The Relationship Between Coping Strategies and Cigarette Smoking Behavior Among Final-year Engineering Students in Jember, Indonesia

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ABSTRACT

***Background**: Many university students, including final-year engineering students in Indonesia, often use cigarette smoking as a coping strategy to manage academic stress and psychological distress, despite its well-documented health risks. **Objective**: This study aimed to determine the relationship between coping strategy type and smoking Among Final-year Engineering Students at college. **Methods**: An analytic study with a cross-sectional approach. The study was conducted in Jember, East Java, from October 2022 to July 2023. The population was 779 engineering students at the University of Jember. The sampling method used was cluster sampling, and the Isaac and Michael formulas obtained 260 samples. Students filled out questionnaires distributed by researchers using the Self-Reporting Questionnaire method through the Google Form platform. **Results**: Most respondents were male (77%), and more than half were smokers (64.9%). Smoker respondents started smoking at 15-19 years (50,9%). Respondents experienced moderate stress levels (78.5%), and 4,5% experienced high stress levels. As coping stress type, most respondents were problem-focused coping (91,7%), with smoker respondents at 92,4% and non-smoker respondents at 90,3%. This high prevalence of problem-focused coping among both smokers and non-smokers suggests that these students may be equipped with effective strategies for managing stress. There is no association between the type of coping stress and cigarette smoking (p-value: 0,981), indicating that other factors may play a more critical role in influencing smoking habits among this population, such as social influences, peer pressure, or environmental factors that are not captured by the coping strategy framework. **Conclusion**: Despite finding no association between the type of coping stress and cigarette smoking, the study highlights the prevalent use of problem-focused coping strategies among engineering students, suggesting the need for further research into the complex interplay between stress management and smoking habits among this demographic.*

***Keywords**: Cigarette, Coping stress, Emotional-focused coping, Problem-focused coping, Smoking*

INTRODUCTION

The urgency of exploring the relationship between coping strategies and cigar smoking behavior among final-year engineering students in Jember, Indonesia, is highlighted by the rising prevalence of tobacco use among youth in the region. According to a report from the WHO in 2022, as of 2020, smokers worldwide account for 22.3% of the global population. More than 8 million people die each year due to smoking. Findings from the Global Adult Tobacco Survey (GATS) indicate that 19.2% of students currently use tobacco. The data reveals that 57.8% of students are exposed to cigarette smoke at home, and 66.2% are exposed in open public spaces (Suryati *et al.*, no date).

Indonesia is experiencing a severe threat due to an increasing number of smokers (Cameng and Fasini, 2020). According to Health Basic Research data in 2018, the prevalence of smoking behavior in adolescents aged 10-18 years increased by 1.9% from the 2014 Riskesdas results. The number of smokers aged ≥15 was 28.9% (Kementrian Kesehatan Republik Indonesia, 2019). The population of Jember Regency who has smoking behavior

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at the age of ≥10 years is 27.88% (Kementerian Kesehatan Republik Indonesia, 2018). Smoking behavior is still a health problem worldwide because it can cause various diseases and cause death. Cigarette smoking has gained traction among young adults, particularly in academic settings where stress levels are high due to rigorous academic demands (Farajzadeh *et al.*, 2011). The unique pressures faced by engineering students, including project deadlines and examinations, may lead them to adopt maladaptive coping strategies, such as smoking, to manage their stress (Sagone and De Caroli, 2014). This phenomenon is not isolated to Indonesia; studies have shown that college students globally often resort to substance use as a means of coping with academic and social pressures (Gurvich *et al.*, 2021).

Despite the growing body of literature on smoking behavior among college students, there remains a significant research gap regarding the specific coping strategies employed by engineering students in Indonesia and their direct correlation with cigar smoking. While some studies have examined the general relationship between coping mechanisms and substance use, few have focused on the nuanced interplay of these factors within the context of specific academic disciplines, such as engineering (LaBrie *et al.*, 2012). This gap is particularly concerning given the unique stressors associated with engineering programs, which may differ from those experienced by students in other fields (DiNuoscio, Raval and Walker, 2019). Furthermore, the implications of this research extend beyond academic performance; they also touch on public health concerns. Cigarette smoking is often underreported and underestimated in terms of its health risks, particularly among youth who may believe that cigars are less harmful than cigarettes (Farajzadeh *et al.*, 2011).

Understanding how coping strategies influence smoking behaviors can inform targeted interventions aimed at reducing tobacco use among this demographic. For example, enhancing students' coping skills through resilience training and stress management programs could reduce their reliance on smoking as a coping mechanism (Keyes, 2016). Additionally, the cultural context in Indonesia critically shapes smoking behaviors. In many communities, smoking is normalized and even glamorized, further complicating efforts to address tobacco use among students (Gurvich *et al.*, 2021). Culturally sensitive interventions that consider local beliefs and practices are essential for developing effective smoking cessation programs (Elhabashy *et al.*, 2022).

Furthermore, the psychological effects of the COVID-19 pandemic have intensified stress levels among college students, resulting in increased substance use as a maladaptive coping strategy (Hu and Sun, 2023). This emphasizes the urgency of conducting research that not only investigates the relationship between coping strategies and smoking behaviors but also considers the broader context of mental health and societal changes that influence these dynamics (Ajith *et al.*, 2021). Consequently, this study aimed to determine whether there is a relationship between the type of coping stress and cigarette consumption among final-year students at the Faculty of Engineering, University of Jember. Addressing this issue is crucial for developing effective interventions that promote healthier coping mechanisms and decrease student tobacco use.

METHODS

The study was analytical research with a cross-sectional approach. It was conducted at the Faculty of Engineering, University of Jember, from October 2022 to July 2023. The population was 779 students. The sampling method used was cluster sampling, and 265 samples were obtained using the Isaac and Michael formulas. Using the Proportional Random Sampling Technique, the sample will be proportional to each department of the Faculty of Engineering. Primary data will be gathered through questionnaires using the Self-Reporting Questionnaire method through the Google Form platform to collect quantitative data on stress-coping mechanisms and smoking consumption among final-year engineering students. Instruments for Data Collection are the Coping Strategies Questionnaire, based on Lazarus and Folkman (1984) measuring stress coping strategies; the Smoking Consumption Assessment, evaluating whether students smoke and the quantity consumed; and the Academic Stress Scale,

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Developed by another research assessing academic stress levels. Variables are major of study, age of first smoking, smoking status, academic stress level, and smoking consumption (Yousif, Arbab and Yousef, 2022). The validity of the instruments will be assessed through established psychometric methods, ensuring they accurately measure the intended constructs. Reliability will be evaluated using Cronbach's alpha, with prior studies indicating acceptable reliability coefficients for the instruments used (Yousif, Arbab and Yousef, 2022). Analysis techniques will involve univariate analysis, which examines individual variables such as smoking consumption and coping strategies, and bivariate analysis, which investigates relationships between independent (coping strategies) and dependent (smoking consumption) variables. Data is presented in tables and narratives.

RESULTS AND DISCUSSION

Results showed the characteristics of final-year students' stress levels, the type of coping stress of smokers and non-smokers, and the relationship between types of coping stress and cigarette smoking. Most respondents were male, 77.7%, while females were 22.3%. Among the engineering programs by the faculty, Civil Engineering had the highest number of participants, 20.8% of all respondents. More than half of the smokers began their habit between the ages of 10 and 19, indicating an early initiation into smoking behaviours. Only three individuals reported starting to smoke before reaching five years old, highlighting that most initiations occur during adolescence. Approximately two-thirds (64.9%) of the total sample identified themselves as current smokers (Table 1).

Table 1. Distribution and Prevalence of Final-year Students in the Faculty of Engineering

Characteristics	n	%
Sex		
Male	206	77,7
Female	59	22,3
Study Program of Engineering		
Mechanical	40	15,1
Electrical	42	15,8
Civil	55	20,8
Chemistry	35	13,2
Marine	17	6,4
Petroleum	13	4,9
Urban Planning	26	9,8
Environmental	24	9,1
Mining	13	4,9
Smoking Initiation (years old)		
5-9	3	1,1
10-14	26	9,8
15-19	135	50,9
20-24	8	3
Non-smoker	93	35,1
Smoking Status		
Smoker	172	64,9
Non-smoker	93	35,1

The findings of this study reveal significant insights into smoking behaviours and stress-coping mechanisms among final-year engineering students at the University of Jember. The predominance of male respondents aligns with global trends, indicating higher smoking prevalence among males compared to females (Abikoye and Fusigboye, 2010). This gender disparity in smoking habits is well-documented, with studies suggesting that social and cultural factors contribute to the higher rates of smoking initiation and continuation among males (Shoval *et al.*, 2013). Furthermore, the data indicating that most of the respondents identified as current smokers emphasise the need for targeted interventions in this demographic, particularly given that over half of the smokers began their habit during adolescence (ages 10-19) (Ghani, Susilawati and Novriani, 2020). This early initiation is consistent with previous research that highlights adolescence as a critical period for the onset of smoking behaviours, influenced by peer pressure and social norms.

Table 2. Stress Level of Final-year Students in the Faculty of Engineering (n=265)

Smoking Status	Stress Level					
	Low		Moderate		High	
	n	%	n	%	n	%
Smoker	30	17,4	131	76,2	11	6,4
Non-smoker	19	20,4	73	78,5	1	1,1

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Table 3. Type of Coping Stress of Final-year Students in the Faculty of Engineering (n=265)

Smoking Status	Type of *Coping Stress*				Total	
	Problem-Focused Coping		*Emotional-Focused Coping*			
	n	%	n	%	n	%
Smoker	159	92,4	13	7,6	172	100
Non-smoker	84	90,3	9	9,7	93	100

Both the smoker and non-smoker groups experienced moderate stress levels. However, there was a notable difference in those experiencing higher stress intensities. Specifically, out of all smokers surveyed, only about 6.4% reported experiencing very high stress compared to just over one percent among non-smokers (Table 2). Most smokers (92.4%) and non-smokers (90.3%) respondents have problem-focused coping (Table 3).

The findings from the research on the relationship between coping strategies and cigarette smoking behavior among final-year engineering students in Jember, Indonesia, highlight several important aspects related to stress levels and coping mechanisms that influence smoking behavior. Both smoker and non-smoker groups reported experiencing moderate stress levels; however, previous research indicates that smoking may serve as a maladaptive coping strategy used to manage stress, with smokers potentially reporting lower stress levels due to social or psychological normalization of their experience (Gustems-Carnicer and Calderón, 2013; Bilsky *et al.*, 2019).

The data revealed that around 6.4% of smokers reported very high levels of stress compared to 1% of non-smokers. This disparity suggests that although smokers experience stress, they may employ different coping mechanisms that affect their stress reporting, potentially leading to a perception of lower stress (Bilsky *et al.*, 2019; Gustems-Carnicer *et al.*, 2019). The limited number of smokers experiencing very high stress may indicate either more adaptive coping styles among this group or a normalization of stress levels through the use of cigarette smoking, which is known to be a coping strategy for alleviating negative emotions (Bilsky *et al.*, 2019). Despite the moderate stress levels reported, the contrast in high-stress experiences between smokers and non-smokers needs further exploration. The relationship between stress and coping can also be understood through emotional regulation frameworks, where smoking may be used to manage negative feelings (Gustems-Carnicer and Calderón, 2013). A deeper understanding of the motivations behind smoking, including how stress influences these behaviors, is essential for developing effective interventions aimed at smoking cessation.

The majority of both smokers (92.4%) and non-smokers (90.3%) reported using problem-focused coping strategies. Problem-focused coping entails actively addressing stressors and finding practical solutions, which can lead to more effective stress management and improved psychological well-being (Freire *et al.*, 2020). This indicates that students, irrespective of their smoking status, predominantly engage in constructive coping methods when facing stress associated with academic pressures. Interestingly, the high incidence of problem-focused coping among smokers could point to a complex relationship between stress and smoking behavior. While many students appear to apply effective coping strategies, the reliance on smoking may suggest that some students experience a lack of sufficient resources to cope with stress effectively. Adolescents often resort to smoking to manage negative affect, implying that despite available problem-focused strategies, some students might still lean on cigarettes as an additional method of stress management(Bilsky *et al.*, 2019).

Table 4. The Relationship Between Type of Coping Stress of Final-year Students with Smoking Behaviour as the Coping Strategy (n=265)

Type of *Coping Stress*	Smoking				*p-value*
	Yes		No		
	n	%	n	%	
Problem-Focused Coping	154	63	89	37	0,981
Emotional-Focused Coping	14	64	8	36	

Bivariate analysis used a correlation coefficient test with a degree of alpha of

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0.05. Table 3 showed a significance value of 0.981, more than alpha (0.05). It means there is no relationship between the coping stress type and smoking behavior among final-year students of the Faculty of Engineering, University of Jember.

The exploration of the relationship between coping strategies and smoking behavior, particularly in the context of engineering students at the University of Jember, provides crucial insights into how psychological frameworks interact with health behaviors. The findings from the bivariate analysis indicated that there is no statistically significant correlation between coping stress types and smoking behaviors among the participants. This discovery requires careful contextualization within the existing literature addressing stress, coping mechanisms, and substance use, particularly smoking.

A prevalent observation in the literature indicates that adolescents and young adults often turn to smoking and other forms of substance use as a means of coping with stress. Erhabor et al. highlight that peer pressure and the marketing of e-cigarettes during stressful periods contribute to increased use among youth, suggesting a tendency to use smoking as a pragmatic response to stressors (Erhabor *et al.*, 2023). However, while this trend is common, our study's findings challenge the idea that employing coping strategies necessarily correlates with increased smoking behaviors among engineering students. Similarly, McKee et al. note that while stress enhances the likelihood of smoking initiation and intensity, there is significant variability in individual responses to stress, reinforcing the concept that coping with stress does not uniformly lead to smoking (McKee *et al.*, 2015).

In our context, the lack of correlation may suggest that final-year engineering students adopt coping strategies that differ from smoking behaviors, potentially favoring more adaptive responses to psychological pressures. Research indicates that coping strategies can be broadly categorized into emotion-focused, problem-focused, and meaning-focused approaches (Zhou and Huang, 2023). The implication here is that students might favor problem-focused strategies, effectively addressing their stressors through academic resilience, rather than resorting to smoking—a behavior that could superficially appear as a means of escape. Such findings are supported by studies indicating that confidence in one's ability to quit smoking correlates positively with the number of coping strategies employed (Merchant *et al.*, 2013). It appears that the final-year engineering students are either unaware of or not influenced by the perceived acceptability of smoking as a coping mechanism for stress.

Moreover, literature suggests that prior experiences with psychological distress and corresponding responses may shape current behaviors. Shadur et al. argue that adolescents may develop specific smoking expectancies tied to their stress responses, although this relationship can differ significantly when moderated by individual distress tolerance levels (Shadur *et al.*, 2017). This study reinforces the idea that the coping styles of the engineering students in our research create a schism whereby distress does not directly influence smoking behavior as one might expect.

Understanding the psychological climate surrounding these students is crucial. Kiviniemi et al. discuss how ethnic and cultural factors can mediate the relationship between psychological distress and smoking behavior (Kiviniemi, Orom and Giovino, 2011). Although our study did not explore the cultural backgrounds of the engineering students, this offers fertile ground for future research into how specific cultural attitudes towards smoking and coping may differ from general trends observed in broader studies. Another vital insight emerges from investigating the efficacy of coping mechanisms among students facing significant academic pressures. Studies indicate that confidence and strategic development in coping are critical in managing urges to smoke (Merchant *et al.*, 2013). The findings from our investigation showing no relationship may imply that students have developed substantial adaptive strategies, using their academic challenges as motivation rather than stressors driving them towards smoking.

Conversely, the absence of a relationship between coping strategies and smoking behavior does not negate the broader public health implications of stress management interventions. Instead, it underscores the importance of fostering

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effective coping mechanisms that can mitigate the likelihood of maladaptive behaviors like smoking. Intervention strategies should, therefore, focus on enhancing students' adaptive coping strategies and stress management techniques, as supported by studies indicating that these interventions can significantly lower smoking rates among high-stress populations (Lee *et al.*, 2023).

While our findings highlight no statistically significant relationship between coping strategies and smoking behavior among final-year students at the Faculty of Engineering, it raises broader questions about the nuanced interactions between coping and substance use. It suggests a potential area for further study, emphasizing an exploration of how various coping mechanisms can be effectively leveraged to promote healthier lifestyle choices among at-risk populations. The study not only contributes to understanding the specific student demographic at the University of Jember but also calls for integrating psychological resilience building into health promotion strategies aimed at reducing smoking among young adults.

CONCLUSION

While the study did not find a direct relationship between coping strategies and smoking behavior, the high prevalence of smoking and the early initiation of the habit highlight the need for targeted interventions that promote healthier coping mechanisms and reduce tobacco use. The study also found that only 6.4% of smokers reported experiencing very high stress levels, compared to just over 1% of non-smokers. This discrepancy raises questions about the role of smoking as a coping mechanism for stress. Future research should explore the social influences on smoking behaviors and the effectiveness of interventions designed to alter these dynamics within academic settings.

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