



Impact of Perceived Vulnerability and Benefits on Adolescent Smoking Cessation Motivation

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ABSTRACT

Background: Most smoking among adolescents aged 15-19 years is associated with a psychosocial crisis, as they are still searching for their identity. Factors such as perceived vulnerability and perceived benefits can lead adolescents to start smoking. **Purpose:** The purpose of this study was to determine the relationship between perceived vulnerability and perceived benefits and motivation for smoking cessation among adolescents. **Methods:** The research design uses an analytical observational design with a cross-sectional approach. The research sample consisted of adolescent smokers selected using a cluster random sampling technique, resulting in 136 participants. Data for variables were collected using the Perceived Vulnerability to Disease (PVD), Perceived Risks and Benefits Questionnaire (PRBQ), and Smoking Cessation Motivation Questionnaire (Q-MAT), which were modified by the researchers and tested for validity and reliability. The research data were analyzed using the Spearman Rank Test. **Results:** The results showed that 97.8% of participants had a positive perceived vulnerability, 97.1% had a positive perceived benefit, and 71.3% had a high motivation for smoking cessation. There was a significant relationship between perceived vulnerability and perceived benefits with motivation for smoking cessation, with a significant p-value of 0.000 and correlation values of +0.478 and +0.643. **Conclusions:** Adolescents' motivation to quit smoking is shaped by their awareness of health risks and the benefits of quitting, such as improved well-being and financial savings. Nursing-based interventions, including counseling, support groups, and school health campaigns, play a crucial role in reinforcing this motivation and ensuring long-term cessation.

KEYWORDS

Adolescent, Benefits, Motivation, Smokers, Vulnerability

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1. BACKGROUND

The Director of the WHO Tobacco-Free Initiative stated that Indonesia ranks third globally in the number of active smokers, following China and India, due to permissive

regulations favoring the cigarette industry (WHO, 2023). According to the World Health Organization (WHO), smoking-related deaths account for 30% of all deaths, equating to 17.3 million fatalities. This

number is projected to rise to 23.3 million by 2030 (WHO, 2024). WHO research also indicates that over 3.9 million children aged 10 to 14 are active smokers, while 239,000 children under 10 initiate smoking yearly. Alarming, 40 million children under five years old are exposed to secondhand smoke (WHO, 2018).

Data from Basic Health Research (Riskesdas) reveal a rising trend in adolescent smoking, with prevalence among 10- to 18-year-olds increasing from 7.2% to 9.1% between 2013 and 2018 (Kemenkes RI, 2018). Similarly, the Global Youth Tobacco Survey (GYTS) 2019 reported an increase in smoking prevalence among 13- to 15-year-olds, from 18% to 19% (WHO, 2019). These figures highlight a worrying trend in adolescent smoking, posing significant public health risks.

Adolescents are highly susceptible to smoking initiation, driven by psychological, environmental, and social factors. The need for identity exploration and peer influence plays a crucial role in encouraging adolescent smoking (Fithria et al., 2021). Furthermore, smoking in adolescents is linked to a cascade of harmful behaviors, including drug abuse and alcohol consumption (Nawi et al., 2021). Initial smoking experiences are often motivated by

experimentation, exposure to cigarette advertisements, peer pressure, and societal influences, including parental smoking habits. The 2024 GYTS found that 72.4% of adolescents aged 13-15 had at least one parent who smokes (Deva et al., 2024).

Smoking cessation in adolescents is challenging due to addiction, social normalization of smoking, and a lack of awareness regarding health risks and benefits of quitting. Environmental factors, such as peer and family smoking, further reinforce the habit (Buczowski et al., 2021). To address this issue, increasing motivation for smoking cessation is critical, as failure to quit may result in prolonged tobacco dependence and further health deterioration (Bil Husna et al., 2024). Adolescents who struggle to cope with psychosocial changes often resort to smoking as a coping mechanism, potentially leading to chronic stress and unhealthy behaviors (Zhang et al., 2024).

Adolescents tend to underestimate smoking risks, believing that its dangers are distant or exaggerated. Poor decision-making skills, impulsivity, and emotional instability contribute to the persistence of smoking behavior among youth (Pidlin et al., 2020). Misconceptions regarding the severity of smoking-related diseases and the

benefits of quitting further prevent adolescents from attempting smoking cessation (Pribadi & Devy, 2020). A lack of knowledge about the long-term dangers of smoking and the advantages of quitting early significantly increases the risk of adolescent smoking behavior (Tsikrika et al., 2023).

Furthermore, adolescents often perceive smoking cessation as unexciting or unnecessary compared to the temporary pleasure derived from smoking (Dadras, 2024). Studies indicate that adolescent smokers, particularly heavy smokers, have weak perceptions of the benefits of quitting, reducing their likelihood of adopting healthier behaviors (Bil Husna et al., 2024). Yet, smoking cessation is one of the most effective ways to protect one's health and prevent secondhand smoke exposure among family, friends, and peers (Sweet et al., 2019). Several motivating factors drive smoking cessation, including health concerns, social norms, financial costs, and personal responsibility (CDC, 2020).

Despite understanding the harmful effects of smoking, adolescents often continue the habit due to a perceived lack of immediate consequences. This results in high adolescent smoking prevalence and resistance to cessation efforts (Lin et al.,

2023). Many adolescents acknowledge the health risks but fail to internalize them, assuming they will not personally experience adverse effects (Akter et al., 2024). Compared to alcohol or drug use, adolescents perceive smoking as less risky and are unaware of its addictive nature and short-term effects (Nawi et al., 2021). Recent studies indicate that many smokers still lack a comprehensive understanding of the health impacts of smoking, particularly its association with chronic non-communicable diseases. Although awareness has improved, significant gaps persist in smokers' knowledge of highly prevalent smoking-related diseases (Tsikrika et al., 2023).

Adolescents lack awareness of the numerous benefits of smoking cessation and underestimate their vulnerability to smoking-related health issues (Banaji et al., 2021). This study aims to explore the relationship between perceived vulnerability, perceived benefits of smoking cessation, and motivation to quit smoking in adolescents. Understanding the psychological and behavioral factors influencing adolescent smoking cessation can help design effective intervention strategies to support healthier lifestyles.

2. METHODS

The research design uses an analytical observational design with a cross-sectional approach. The sample in this study consisted of 136 adolescents in Malang City who smoked, determined using Slovin's formula. This formula was chosen because it allows for an efficient sample size calculation while maintaining a balance between accuracy and feasibility when the total population size is known but complete enumeration is impractical. A cluster random sampling technique was employed to ensure representation from different schools, minimizing selection bias and improving generalizability. Respondents were selected from 10 senior high schools, with proportional allocation to each school. Data collection involved visiting each selected school, determining the proportion of respondents needed, and randomly selecting participants from the attendance list after the learning process had ended.

The measuring instrument in this study used a questionnaire modified by researchers based on the perceived vulnerability to disease (PVD) questionnaire, the Perceived Risks and Benefits Questionnaire (PRBQ), and the smoking cessation motivation questionnaire (Q-MAT). The PVD questionnaire developed by

Duncan (Duncan et al., 2009) consists of 15 item statements using a Likert scale with answer choices strongly agree=5, agree=4, undecided=3, disagree=2, and strongly disagree=1. The PRBQ developed by McKee (Weinberger et al., 2010) is a 40-item measure assessing risks and benefits of smoking cessation on a likert scale (strongly disagree=1, disagree=2, undecided=3, agree=4, 5=strongly agree). Q-MAT questionnaire with 25 questions which explored nine dimensions using a likert scale with answer choices always=5, often=4, sometimes=3, rarely=2, and never=1 (Badrooh et al., 2020). The PVD questionnaire, PRBQ, and Q-MAT were tested for validity and reliability on 20 respondents. The results of the validity and reliability test have an arithmetic value of 0.58 – 0.79 (> 0.44) and a Cronbach Alpha coefficient of $0.832 > 0.600$, have an arithmetic value of 0.566 – 0.721 (> 0.44) and a Cronbach Alpha coefficient of $0.903 > 0.600$, and have an arithmetic ratio of 0.476 – 0.821 (> 0.44) and a Cronbach Alpha coefficient of $0.893 > 0.600$.

Data analysis was conducted using Spearman's Rank correlation in SPSS, as this method is appropriate for analyzing relationships between ordinal variables. Given that the data were measured on a

categorical (ordinal) scale, Spearman's Rank correlation was chosen because it does not assume a normal distribution and is suitable for assessing monotonic associations. The test was performed with a 99% confidence level (CI = 1%). The two independent variables are analyzed separately to identify trends and patterns, revealing hidden data trends and patterns by evaluating the relationship between them. This study was approved by the Health Ethics Committee,

Faculty of Medicine, Universitas Brawijaya, with ethical clearance number 012/EC/KEPK/01/2020. All participants, including minors, were provided with detailed information about the study's objectives, procedures, potential risks, and benefits. Written informed consent was obtained from all participants. For participants under the age of 18, parental or guardian consent was also secured prior to their involvement in the study.

3. RESULTS

Table 1. Demographic characteristics

Characteristics	Distribution	
	n	%
Cigarette consumption per day		
1-10 cigarettes	128	94.1
11-21 cigarettes	8	5.9
Long-term smoking		
< 1 year	63	46.3
> 1 year	73	53.7
Gender		
Male	136	100
Age (years)		
Middle adolescence (15-17)	126	92.6
Late adolescence (18-21)	10	7.4
Grade		
10	26	19.1
11	43	31.6
12	67	49.3

The demographic characteristics of male respondents (100%) show that the majority (92.6%) are in the middle adolescence category. They have more than one year of smoking experience (53.7%), which means they were first exposed to

smoking during lower school, specifically junior high school. The level of daily cigarette consumption is 1-10 (94.1%) cigarettes a day, obtained through self-purchase using pocket money or from peers (table 1).

Table 2. Distribution of Perceived Vulnerabilities, Benefits, and Motivation

Variables	Distribution	
	n	%
Vulnerabilities		
Positive perception	133	97.8
Negative perception	3	2.2
Benefits		
Positive perception	132	97.1
Negative perception	4	2.9
Motivation		
Low motivation	1	0.7
Moderate motivation	38	27.9
High motivation	97	71.3

Perceived vulnerability data shows that 133 respondents (97.8%) have a positive perception of vulnerability while 3 adolescence (2.2%) have a negative perception of vulnerability. Based on the results of calculating the frequency of answers to the vulnerability perception questionnaire, it was found that 129 adolescence (94.9%) strongly agreed and agreed that smoking can cause heart attacks, cancer, and strokes. As many as 60 students (44.1%) strongly disagree and disagree that every day, every time they smoke, they do not have thoughts of getting a heart attack, cancer or stroke in the near

future. Perceived benefits data shows that 132 adolescence (97.1%) have positive perceptions of the benefits of quitting smoking, while 4 respondents (2.9%) have negative perceptions of the benefits of quitting smoking. Based on the results of calculating the frequency of answers to the perceived benefits questionnaire, the results obtained were 124 adolescence (91.2%) strongly agreed and agreed that by stopping smoking, they could save more money. As many as 77 adolescence (56.6%) strongly agreed and agreed that they would be healthier if they smoked (table 2).

Table 3. Results Analysis of Perceived Vulnerability and Motivation Smoking Cessation (Continue to page 22)

Variables	Motivation Smoking Cessation						Total		p value	Correlation coefficient (r)
	High		Moderate		Low					
	f	%	f	%	f	%	f	%		
Perceived Vulnerabilities	96	70.6	37	27.2	0	0	133	97.8	0.000	0.478
Positive	1	0.7	1	0.7	1	0.7	3	2.2		
Negative										

Variables	Motivation Smoking Cessation						Total		p value	Correlation coefficient (r)
	High		Moderate		Low					
	f	%	f	%	f	%	f	%		
Perceived Benefits									0.000	0.643
Positive	96	70.6	35	25.7	1	0.7	132	97.1		
Negative	1	0.7	3	2.2	0	0	4	2.9		

Data on motivation smoking cessation shows that 1 respondent (0.7%) has low motivation to smoking cessation, 38 adolescence (27.9%) have moderate motivation to smoking cessation and 97 adolescence (71.3%) have high motivation to smoking cessation. Based on the results of calculating the frequency of answers to the smoking cessation motivation questionnaire, it was found that 109 adolescence (80.1%) strongly agreed and agreed that quitting smoking is the right way to avoid smoking-related diseases (cancer, heart attack, and impotence). As many as 73 adolescence (53.7%) strongly agreed and agreed that if they were able to smoking cessation, they would not return to smoking (table 2).

The results of the cross-table analysis demonstrate a high proportion between motivation smoking cessation and perceived susceptibility to the dangers of smoking (70.6%). The results of the cross-table analysis for the perceived vulnerability variable indicate a high proportion between

motivation to smoking cessation and the perception of vulnerability to the dangers of smoking (70.6%). Similarly, for the perceived benefits variable, a high proportion was observed between smoking cessation motivation and the perception of vulnerability to the dangers of smoking (70.6%) (table 3).

The bivariate analysis using Spearman's Rank correlation test for each variable yielded a p-value of 0.000. Hence, it can be concluded that there is a significant relationship between the two variables, perceived vulnerability and perceived benefits, and motivation to quit smoking (p-value < 0.01). The correlation coefficient (r) is 0.478, indicating moderate correlation strength (0.40 – 0.599). A correlation value of 0.478 signifies a positive relationship, suggesting that the higher the perceived vulnerability, the higher the motivation to quit smoking among adolescents. Regarding the perceived benefits variable, the correlation coefficient (r) has a value of 0.643, indicating a strong correlation (0.600-

0.799). This correlation value of 0.643 signifies a positive relationship, implying that the higher the perceived benefits, the stronger the motivation to quit smoking among adolescents (table 3).

4. DISCUSSION

Perceived vulnerability reflects an individual's belief about the likelihood of experiencing a health threat or developing a smoking-related illness. The results of this study indicate that adolescent smokers generally acknowledge the risk of developing conditions such as heart attacks, cancer, and stroke (Gallucci et al., 2020). Adolescents believe that if they do not quit smoking, they will eventually suffer from these diseases. However, the long-term nature of these health consequences often makes it difficult for adolescents to prioritize smoking cessation. This aligns with previous research indicating that individuals who recognize their susceptibility to smoking-related illnesses are more likely to attempt quitting (Lin et al., 2023).

Despite this, some adolescent smokers maintain positive beliefs about smoking (negative perceived vulnerability), which makes it difficult for them to quit entirely (Lin et al., 2023). Smoking is often associated with relaxation, social bonding, and stress

relief, making cessation challenging (van Dijk et al., 2021). Other factors such as peer influence, anxiety, and nicotine addiction further contribute to the difficulty of quitting (Nagawa et al., 2022). Anggreani et al., (2022) found no significant relationship between perceived vulnerability and smoking cessation motivation, suggesting that the influence of vulnerability perception may vary across age groups and populations. Similarly, recent studies indicate that other psychological factors, such as perceived severity and self-efficacy, play a more crucial role in determining smoking cessation behavior (Oh & Boo, 2023; Dahne et al., 2023). Younger adolescents may respond more strongly to health warnings, whereas older adolescents may require more immediate and tangible incentives, such as financial benefits or social support, to motivate quitting.

Another key factor influencing smoking cessation is risk perception shaped by visual warnings. Adolescents' perceptions of smoking dangers can be influenced by exposure to graphic health warnings on cigarette packs, such as images of lung cancer or throat cancer (Mia et al., 2021). Research suggests that such images increase awareness and reduce smoking rates, as adolescents internalize the visual

representation of smoking-related diseases (Shrestha et al., 2022). However, this study also highlights that some adolescents do not perceive themselves as vulnerable because they do not experience immediate negative effects from smoking (Pourtau et al., 2019). The delayed onset of severe health consequences often leads adolescents to underestimate the real dangers of smoking.

Adolescents are an age group with growing independence and rational decision-making skills, enabling them to weigh the benefits and risks of smoking (Ciranka & van den Bos, 2019). Many adolescents first experiment with cigarettes between the ages of 9 and 12, often due to peer influence or imitating family members who smoke (Susanto et al., 2022). As they grow older, increased knowledge and personal experiences with the negative effects of smoking lead many to reassess their smoking behavior. Anti-smoking campaigns, age restrictions on cigarette sales, and rising health costs contribute to a shift in perception, encouraging some adolescents to quit smoking (Asbath et al., 2024).

The findings of this study indicate that financial considerations play a crucial role in smoking cessation motivation. Many respondents recognized that quitting

smoking would allow them to save money for more useful purposes (Martins et al., 2021). Furthermore, awareness of the health benefits of quitting, such as reducing the risk of heart disease, cancer, and stroke, also influenced smoking cessation motivation (Okorare et al., 2023). Peer influence can also play a role, as adolescents who quit smoking may encourage their friends to do the same (Notley et al., 2019). However, while many adolescents acknowledge the benefits of quitting, the presence of strong nicotine dependence and the lack of effective coping strategies for stress may still hinder their ability to quit successfully (Fatani et al., 2022).

The results of this study align with the Health Belief Model, which suggests that low perceptions of the benefits of quitting smoking can negatively impact a person's willingness to quit (Napirah et al., 2022). The benefits of smoking cessation extend beyond health improvements, encompassing economic, social, and psychological aspects (CDC, 2020). However, not all individuals with a positive perception of smoking cessation benefits have high motivation to quit. Some smokers struggle with stress, depression, and social pressures, which can outweigh their motivation to quit despite recognizing the

benefits (Olando et al., 2020). This finding suggests that smoking cessation programs should incorporate stress management techniques and mental health support to increase the likelihood of successful quitting.

Given these findings, several policy recommendations should be considered to strengthen smoking cessation programs and public health interventions for adolescents. Anti-smoking campaigns should highlight both immediate and long-term health risks, as many adolescents tend to overlook future consequences (Pa, 2023). Research indicates that stronger warning labels and graphic health images on cigarette packaging can significantly influence adolescent risk perception, making such policies crucial for discouraging smoking initiation (Mia et al., 2021). Additionally, stricter regulations on tobacco sales and marketing are essential, particularly to prevent cigarette advertisements from targeting young people through digital platforms and social media (Kong et al., 2024). Restricting cigarette sales near schools and increasing tobacco taxes can further reduce access and affordability for adolescents (Alebshehy et al., 2023). Moreover, this study highlights the importance of financial incentives as a key motivator for smoking cessation.

Adolescents who recognize the economic burden of smoking are more likely to quit, suggesting that reward-based cessation programs could be effective (Siersbaek et al., 2024). Governments and health organizations could implement scholarship programs, school fee discounts, or financial incentives for adolescents who successfully quit smoking, which has been shown to improve cessation rates (Notley et al., 2019). In addition to financial incentives, smoking cessation programs must address psychosocial factors, as many adolescents smoke as a coping mechanism for stress and social anxiety (Fatani et al., 2022). School-based counseling services and peer support groups should be integrated into cessation programs to help adolescents develop alternative coping strategies. Lastly, public health campaigns should emphasize short-term consequences of smoking, such as reduced athletic performance, bad breath, and skin aging, making the risks of smoking more tangible for adolescents (Maspero et al., 2024).

5. CONCLUSION

This study confirms that both perceived vulnerability and perceived benefits significantly influence adolescent motivation to quit smoking. However, the

perceived benefits of quitting have a stronger influence than fear of smoking-related health risks. These findings suggest that smoking cessation programs should focus on promoting the positive outcomes of quitting, rather than solely emphasizing the dangers of smoking. Despite its contributions, this study has limitations. The self-reported nature of the data may introduce bias, as participants may have provided socially desirable answers. Additionally, the study was limited to adolescents in Malang City, which may reduce the generalizability of the findings. Future research should include larger and more diverse samples, long-term follow-ups, and experimental designs to assess the effectiveness of different smoking cessation interventions. By addressing policy gaps and integrating psychosocial support strategies, adolescent smoking cessation programs can become more effective. A multi-faceted approach including education, financial incentives, counseling, and stricter tobacco regulations will be essential in reducing smoking prevalence among adolescents and improving public health outcomes.

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AUTHOR CONTRIBUTIONS

Setyoadi (STO), Lala Aisyana (LLA), Efris Kartika Sari (EFK), Dina Dewi Sartika Lestari Ismail (DDS). STO contributed to the conception and design of the study, data collection, and manuscript writing. LLA was involved in data collection, analysis, and manuscript writing. EFK contributed to data analysis, manuscript writing, and revisions. DDS was responsible for manuscript revisions and final approval of the version to be published. All authors have read and approved the final manuscript.

CONFLICT OF INTEREST

There are no potential conflicts of interest to declare.

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DATA AVAILABILITY

The datasets are available from the corresponding author on reasonable request.

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