowledge and attitudes that may have a stronger influence on adolescent smoking behavior.

2. Method

This study used a cross-sectional research design to determine the relationship between knowledge and attitudes toward smoking behavior in adolescents in Aceh. The population in this study was lower secondary school students in grades 1 and 2 in 5 public junior high schools in Aceh Besar. This study used 304 students as samples.

The variables in this study consisted of knowledge, attitude, and smoking behavior variables collected using a questionnaire modified from the *Global Youth Tobacco survey* questionnaire (Group, n.d.). Knowledge was measured by 15 positive statements with true and false answer options; 7 questions, measured attitude, and smoking behavior was measured by 1 question asking, "Have you ever smoked a cigarette?". Data were collected by distributing questionnaires to male students in each school selected for the study. Before being given the questionnaire, all respondents were given an informed consent sheet to ask for consent to participate in the study.

The study's data analysis consisted of descriptive and inferential analysis. Inferential analysis used the chi-square test to determine the relationship between each question about knowledge and attitude and smoking behavior.

3. Results and Discussions

Based on Figure 1. Shows that the majority of respondents aged 13 years as many as 155 people (51.0%) and the minority of respondents aged 15 years as many as 25 people (8.2%).

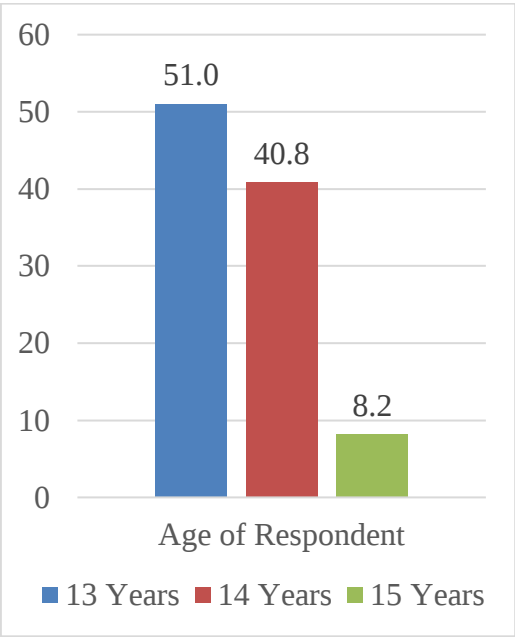


Figure 1. Age characteristics of respondents

Figure 2 shows that most respondents did not answer each question correctly. Still, as many as 61.2% of respondents stated that smoking is prohibited in non-smoking areas, including schools.

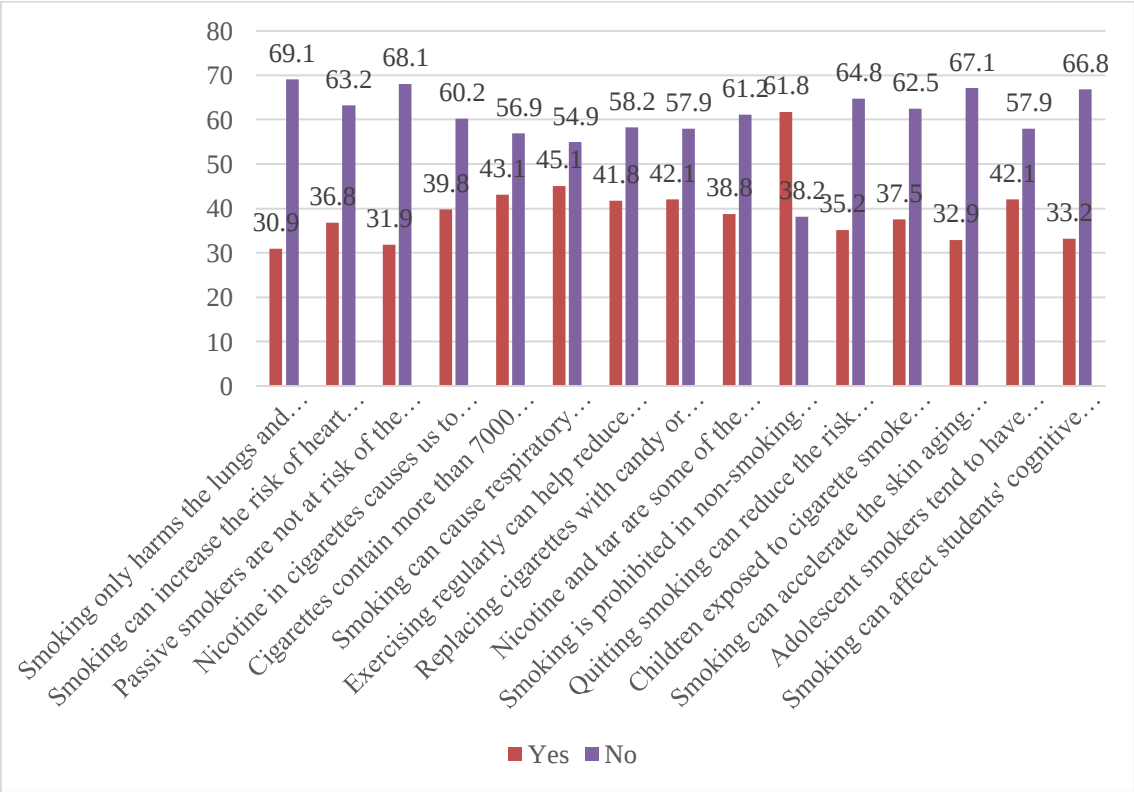


Figure 2. Prevalence of respondents' knowledge of smoking

Table 1. Prevalence of respondents' attitudes to smoking (n=304)

No	Questions	f	%
1	How harmful do you think smoking is to your health?		
	Very dangerous	28	9.2
	Harmful	72	23.7
	Somewhat dangerous	93	30.6
	Slightly harmful	111	36.5
	Not at all dangerous	0	0
2	How much do you think people harm themselves when they smoke frequently or occasionally?		
	Very Harmful	20	6.6
	Adverse	74	24.3
	Somewhat detrimental	87	28.6
	Some harm	123	40.5
	No harm	0.0	0.0
3	In your opinion, how likely is it for someone to become addicted to smoking?		
	Very likely	25	8.2
	Possible	70	23.0
	Somewhat likely	98	32.2
	Unlikely	111	36.5
	Very unlikely	0	0
4	Would you use a cigarette if one of your friends offer to you?		
	Not	68	22.4
	Probably not	73	24.0
	Probably yes	96	31.6
	Definitely yes	67	22.0
5	Will you use cigarettes in the next 12 months?		
	Not	42	13.8
	Probably not	55	18.1
	Probably yes	83	27.3
	Definitely yes	124	40.8
6	Once someone has started using cigarettes, how easy or difficult do you think it is for them to quit?		
	Very difficult	21	6.9
	Difficult	52	17.1
	Easy	130	42.8
	Very easy	101	33.2
7	Do you think using cigarettes helps people feel more comfortable?		
	More comfortable	210	69.1
	Less comfortable	94	30.9

Based on Table 1. shows that 23.7% said that smoking is harmful to health. A total of 40.5% said that people who smoke only a little are themselves. A total of 36.5% said that it is impossible for someone to experience tobacco addiction. 31.6% of respondents said they would smoke cigarettes offered by their friends. A total of 40.8% said they would smoke in the next 12 months. A total of 42.8% said that it was easy to quit smoking. A total of 69.1 said that cigarette users help someone more comfortable.

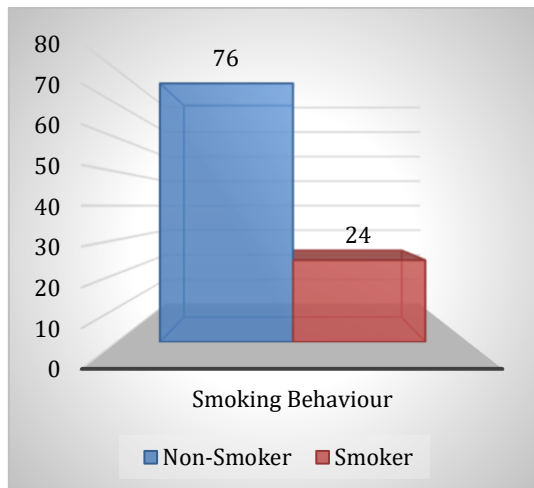


Figure 3. Prevalence of smoking behavior

Based on Figure 3. shows that respondents who do not smoke (76.0%) are higher than those who smoke (24%).

Table 2. The Relationship Between Knowledge and Smoking Behavior in Adolescents

No	Knowledge	Smoking Behavior				P-value
		Non-Smokers (n=231)		Smokers (n=73)		
		f	%	f	%	
1	Smoking only harms the lungs and does not affect other organs.					
	Yes	79	84.0	15	16.0	0.040*
	No	152	72.4	58	27.6	
2	Smoking can increase the risk of heart disease and stroke.					
	Yes	93	83.0	19	17.0	0.040*
	No	138	71.9	54	28.1	
3	Passive smokers are not at risk of the negative effects of cigarette smoke.					
	Yes	79	81.4	18	18.6	0.167
	No	152	73.4	55	26.6	
4	Nicotine in cigarettes causes us to become addicted to cigarettes					
	Yes	100	82.6	21	17.4	0.038*
	No	131	71.6	52	28.4	
5	Cigarettes contain more than 7000 chemicals that are bad for health					
	Yes	109	83.2	22	16.8	0.015*
	No	122	70.5	51	29.5	
6	Smoking can cause respiratory problems: cancer and lung disease.					
	Yes	112	81.8	25	18.2	0.046*
	No	119	71.3	48	28.7	
7	Exercising regularly can help reduce cravings for cigarettes					0.786

No	Knowledge	Smoking Behavior				P-value
		Non-Smokers (n=231)		Smokers (n=73)		
		f	%	f	%	
	Yes	98	77.2	29	22.8	
	No	133	75.1	44	24.9	
8	Replacing cigarettes with candy or healthy snacks can help in the quitting process					
	Yes	100	78.1	28	21.9	0.543
	No	131	74.4	45	25.6	
9	Nicotine and tar are some of the substances contained in cigarettes					
	Yes	98	83.1	20	16.9	0.031*
	No	133	71.5	53	28.5	
10	Smoking is prohibited in non-smoking areas, including in schools					
	Yes	146	77.7	42	22.3	0.465
	No	85	73.3	31	26.7	
11	Quitting smoking can reduce the risk of heart and lung disease					
	Yes	84	78.5	23	21.5	0.537
	No	147	74.6	50	25.4	
12	Children exposed to cigarette smoke are at higher risk of developing respiratory infections					
	Yes	90	78.9	24	21.1	0.425
	No	141	74.2	49	25.8	
13	Smoking can accelerate the skin aging process					
	Yes	76	76.0	24	24.00	1.000
	No	155	76.0	49	24.00	
14	Adolescent smokers tend to have lower academic performance compared to non-smokers.					
	Yes	105	82.0	23	18.0	0.049*
	No	126	71.6	50	28.4	
15	Smoking can affect students' cognitive abilities.					
	Yes	78	77.2	23	22.8	0.830
	No	153	75.4	50	24.6	

Table 2 explains the relationship between knowledge about smoking and smoking behavior. The majority of respondents who smoke do not realize that smoking is healthy, the content of cigarettes causes addiction, exercise can reduce smoking behavior, smoking is prohibited in non-smoking areas, including schools, and smoking can reduce academic achievement and cognitive abilities of students. Statistical results show that knowledge factors associated with smoking behavior are smoking can cause lung disease ($p=0.040$), smoking can increase the risk of heart disease and stroke ($p=0.040$), nicotine in cigarettes can cause smoking addiction ($p=0.038$), cigarettes contain more than 7000 chemicals ($p=0.015$), smoking can cause respiratory problems, cancer, and lungs ($p=0.046$), nicotine and tar are one of the substances in cigarettes ($p=0.031$). Adolescent smokers tend to have lower academic achievement compared to non-smokers ($p=0.049$).

This study is in line with the research of Omari et al. (2021), which shows that the

knowledge score of the dangers of smoking is higher in respondents who do not smoke compared to those who smoke (Al Omari et al., 2021). Likewise, another study showed that higher knowledge of health problems due to smoking was found in the non-smoker group compared to the smoker group (Haddad et al., 2020).

Adolescents who smoke tend to have lower knowledge regarding the adverse effects of smoking on health and academic achievement compared to adolescents who do not smoke (Juliansyah & Rizal, 2018; Muslim et al., 2023; Ramadhani et al., 2024). According to Rizkiawati, adolescent smokers tend to have lower educational attainment compared to non-smokers. This is because smoking can cause impaired concentration and focus, as well as negatively affect adolescents' mental and physical health, which in turn affects academic performance.

In contrast, a study conducted in Depok showed that high school students' smoking was not influenced by their knowledge. There was no difference between smokers and non-smokers in recognizing the adverse effects related to smoking, such as lung cancer and heart disease (Nurmansyah et al., 2021).

The Health Belief Model theory explains that individual perceptions of the threat of disease and the benefits of preventive measures will influence health behavior (Nursalam, 2020). In the context of adolescents' smoking behavior, their low knowledge of the dangers of smoking may reduce the perceived threat and benefits of quitting smoking, thus encouraging them to continue smoking.

In addition, not all adolescents who have low knowledge about the dangers of smoking also smoke. This could be due to several possible factors, such as strong social support from family, friends, or the environment not to smoke, good self-control to be able to resist the urge to smoke, and limited access and availability of cigarettes in the adolescent environment. Other environmental factors, such as regulations and enforcement of the smoking ban at school, can also prevent adolescents from smoking despite inadequate knowledge.

Table 3. Relationship between attitude factors and smoking behavior

		Smoking Behavior				p-value
No	Attitude	Non-Smokers		Smokers		
		(n=231)		(n=73)		
		f	%	f	%	
1	How harmful do you think smoking is to your health?					0,039*
	Very dangerous	23	82.1	5	17.9	
	Harmful	59	81.9	133	18.1	
	Somewhat dangerous	75	80.6	18	19.4	
	Slightly harmful	74	66.7	37	33.3	
2	How much do you think people harm themselves when they smoke frequently or occasionally?					0.012*
	Very Harmful	18	90.0	2	10.0	
	Adverse	62	83.8	12	16.2	
	Somewhat detrimental	69	79.3	18	20.7	
	Some harm	82	66.7	41	33.3	
3	In your opinion, how likely is it for someone to become addicted to smoking?					0.027*
	Very likely	22	88.0	3	12.0	
	Possible	60	85.7	10	14.3	

No	Attitude	Smoking Behavior				p-value
		Non-Smokers		Smokers		
		(n=231)		(n=73)		
		f	%	f	%	
	Somewhat likely	73	74.5	25	25.5	
	Unlikely	76	68.5	35	31.5	
4	Would you use a cigarette if one of your friends offered you it?					
	Not	54	79.4	14	20.6	0.017*
	Probably not	62	84.9	11	15.1	
	Probably yes	73	76.0	23	24.0	
	Definitely yes	42	62.7	25	37.3	
5	Will you use cigarettes in the next 12 months?					
	Not	36	85.7	6	14.3	0.117
	Probably not	44	80.0	11	20.0	
	Probably yes	65	78.3	18	21.7	
	Definitely yes	86	69.4	38	30.6	
6	Once someone has started using cigarettes, how easy or difficult do you think it is for them to quit?					
	Very difficult	18	85.7	3	14.3	0.470
	Difficult	42	80.8	10	19.2	
	Easy	98	75.4	32	24.6	
	Very easy	73	72.3	28	27.7	
7	Do you think using cigarettes helps people feel more comfortable?					
	More comfortable	165	78.6	45	21.4	0.115
	Less comfortable	66	70.2	28	29.8	

Table 3. explains that respondents who do not smoke have a better attitude than respondents who smoke. Attitude factors associated with smoking behavior are smoking is harmful to health ($p=0.039$), smoking is very detrimental to yourself ($p=0.012$), smoking is very likely for someone to experience smoking addiction ($p=0.027$), and offering cigarettes from friends to smoke ($p=0.017$). Adolescents with a good attitude about the dangers of smoking tend not to smoke compared to adolescents who have a less good attitude.

This study is in line with research by Julaecha et al., which shows that the attitude of adolescents who consider smoking harmful to health is associated with low smoking behavior (Julaecha & Wuryandari, 2021). This study is in line with other studies that show a better attitude towards smoking restrictions is higher in the non-smoker group compared to the smoker group (Haddad et al., 2020).

This finding is in line with behavioral theory, which explains that an individual's attitude or perception towards a behavior is one of the important factors determining whether or not the individual will perform the behavior (Ajzen, 1991). In the context of smoking behavior, adolescents who have negative attitudes or perceptions towards smoking, such as considering smoking harmful to health, self-harm, and addiction, are less likely to smoke.

The results also show that the attitude of cigarette offers from friends is also related to smoking behavior. Similarly, research by Deve et al. shows that one of the drivers of

smoking behavior in adolescents is the offer of smoking from peers. When someone refuses the invitation, there will be a feeling of being shunned by his friends (Deve et al., 2019). In addition to smoking offers, various negative words from peers trigger a greater desire to try smoking (Reskiaddin & Supriyati, 2021).

Smoking behavior in adolescents is influenced by individual attitudinal factors and social factors, such as peer influence (Hefler et al., 2017). Adolescents who get offers of cigarettes from their friends tend to be more susceptible to starting or continuing smoking behavior due to social pressure and the desire to be accepted by the group.

Researchers assume that positive adolescent attitudes towards the dangers of smoking, such as viewing smoking as harmful to health, can be a protective factor for adolescents not to engage in smoking behavior. Likewise, adolescents who perceive that smoking is very detrimental to themselves also tend not to smoke. This attitude reflects an awareness of the adverse effects of tobacco on oneself, which encourages them to avoid this behavior. Finally, adolescents who perceive that smoking is very harmful to themselves also tend not to smoke. This attitude reflects an awareness of the adverse effects of tobacco on oneself, which encourages them to avoid this behavior.

4. Conclusions

The results showed that the majority of respondents who smoked did not realize that smoking can hurt health, cause addiction, interfere with academic performance, and is prohibited in some places. This indicates their lack of knowledge about the dangers of smoking. Statistically, there is a significant relationship between knowledge about the risks of smoking and smoking behavior, where respondents who have better knowledge tend to have lower smoking behavior. In addition, respondents who do not smoke also show a more positive attitude towards smoking behavior compared to respondents who smoke.

It is expected that efforts will be made to increase students' knowledge about the dangers of smoking through health education and promotion programs in schools. Schools should also adopt strict policies and regulations regarding the prohibition of smoking in the school environment. Teachers and parents need to support and be good role models for students in healthy behavior, especially not smoking. In addition, further research is needed to explore other factors that can influence smoking behavior in adolescents, such as environmental factors, peers, and access to cigarettes.

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