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Analysis on Smoking Behavior of Final Semester Students of Diponegoro University Semarang

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Abstract

Introduction: World Health Organization (WHO) data showed that tobacco consumption causes millions of deaths each year. Research on the University of Riau students found that 22-year-old students, who worked on their theses, tended to smoke. Another study at Faculty of Medicine, Diponegoro University, showed that college students used cigarettes to cope with academic stress. This study aimed to determine factors associated to smoking behavior on final-semester students of Diponegoro University Semarang.

Methods: This observational study used a cross-sectional design. The purposive sampling with the criteria of Undip students who were active members of Thesis World Community, X social media accounts who were working on their thesis on May-August 2024, on the 2018-2020 class who smoked, and agreed to fill out the research forms. This study included a total of 100 students. Data collection was conducted through gforms, disseminated online in the Thesis World Community. Data analysis was performed using the chi-square tests.

Results: These variables were associated to light or heavy smoking behavior: father's education level (p=0.004), mother's education level (p=0.001), knowledge about the dangers of smoking (p=0.003), family encouragement (p=0.001), peer encouragement (p=0.011), perceived vulnerability (p=0.001), perceived seriousness (p=0.020), perceived benefits (p=0.022), perceived barriers (p=0.001), suggestions from others (p=0.001), and family experience (p=0.032). The variables that had no association with heavy smoking behavior were age (p=0.394) and sex (p=0.796).

Conclusion: The determinants associated with heavy students' smoking behavior were low parental education level, the dangers' of smoking knowledge, family encouragement, peer encouragement, perceived vulnerability, perceived seriousness, perceived benefits, perceived barriers, advice from others, and family experience.

Keywords: determinants; smoking behavior; university students; family; knowledge.

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Introduction

Smoking is considered very dangerous for health as it can cause various serious diseases and even death.[1] The WHO reported that in 2023, tobacco caused more than 8 million deaths, including 1.3 million from cigarette smoke. Most of the world's 1.3 billion smokers live in developing countries, where support for quitting as well as weak regulations encourage high rates of smoking. In 2020, 22.3% of the global population smoked,

with a significant gender difference: 36.7% of men smoked compared to 7.8% of women. Thus, tailored tobacco control efforts were urgently needed.[2]

In 2021, the Central Java Statistics Agency (BPS) conducted observations related to smoking habits among residents aged ≥ 15 years who had smoked in the past month. The 15-24 age group had a prevalence of 19.72%, while the 55-64 age group had a prevalence of 28.52%. The prevalence of smoking among those aged 65 years and older was recorded at 23.39%. These data provide insight into smoking trends in various age groups in the Central Java Province. BPS Central Java Province made similar observations with the coverage of a smaller area in Semarang City in 2021. The results showed that in Semarang City, 15.6% were smokers aged 15-24 years, based on observations.[3] Residents in Semarang City found that many have smoked since adolescence, or at the age of 15-24 years.

The use of e-cigarettes by children and teens would be increased by 2023, as they are often advertised through social media and influencers with attractive designs for the younger generation. WHO Director of Health Promotion, Dr. Ruediger Krech said that the sale of e-cigarettes aimed to the children through a variety of interesting marketing strategies.[3,4] Indonesia's Deputy Minister of Health, Dante Saksono Harbuwono, voiced his concern over the increasing prevalence of e-cigarette use in the country, especially among teenagers.[5]

The government enacted tobacco control through Law Number 36 of 2009, which encouraged awareness of the dangers of smoking and established smoke-free areas including health facilities, schools, places of worship, public transportation, and workplaces. Local governments must implement and enforce this policy.[6]

WHO launched the Health Promoting University program to reduce smoking among adolescents. This approach focuses on creating a healthy environment, integrating with health promotion in daily activities, and engaging the academic community as well as students.[7,8] Health promotion has been implemented by Diponegoro University. Regulation Number 11 of 2015 stipulated that “Student Center is a non-smoking area, smoking is prohibited, as well as the possession, production, sale, and promotion of cigarettes within the university's smoke-free zone." However, in 2022, observations on 50 Diponegoro University student respondents, revelealed that about 10% of respondents smoked in the campus environment. Smoking in the campus environment is still practiced by students even though it is prohibited. The regulation has not been enforced, and the Smoking Free Area (KTR) function is only carried out by the Faculty of Public Health and the Faculty of Medicine.[9] The number of adolescent smokers was still a concern despite efforts to prevent smoking behavior.

Studies has been conducted on students of Faculty of Medicine [10] and Economics and Business, Diponegoro University. Both studies reported the stress, anxiety, and social pressure experienced by the students. Students smoked not only because they wanted to try but also as a coping mechanism for their pressure, whether from academics, peers, or personal problems. The study found that smoking provided temporary emotional effects such as feeling calm, happy, or confident. Conversely, when they were not smoking, they felt anxious, stressed, and less energized. It has also been found that the No Smoking Area (KTR) Policy was known by most respondents in both studies but was considered ineffective in reducing student smoking behavior. Social environmental factors (family or friends who smoke) and lack of self-control over stress emerged as triggers for smoking behavior in both groups of students. Both studies confirmed that among college students, smoking was more than just a habit but also as the response to psychological pressure and social influences. [11]

The lack of awareness of quitting, and the assumption that smoking was a trend among teenagers were the driving factor of this behavior. Students' perceptions of cigarettes and the negative impact of smoking behaviors are certainly different. Perception is a cognitive process

experienced by each person in understanding information about his or her environment, whether through sight, hearing, appreciation, feelings, or smell. Most respondents perceived cigarettes as pleasurable. According to one of the respondents, in addition to being a pleasure, cigarettes were also a symbol of associations and current trends. Many young people today made cigarettes become trends and lifestyles. Most students had perceptions and considered the habit of smoking among students as a common thing. Some students who were actively smoke thought that the habit of smoking among students was not a good thing.[12]

Based on a preliminary study of 129 Undip's final-semester students in the Dunia Thesis community who actively smoked, smoking behavior had become an increasing habit along with the academic pressure they face. Many of them used cigarettes as an escape from stress due to thesis deadlines, stressful tutoring, and uncertainty about the future after graduation. Smoking activities were often done in groups, both in the campus area and at their favorite hangouts, creating a kind of informal discussion space where they shared academic grievances. Even though they awared of health risks, they could not resist as it had become part of the routine activities and also a form of solidarity between fellow thesis fighters.

Previous research had shown that students' perception of cigarettes was poor. Therefore, the researcher conducted a study using the Health Belief Model (HBM) theory to determine the perceptions of final-semester students at Undip Semarang who are members of the Thesis World Community on social media X. The Health Belief Model (HBM) theory is a behavioral theory that has been created and can be used to determine an individual's perception of a person's acceptance of their own health. This study aimed to identify variables related to the heavy smoking behavior among the smokers of final-semester students at Diponegoro University Semarang.

Method

This observation refers to the Health Belief Model theory with independent variables of age, gender, parental education level, knowledge about the dangers of smoking, family encouragement, peer encouragement, perception of vulnerability, perceived seriousness, perception of benefits, perception of constraints, suggestions from others, and family experience. The dependent variable was heavy smoking behavior of final-semester students of Diponegoro University Semarang. This study used a cross-sectional design, conducted at Diponegoro University from May to August 2024, targeting active smokers in the final semester of the 2018-2020 batch. This study used gforms for the data collection. The questionnaire was opened to the Thesis World Community via social media (X).in May-August 2024.

The purposive sampling technique was used in this study. The first criteria of students to be included in the study was Diponegoro University students who were active in the World Community Thesis Social media account X and worked on their thesis from May-August 2024. The population were 129 students. The second criterion was the students from the class of 2018-2020 who smoked and agreed to fill out the form distributed by the researcher. A total of 101 students fullfilled the criteria, but 1 participant had invalid data, thus 100 participants were included in the study. The participants were traditional smokers or electric smokers or both.

The World Health Organization (WHO) divides adolescence into three stages: early (12-14 years), middle (15-17 years), and late adolescence (18-24 years), with early adulthood ranging from 25 to 40 years. In this study, respondents were grouped into late adolescents (18-24 years) and early adults (25-40 years).

Categorization of smoking behavior variables of Diponegoro University students, knowledge about the dangers of smoking, family encouragement, peer encouragement, perceived vulnerability perception of smoking behavior, perceived seriousness of smoking behavior, perception of the benefits of smoking when working on thesis, cigarette advertising,

perception of smoking barriers to quitting, suggestions from others to smoke, and family experience using median because the research data obtained were not normally distributed.

Data were analyzed using Chi-square tests with a significance level of less than 0.05.

This study followed the ethical requirements and got the approval from Public Health Research Ethics Commission of Diponegoro University No. 225/EA/KEPK-FKM/2024). The subjects provided their consent before completing the questionnaires.

Results

In this study, smoking behavior described in several variables: the type of cigarette consumed, start smoking time, the frequency of smoking, the number of cigarettes consumed per day, the difference in cigarettes before and after thesis, and obstacles to not smoking.

Students with heavy smoking behavior were determined through the following criteria: consumed 2 types of cigarettes and e cigarettes, had smoked before starting their thesis until now, smoked every day, smoked ≥ 1 cigarette per day or smoked ≥ 1 ml of e-cigarettes per day or refilling e-cigarettes ≥ 1 times per day (e-cigarettes), smoked more and often at the time of thesis, and there were some obstacles to quit smoking. Students with light smoking behavior are determined through these criteria: one type of smoker (stick/electric), smoked started from working on the thesis until now, did not smoke every day, did not smoke talent, did not smoke e-cigarettes, smoke more often before thesis, and there were no obstacle to quit smoking. Respondents who had most or all of them meet the criteria for heavy smokers will be included in the category of heavy smokers. Respondents who most or all of them meet the criteria for light smoking, will be included in the category of light smoker students.

Table 1 presents the characteristics of the subjects. Most of the subjects were men in their late adolescent age. Table 2 shows the faculty of the subjects. The subjects from Faculty of Engineering (FT) were the highest among the other faculties, while Faculty of Science and Mathematics had the lowest number of student smokers. Table 3 shows the description of smoking behavior category (heavy and light) among the subjects. Of the 100 respondents involved in this study, 81 (81%) were classified as heavy smokers and 19 (19%) were categorized as light smokers. This shows that the majority of final-year students who smoke at Undip Semarang tend to smoke with a high intensity. A higher percentage of heavy smokers than light smokers suggests that smoking behaviors among final-year students was more in the heavy-use category.

Table 4 presents distribution of variables in Health Belief Model (HBM) theory related to smoking behavior among final-year students. On modifying factors category, it is shown that knowledge of the harmful effects of smoking were mostly high. On individual perception variables, it is presented that perceived vulnerability, seriousness and benefits to smoking behavior were all relatively balanced between high and low, while perceived barriers to smoking behaviour, more of them felt high. On signal to act variable category, friend encouragement were high toward smoking behavior.

From the data, it can be concluded that the majority of respondents had good knowledge about the dangers of smoking, but the perceived vulnerability and severity of the impact were still quite divided. Gestures to act, especially peer encouragement, seem to play a large role in the smoking behavior of final-year students. Therefore, health interventions that involve social settings such as friends and family can be an effective strategy for reducing smoking among college students.

Table 5 shows a bivariate analysis that revealed a significant association between several factors: paternal education (p=0.004), maternal education (p=0.001), understanding of smoking risks (p=0.003), family motivation (p=0.001), peer encouragement (p=0.011), (p=0.001), perceived vulnerability (p=0.001), perceived seriousness (p=0.020), perceived benefits (p=0.022), perceived barriers (p=0.001), cigarette advertising (p=0.005), suggestions from others

(p=0.001), family experiences (p=0.032) and smoking behavior. However, age (p = 0.394) and sex (p = 0.796) were not significantly associated with heavy or light smoking behavior.

Table 1. Respondent's Characteristics

Variables	Category	Frequency	Percentage
Age	Late Adolescence (18-24 years old)	97	97%
	Early Adulthood (≥25 years)	3	3%
Gender	Man	91	91%
	Woman	9%	9%
Father's Education Level	Elementary Education (Elementary, Junior High)	26	26%
	Higher Education (Senior High School/Vocational, Diploma, Bachelor, Master).	74	74%
Mother's Education Level	Elementary Education (Elementary, Junior High)	34	34%
	Higher Education (Senior High School/Vocational, Diploma, Bachelor, Master).	66	66%

Table 2. Faculty of the Respondents

Faculty	Frequency	Percentage
Social and Political Science	21	21%
Economic and Business	19	19%
Engineering	42	42%
Agriculture and Veterinary	2	2%
Science and Mathematics	1	1%
Law	15	15%
Total	100	100%

Table 3. Smoking Behavior Category

Smoking Behavior Category	Frequency	Percentages
Heavy Smokers	81	81%
Light Smokers	19	19%
Total	**100**	**100%**

Table 4. Description of variables in Health Belief Model

Variables	Frequency	Percentages
Modifying Factors		
Knowledge of the Harmful Effects of Smoking		
High	68	68%
Low	32	32%
Individual Perceptions		
Perceived Vulnerability		
High	51	51%
Low	49	49%
Perceived Seriousness		
High	55	55%
Low	45	45%
Perceived benefits		
High	50	50%
Low	50	50%
Perceived Barriers		
High	60	60%
Low	40	40%
Signals to Act		
Family Encouragement		
High	54	54%
Low	46	46%
Friend Encouragement		
High	71	71%
Low	29	29%
Advice from Others		
High	59	59%
Low	41	41%
Family Experience		
High	57	57%
Low	43	43%

Table 5. Smoking Behavior and Health Belief Model Theory

Variables	Smoking Behavior				Total		p
	Light		Heavy				
	F	%	F	%	F	%	
Modifying Factors							
Age							
Late Teens	19	19.6	78	80.4	97	100	0.394
Early Adulthood	0	0.0	3	100.0	3	100	
Gender							
Man	17	18.7	74	81.3	91	100	0.796
Woman	2	22.2	7	77.8	9	100	
Father's Education Level							
High	19	25.7	55	74.3	74	100	0.004
Low	0	0.0	26	100.0	26	100	
Mother's Education Level							
High	19	28.8	47	71.2	66	100	0.001
Low	0	0.0	34	100.0	34	100	
Knowledge of the Harmful Effects of Smoking							
High	17	28.8	42	71.2	59	100	0.003
Low	2	4.9	39	95.1	41	100	
Individual Perceptions							
Perceived Vulnerability							
High	17	32.7	35	67.3	52	100	0.001
Low	2	4.2	46	95.8	48	100	
Perceived Severity							
High	15	27.3	40	72.7	55	100	0.020
Low	4	8.9	41	91.1	45	100	
Perceptions of the Perceived Benefits of Smoking							
High	14	28.0	36	72.0	50	100	0.022
Low	5	10.0	45	90.0	50	100	
Perceived Barriers to Quitting Smoking							
High	18	30.0	42	70.0	60	100	0.001
Low	1	2.5	39	97.5	40	100	
Signals to Act							
Family Encouragement							
High	18	33.3	36	66.7	54	54%	0.001
Low	1	2.2	45	97.8	46	46%	
Friend Encouragement							
High	18	25.4	53	74.6	71	71%	0.011
Low	1	3.4	28	96.6	29	29%	
Advice from Others							
High	18	30.5	41	69.5	59	100	0.001
Low	1	2.4	40	97.6	41	100	
Family Experience							
High	15	26.3	42	73.7	57	100	0.032
Low	4	9.3	39	90.7	43	100	

Discussion

Student Smoking Behavior

The percentage of heavy smokers was higher than that of light smokers. Thus the respondents' daily cigarette consumption mostly ranges from to 1-5 cigarettes per day, which can increase long-term health risks, such as lung cancer, heart disease, and respiratory disorders. The high dependence on cigarettes and the presence of barriers to quitting smoking, indicating the potential for strong physical and psychological dependence on nicotine. This problem is difficult to overcome without professional support or smoking cessation programs. The significant use of e-cigarettes, with most respondents having used them for more than a year, although e-cigarettes still carry long-term health risks. There was a misconception about

smoking, where respondents feel that smoking can help them in stressful situations, such as completing a thesis, which can prevent them from finding healthier ways to manage stress. The students tended to be more vulnerable to social impacts, especially in environments without strict regulations related to smoking bans. This can complicate efforts to reduce the prevalence of smoking. The high prevalence of smoking behavior among students create an unhealthy campus environment and does not support a smoke-free lifestyle. Fixing these problems is essential to maintaining the image of the campus, increasing student productivity, and ensuring the success of health education programs.

Modifying Factors

Age

There was no significant association between age and smoking behavior of the respondents. A univariate analysis showed that more than half of the respondents fell into the category of late adolescents. According to the Health Belief Model, age is a variable that can affect health-related behavior. However, in this study, the variation in smoking intensity between late adolescence and early adulthood was not statistically significant, suggesting that age alone did not directly influence smoking behavior. Other external factors, such as social environment, academic pressure, and easy access to cigarettes, migh have more impact on smoking behavior. These factors could contribute to students' decisions to continue or improve their smoking habits, regardless of their age group. These findings are in line with the observations of Deastri (2022), who also found no association between age and smoking behavior. This suggests that interventions to reduce smoking among college students should focus more on addressing external impacts than on age-specific approaches. Understanding the social and psychological factors that drive smoking behavior can help create more effective prevention strategies [13]

Gender

There was no association between gender and smoking behavior. While the majority of the respondents were male, the percentage difference between males and females was not statistically significant. Therefore, gender cannot be considered the main factor in determining the light or heavy smoking behavior among final-year students of Diponegoro University. Other factors, such as the social, cultural, and cultural impacts of local customs, might have a greater influence on smoking behavior than biological or gender factors. The results of this observation were consistent with those of Simangunsong (2023), who concluded that there was no relationship between gender and smoking behavior. [14]

Parents' Education Level

Statistical tests showed a relationship between parents' educational level and students' smoking behavior. Most respondents had parents with higher education, high school, diploma, bachelor's, or master's degrees. This factor is part of the Health Belief Model, as higher education helps individuals to better understand information related to health and technology. [15] On the other hand, a low level of parental education can reduce the effectiveness of perception; therefore, students tended to be more susceptible to heavy smoking. Raising awareness of the impact of smoking on families with low educational backgrounds is essential through educational and health intervention programs. Similar findings were also reported in Sinaga's (2016) study, which concluded that parental education and parenting levels played a role in influencing smoking behavior in children. [16]

Knowledge of the Dangers of Smoking

Statistical tests showed a relationship between knowledge about the dangers of smoking and smoking behavior. Most respondents had a high level of understanding, which, according to the Health Belief Model, helped shape perceptions and behaviors to prevent smoking. The analysis found that the respondents understood the risks of smoking, such as harmful chemicals and nicotine. These results are consistent with those of Amanda (2023), who also found a

significant relationship between smoking knowledge and behavior in Semarang adolescents. [14]

Individual Perceptions

Perceived susceptibility to smoking behaviour

The results of the statistical tests showed the perceived vulnerability to smoking behavior. More than half of the respondents had a high perceived vulnerability, which means that they felt vulnerable to smoking-related health risks, such as cancer and heart disease. This awareness has led to concerns about the negative effects of smoking, as well as better self-control over the impact of advertising. This is in line with the Health Belief Model, which shows that greater perceived vulnerability drives health protective behaviors. The results showed that respondents with high perceived susceptibility tended to have milder smoking behaviors than those with low perceived susceptibility. Although respondents were aware of the risks of smoking, many found difficulties to quit. Although respondents with high perceived susceptibility were more aware of the dangers of smoking, most still engaged in heavy smoking behaviors. Many respondents with perceived high vulnerability still engaged in heavy smoking behavior, suggesting that risk awareness alone is not enough to change behavior. Respondents with a low perceived susceptibility were more likely to smoke heavily. This suggests that a lack of risk awareness can worsen smoking behavior. These findings are in line with the observations of Yassin (2023), who did not believe that perceived vulnerability is one of the main predictors of smoking behavior. [17]

Perceived Seriousness of Smoking Behavior

Statistical tests revealed a link between perceived seriousness and smoking behavior. More than half of the respondents acknowledged the severity of smoking-related health risks such as cancer. However, they do not fully understand the immediate effects, such as body weakness and risk of death. These findings are in line with the Health Belief Model, in which perceived seriousness influences health behaviors. The results showed that respondents with a perception of high seriousness were less involved in heavy smoking behaviors than the low-perception group. However, there was a gap between perceived seriousness and smoking behavior, where awareness of the risks of smoking did not necessarily translate into efforts to quit or reduce smoking. This finding is in line with the observations of Wahyu Saputra (2020), who showed the relationship between perceived seriousness and the level of smoking behavior in students [18]

Perceived Benefits of Smoking Behavior

The statistical results showed an association between perceived benefits and smoking behavior. Half of the respondents believed that smoking offered psychological benefits such as stress relief, calmness, and relaxation. In the deep health belief model, perceived benefits influence health behaviors by shaping an individual's belief in the positive effects of an action. However, they also realized that smoking did not improve health or reduce the risk of diseases such as lung cancer. These perceived psychological benefits provided a strong motivation for respondents to continue smoking despite being aware of health risks. Perceived psychological benefits seemed to encourage heavier smoking behaviors. Respondents with high perceived benefits tended to exhibit more intense smoking behaviors. The results of this observation were in line with the observation of Mutik (2020) who showed that smoking that was perceived positively could increase the tendency to smoking behavior in adolescents [19]

Perceived Barriers to Quit Smoking

Statistical analysis revealed a relationship between perceived barriers and smoking behavior. More than half of the respondents reported high perceived barriers, which are factors that influence health behaviors, according to the Health Belief Model. Most respondents did not express concerns about the health risks of smoking, such as disease or body odor.

Those who experienced more inhibition were less likely to smoke. This is in line with the observations of Tantri (2018), who found a similar relationship between perceived inhibition and smoking behavior. [20]

Cues to Action

Family Encouragement to Smoke

Statistical results showed a significant link between family role and smoking behavior, with more than half of the respondents reporting a strong family drive. In the Health Belief Model, family encouragement is a signal of action. This factor was directly related to individual perceptions. Based on the chi-square test results, most of the respondents were known to have family members who smoke, families often smoke at home, and rarely provide education about the dangers of smoking. This created an environment that encourages teenagers to smoke. In addition, some respondents were found to have been invited to smoke by family members or felt encouraged by their families' smoking behavior. Students from low-income families tended to have better confidence because they received adequate support to control their smoking habits. These findings were in line with the observations of Komasari (2020), who also identified a relationship between Family Impulse and children's smoking behavior.[21]

Friend Encouragement to Smoke

Statistical results revealed a significant relationship between the impact of friends and smoking behavior, with more than half of the respondents heavily influenced by their friends. According to the Health Belief Model, Friend Encouragement is categorized as a cue to action, which plays a powerful role in shaping individual behavior. The study found that many respondents were part of a social circle in which smoking was commonplace, and they viewed smoking as something "discouraged" or unavoidable. This perception, combined with the social impact of friends, leads to greater interest in smoking, especially when spending time with peers. These findings are in line with observations by Hilda Irianty (2019), who also established a significant relationship between friend urges and smoking behavior. This study showed that peer motivation was an important factor in adolescent smoking habits, thereby creating an environment in which smoking was normalized and even encouraged. It emphasizes the role played by the social environment, especially friendship, in determining smoking behavior, further supporting the idea that the friend Impulse is a powerful signal to act in the context of smoking [22]

Advice From Others to Smoke

The results of the statistical test revealed a significant relationship between suggestions from others and the respondents' smoking behavior. This suggests that external advice plays a role in shaping smoking habits among individuals. These findings suggest that individuals who were more exposed to advice from others were more likely to engage in heavy smoking behavior. The univariate analysis further emphasized this, showing that more than half of the respondents reported receiving strong advice from others. This finding highlights the important impact of social and external factors on an individual's decision to smoke. This fact suggested that peer and family advice could significantly contributed to whether individuals consume or continue to smoke. In the context of the Health Belief Model, suggestions from others are categorized as "incentives to act." These cues trigger behavioral changes, motivating individuals to initiate or stop certain behaviors. In this matter, advice from others can serve as a guide or catalyst for respondents' smoking behavior, influencing their actions based on the opinions and suggestions they receive from those around them. Suggestions from others include other encouragements and recommendations related to smoking behavior, such as invitations, encouragement to smoke, and views that affect respondents. It was found that most respondents received "high-level advice, " which encouraged them to smoke harder. Certain myths suggest that smoking can reduce stress in students or that a constant offer of cigarettes can influence smoking behavior. Fatalistic statements, such as

"smoking or not smoking, still dead" are used as justifications or "high-level suggestions" that affect respondents' perceptions. The findings of this study were in line with Syahputra's (2021) observation regarding the relationship between suggestions from others and smoking behavior. [23]

Family Experience

Statistical analysis showed a link between family experiences and smoking behaviors, with more than half of the respondents influenced by family stories about smoking. In the Health Belief Model, this family experience, acts as a cue for action that influences behavior. Respondents with “Low Family Experience" were more likely to smoke than those with “High Family Experience". This suggested that while family experiences influenced smoking behavior, other factors, such as peer urges, media, and personal characteristics, could also play an important role. These findings are in line with the observations of Nahsyabandi (2020) regarding the relationship between family experience and smoking behavior. [24]

Conclusion

Factors related to light or heavy smoking behavior in final-semester students of the Diponegoro University Semarang thesis world community included parental education, knowledge about the dangers of smoking, perception of vulnerability, perceived seriousness, perception of benefits, perception of constraints, family encouragement, encouragement of friends, parental experience, and advice from others. Age and sex were not related to the light or heavy smoking behavior. It is recommended to provide counseling support and smoking cessation programs by providing counseling services for students who want to quit smoking and offering behavioral therapy or community-based mentoring programs to help students reduce or quit smoking. It is suggested for student organizations to create podcasts and webinars using the Spotify or YouTube platforms to discuss the impact of smoking with an approach that appeals to students, create #UndipWithoutSmoke challenging hashtags, or #HealthyWithoutSmoke to raise awareness on social media. It is adviced for parents to increase awareness to their children from an early age. Parents can discuss the negative impacts of smoking on health, academic achievement, and the future. The next suggestion for researchers is to conduct research by exploring the determinants of smoking behavior of students in Semarang by considering research variables and identifying other factors that can affect smoking behavior, such as genetic, psychological, and sociocultural factors.

Etchics approval

This study was approved by the Health Research Ethics Committee, Faculty of Public Health, Diponegoro University, and was declared to have passed the ethics review (No. 225/EA/KEPK-FKM/2024).

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available because of the privacy protection agreement between the authors and respondents but are available from the corresponding authors.

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Author Contributions

The VA analyzes and interprets all respondent data. PN and NH corrected all analyzed and interpreted the data and were major contributors to the writing of the manuscript. All the authors have read and approved the final manuscript.

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