Adolescent knowledge, parental role, and smoking behavior among high school students in Jakarta

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Abstract

Adolescence is a critical period of curiosity and experimentation, often associated with increased risk-taking, including smoking. Once initiated, smoking can become a difficult habit to quit. Strengthening adolescents' knowledge about its dangers and fostering parental support are key to prevention. This study aimed to examine the influence of adolescents' knowledge and parental roles on smoking behavior among high school students in Jakarta, Indonesia. A descriptive-analytical research with a cross-sectional design was conducted, involving 155 high school students selected through stratified random sampling. The dependent variable was smoking behavior, while the independent variables included adolescents' knowledge of smoking and the parental role. Data were collected using a structured questionnaire and analyzed statistically. Results indicated a significant relationship between knowledge and smoking behavior (p=0.003). Adolescents with higher knowledge were 4.671 times more likely to be non-smokers. In contrast, no significant relationship was found between parental role and adolescent smoking behavior (p=0.600). These findings highlight the critical role of knowledge in deterring smoking among adolescents. Strengthening health education in schools may empower students to make informed, healthy choices. While parental influence showed no direct statistical association, parents remain important figures and should model non-smoking behavior to reinforce anti-smoking norms.

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Introduction

Adolescence is a critical developmental stage marked by the transition from childhood to adulthood, during which individuals undergo rapid physical, emotional, and social changes.[1] This period is also characterized by a heightened sense of curiosity and a desire for exploration, which often includes experimentation with risky behaviors such as smoking.[2,3] Smoking remains one of the leading preventable causes of morbidity and mortality worldwide.[4] Globally, there are approximately 70.2 million smokers, accounting for around 34.5% of the global population, with Indonesia ranking third in terms of the number of smokers after China and India.[5]

Nationally, the issue of adolescent smoking is increasingly alarming.[6] The 2018 Basic Health Research (RISKESDAS) survey reported a rise in the smoking prevalence among individuals aged 10-18 years, from 7.2% in 2013 to 9.1% in 2018. Moreover, the Global Youth Tobacco Survey (GYTS, 2024) indicated that 40.6% of students aged 13-15 years in Indonesia had tried tobacco products, and 19.2% were current smokers.[7] In the capital city, DKI Jakarta, the Central Statistics Agency (BPS, 2023) reported that 22.6% of individuals aged 15 years and older are smokers.[8]

The consequences of tobacco use are severe and far-reaching.[9] The WHO (2020) estimated that smoking-related illnesses cause approximately 225,700 deaths annually in Indonesia.[10] Tobacco use is a major risk factor for numerous non-communicable diseases, including lung cancer (accounting for nearly 90% of cases), chronic obstructive pulmonary disease (COPD), and cardiovascular diseases.[11] Despite widespread health campaigns and government initiatives – such as mass media education, smoke-free

zones, and collaborations with civil society organizations – the prevalence of smoking among adolescents remains high.[12]

Numerous factors contribute to adolescent smoking behavior, with knowledge and parental influence being particularly significant. According to the health behavior theory by Lawrence Green,[13] an individual's knowledge is a key determinant of their health-related behaviors. Adolescents with a limited understanding of the harmful effects of smoking are more likely to engage in the habit. A study by Ain found a statistically significant relationship between knowledge about smoking and smoking behavior among teenagers.[14] Parental influence also plays a crucial role during adolescence, a time when individuals often face emotional turbulence and require guidance. Research by Rongalaha *et al.* emphasized that active parental involvement can shape adolescents' behavioral choices,[15] including those related to tobacco use. Conversely, inadequate parental supervision has been linked to higher rates of smoking among youth.[16] However, findings in this area remain mixed and context-dependent, indicating the need for further research. Although national statistics show a rise in smoking among adolescents, studies examining the specific contributing factors – particularly in urban areas such as Jakarta – are still limited. Understanding how adolescent knowledge and parental roles influence smoking behavior is essential for developing effective preventive strategies. Therefore, this study aimed to assess the relationship between adolescent knowledge, parental role, and smoking behavior among high school students in East Jakarta, Indonesia.

Materials and Methods

This study employed a descriptive analytical design with a cross-sectional approach. The independent variables in this research were the role of parents and adolescents' knowledge about smoking. The parental role refers to the actions taken by parents in preventing and addressing smoking behavior in adolescents and was categorized as either *active* or *passive*. Adolescents' knowledge about cigarettes encompassed understanding of cigarette content, health impacts, and relevant smoking laws. Knowledge levels were classified as good, sufficient, or poor.

The study population consisted of high school students in East Jakarta. The sample size was calculated using the Lemeshow formula for estimating population proportions with specified absolute precision. The minimum required sample size was 139 respondents. To accommodate potential dropouts, an additional 10% was added, resulting in a final sample size of 155 students.

Stratified random sampling was used to ensure a representative distribution across grade levels. The sampling frame included students from grades 10 and 11, who shared similar characteristics. Out of 358 eligible students, the sample was proportionally divided: grade 10, $(194/358)\times155 \approx 84$ students and grade 11, $(164/358)\times155 \approx 71$ students. Within each stratum, simple random sampling was conducted using software to ensure each student had an equal chance of selection.

Data collection was carried out using three structured questionnaires: Smoking Behavior Questionnaire,[17] Knowledge about Smoking Questionnaire,[17] and Parental Role Questionnaire.[18]

All instruments were adapted from previously published studies. Prior to data collection, validity and reliability testing were performed. The instruments were confirmed valid (R-calculated > R-table) and reliable, with a Cronbach's alpha score of 0.977, indicating excellent internal consistency. This study was approved by the Ethics Committee of Poltekkes Kemenkes Jakarta III, under ethical approval letter number: LB.02.02/F.XIX.21/4263/2024.

Results

Table 1 shows that 115 (74.2%) teenagers were aged ≤17 years, while 40 (25.8%) were aged >17 years. Furthermore, the majority of teenagers were male, namely 82 respondents (52.9%), compared to 73 female teenagers (47.1%). Regarding the respondents' smoking behavior, the majority were non-smokers, with 116 respondents (74.8%). Nine respondents (5.8%) smoked lightly, 25 (16.1%) smoked moderately, and five (3.2%) smoked heavily. The respondents' knowledge levels were grouped into good, sufficient, and poor. The results showed that the majority of respondents had a good level of knowledge (135 respondents, 87.1%), 13 respondents (8.4%) had a sufficient level of knowledge, and 7 respondents (4.5%) had a poor level of knowledge. The respondents' parental roles were classified as active or passive. The results indicated that the majority of respondents had active parental roles

Table 1. Frequency distribution of respondents based on characteristics.

No.	Characteristic	Category	Frequency (n)	Percentage (%)
1	Age	≤17 years old	115	74.2
		>17 years old	40	25.8
2	Sex	Female	73	47.1
		Male	82	52.9
3	Smoking behavior in adolescents	Do not smoke	116	74.8
		Light Smoking	9	5.8
		Moderate Smoking	25	16.1
		Heavy Smoking	5	3.2
4	Teenagers' knowledge level	Good	135	87.1
		Enough	13	8.4
		Not enough	7	4.5
5	The role of parents	Active	150	96.8
		Passive	5	3.2

(150 respondents, 96.8%), while five respondents (3.2%) had passive parental roles.

During the cross-distribution analysis of the variables of smoking behavior and level of knowledge using the chi-squared test, some cells were empty. Therefore, the behavioral categories of light, moderate, and heavy smoking were combined, resulting in only two categories: not smoking and smoking. Additionally, the categories of insufficient and sufficient levels of knowledge were combined, resulting in only two categories: good and sufficient. The results of the bivariate analysis are presented in Table 2.

Table 2 mentions that age was significantly related to smoking behavior (p=0.000). Adolescents aged 17 or younger were far less likely to smoke compared to those over 17, with an Odds Ratio (OR) of 5.053. Similarly, sex showed a strong association with smoking behavior (p=0.000). Female students were significantly less likely to smoke than male students. The odds ratio of 7.520 indicates that females were over seven times more likely to be non-smokers compared to males, highlighting a gender disparity in smoking habits. The level of knowledge about smoking also played a critical role (p=0.003). Students with good knowledge were 4.671 times more likely to refrain from smoking than those with only enough knowledge. In contrast, the role of parents did not show a statistically significant relationship with adolescent smoking behavior (p=0.600). Although students with active parental involvement appeared less likely to smoke, the difference was not strong enough to be considered significant in this study.

Discussion

The study revealed a significant association between age and smoking behavior among adolescents. Participants aged 17 years or younger were less likely to smoke compared to those older than 17. This finding aligns with prior research, which found a higher prevalence of smoking among individuals aged 18 and above.[19] This period of late adolescence often involves identity exploration, which may lead to risk-taking behaviors such as smoking.[20] Older adolescents typically have greater autonomy and easier access to cigarettes, both legally and illegally. Moreover, stressors such as academic pressure or social challenges may further encourage smoking initiation.[21]

This study identified a statistically significant relationship between gender and smoking behavior. Male students were more likely to smoke than female students. This finding is consistent with research by Putri and Adiwiryono[22] and Zahrani and Arcana,[23] both of which reported that male adolescents are significantly more prone to engage in smoking behavior. In the Indonesian context, cultural and social norms play a pivotal role in shaping these patterns. Smoking among females is often culturally discouraged, which may explain the lower prevalence among this group. Similarly, Solihin *et al.* found that male adolescents in Indonesia tend to smoke more frequently than their female counterparts.[24]

A significant relationship was also observed between adolescents' level of knowledge about smoking and their smoking behavior. Students with good knowledge were significantly more likely to refrain from smoking. This aligns with findings from Ain, which demonstrated a positive correlation between knowledge and reduced smoking behavior among adolescents.[14] These findings showed that knowledge serves as a foundational determinant of behavior change. The results suggest that enhancing adolescents' understanding of the harmful effects of smoking could be a key strategy in tobacco control interventions targeting youth.

Interestingly, this study found no significant association between the role of parents and adolescent smoking behavior. Although most respondents reported having actively involved parents, this did not translate into a statistically significant reduction in smoking. This finding corroborates results by Trisaputro, who also reported no significant link between parental role and youth smoking behavior.[25] However, this contrasts with other studies, such as that by Anwary, which found a significant association between parental involvement and student smoking habits.[26]

Several factors may account for this discrepancy. Firstly, peer influence is particularly strong during adolescence and may override parental influence. Previous research by Deve *et al.* found that 25.3% of students were likely to smoke when offered cigarettes by friends, and 90.7% had peers who smoked.[27] Adolescents often seek acceptance within their social circles, which may drive them to engage in smoking regardless of parental guidance.

Secondly, while parental roles may be reported as "active", the quality and consistency of this involvement may vary. Parents who smoke themselves may inadvertently model smoking behavior, undermining their anti-smoking messages. According to Pelawi *et al.*, parental smoking significantly increases the likelihood of adolescent smoking.[28] Conversely, when parents act as non-smoking role models and engage in open communication, adolescents may be more likely to abstain from tobacco use.

Table 2. Distribution of respondents based on characteristics and smoking behavior.

Variable	Do not smoking		Smoking		Total		p	OR (CI 95%)
	n	%	n	%	n	%		
Age								
≤17	96	83.5	19	16.5	115	100	0.000	5.053* (2.290-11.149)
>17	20	50. 0	20	50. 0	40	100		
Sex								
Female	67	91.8	6	8.2	73	100	0.000	7.520* (2.924-19.342)
Male	49	59.8	33	40.2	82	100		
Knowledge level								
Good	107	79.3	28	20.7	135	100	0.003	4,671* (1.763-12.373)
Enough	9	45.0	11	55.0	20	100		
The role of parents								
Active	113	75.3	37	24.7	150	100	0.600	-
Passive	3	60.0	2	40.0	5	100		

OR, odds ratio; CI, confidence interval; *chi-square test.

Conclusions

Based on the findings, analysis, and discussion of this study, it can be concluded that age, gender, and the level of knowledge among teenagers are significantly associated with smoking behavior in one of the high schools in East Jakarta. These results highlight the importance of increasing awareness and education about the risks of smoking among adolescents, empowering them to make more informed decisions regarding smoking. Although no significant relationship was found between parental roles and adolescent smoking behavior, it remains essential for parents to model non-smoking behavior as a form of guidance.

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