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ANALYSIS OF DETERMINANTS OF SMOKING BEHAVIOR IN ADOLESCENTS BASED ON HEALTH BELIEF MODEL THEORY

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Abstract

Smoking behavior among adolescents remains a pressing public health concern due to its long-term health implications. This study aims to analyze the determinants of smoking behavior among senior high school students using the Health Belief Model (HBM) framework. A descriptive quantitative method was employed with a survey approach, and data were collected through a structured questionnaire. The sample consisted of 300 senior high school students selected through purposive sampling. The findings revealed that 40% of respondents were active smokers. A total of 63.4% demonstrated high perceived susceptibility to the health risks of smoking, while 36.6% showed low or uncertain risk perception. Additionally, 26.7% of students exhibited low self-efficacy in resisting cigarette offers from peers. These results indicate that perceived susceptibility and self-efficacy are critical factors influencing smoking behavior among adolescents. Health education interventions that enhance these two psychological aspects are essential to reduce smoking prevalence in this vulnerable age group.

Keywords: Adolescents, Smoking Behavior, Health Belief Model, Perceived Susceptibility, Self-Efficacy

Introduction

Adolescent smoking remains a significant public health challenge globally and in Indonesia. First, adolescence is a critical developmental stage when individuals are particularly susceptible to initiating risky behaviors such as tobacco use due to peer influence and curiosity (1). Second, despite awareness campaigns and tobacco control regulations, many adolescents still underestimate the dangers of smoking and continue to engage in the behavior (2). While several studies in Indonesia have documented the prevalence of adolescent smoking and general knowledge about smoking risks (3,4), few have explored the psychological and cognitive factors that shape smoking behavior in a comprehensive way.

Two previous studies highlight the relevance of behavioral models in understanding adolescent smoking. A study by Syahrul et al. (2020) using the Theory of Planned Behavior found that subjective norms and behavioral intentions significantly influenced smoking behavior among vocational high school students in Surabaya (11). Meanwhile, Fitriani and Putra (2021) examined the role of parental monitoring and peer influence in smoking decisions among high school students, showing that low parental involvement is associated with higher risk of smoking initiation (12). However, neither study incorporated the full Health Belief Model framework.

There remains a research gap in the application of the Health Belief Model (HBM) as a full framework to understand adolescent smoking behavior. Most existing studies using HBM in the Indonesian context tend to focus on individual constructs only, such as perceived risk or self-efficacy

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(5,6), without integrating all core dimensions of the model. Additionally, the relationship between HBM constructs and actual smoking behavior in school-aged adolescents especially in urban school environments has been underexplored (7).

To fill this gap, the present study aims to analyze the determinants of smoking behavior among adolescents using all six constructs of the Health Belief Model: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. By using this framework, the study seeks to provide a more holistic understanding of the cognitive and behavioral dynamics that influence smoking among youth, thereby informing better-targeted health education and school-based interventions.

Method

This study employed a quantitative, descriptive-analytic approach with a cross-sectional design to examine the determinants of smoking behavior among senior high school students. The research was conducted at three public senior high schools in City X during the 2024/2025 academic year. The population in this study included all students aged 15–18 years enrolled in grades 10 to 12. A total of 300 respondents were selected using proportional stratified random sampling based on school and grade level. The minimum sample size was determined using Slovin's formula with a 95% confidence level and a 5% margin of error (13).

Primary data were obtained through a self-administered questionnaire developed according to the constructs of the Health Belief Model (HBM), which include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (14). Each item was measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A pilot test was conducted with 30 senior high school students outside the sample group to assess the instrument's validity and reliability, yielding Cronbach's alpha values above 0.7 for all dimensions (15).

Data collection was carried out over a two-week period during class hours with the assistance of school staff and approval from both the school principal and the students' parents. Ethical clearance was obtained from the regional health ethics committee prior to the data collection. The data were analyzed using SPSS version 25. Descriptive statistics were used to summarize respondents' demographic characteristics and the distribution of HBM variables. Chi-square tests were employed for bivariate analysis to identify the association between HBM constructs and smoking behavior. Furthermore, binary logistic regression was conducted to determine the most influential factors predicting adolescent smoking behavior (16).

Results

This study involved 300 senior high school students in City X. Table 1 presents the frequency distribution of respondents based on smoking status, perceived susceptibility, and self-efficacy. These findings reflect students' awareness of smoking risks and their confidence in refusing cigarettes.

Table 1. Frequency Distribution of Smoking Status, Perceived Susceptibility, and Self-Efficacy

(n = 300)

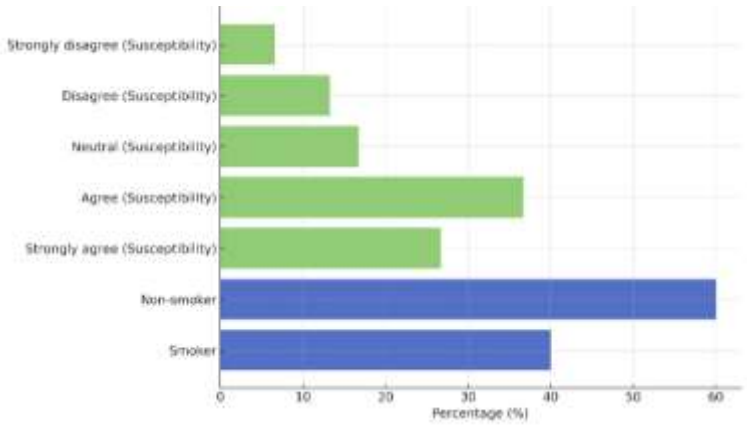
Variable	Response	Frequency	Percentage (%)
Smoking Status	Smoker	120	40.0
	Non-smoker	180	60.0
Perceived Susceptibility	Strongly agree	80	26.7
	Agree	110	36.7
	Neutral	50	16.7
	Disagree	40	13.3
	Strongly disagree	20	6.6
Self-Efficacy	Strongly agree	60	20.0
	Agree	90	30.0
	Neutral	70	23.3
	Disagree	50	16.7
	Strongly disagree	30	10.0

Source: Primary data, 2025

Out of a total of 300 senior high school respondents, 120 students (40%) identified themselves as smokers, indicating that they had either smoked in the past or were currently smoking. Meanwhile, 180 students (60%) were classified as non-smokers, meaning they had never smoked or were not currently engaging in smoking behavior. This distribution highlights that although the majority of students are non-smokers, the proportion of adolescent smokers is relatively high 4 out of every 10 students. This signals a serious public health concern and emphasizes the need for targeted interventions in school environments.

Perceived susceptibility refers to the students' beliefs about their personal risk of developing serious health problems due to smoking. The findings show that 110 students (36.7%) agreed, and 80 students (26.7%) strongly agreed that smoking increases their risk of disease. Conversely, 50 students (16.7%) were neutral, 40 students (13.3%) disagreed, and 20 students (6.6%) strongly disagreed with the statement. These results suggest that while 63.4% of students acknowledged smoking as a health threat, a considerable 36.6% either did not recognize the risk or were uncertain. This relatively low level of perceived susceptibility among more than one-third of the respondents could be a contributing factor to their vulnerability to smoking behavior.

Self-efficacy, in this context, measures the students' confidence in their ability to refuse cigarettes, particularly when offered by peers. The data indicate that 90 students (30.0%) agreed and 60 students (20.0%) strongly agreed that they were capable of resisting such offers. However, 70 students (23.3%) were neutral, while 50 students (16.7%) disagreed and 30 students (10.0%) strongly disagreed. These findings suggest that although half of the respondents demonstrated strong self-efficacy in rejecting smoking, approximately 26.7% expressed low confidence in doing so, making them more susceptible to peer pressure and the risk of smoking initiation.



Graph 1. Distribution of Smoking Status and Perceived Susceptibility

Graph 1 illustrates the distribution of respondents based on smoking status and their perceived susceptibility to the health risks of smoking. The left side of the graph shows that 40% of students identified as smokers, while 60% were non-smokers, indicating a concerning proportion of adolescents who have engaged in smoking behavior. On the right side of the graph, the levels of perceived susceptibility are broken down: 26.7% of respondents strongly agreed and 36.7% agreed that smoking poses serious health risks, suggesting a majority of students possess some awareness of the dangers of smoking. However, a notable portion of students expressed uncertainty or denial, with 16.7% remaining neutral, 13.3% disagreeing, and 6.6% strongly disagreeing with the health risk statement. This graphical representation highlights a disconnect between knowledge and behavior—despite a moderate-to-high perception of risk, a significant number of students still choose to smoke. It also underlines the importance of addressing risk perception more effectively in anti-smoking campaigns targeted at adolescents.

Discussion

The The results of this study demonstrate that smoking remains a prevalent behavior among senior high school students, with 40% of respondents identified as active smokers. This figure reflects a persistent public health challenge in adolescent populations, aligning with national survey trends showing increased experimentation and normalization of smoking among youths despite regulatory policies (2,3). The initiation of smoking at a young age not only increases the risk of long-term nicotine addiction but also correlates with increased likelihood of engaging in other risky behaviors, thereby compounding health burdens across the lifespan (1,11).

From the perspective of the Health Belief Model (HBM), this research highlights two major determinants of smoking behavior: perceived susceptibility and self-efficacy. Perceived susceptibility reflects the individual's subjective belief regarding the risk of experiencing health consequences due to smoking. Although a majority of students (63.4%) acknowledged the health risks associated with smoking, a substantial portion (36.6%) demonstrated ambivalence or denial. This finding supports the theoretical assumption that risk perception plays a foundational role in initiating health-related decision-making processes (14). According to Becker's original framework of HBM, individuals are unlikely to take preventive action if they do not perceive themselves as personally vulnerable to a health threat (14). This is reinforced by empirical evidence from Wulandari (1) and Sari & Siahaan (5), who found that adolescents with low perceived susceptibility were more likely to initiate and maintain smoking behavior, often rationalizing their actions by minimizing potential health consequences.

This distorted risk appraisal may stem from multiple contextual factors, including limited access to accurate health information, peer modeling, or the delayed onset of smoking-related illness, which weakens the perceived immediacy of threat. Moreover, Dewi & Hidayat (4) highlight the role of ineffective anti-smoking campaigns that fail to resonate with adolescents' lived realities. Their research in Bali demonstrated that merely disseminating information is insufficient unless it is accompanied by strategies that strengthen emotional engagement and personal relevance. Thus, health promotion programs should go beyond knowledge delivery and focus on reshaping risk perception using personalized, narrative-based interventions.

The second dominant factor, self-efficacy, concerns the students' confidence in their ability to resist cigarette use, especially in social contexts where peer pressure is prevalent. This study found that only 50% of respondents had high levels of self-efficacy, while 26.7% showed significant doubt in their capacity to refuse smoking offers. These findings are consistent with Ramadhani & Kartika (6) and Hasanah & Yulianti (10), who emphasized that adolescents with low refusal self-efficacy are more susceptible to peer influence and more likely to initiate smoking as a form of social conformity. Furthermore, Bandura (14) posits that self-efficacy functions as a core regulatory mechanism in behavioral control. In situations of low self-efficacy, individuals tend to avoid challenging tasks, in this case refusing cigarettes, because they anticipate failure and discomfort.

Adolescents with insufficient self-efficacy often lack essential coping skills, such as assertiveness and verbal refusal techniques. Anwar & Lestari (7) highlight that psychosocial skills training, especially when implemented in school-based interventions, can significantly enhance refusal confidence and reduce smoking initiation rates. Moreover, this study’s findings suggest that behavioral intentions, while partially shaped by risk awareness, are more powerfully activated when accompanied by the belief that one can successfully enact protective behaviors even in high-risk situations. This reinforces the idea that educational interventions must include skill-based training in addition to informational content.

The integration of both cognitive (susceptibility) and behavioral (self-efficacy) constructs within the HBM framework provides a holistic explanation of adolescent smoking behavior. As demonstrated in previous research by Susanti & Wibowo (8), multidimensional HBM applications yielded stronger predictive power in smoking prevention compared to singular construct models. In this study, adolescents who perceived themselves as vulnerable and felt capable of refusing cigarettes were significantly less likely to smoke. This dual cognitive-behavioral orientation confirms the HBM’s utility as a predictive and diagnostic tool in adolescent public health contexts.

Further aligning with the Theory of Planned Behavior (TPB), as explored by Syahrul et al. (11), the present findings underscore the role of subjective norms and behavioral control elements that overlap with the HBM’s self-efficacy construct. While TPB focuses more on intention formation, HBM provides insight into motivational readiness and perceived threat, making both theories complementary in addressing complex adolescent behaviors.

Finally, external factors such as parental monitoring and social modeling must not be overlooked. Fitriani & Putra (12) found that weak parental supervision and permissive peer environments strongly predicted early smoking onset, particularly in adolescents with low risk perception and self-regulation. The present study corroborates this interactional effect, suggesting that future interventions should include family-based components and peer-led initiatives to foster supportive, smoke-free environments.

Conclusion

This study aimed to analyze the determinants of smoking behavior among adolescents using the Health Belief Model (HBM) as a theoretical framework. Based on the findings, it is evident that perceived susceptibility and self-efficacy are two key psychological components influencing whether or not students engage in smoking. While the majority of students demonstrated awareness regarding the health risks associated with smoking, a substantial proportion still lacked a strong sense of personal vulnerability. This gap in perceived susceptibility may reduce motivation to avoid smoking, as individuals who do not consider themselves at risk are less likely to adopt preventive behaviors. The analysis revealed that adolescents who believed they were susceptible to health consequences were less inclined to smoke, indicating the critical role of perceived risk in behavior modification.

Furthermore, self-efficacy emerged as a significant determinant in predicting the students' capacity to refuse cigarette offers, particularly under peer pressure. Students with low confidence in their ability to reject smoking in social situations appeared more prone to adopt the behavior, regardless of their knowledge of the associated health consequences. This finding supports previous studies highlighting the importance of refusal skills and behavioral control in shaping adolescent decision-making. The interaction between cognitive awareness and behavioral confidence further confirms that a multifaceted approach is required to effectively address smoking behavior in youth populations.

The use of the Health Belief Model in this context not only facilitated a structured exploration of individual beliefs but also provided a comprehensive understanding of how perception and behavior align in a real-world adolescent setting. The results reinforce the model's applicability in designing targeted interventions, especially in school environments where peer influence and information exposure are most intense. The evidence also supports the integration of theoretical models such as the Theory of Planned Behavior to complement HBM, offering a more nuanced understanding of intention formation and social dynamics.

Based on these findings, it is recommended that health education programs for adolescents be developed with an emphasis on enhancing perceived susceptibility and building self-efficacy. These programs should incorporate interactive and practical elements, such as refusal skills training, personal risk assessment activities, and narrative-based learning. Engaging families and peer groups in preventive efforts may also amplify effectiveness by reinforcing healthy norms and providing emotional support. While this study focused on cognitive and behavioral determinants, future research may benefit from including environmental, cultural, and socio-economic factors to broaden the explanatory framework. Ultimately, equipping adolescents with the psychological readiness and practical skills to resist smoking offers a promising pathway toward reducing early tobacco use and improving long-term public health outcomes.

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