



Smoking Behavior Among Schoolchildren in Permata Kecubung Subdistrict in 2025

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ABSTRAK

Penyakit tidak menular (PTM) merupakan masalah kesehatan global yang bertanggung jawab atas sebagian besar kematian di seluruh dunia. Salah satu faktor risiko utama PTM adalah merokok, yang semakin meningkat di kalangan anak usia sekolah di Indonesia. Merokok sejak dini merupakan masalah serius karena dapat menyebabkan kerusakan organ dan meningkatkan risiko ketergantungan jangka panjang. Penelitian ini bertujuan untuk mendeskripsikan perilaku merokok di kalangan siswa sekolah di Kecamatan Permata Kecubung. Penelitian ini menggunakan desain observasional dengan pendekatan cross-sectional. Subjek penelitian terdiri dari 494 siswa dari sekolah dasar, sekolah menengah pertama, dan sekolah menengah atas yang dipilih menggunakan purposive sampling berdasarkan kelengkapan data skrining tahun 2025. Variabel yang diteliti meliputi perilaku merokok, jenis kelamin, tingkat pendidikan, jenis rokok, dan intensitas merokok. Data dianalisis menggunakan analisis univariat dan bivariat dengan uji Chi-Square. Hasil penelitian menunjukkan bahwa 5,1% siswa terlibat dalam perilaku merokok, semuanya menggunakan rokok konvensional dengan intensitas konsumsi rata-rata 1–3 batang rokok per hari. Prevalensi merokok meningkat seiring bertambahnya usia, dengan proporsi tertinggi di antara siswa SMA (18,6%) dan siswa kelas 10 (32,2%). Secara statistik, terdapat hubungan yang signifikan antara tingkat pendidikan dan jenis kelamin dengan perilaku merokok ($p < 0,05$), dengan siswa laki-laki lebih banyak yang merokok dibandingkan perempuan. Disimpulkan bahwa perilaku merokok di kalangan anak sekolah sangat berkaitan dengan tingkat pendidikan dan jenis kelamin, dengan risiko yang lebih tinggi di antara siswa laki-laki pada tingkat pendidikan yang lebih tinggi. Diperlukan program pendidikan dan penegakan Zona Bebas Asap Rokok (ZFAZ) di sekolah.

ABSTRACT

Noncommunicable diseases (NCDs) are a global health problem responsible for the majority of deaths worldwide. One of the main risk factors for NCDs is smoking, which is on the rise among school-aged children in Indonesia. Early initiation of smoking is a serious concern because it can cause organ damage and increase the risk of long-term dependence. This study aims to describe smoking

Keywords

Health Screening; Noncommunicable Diseases; Schoolchildren; Smoking Behavior

behavior among schoolchildren in Permata Kecubung Subdistrict. The study employs an observational design with a cross-sectional approach. The study subjects consisted of 494 students from elementary, junior high, and senior high schools selected using purposive sampling based on the completeness of 2025 screening data. The variables examined included smoking behavior, gender, educational level, type of cigarette, and smoking intensity. Data were analyzed using univariate and bivariate analysis with the Chi-Square test. The results showed that 5.1% of students engaged in smoking behavior, all of whom used conventional cigarettes with an average consumption intensity of 1–3 cigarettes per day. Smoking prevalence increased with age, with the highest proportions among high school students (18.6%) and 10th graders (32.2%). Statistically, there was a significant association between educational level and gender with smoking behavior ($p < 0.05$), with male students being more prevalent as smokers compared to females. It is concluded that smoking behavior among schoolchildren is closely related to educational level and gender, with a higher risk among male students at higher educational levels. There is a need for educational programs and the enforcement of Smoke-Free Zones (SFZs) in schools.

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1. Introduction

The World Health Organization defines noncommunicable diseases (NCDs) as “noncommunicable diseases (NCDs) are diseases, generally of long duration, that cannot be spread directly from one person to another” meaning that these diseases are not transmitted through vectors such as insects, animals, or humans (Tulchinsky *et al.*, 2014; World Health Organization, 2022). Currently, the dominant public health burden has shifted from communicable diseases to noncommunicable diseases. The leading causes of mortality are now largely attributed to NCDs, particularly stroke, cardiovascular diseases, diabetes mellitus, cancer, and chronic respiratory diseases (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2018). Disease control, as an effort to reduce the incidence, prevalence, morbidity, and mortality of diseases, plays an essential role in measuring the health status of a population. Noncommunicable diseases can be controlled through preventive measures and early detection of specific NCDs.

Noncommunicable diseases (NCDs) have become the most fatal global health threat, surpassing communicable diseases over the past several decades. The World Health Organization reported that NCDs were responsible for at least 43 million deaths in 2021, accounting for approximately 75% of all non-pandemic-related deaths worldwide (World Health Organization, 2025a). This issue not only affects high-income countries but also imposes a substantial burden on low- and middle-income countries, where premature mortality due to NCDs frequently occurs and hampers economic productivity and public health development. Theoretically, NCDs such as cardiovascular diseases, cancer, and diabetes mellitus are chronic conditions that develop over a long period and are generally caused by the interaction of multiple factors, including genetic, physiological, environmental, and behavioral determinants (Tulchinsky *et al.*, 2014; World Health Organization, 2022).

One of the most important behavioral determinants contributing to the increasing incidence of NCDs is smoking behavior. Tobacco, as a major risk factor for various chronic diseases, contains toxic

substances that can progressively damage the respiratory and vascular systems, thereby increasing the risk of cardiovascular diseases, cancer, and respiratory disorders (World Health Organization, 2025b). Ironically, smoking behavior is no longer limited to adults but has also emerged among school-aged children and adolescents. Globally, there is an alarming trend of smoking initiation at an early age. School-aged groups are particularly vulnerable because this developmental stage involves the formation of self-identity and health-related behaviors that tend to persist into adulthood. Nicotine exposure from an early age not only accelerates organ damage but also increases the likelihood of stronger nicotine dependence and prolongs lifetime exposure to harmful substances.

In Indonesia, this issue has reached a critical stage. Data from the Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI (Riskesdas) demonstrated an increase in the prevalence of smokers aged 10–18 years from 7.2% in 2013 to 9.1% in 2018 (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2013, 2018). A similar trend was confirmed by the Global Youth Tobacco Survey (GYTS), which reported an increase in smoking prevalence among adolescents aged 13–15 years from 18.3% in 2016 to 19.2% in 2019 (Marsya, 2024). These figures indicate that tobacco control efforts in Indonesia continue to face major challenges, particularly in protecting school-aged children from the influence of the tobacco industry and permissive social environments toward smoking behavior.

According to a study conducted by Han, Seo and Lin (2023), exposure to cigarette smoke during adolescence is significantly associated with decreased lung function and an increased risk of chronic respiratory disorders later in life. This finding is consistent with the report of the (World Health Organization (2025), which states that individuals who begin smoking at an early age have a higher risk of

developing cardiovascular diseases and chronic health disorders due to the accumulation of toxic substances since the growth period.

School-based health screening represents a strategic instrument for identifying smoking behavior at an early stage, thereby enabling promotive and preventive interventions to be designed more effectively before more severe health impacts emerge. Without accurate local-level data, prevention policies often fail to address the specific root causes of the problem within a particular area. Permata Kecubung District is one of the areas that has actively integrated smoking behavior screening into its school health programs. Although implemented at the district level, mapping smoking behavior in this area is crucial to provide a realistic overview of the magnitude of the problem at the grassroots level. Based on this background, this study was conducted to describe smoking behavior among school children in Permata Kecubung District as a basis for planning educational programs and strengthening Smoke-Free Areas (Kawasan Tanpa Rokok/KTR) policies in the future.

2. Methods

This study employed an observational design with a cross-sectional approach, in which all variables were measured at a single point in time without any specific intervention being administered to the respondents. The population in this study consists of all students at the elementary school (SD), junior high school (SMP), and senior high school (SMA) levels who participated in smoking behavior screening activities in 2025 in the Permata Kecubung subdistrict, Sukamara Regency, Central Kalimantan Province. The sample in this study consisted of 494 respondents. The sampling technique used was purposive sampling, which involves selecting samples based on specific criteria. In this study, the inclusion criterion was respondents with complete

smoking behavior screening data, while those with incomplete data were excluded from the study. The primary variable in this study was smoking behavior, defined as the habit of smoking based on respondents' self-reports and categorized as "smoker" and "non-smoker." Other variables analyzed include respondent characteristics, namely gender (male and female) and educational level (elementary school, junior high school, and senior high school). Additionally, measurements were taken regarding the type of cigarettes used and smoking intensity, assessed based on the number of cigarettes consumed per day. The data used in this study are secondary data obtained from the Permata Kecubung Community Health Center. Data collection was conducted using a questionnaire completed by respondents with direct assistance from health center staff during screening activities at the school. Data analysis involved several stages, including a check for data completeness prior to statistical processing. Univariate analysis was used to describe the frequency distribution and percentage of each study variable. Subsequently, bivariate analysis was performed using the Chi-Square test to determine the relationship between smoking behavior and gender as well as educational level, with the significance level determined based on the p-value (<0.05).

3. Results

Table 1. Frequency Distribution of Respondent Characteristics

Variable	Frequency (n=494)	Percentage (%)
Education Level		
SD	339	68,6
SMP	69	14,0
SMA	86	17,4
Student Class		
Class 5	198	40,1

Class 6	141	28,5
Class 7	124	25,1
Class 10	31	6,3

Variable	Frequency (n=494)	Percentage (%)
Gender		
Male	242	49,0
Female	252	51,0
Smoking Behavior		
Yes	25	5,1
No	469	94,9

Based on the characteristics of the respondents in Table 1, the majority of respondents were from elementary school (SD), totaling 339 respondents (68.6%). In terms of grade level, most respondents were in the 5th grade, totaling 198 respondents (40.1%). This proportion indicates the dominance of elementary school students, particularly those in middle to upper grades, who, in terms of cognitive development, are at the concrete operational stage and are beginning to transition toward the formal operational stage. At this stage, children are capable of logical thinking regarding concrete objects and begin to gradually develop abstract thinking skills as they age (Cerovac *et al.*, 2025).

The gender distribution in Table 1 shows a relatively balanced proportion between males and females. There were 242 male respondents (49%), while female respondents numbered 252 (51%). This balanced gender distribution minimizes the potential for gender bias in data analysis and enhances the sample's representativeness of the target population.

In terms of smoking behavior, the majority of respondents 469 people (94.9%) were non smokers, while 25 respondents (5.1%) were smokers. Although the proportion of smokers is relatively small, their presence among elementary school-aged children is a finding that warrants special attention, given that exposure to smoking behavior at a young age is closely linked to the risk of long-term dependence and significant health impacts. This aligns

with Dai (2025) research, which indicates that the longer the time elapsed since the initiation of nicotine use among adolescents, the higher the risk of dependence and the lower the desire to quit.

Table 2. Characteristics of Cigarette Use Among Respondents

Characteristics	Frequency	Percentage (%)
Types of Cigarettes		
Conventional cigarettes (filter cigarettes, kretek, hand-rolled cigarettes)	25	100,0
Cigarettes Intensity		
1	4	25,0
2	4	25,0
3	7	43,8
5	1	6,3

Based on Table 2, the 25 respondents who smoke were found to use conventional cigarettes, including filtered/white cigarettes, kretek, and hand-rolled cigarettes. These findings indicate that preferences for tobacco products among school-age adolescents are still dominated by conventional cigarettes. This may be influenced by factors such as product availability, social environment, and consumption patterns that remain

common in society, particularly among early adolescents who tend to mimic the behavior of the adults around them.

Of the 25 respondents who smoke, only 16 provided complete data regarding daily cigarette consumption. Based on the data in Table 2, the majority of respondents fall into the light smoker category, with the majority consuming approximately 3 cigarettes per day (43.8%). Others consume 1–2 cigarettes per day, while one respondent consumes up to 5 cigarettes per day. Although the consumption levels are relatively low, this finding is important to note because even small amounts of cigarette consumption at a young age can serve as a gateway to increased usage intensity in the future.

Theoretically, this phenomenon can be explained through the mechanism of nicotine addiction. Nicotine is the primary addictive substance in tobacco products that acts directly on the central nervous system, particularly by stimulating the release of dopamine in the brain's reward system. Exposure to nicotine from an early age, when brain development is still ongoing, makes individuals more susceptible to dependence due to increased sensitivity to these reward effects. This is supported by Lis *et al.*, (2024), who emphasize that adolescents are a group highly vulnerable to nicotine addiction because of the brain's incomplete maturation, making them more prone to cravings and difficulty quitting after exposure.

Table 3. Results of Statistical Tests on Respondent Characteristics by Smoking Behavior (n=494)

Variable	Category	Smoking Behavior				p-value
		Smoking		No Smoking		
		Frequency	%	Frequency	%	
Education level	SD	5	1,5	334	98,5	0,000
	SMP	4	5,8	65	94,2	
	SMA	16	18,6	70	81,4	
Gender	Male	23	9,5	219	90,5	0,000
	Female	2	0,8	250	99,2	

Based on the results of the statistical tests in Table 3, the percentage of respondents who smoke was 1.5% at the elementary school level, 5.8% at the junior high school level, and 18.6% at the senior high school level. Meanwhile, based on gender, there was a statistically significant difference between males and females, with males accounting for 9.5% and females for 0.8%. The results of the Chi-Square test showed a p-value of 0.000 (<0.05) across all categories (educational level and gender), indicating a significant association between educational level and gender with smoking behavior among respondents.

The results of this study reveal that smoking behavior among schoolchildren in Permata Kecubung Subdistrict tends to increase linearly with age and educational level. A striking surge in prevalence is observed at the high school level, where nearly one-fifth of students are smokers, and the peak is found among 10th-grade students with a prevalence rate far exceeding the general average. This phenomenon confirms the theory that adolescence is a critical period for identity formation, during which the influence of the social environment and the desire to experiment with risky health behaviors are particularly high.

Demographically, smoking behavior is dominated by male students compared to female students. This striking difference indicates the influence of social and cultural constructs in society that tend to be more permissive toward men smoking compared to women. This aligns with various studies showing that gender norms and perceptions of masculinity play a role in shaping smoking behavior among men. Furthermore, national data from the Ministry of Health of the Republic of Indonesia, through the Basic Health Research (Riskesdas), also indicates that the prevalence of smoking among males is significantly higher than among females, making males the primary group in tobacco product consumption in Indonesia (Badan Penelitian dan Pengembangan Kesehatan

Kementrian Kesehatan RI, 2018). All students who smoke in this study still use conventional cigarettes, with consumption levels mostly ranging from 1 to 3 cigarettes per day. Although the number of cigarettes consumed per day remains relatively low, smoking initiation during school-age years remains a serious threat to public health. Exposure to nicotine and toxic substances at this age not only damages developing respiratory organs and blood vessels but also increases the risk of long-term dependence and future cardiovascular diseases.

Theoretically, smoking behavior among adolescents is influenced by age-related development and psychosocial factors. As they grow older, individuals experience increased independence, identity exploration, and exposure to a broader social environment, including peer influence. These conditions increase the likelihood of smoking initiation, particularly at higher educational levels. Additionally, during adolescence, cognitive development progresses toward the formal operational stage, enabling individuals to make more complex decisions; however, this is not yet fully balanced by mature self-control, making them vulnerable to risky behaviors such as smoking.

These findings directly address the research objective regarding the need for local data mapping as a basis for intervention. The significant association found between educational level and smoking behavior underscores the need to strengthen educational programs and enforcement of Smoke-Free Zones (SFZs), particularly during the transition from secondary to higher education. This data serves as a strategic tool for local health authorities to design more targeted preventive interventions aimed at breaking the chain of smoking behavior starting from school age.

4. Conclusion

This study concludes that, out of 494 respondents, the prevalence of smoking

among schoolchildren in Permata Kecubung Subdistrict in 2025 was 5.1%. The results of the Chi-Square test analysis indicate a significant association between educational level, grade level, and gender with smoking behavior ($p = 0.000$), where the risk of smoking tends to increase with the student's age and educational level. Additionally, smoking behavior is more prevalent among male students (9.5%) compared to female students (0.8%). All respondents who smoke use conventional cigarettes, with the highest consumption intensity being 3 cigarettes per day.

Based on the conclusions drawn, it is hoped that the Permata Kecubung Community Health Center, together with educational institutions in Permata Kecubung Subdistrict, can strengthen the implementation of periodic health screening programs and intensify education regarding the dangers of smoking among students. These efforts should be focused primarily on the high school level, which showed a higher prevalence of smoking. Additionally, stricter oversight is needed regarding the implementation of Smoke-Free Zones (SFZs) on school campuses to limit access to cigarettes and reduce environmental influences that may encourage smoking behavior among schoolchildren.

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