

# Predictors of smoking cessation intentions among adolescents in Indonesia

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## Abstract

Tobacco causes more than 8 million deaths every year worldwide. In Indonesia, the prevalence of tobacco consumption remains alarmingly high among adolescents. Although many young smokers express a desire to quit, they often face significant challenges due to various influencing factors. This study aimed to analyze the predictors of smoking cessation intention among adolescents in Indonesia, employing a cross-sectional design and utilizing secondary data from the 2019 Global Youth Tobacco Survey

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Ethics approval and consent to participate: the Indonesia 2019 GYTS had obtained permission from the National Institute of Health Research and Development, solidifying its credibility and legitimacy. Additionally, the questionnaires were completed by the respondents themselves and were anonymous to maintain confidentiality. All respondents provided written consent before taking the survey.

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(GYTS) conducted in Indonesia. Utilizing a purposive sampling technique, a robust dataset comprising 1,191 adolescents was meticulously curated. To analyze the data, we employed the STATA application, using inferential tests such as chi-square and logistic regression for variable identification and processing, ensuring the precision and rigor of our findings. The study findings revealed that most adolescents want to quit smoking (81.61%). The ability to quit smoking (adjusted odds ratio [AOR]=9.80, 95% confidence interval [CI]=6.12-15.73), perception of smoking as harmful to health (AOR=2.20, CI=1.40-3.48), source of support (AOR=1.68, CI=1.02-2.50), smoking status of friends (AOR=0.48, CI=0.38-0.74), were predictors associated with adolescents' intention to quit smoking. Data from GYTS indicated that the majority of adolescents who smoke intend to cease smoking. Based on these insights, it is recommended that the government enhance the enforcement and supervision of existing tobacco control policies to effectively support youth cessation initiatives.

## Introduction

Tobacco consumption remains a pressing global health concern, claiming over 8 million lives annually worldwide, with direct tobacco use accounting for more than 7 million of these deaths.<sup>1</sup> In Indonesia, national surveys conducted in 2013 and 2018 revealed a persistent high prevalence of tobacco use among adolescents. The prevalence of smoking among individuals aged 10-19 increased from 7.2% in 2013 to 9.1% in 2018, marking a significant rise of approximately 20%.<sup>2</sup> Additionally, a study reported a concerning trend of high levels of smoking addiction behavior among Indonesian students.<sup>3</sup> Despite this alarming scenario, many adolescents express a desire to quit smoking but face considerable challenges due to a lack of strong intentions and motivation.

Several previous studies have investigated smoking cessation intentions among adolescents. The survey conducted by Dadras<sup>4</sup> focused exclusively on male adolescents aged 16 years and older. In contrast, our study targets a younger age group (13-15 years) and includes both male and female participants. Dadras<sup>4</sup> also explored the correlation between early smoking initiation (by age) and smoking cessation among adolescents. In contrast, our study focuses on school grade levels, specifically examining students from grades 7 to 12. Meanwhile, parental involvement in influencing adolescents' cessation efforts has also been studied by Ihyauddi.<sup>5</sup> However, the data is from the 2015 Indonesian Global School-Based Student Health Survey (GSHS). The study by Syapiila<sup>6</sup> looked at the influence of having friends who smoke significantly in Zambia. Our study looks at the correlation between having friends who smoke and smoking cessation intentions

among adolescents in Indonesia. Notably, research examining predictors of intention to quit smoking among Indonesian adolescents, utilizing data from the Global Youth Tobacco Survey (GYTS), remains conspicuously absent.<sup>7</sup>

Data from the World Health Organization (WHO) in 2019 underscore the severity of the issue, revealing that 40.6% of Indonesian students aged 13-15 years have used tobacco products, with two-thirds of boys and nearly one-fifth of girls reported as users.<sup>2</sup> The age of initiation is particularly concerning, with the majority of adolescents starting smoking between the ages of 10 and 14, further perpetuating the cycle of addiction.<sup>8</sup> Moreover, findings from the 2019 GYTS reveal that 18.8% of students currently smoke tobacco, with a significant disparity between genders, where 35.5% of boys and 2.9% of girls are active smokers.

Teenagers who smoke are at a high risk of experiencing various serious health problems, both in the short term and long term.<sup>9</sup> Firstly, smoking can damage the lungs and respiratory system, leading to issues such as shortness of breath, chronic coughing, and an increased risk of chronic lung diseases like asthma and emphysema.<sup>10</sup> Additionally, there is a correlation between smoking and mental health problems in teenagers, as smoking can increase the risk of depression, anxiety, and stress.<sup>11</sup> Furthermore, nicotine in cigarettes is highly addictive, and teenagers are more susceptible to addiction than adults, leading to difficulties in quitting even when they are aware of the negative consequences.<sup>12</sup> Moreover, smoking can impact cognitive abilities and concentration, affecting academic performance and study productivity.<sup>13</sup> Physically, smoking can damage the skin, teeth, and nails, as well as cause unpleasant mouth odor and yellowing of teeth, affecting confidence and physical appearance. Finally, smoking during teenage years can increase the risk of various serious diseases later in life, such as heart disease, stroke, cancer, and vascular disorders.<sup>14</sup>

The Ministry of Health of Indonesia, in collaboration with local governments and development partners, has implemented various measures such as banning cigarette advertising, expanding Smoking-Free Areas (SFAs), and providing education on the hazards of tobacco products.<sup>15</sup> Additionally, the introduction of smoking cessation services through the toll-free Quit Smoking Line represents a significant government initiative aimed at supporting individuals in their cessation efforts, particularly those who may face barriers to accessing traditional healthcare facilities.

Research from other regions, such as China, suggests that parental disapproval, teacher intervention, and social support significantly influence adolescents' intentions to quit smoking.<sup>16</sup> However, similar investigations tailored to the Indonesian context are lacking. To address this gap and contribute to the design of effective smoking prevention programs in Indonesia, this study aims to analyze predictors of intention to quit smoking among Indonesian adolescents using data from the GYTS. By investigating these predictors, this study seeks to inform evidence-based interventions and policies aimed at reducing tobacco consumption among Indonesian youth, ultimately mitigating the associated health risks and improving public health outcomes in the country.

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## Materials and Methods

### Population, sample, and sampling

This study's population was derived from the 2019 Indonesian GYTS population. The target population consisted of students in grades 7-12, or junior and senior high school, totaling 9,992

teenagers. We used a purposive sampling technique. The inclusion criteria were adolescents who actively smoked, male or female, and smoked tobacco. The sample size was 1,191 adolescents. We conducted no intervention in the sample. Our research utilized secondary data derived from the 2019 Indonesian GYTS.

### Variables

The dependent variable, namely the desire to quit smoking, was determined based on the question: "Do you want to stop smoking now?". The independent variables include age, gender, school grade, perception of smoking as harmful, belief in one's ability to quit smoking, parental smoking status, friends' smoking behavior, and whether the respondent had received help or advice to quit smoking.

### Data collection

The data collection process began by downloading the GYTS dataset from the Centers for Disease Control (CDC) website (<https://www.cdc.gov/tobacco/global/index.htm>). Subsequently, data cleaning was performed to select relevant data and identify the variables to be utilized in the study.

### Analysis

Data analysis was conducted using univariate and inferential statistics, including the chi-square test ( $p < 0.05$ ) and logistic regression, with the STATA version 16 application for Windows. A chi-square analysis was conducted to determine whether a relationship existed between the independent variables and the dependent variable. While multivariate data analysis used logistic regression to determine the strongest factors in sequence that influence smoking cessation intentions among adolescents in Indonesia.

A clear operational definition of the research was established in advance to account for various variables that could act as potential confounders during regression analysis. This approach also facilitates a more focused discussion of the relevant variables in relation to the existing literature.

### Ethical clearance

The GYTS obtained permission from the National Institute of Health Research and Development, solidifying its credibility and legitimacy. Additionally, the questionnaires were completed by the respondents themselves and were anonymous to maintain confidentiality. All respondents filled out written consent before taking the survey.

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## Results

The data are presented in accordance with the research objectives, including sample frequencies for both independent and dependent variables, chi-square test results to identify associations between variables, and logistic regression analysis to determine which independent variables are most strongly associated with and have a sequential influence on the dependent variable.

A large proportion of the teenagers who smoke fall within the age range of 13 to 15 years, constituting 583 individuals (48.95%) out of a total of 1,191 teenagers. Most of these adolescents (58.27%) were enrolled in grades 7 through 9, while 497 (41.73%) were in grades 10 through 12. The majority of adolescents (87.57%) perceive smoking as detrimental to health and believe they have the ability to cease smoking if they choose to do so (87.99%). Most adolescents (54.83%) do not reside with smoking parents, and a significant portion of teenagers (53.06%) have

friends who smoke. Moreover, most adolescents (85.31%) have received assistance in their efforts to quit smoking. Among those who express a desire to quit, 81.61% are inclined to do so, as shown in Table 1.

Table 2 illustrates that four independent variables demonstrated statistically significant results concerning the desire to cease smoking ( $p < 0.05$ ). These variables include: perception of smoking as harmful to health ( $p = 0.000$ ); confidence in the ability to quit smoking if desired ( $p = 0.000$ ); smoking status of friends ( $p = 0.000$ ); and receiving assistance to quit smoking ( $p = 0.0171$ ). Meanwhile, the variables that showed insignificant results on the desire to quit smoking with  $p > 0.05$  were: age ( $p = 0.0993$ ); gender ( $p = 0.6253$ ); school grade level ( $p = 0.5299$ ); and living with parents who smoke ( $p = 0.6116$ ).

Table 3 presents the results of the multivariate logistic regression analysis, identifying four significant predictors of the intention to quit smoking: perception of the harmfulness of smoking to health, self-efficacy in quitting smoking, friends' smoking status, and receiving help to quit smoking. Adolescents who perceive themselves as capable of quitting smoking are 9.8 times more likely to express a desire to quit (AOR=9.81; 95% CI=6.12-15.7;  $p < 0.001$ ). This highlights the critical role of self-efficacy in shaping the intention to quit smoking. Similarly, adolescents who recognize the harmful effects of smoking on health are 2.2 times more likely to express a desire to quit (AOR=2.20; 95% CI=1.40-3.48;  $p = 0.001$ ). This finding underscores the importance of health awareness in motivating smoking cessation. In addition, adolescents whose friends also smoke are 1.6 times more likely to express a desire to quit (AOR=1.60; 95% CI=1.02-2.50;  $p = 0.040$ ).

This suggests that peer influence, while modest, has a significant impact on smoking behaviors and intentions. Lastly, adolescents who receive assistance or support to quit smoking are significantly more likely to express the desire to quit (AOR=0.48; 95% CI=3.08-7.49;  $p = 0.002$ ), suggesting that access to support services is crucial in reinforcing their intention to quit.

## Discussion

The dataset from our study, involving a cohort of 1,191 adolescents, highlights a notable trend: a substantial 81.61% of adolescents express a strong desire to quit smoking. This aligns with findings from a comprehensive international study spanning 61 countries, consistently revealing that a majority of adolescent smokers aspire to overcome their smoking habit.<sup>11</sup> Recognizing the urgency of addressing this issue, Indonesia has implemented a multifaceted approach in collaboration with the Ministry of Health, local governments, and development partners. These cross-sectoral efforts include essential measures such as bans on cigarette advertising, promotional campaigns, and sponsorships; the expansion of SFAs; and comprehensive education initiatives to explain the dangers of cigarettes and tobacco products.<sup>10</sup> Additionally, the Ministry of Health has achieved a significant milestone by launching an innovative Smoking Cessation Line. This progressive initiative reflects the government's commitment to facilitating smoking cessation for individuals who may lack the time to visit healthcare facilities, acknowledging the challenge of quitting smoking.

Indeed, quitting smoking remains a challenging task, mainly

**Table 1.** Univariate analysis of predictors of smoking cessation intentions among adolescents in Indonesia (n=1,191).

Variable	n	%
Age		
<13	175	14.69
13-15	583	48.95
>15	433	36.36
Sex		
Male	1122	94.21
Female	69	5.79
Grade		
Class 7-9	694	58.27
Class 10-12	497	41.73
Perception that smoking is harmful to health		
No	148	12.43
Yes	1043	87.57
Able to quit smoking if desired		
No	143	12.01
Yes	1048	87.99
Living with smoking parents		
No	653	54.83
Yes	538	45.17
Friends who smoke		
No	559	46.94
Yes	632	53.06
Received help to quit smoking		
No	175	14.49
Yes	1016	85.31
Desire to quit smoking		
No	219	18.39
Yes	972	81.61

because of the addictive nature of nicotine cigarettes, as supported by abundant scientific evidence highlighting the profound health risks associated with smoking. Nevertheless, the benefits of cessation extend not only to one's individual health but also to the well-being of those in proximity. In this regard, the toll-free Quit Smoking Line offered by the government serves as a vital resource for accessing critical information about the hazards of smoking and gaining invaluable motivation to embark on the journey towards quitting.

The key findings in our research are that age, sex, and grade were not significant predictors. Age did not demonstrate a significant relationship, consistent with previous research indicating that the desire to quit smoking can manifest at various ages for different reasons.<sup>12</sup> This contrasts with a study conducted in Korea, suggesting that the age of smoking initiation influences cessation rates.<sup>13</sup> However, our study found consistent levels of desire to quit smoking across different age groups, emphasizing the need for cessation interventions tailored to adolescents regardless of age.

**Table 2.** Bivariate analysis of predictors of smoking cessation intentions among adolescents in Indonesia (n=1,191).

Independent variable	Dependent variable					p	X <sup>2</sup>	Correlation
	Smoking cessation intentions							
	Yes		No					
n	%	n	%					
Age					0.0993	7.64	No correlation	
<13	155	88.65	20	11.35				
13-15	462	79.37	121	20.63				
>15	355	81.1	78	18.9				
Sex					0.6253	0.37	No correlation	
Male	914	81.09	208	18.91				
Female	58	84.15	11	15.85				
Grade					0.5299	0.80	No correlation	
Class 7-9	570	82.01	124	17.99				
Class 10-12	402	79.9	95	20.1				
Perception that smoking is harmful to health					0.0000	24.32	Correlation	
No	103	66.64	43	33.36				
Yes	869	83.38	174	16.62				
Able to quit smoking if desired					0.0000	216.60	Correlation	
No	57	36.25	86	63.75				
Yes	915	87.41	133	12.59				
Living with smoking parents					0.6116	0.21	No correlation	
No	541	81.74	112	18.26				
Yes	431	80.96	107	19.31				
Friends who smoke					0.0000	31.70	Correlation	
No	500	87.89	59	12.11				
Yes	427	75.15	160	24.85				
Received help to quit smoking					0.0171	8.57	Correlation	
No	129	73.19	46	26.81				
Yes	843	82.62	173	17.38				

X<sup>2</sup>, chi-square test.

**Table 3.** Multivariate analysis of predictors of smoking cessation intentions among adolescents in Indonesia (n=1,191).

Independent variable	Dependent variable		p
	AOR	Smoking cessation intentions 95% CI	
Able to quit smoking			
No (ref)			
Yes	9.81	6.12-15.7	0.000
Perception that smoking is harmful to health			
No (ref)			
Yes	2.20	1.40-3.48	0.001
Friends who smoke			
No (ref)			
Yes	1.60	1.02-2.50	0.040
Received help to quit smoking			
No (ref)			
Yes	0.48	3.08-7.49	0.002

CI, confidence interval; AOR, adjusted odds ratio.

Similarly, sex did not emerge as a significant predictor, aligning with previous studies in Indonesia.<sup>14</sup> Contrastingly, studies from other regions have shown gender disparities in cessation rates.<sup>15,16</sup> Our findings suggest a uniform desire to quit smoking among adolescent boys and girls, emphasizing the importance of gender-neutral education on smoking dangers.

Grade level also did not predict intention to quit smoking, consistent with prior research.<sup>14</sup> Adolescents across elementary, middle, and high school demonstrated similar levels of motivation to quit smoking. This highlights the influence of environmental factors on cessation intentions, such as family and peer dynamics, regardless of age or grade.<sup>12</sup> Living with smoking parents did not predict intention to quit smoking, diverging from findings in Nigeria.<sup>17</sup> While parental smoking influences adolescent smoking behavior, our study suggests that other factors may outweigh this influence in the intention to quit smoking among Indonesian adolescents.

Another key finding is that having friends who smoke emerged as a significant predictor of intention to quit smoking, consistent with previous research.<sup>18</sup> Peer influence plays a crucial role in smoking behavior, highlighting the importance of interventions targeting social networks. Adolescents with a source of support exhibited higher intention to quit smoking, consistent with the role of social support in cessation processes.<sup>19</sup> Support from parents, friends, teachers, and professionals can significantly impact adolescents' motivation to quit smoking, underscoring the importance of comprehensive support systems. Additionally, adolescents who perceive smoking as harmful to health and believe they have the ability to quit smoking are more likely to express intention to quit, aligning with previous studies.<sup>19-21</sup> Health concerns and self-efficacy are significant motivators for smoking cessation, emphasizing the need for educational interventions highlighting the health risks of smoking and enhancing individuals' belief in their ability to quit.

One limitation of this study stems from its reliance on secondary data extracted from the 2019 GYTS in Indonesia, whereas our research was conducted in 2022. This time gap between data collection periods may introduce disparities in adolescent characteristics, potentially yielding variations in outcomes compared to the present context. Furthermore, our investigation was constrained by the predetermined variables available within the results of the GYTS questionnaire, limiting the scope of factors considered in our analysis. However, we consider the phenomena presented in the existing data using the latest and most representative literature. We also suggest that further researchers identify adolescent awareness of the dangers of conventional and electronic cigarettes. Finally, the most significant findings in this study concluded that the various factors that most strongly influence the intention to quit smoking in adolescents in sequence include: being able to quit smoking; perception that smoking is harmful to health; friends' smoking status; and receiving help to quit smoking. These factors are interesting to be used as reference material for adolescents who want to quit smoking, as well as being a consideration for policymakers in making policies to cover programs that are more targeted at active adolescent smokers.

## Conclusions

Several factors play a significant role in the initiation of smoking cessation behavior, including being able to quit smoking, perception that smoking is harmful to health, friends' smoking status,

and receiving help to quit smoking. The findings highlight the need for empowering the interventions and policies targeted at reducing the smoking behavior of adolescents in Indonesia. Nurses and healthcare professionals can utilize these findings to develop effective smoking prevention and cessation programs for adolescents, thereby improving their overall health outcomes. Future research can explore other factors that address variables not captured in the secondary dataset or explore qualitative aspects of adolescents' motivation to quit smoking.

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