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The Correlation of Knowledge and Attitudes to Passive Smoking Behavior among Public Health Students of Sriwijaya University, Indonesia

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ABSTRACT

Background: There is no safe level of cigarette smoke, but not everyone can avoid the exposure. Public health students are expected to bring changes to healthy behaviors in the community, including getting the right to have air free from cigarette smoke through various preventive efforts. Therefore, this study aims to identify the behavior of public health students at Universitas Sriwijaya as passive smokers, and its correlation with knowledge and attitudes.
Subjects and Method: This was a cross-sectional study conducted at Universitas Sriwijaya, South Sumatera, Indonesia, from February to March 2025. A sample of undergraduate students of Public Health was selected using purposive sampling. The dependent variable was smoking behavior. The independent variables were knowledge and attitude. Data were analyzed using a multiple logistic regression.
Results: Passive smoking behavior among college students was influenced by knowledge (b = 0.17; 95% CI = −0.14 to 0.47; p = 0.103) and attitude (b = 0.61; 95% CI = 0.26 to 0.96; p = 0.001). While knowledge showed a positive but not statistically significant association with passive smoking behavior, attitude showed a statistically significant positive association.
Conclusion: Passive smoking behavior among college students is influenced by knowledge and attitude. Knowledge and attitude have positive association with passive smoking behavior.

Keywords: attitude, behavior, knowledge, passive smokers, tobacco

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BACKGROUND

The tobacco epidemic is one of the biggest public health threats worldwide. Every year, 8 million people die worldwide from smoking, including 1.3 million people from exposure to secondhand smoke. Tobacco use is extremely dangerous, and there is no safe limit for tobacco exposure. Exposure at any level has adverse effects on health. Second-hand Smoke (SHS) is exposure to cigarette

smoke in public places when a smoker is smoking. WHO implements tobacco control interventions through MPOWER, which is part of the WHO Framework Convention on Tobacco Control (WH FTCT). MPOWER specifically (1) Monitoring tobacco consumption; (2) Protecting people from cigarette smoke; (3) Offering to quit smoking; (4) Acquiring warning about the danger; (5) Enforcing bans; (6) Raising taxes (WHO, 2023).

Based on global data in 2016, the SHS (Secondhand Smoke) Index shows that people who smoked were associated with one death for non-smokers, based on the year index of exposure of 2016 (Yousuf et al., 2020). Adolescent smoking behavior in high- and middle-income countries (HICs and UMICs) shows a correlation between exposure to SHS in public places (HICs: wOR=3.5 [95% CI= 2.85 to 4.31]; UMICs: wOR=2.90 [95% CI= 2.60 to 3.23]) compared to at home, while low- and lower-middle-income countries (LICs and LMICs) shows an association with SHS exposure at home (LICs: wOR=5.33 [95% CI= 3.59 to 4.31]; LMICs: wOR=2.71 [95% CI = 2.33 to 3.17]) compared to public spaces (putra et al., 2024).

There are 10 countries with the highest number of smokers over the age of 15 in 2023: China, India, Indonesia, the US, the Russian Federation, Bangladesh, Japan, Turkey, Vietnam and the Philippines. About 61.5 million Indonesians are active smokers, and 3.5 million of them are female (The Tobacco Atlas, 2023).

Based on the 2021 Global Adult Tobacco Survey regarding the smoking behavior of the Indonesian people, the highest source of exposure to cigarette smoke for passive smokers is in restaurants, which is 82.2% (Listyorini, 2023). Health impacts caused by exposure to cigarette smoke in passive smokers include Ischemic Heart Disease (RR=1.26), stroke (RR=1.16), type 2 diabetes mellitus (RR=1.16), trachea, bronchi, and lung cancer (RR=1.37), otitis media (RR=1.12), Asthma (RR=1.21), lower respiratory tract infections (RR=1.34), breast cancer (RR=1.22), and chronic obstructive pulmonary disease (RR=1.44) (Flower et al., 2024).

The percentage of Indonesians aged 15 years and above who have smoked tobacco for the last four years, 2021 to 2024, has not experienced significant changes, namely 28.96%, 28.26%, 28.62%, and 28.99%. In 2024, 13 provinces out of 38 provinces surpassed the national average of Indonesians aged 15 years and above who smoked tobacco. South Sumatra Province was ranked the 9th highest, surpassing the national average of 31.01% (Central Statistics Agency, 2024).

Exposure to cigarette smoke is called Secondhand Smoke and Thirdhand Smoke. Secondhand Smoke is direct exposure from inhalation and exhalation of smokers and the burning of cigarettes inhaled directly by other non-smokers. The exposure is at a high level and in a short time if outdoors. Thirdhand smoke is a condition of exposure to cigarette smoke from inhalation, consumption, and through the skin. The residue remains and sticks to the surfaces of furniture, walls, chairs, carpets, pillows, curtains, clothing, leather, and hair. Although the exposure is at a low level, it can last up to 18 months (Ministry of Health, 2023).

A study related to the evaluation of non-smoking areas at the Faculty of Public Health revealed the fact that there are still violations committed by students, lecturers, educators, and cleaning personnel in smoke-free areas. There are no sanctions received by individuals who violate the regulations (Son, 2020). Based on a worldwide program to implement MPOWER across the country, a public service advertisement by the

Ministry of Health regarding passive smokers stated that the home is a refuge from cigarette smoke (Ministry of Health, 2021). A study showed that there is a link between smoking habits inside the house and the incidence of pneumonia in children aged 1-4 years (Wahyuni et al., 2020).

The awareness of the Indonesian people is in the worrisome category. A study that describes the awareness of Indonesian people towards non-smoking areas in Indonesia, based on the Global Adult Tobacco Survey (2011) shows that families with a policy that allows smoking in the house are 46.9% and there are 62.5% of people who smoke in the house every day. In addition, the frequency of exposure to cigarette smoke in public spaces such as workplaces, government offices, universities, educational facilities, religious facilities, health facilities, clubs, and public transportation was 51.4%, 66.4%, 55.3%, 40.3%, 17.9, 18.4%, 91.8%, and 70.8% respectively (Tarigan and Yulianti, 2019).

Passive smokers must have the courage to voice their rights regarding exposure to cigarette smoke. Public health students have a crucial role in voicing these rights. The reason is, they will fill strategic positions in the community to intervene in policies related to cigarettes in Indonesia, conduct health education related to the dangers of smoking, and become the best role models for themselves, their families, and the community to implement a healthy lifestyle without cigarette smoke. However, do public health students already have good knowledge, attitudes, and behaviors as passive smokers? Does knowledge have a correlation with behavior? Does attitude have a correlation with behavior?

Behavior is a tangible form of response to a stimulus. Knowledge and attitudes are predisposing factors for a person to respond with actions. In addition, Bloom's taxonomic theory reveals that cognitive, affective, and psychomotor aspects are behavioral domains. Knowledge is one of the cognitive aspects, while attitude is one of the affective aspects (Swarjana, 2021). This study aims to determine the correlation between knowledge and attitudes towards passive smoking behavior in Sriwijaya University public health students.

SUBJECTS AND METHOD

1. Study Design

This study was an analytical observational study with a cross-sectional design. Data collection was conducted from February to March 2025 in the 2nd semester of the Public Health Science Study undergraduate program of Sriwijaya University.

2. Population and sample

The target population in this study was Sriwijaya University public health students. The respondents in this study were adolescents who were students of the Public Health Science study program at Sriwijaya University. The sampling technique used was purposive sampling. To determine the sample size this study used the Slovin formula, with the result was 103 respondents.

3. Study variables

The independent variables in this study were knowledge and attitude, while the dependent variable was the behavior of passive smokers.

4. Operational definition

Knowledge is information related to the content of cigarettes and the impact it has on passive smokers.

Attitude is the psychological tendency to agree or disagree with the behavior of passive smokers at home or in public areas.

Behavior is the frequency of a daily activity carried out by students as passive smokers at home or in public areas.

5. Study Instruments

Primary data included respondent characteristics, knowledge, attitudes, and behaviors of public health students as passive smokers. The questionnaire used a Likert scale that contained 51 like and dislike question items. There were 15 questions for knowledge and attitude variables, respectively, and 21 questions behavior variable. Variables of knowledge, attitudes, and behaviors used ordinal data scales using the median. was 0.361. The knowledge variable had 11 valid question items, the attitude variable had 10 valid question items, and the attitude variable had 18 valid question items. All variables were reliable with Cronbach's alpha > 0.700.

6. Data Analysis

Statistical analysis was conducted using the Spearman's rank correlation with the SPSS application. Normality test was conducted using Kolmogorov Smirnov before selecting a suitable statistical test. Multivariate analysis was conducted by using multiple linear regression tests.

7. Ethical consideration

Study ethics issues including consent, anonymity, and confidentiality were carefully addressed throughout the study process. The ethic clearance was obtained from the Research Ethics Committee at the KEPK FKM UNSRI number 597/UN9. FKM/TU. KKE/2025 on March 21, 2025.

RESULTS

1. Characteristic of respondent

Table 1 shows the characteristics of the study respondents which totaled 103 respondents. The majority of respondents were female (92.23%). The current place of residence was to live alone (58.26%) such as in boarding houses, rented houses, or private houses. The source of exposure to cigarette smoke mostly came from inside the house (53.40%).

Table 1. Respondent Characteristics

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	8	7.77
	Female	95	92.23
Current residence	Living alone	60	58.26
	With family/relatives	43	41.74
Exposure source	House	55	53.40
	Other	48	46.60

Table 2 shows the frequency distribution of passive smoking knowledge, attitudes, and behaviors. The proportion of good knowledge is higher than bad knowledge among public health students at Sriwijaya University, which is 57.30%. The variables of attitude and behavior among passive smokers fall into the good category, with proportions of 53.40% and 51.50%, respectively.

Table 2. Frequency distribution of independent variables and dependent variables

Variable	Category	Total (n=103)	Percentage (%)
Knowledge	Insufficient	44	42.70
	Good	59	57.30
Attitude	Insufficient	48	46.60
	Good	55	53.40
Behavior	Insufficient	50	48.50
	Good	53	51.50

2. Bivariate Analysis

Table 3 shows that the significance value of the correlation between knowledge and passive smoking behavior is > 0.05, which is 0.592. Based on the Spearman test, there was no significant correlation between the two variables. The significance value of the correlation between attitude and passive smoking behavior is p< 0.001. This means that there is a significant correlation between the two variables.

Table 3. Results of analysis using Spearman's rank correlation

Variables	r	p
Knowledge	0.25	0.010
Attitude	0.10	0.311

Knowledge and passive smoking behavior among Public Health students of Sriwijaya University showed a positive correlation, and the relationship was statistically significant (r=0.25; p=0.010). Students with higher knowledge were less likely to be exposed to passive smoking compared to students with lower knowledge.

Meanwhile, the correlation between attitude and passive smoking behavior was positive but not statistically significant (r=0.10; p=0.311). This indicates that attitude did not show a meaningful relationship with passive smoking behavior in this study.

3. Multivariate Analysis

Table 4 shows the classical assumption test as the basic assumption of the linear regression model. Multiple linear regression tests are used to determine the influence of independent variables on dependent variables simultaneously.

Knowledge and passive smoking behavior in college students showed a positive relationship, but the relationship was not statistically significant. The results of the linear regression showed that for every 1 unit increase in knowledge, passive smoking behavior increased by 0.17 units. Students with higher knowledge were not significantly more likely to avoid passive smoking compared to those with lower knowledge (b= 0.17; CI95% = −0.14 to 0.47; p = 0.103).

Attitude and passive smoking behavior in college students showed a positive and statistically significant relationship. The results of the linear regression indicated that for every 1 unit increase in attitude, passive smoking behavior increased by 0.61 units. Students with a more positive attitude were significantly more likely to avoid passive smoking compared to those with a less positive attitude (b = 0.61; CI95% = 0.26 to 0.96; p= 0.001).

Table 4. Multivariate analysis using linear regression models

Independent Variable	b	95% CI		p
		Lower limit	Upper limit	
Knowledge	0.17	-0.14	0.47	0.103
Attitude	0.61	0.26	0.96	0.001
N Observation= 103 Adj R-Squared = 0.132 P < 0.001				

DISCUSSION

1. Correlation between knowledge and passive smoking behavior

This study did not show a significant correlation between knowledge and behavior towards passive smokers. A previous study has shown that there is no significant correlation between knowledge about the dangers of cigarettes and smoking avoidance behavior among adolescents in the 2nd grade of junior high school (Lee et al., 2018).

Based on Bloom's taxonomy, knowledge is part of the cognitive realm. There are six levels in the cognitive realm. Knowledge is the lowest cognitive goal. Knowledge in general is related to a person's ability to remember things that have been learned (recall). The scope of knowledge in this study is limited to conceptual knowledge (recall) related to the harmful content of cigarettes, and other people's cigarette smoke.

A study on the level of knowledge of high school students in Malang about the dangers of cigarettes and the level of carbon monoxide in the air inhaled found that there is no significant correlation between the level of knowledge and smoking behavior. Although the level of knowledge is in the moderate category, smoking behavior remains high. This suggests that there are other factors that are more powerful in influencing behavior, such as social and psychological factors (Preliminary et al., 2024).

Literature studies show that the prevalence of smokers among health workers is 4.4-46%, with most of them having a nursing background. Health workers are well aware of the negative impact of smoking, but there are other triggering factors such as stress, peer and family influence, or addiction, that cause health workers to have smoking behaviors (Rahman and Huriah, 2021).

Respondents were more intensely exposed to cigarettes from inside the house for a long time. The proportion of respondents who have active smoking families in this study was 53.40%. The phenomenon in Indonesia related to single smoking couples states that (the majority) wives who do not smoke do not like their husband's smoking habit (Ayuningtyas et al., 2021). However, they can accept it to maintain marital harmony, as a form of tolerance. The increase in knowledge related to the dangers of cigarettes in the passive group does not reflect the behavior of the respondents to protect themselves, one of the reasons is the high culture of tolerance to avoid conflict (Ayuningtyas et al., 2021).

Knowledge is an important gateway to forming a paradigm of thinking, but knowledge is not strong enough to force a person to act on that knowledge. Based on Lawrence Green's theory, knowledge is a predisposing factor. However, in addition to predisposing factors, there are reinforcing factors and enabling factors (Mahendra et al., 2019).

2. Correlation between attitude and passive smoking behavior

This study shows that there was a significant correlation between attitudes and behaviors in passive smokers. A previous study has shown a significant correlation between SHS avoidance attitudes and behaviors among undergraduate students in Malaysia (M.Z. et al., 2017). A similar study among students in Bangladesh shows a correlation between attitudes and behaviors towards exposure to SHS, with an explanatory variance of 14.7% (Islam et al., 2025).

According to Bloom's taxonomy, attitude falls within the affective domain. The affective domain is related to emotional things, life values, motivation, and character. The affective domain is a continuation of the cognitive domain, which has five levels.

The scope of attitudes in this study is related to acceptance, response, and reward.

Acceptance is sensitivity to symptoms, conditions, or problems. Some of the question items in the questionnaire reflect acceptance. "Knowledge related to passive smoking and its impact on health is not important to me"; "I feel threatened when I am in a group of people who smoke". The response is a reaction to the willingness to be proactive in certain activities.

There were several question items that reflected the response in the study, most notably "I will not give up advising my closest people (friends or relatives) so that they can quit smoking.". Appreciation is the willingness to judge the observed symptoms or objects. There are a few question items to reflect appreciation, especially "I don't mind if after eating with someone they smoke.". This study does not discuss further levels, especially self-regulation and value characterization. However, respondents' answers regarding acceptance, responses, and awards may be part of the characterization of respondents' values that were not discussed in this study. Personal values are criteria for judgment, preference, and decision-making (Hari, 2015).

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

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