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Adherence to Smoke-Free Campus Policy: A Descriptive Analysis of Student Behavioral Patterns at Universitas Gadjah Mada

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Abstract

Background: According to the 2021 Global Adult Tobacco Survey (GATS) conducted by the Indonesian Ministry of Health, the number of adults who smoke increased from 60.3 million to 69.1 million. Smoking prevalence remains high, driven by the emergence of various tobacco products. A study conducted among Universitas Gadjah Mada students reported that 245 students (62%) used e-cigarettes (Rahma, 2024). To promote a smoke-free campus, Universitas Gadjah Mada enacted Rector's Decree No. 29/P/SK/HT/2008 concerning Smoke-Free Areas (SFA). This highlights the need to evaluate student compliance with the SFA policy.
Aims: To identify the level of compliance among Universitas Gadjah Mada students with the Smoke-Free Area (SFA) policy.
Methods: This study employed a quantitative approach with a descriptive cross-sectional design involving 194 undergraduate (bachelor's and diploma) student smokers at Universitas Gadjah Mada. Participants were recruited using consecutive sampling. Data were collected using an Adherence Questionnaire and analyzed using descriptive statistics.
Results: Most UGM student smokers complied with the Smoke-Free Area (SFA) policy, with an overall compliance rate of 92.30%. Despite the high level of compliance, smoking remained common in residential environments (44.80%) and cafés (25.30%), while 4.10% of students still reported smoking on campus. Conventional cigarettes were the most commonly used tobacco product (37.60%), followed by dual use of conventional and electronic cigarettes (31.00%) and exclusive electronic cigarette use (30.90%).
Conclusion: The majority of Universitas Gadjah Mada students complied with the Smoke-Free Area (SFA) policy.

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INTRODUCTION

According to 2021 World Health Organization data, approximately 70.2 million adults, or 34.5%, still use tobacco products. Indonesia ranks fifth in the world for the number of smokers (Yonatan, 2024; Puspitasari et al., 2026). Furthermore, the prevalence of smoking among women in Indonesia is also quite high, ranging from 4.4% to 7.1%, according to a 2021 report from the Southeast Asia Tobacco Control Alliance. Smoking is known to trigger various serious illnesses, such as chronic lung disease, stroke, heart attack, vision impairment, and even cancer (Yonatan, 2024). This is because a single cigarette contains more than 4,000 harmful chemicals that pose health risks (Purwanta et al., 2025).

The development of e-cigarettes has led to their widespread perception as a safer alternative to conventional cigarettes because they do not involve tobacco combustion (Izquierdo-Condoy et al., 2024; Marqués et al., 2021; Thiem et al., 2023). In Indonesia, the prevalence of e-cigarette use increased substantially from 0.3% in 2011 to 3% in 2021, according to World Health Organization data reported in 2024. This trend is also evident among university students. A study conducted at Universitas Gadjah Mada found that 245 students (62%) used e-cigarettes, comprising 164 males

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(41.5%) and 81 females (20.5%) (Rahma, 2024). However, e-cigarettes often do not fully replace conventional cigarettes; instead, many users engage in dual use, consuming both products simultaneously (Moeis et al., 2020; Hương et al., 2022). Despite their perceived safety, e-cigarettes still contain toxic substances, carcinogens, and harmful particles that may adversely affect health (Glantz & Bareham, 2018; Seiler-Ramadas et al., 2021).

Smoking behavior among university students is influenced by a range of social and psychological factors. Social influences, particularly from parents and peers, play a significant role in shaping smoking behavior (Riyandi et al., 2017; Otsuka et al., 2026). Within the university environment, students may smoke to gain social acceptance, fit in with smoking peers, or project a more mature image (Rahayu & Purwanti, 2017; Azzahra et al., 2025; Danielsen et al., 2024). In addition, academic demands and other life stressors may contribute to smoking as a coping mechanism. Psychological factors such as stress relief, anxiety reduction, emotional regulation, and curiosity about cigarettes have also been identified as important drivers of smoking initiation and continuation among young adults (Riyandi et al., 2017; Zarifkar et al., 2026; Suryavanshi et al., 2026).

The Indonesian government established a Smoke-Free Area (SFA) policy through the Joint Regulation of the Minister of Health and the Minister of Home Affairs No. 188/MENKES/PB/I/2011, which provides guidelines for implementing smoke-free areas in public settings, including educational institutions. In line with this national policy, Universitas Gadjah Mada (UGM) issued Rector's Regulation No. 29/P/SK/HT/2008 concerning Smoke-Free Areas as the institutional legal framework for creating a smoke-free campus environment. This regulation mandates the implementation of smoke-free policies across all faculties, with each faculty responsible for enforcing the policy within its respective area. However, despite the existence of this institutional regulation, there is no clearly defined organizational structure or designated personnel responsible for coordinating, monitoring, and enforcing the smoke-free area policy. This absence of a formal implementation mechanism may reduce the effectiveness and consistency of policy enforcement across faculties.

Smoke-Free Areas are designated spaces where all tobacco-related activities, including smoking, the production, sale, advertisement, and promotion of tobacco products, are prohibited. Such policies are commonly implemented in public places, including educational institutions, healthcare facilities, children's playgrounds, and places of worship (Lutfianah, 2025). The implementation of smoke-free policies has been shown to reduce smoking behavior, encourage smoking cessation, and protect non-smokers from exposure to secondhand smoke (Breunis et al., 2021). Nevertheless, smoking remains prevalent among university students, indicating that the existence of smoke-free regulations alone may not be sufficient to ensure compliance. Therefore, this study aims to assess the level of student compliance with the smoke-free policy in designated smoke-free areas and to evaluate the implementation of the smoke-free area regulations across different faculties.

METHOD

This study used a descriptive quantitative approach with a cross-sectional design. The study was conducted at Universitas Gadjah Mada, Yogyakarta, and involved smokers from undergraduate and applied undergraduate programs in the Agriculture, Science, and Technology, and Social Sciences clusters. Data collection was conducted from 2 to 14 October 2025. The inclusion criteria for this study were active undergraduate and diploma students from the 2021-2024 intake, aged 18-25 years. Consecutive sampling with the assistance of gatekeepers was used to recruit a total of 194 students. The exclusion criteria were students who had not actively smoked during the previous two months and those who had been smoking for less than two months.

The research instrument was a compliance questionnaire that had undergone validity and reliability testing, with a Cronbach's alpha value of 0.777. A Cronbach's alpha of 0.777 indicates that the 7-item compliance questionnaire has satisfactory reliability with a polytomous Likert scale. The questionnaire was developed using Google Forms and distributed via WhatsApp, Instagram, and Twitter to student council leaders and class representatives. Respondents first provided informed consent, then independently completed demographic data and the main questionnaire. Data analysis included univariate analysis using descriptive frequency statistics.

RESULTS AND DISCUSSION

Results

Respondent Demographic Characteristics

The demographic characteristics of the respondents include data related to the distribution of gender, age, educational background, cigarette type, and most frequent smoking location among the 194 respondents in this study, as illustrated in the following table:

Table 1. Demographic Characteristics of Respondents

Variable	Category	f	Percentage (%)
Gender	Male	136	70.10
	Female	58	29.89
Education Level by Cluster	Bachelor of Science and Technology	47	24,23
	Bachelor of Social Sciences	70	36.08
	Bachelor of Agriculture	57	29.38
	Vocational School	20	10.31
Age	18-19	36	18.56
	20-21	114	58.76
	22-25	44	22.68
Use of Cigarette Types	e-cigarette (Vape)	60	30.93
	Conventional	73	37.63
	Dual User	61	31.44
Most Frequent Smoking Places	Campus	8	4.12
	Park	3	1.55
	Food court	21	10.82
	House/boarding house/dormitory/rented accommodation	87	44.85
	Cafe	49	25.26
	Smoke-free areas	1	0.52
	Smoking Area	20	10.31
	Others	5	2.58

Based on Table 1, the majority of student smokers in this study were male, 136 students (70.1%), with the majority aged 20-21 (114 students) (58.8%). The number of smokers was also evenly distributed across each educational cluster, with the majority being students from the social and humanities cluster (36.1%). Most students used conventional cigarettes (37.6%), while others used dual cigarettes (31.4%) and e-cigarettes (30.9%). The most common place for smoking was in the residential areas (44.8%), with only a small percentage still smoking on campus (4.1%) and in Smoke-Free Areas (0.5%).

Table 2. Frequency of Number of Cigarette Users Based on Gender

Gender	Use of Cigarette Types	Total
Male (136)	e-cigarette (Vape)	35 (25.73%)
	Conventional	62 (45.59%)
	Dual User	39 (28.68%)
Female (58)	e-cigarette (Vape)	25 (43.10%)
	Conventional	11 (18.97%)
	Dual User	22 (37.93%)

As presented in the Table 2, male students accounted for the majority of smokers in this study, comprising 136 respondents (70.2%), while female students represented 57 respondents (29.8%). Among male smokers, conventional cigarette use was the most prevalent (46.27%),

followed by dual use of conventional and electronic cigarettes (29.10%) and exclusive e-cigarette use (24.63%). In contrast, female smokers were more likely to use e-cigarettes (42.11%), whereas 38.60% were dual users and only 19.30% exclusively smoked conventional cigarettes. These findings indicate that conventional cigarette use predominated among male students, while e-cigarette use was more common among female students.

Table 3. Cigarette Types Based on Respondent Demographics

Gender			
Use of Cigarette Types	Male (%)	Female (%)	Total
e-cigarette (Vape)	35 (18,04)	25 (12,87)	60 (30,93)
Conventional	62 (31,96)	11 (5,67)	73 (37,63)
Dual User	39 (20,10)	22 (11,34)	61 (31,44)
Total	136 (70,10)	58 (29,90)	194 (100,0)

Use of Cigarette Types				
Education Level by Cluster	e-cigarette (%)	Conventional (%)	Dual User (%)	Total
Bachelor of Science and Technology	18 (9,28)	17 (8,76)	12 (6,19)	47 (24,23)
Bachelor of Social Sciences	23 (11,86)	25 (12,88)	22 (11,34)	70 (36,08)
Bachelor of Agriculture	12 (6,18)	23 (11,86)	22 (11,34)	57 (29,38)
Vocational School	7 (3,61)	8 (4,12)	5 (2,58)	20 (10,31)
Total	60 (30,93)	73 (37,63)	61 (31,44)	194 (100,0)

Use of Cigarette Types				
Age	e-cigarette (%)	Conventional (%)	Dual User (%)	Total
18-19	10 (5,15)	13 (6,70)	13 (6,70)	36 (18,56)
20-21	38 (19,59)	40 (20,62)	36 (18,56)	114 (58,76)
22-25	12 (6,18)	20 (10,31)	12 (6,19)	44 (22,68)
Total	60 (30,93)	73 (37,63)	61 (31,44)	194 (100,0)

Based on the table above, the majority of male respondents used conventional cigarettes (32%), while female respondents used e-cigarettes (12.9%) and dual cigarettes (11.3%). The distribution of cigarette use showed varying results across educational clusters. Based on age group, cigarette use was reported in 114 respondents (58.8%) aged 20-21, and the distribution of cigarette types was nearly identical across this age group based.

Compliance with Smoke-Free Areas (SFA)

These data illustrate student compliance with the smoking ban in non-smoking areas, as summarized in Table 4.

Table 4. Compliance with Regulations in Non-Smoking Areas

Variable	**Category**	**f**	**Percentage (%)**
Compliance with No-Smoking Area regulations	Obedient	179	92,30
	Disobedient	15	7,70

Compliance with No-Smoking Area regulations			
Gender	Disobedient (%)	Obedient (%)	Total (%)
Male	13 (6.70)	123 (63.40)	136 (70.10)
Female	2 (1.00)	56 (28.90)	58 (29.90)
Total	15 (7.70)	179 (92.30)	194 (100.0)

Compliance with No-Smoking Area Regulations per cluster			
Education Level by Cluster	Disobedient (%)	Obedient (%)	Total (%)
Bachelor of Science and Technology	6 (12.77)	41 (87.23)	47 (100)

Variable	Category	f	Percentage (%)
Bachelor of Social Sciences	7 (10.00)	63 (90.00)	70 (100)
Bachelor of Agriculture	2 (3.51)	55 (96.49)	57 (100)
Vocational School	0 (00)	20 (100)	20 (100)

Based on the analysis results, the majority, (179 students,92.3%) complied with the smoking ban in the Smoke-Free Area. Viewed by gender, both male students (63.4%) and female students (28.9%) showed compliance with the Smoke-Free Area regulations. Based on the level of education, both undergraduate (Bachelor of Science and Technology, Social Science and Agricultural) and D4 diplome students (Vocational), compliance rates varied across clusters ranging from 87.23% to 100% the SFA regulations, in each education and cluster, it showed that the majority of students complied with the Smoke-Free Area regulations.

Discussion

Research results indicate that the majority of smokers among Universitas Gadjah Mada students are male (70.1%), while 29.9% are female. Regarding age groups, the majority of respondents (58.8%) fall within the 20–21 age range. These findings demonstrate that smoking behavior among students remains more prevalent among males, although the proportion of female smokers is also significant. This situation aligns with data showing that Indonesia has the highest prevalence of male smokers in the ASEAN region, at 73.6% (Marietha, 2024). Conversely, the prevalence of female smokers in several Southeast Asian countries, including Indonesia, ranges from 4.4% to 7.1% (Southeast Asia Tobacco Control Alliance, 2021). On a broader scale, national data also indicate that more than 28% of the Indonesian population aged 15 and older were smokers during the 2021–2024 period (Badan Pusat Statistik Indonesia, 2025). This picture illustrates that smoking behavior remains a relevant public health issue, including among the student demographic. This is supported by results from the 2021 Global Adult Tobacco Survey (GATS) Indonesia, which show that within the 15–24 age group, 18.1% were daily smokers and 9.7% were non-daily smokers; this indicates that smoking behavior is still quite common in the age group that comprises the majority of the student population. Nationally, 34.5% of the population aged 15 and older approximately 70.2 million people used tobacco products, while 33.5% approximately 68.9 million people were smokers. These figures demonstrate that tobacco use remains a significant public health problem in Indonesia; it is not limited to older age groups but has also become an issue among young people transitioning into adulthood. This problem is increasingly complex with the increasing use of e-cigarettes, which has increased tenfold from 0.3% in 2011 to 3% in 2021.

When analyzed by age, the 20–21 age group had the highest number of smokers in the study, comprising 114 respondents. This group consisted of 38 e-cigarette users, 40 conventional cigarette users, and 36 dual users. The high number of smokers in this age range is likely linked to the characteristics of the transition to young adulthood, a period marked by increased curiosity, the process of identity formation, and the strong influence of peer groups and lifestyle. University life also provides a broader scope for social interaction, potentially exposing students more frequently to smoking behaviors among their peers (Kim et al., 2020; Martini et al., 2022). Beyond social factors, academic pressure, social demands, and the perception that smoking offers a relaxing effect can also drive the use of both conventional cigarettes and e-cigarettes (Erhabor et al., 2023; Leshargie et al., 2019).

The vulnerability of this age group must also be understood from the perspective of biological development. During young adulthood, brain development in the prefrontal cortex, which governs impulse control, decision-making, and emotional regulation is still ongoing. Nicotine exposure at a young age can affect the brain's neurotransmitter systems and increase the risk of dependency, concentration difficulties, and cognitive decline (Leslie, 2020; Mahajan et al., 2021; Liziawati et al., 2025). Furthermore, the dopamine release triggered by nicotine exposure can induce sensations of comfort and pleasure, potentially reinforcing smoking behavior. Consequently, the high proportion of smokers within the 20–21 age group should be viewed not merely as a behavioral issue, but also as a health concern linked to the risk of nicotine dependency among young people (Joannès et al., 2023; Lee et al., 2022).

Additionally, research indicates that university students use various types of smoking products, ranging from conventional cigarettes and e-cigarettes to a combination of both. Although the distribution is relatively balanced, conventional cigarettes remain the most dominant type. These findings align with World Health Organization (WHO) data showing that the prevalence of tobacco cigarette use in Indonesia reached 34.5% or approximately 70.2 million people in 2021. During the same period, e-cigarette use also rose, increasing from 0.3% in 2011 to 3% in 2021 (Yonatan, 2024). In this study, high rates of conventional cigarette use were observed primarily among males, whereas the proportion of female users was relatively lower. This pattern is consistent with 2021 WHO data indicating that 65.5% of tobacco users in Indonesia were male and 3.3% were female. Differences in usage patterns based on gender become more apparent when specific types of cigarette products are analyzed. Conventional cigarette users in this study were predominantly male, numbering 62 individuals. This dominance is likely influenced by a range of interconnected factors, including peer influence, social norms, long-standing smoking habits, and the perception of smoking as a symbol of masculinity and maturity. Men also tend to face greater social acceptance regarding smoking behavior and are more frequently exposed to cigarette promotions. These findings align with the 2018 Basic Health Research (Riskesdas) conducted by the Health Research and Development Agency of the Indonesian Ministry of Health, which indicates that smoking prevalence is significantly higher among men than women. Various studies also demonstrate that social and cultural factors play a crucial role in shaping the high prevalence of smoking behavior among men (Martini et al., 2022; Kodriati & Rosemary, 2025; Ayuningtyas et al., 2020).

In contrast, a different pattern was observed among female respondents, who showed a tendency toward using e-cigarettes and engaging in "dual use." These findings are consistent with previous research showing no significant difference in e-cigarette use between men and women recorded at 11.6% and 10.3%, respectively (Sweet et al., 2018; Jankowski et al., 2024; Kramarow, 2023). One characteristic of e-cigarettes that enhances their appeal to women is the availability of diverse flavor options particularly sweet flavors and aromas perceived as more attractive than those of conventional cigarettes. Furthermore, there is a perception that e-cigarettes are safer or carry lower health risks than tobacco cigarettes. This perception may be influenced by promotional strategies, product designs perceived as more modern, and the belief that the resulting aerosol is cleaner and less harmful to the environment. These findings are reinforced by previous research indicating that e-cigarette use among women is influenced by the appeal of flavor variants, the desire to experiment, and the belief that these products carry lower health risks than conventional cigarettes (Seiler-Ramadas et al., 2021). A wide range of flavors particularly sweet ones has also been reported as a factor driving women and adolescents to try e-cigarettes (Wachs & Wright, 2018). Thus, the differences in smoking patterns between men and women demonstrate that smoking behavior is not solely linked to biological characteristics but is also shaped by social constructs, perceptions of health risks, social circles, and the distinct characteristics and appeal of the products themselves.

Beyond gender, the social environment is a crucial aspect in understanding the distribution of smoking behavior among university students. When categorized by field of study, the highest number of smokers was found in the social sciences and humanities group, comprising 70 students (36.1%). This high figure is likely linked to the intensity of social interactions, peer environments, and the level of acceptance regarding smoking within specific social groups. Students in the social sciences and humanities generally engage in significant organizational activities and interpersonal interactions, thereby increasing the likelihood of exposure to smoking behaviors among their peers. The high proportion of smokers within the social sciences and humanities group in this study is likely associated with the characteristics of the students' social environments, including the frequency of peer interactions and involvement in social groups or organizations. Peer circles play a significant role in shaping students' smoking behaviors. Previous research has shown that conformity to close friends, small groups, or organizational groups is associated with smoking behavior among university students.

Furthermore, academic pressure and lifestyle choices can serve as additional factors driving smoking behavior. This aligns with research indicating that peer influence, the social environment, and cultural norms are strongly linked to smoking habits among adolescents and young adults in

Indonesia (Martini et al., 2022). The influence of the social environment is also relevant when examining smoking behavior within the university campus. In this study, eight students (4.1%) reported frequently smoking on campus, despite Universitas Gadjah Mada having implemented Rector's Regulation No. 29/P/SK/HT/2008 regarding Smoke-Free Areas. These findings demonstrate that the existence of a formal policy has not fully eliminated smoking behavior within the academic environment. One possible reason is the perception that smoking is a matter of personal freedom or individual right; consequently, smoking restrictions may be viewed as detrimental to the comfort and productivity of smokers (Lutfianah, 2025). Additionally, social culture and peer group norms can perpetuate smoking behavior, as cigarettes are often seen as a means to foster camaraderie, a form of solidarity, or a symbol of maturity. This perspective aligns with research on student responses to smoking on campus, which indicates that students who smoke may view cigarettes as a means to foster camaraderie and social interaction (Tuarissa, 2016). This phenomenon can be explained by Social Learning Theory, which posits that behaviors are acquired and maintained through processes of observation, imitation, and reinforcement within a social environment. During young adulthood, peer acceptance and a sense of belonging are crucial factors in shaping behavior. Students may continue to smoke if the behavior is perceived as socially acceptable or beneficial for building interpersonal relationships, even when they are aware of campus smoking bans.

Consequently, the presence of students who continue to smoke on campus highlights a gap between formal policies and prevailing social norms. Although the number of students reporting this behavior is relatively small, its existence demonstrates that policy effectiveness depends not merely on the existence of regulations but also on monitoring, social control, and consistent enforcement. From an ecological perspective, health behaviors are influenced by various environmental levels, ranging from individual and interpersonal factors to organizational and environmental ones. Therefore, smoke-free zone policies may be suboptimal if monitoring and enforcement mechanisms are not consistently implemented. Conversely, clear and consistent rule enforcement coupled with strict sanctions and the establishment of social norms that support a smoke-free environment can strengthen policy compliance.

Nevertheless, the overall research findings indicate that the majority of respondents possess a good level of awareness and compliance regarding the implementation of Smoke-Free Zones (KTR) at Universitas Gadjah Mada. This high level of compliance can be attributed to students' increasing knowledge regarding the negative impacts of cigarette smoke on both active and passive smokers. From a public health perspective, the implementation of smoke-free areas aims to reduce exposure to tobacco smoke, which contains various harmful substances including nicotine, tar, carbon monoxide, and carcinogens that can increase the risk of heart disease, respiratory disorders, and lung cancer. As a group with a higher education background, university students generally have better access to health information, making it easier for them to understand the importance of creating a smoke-free campus environment.

Compliance with smoke-free area (KTR) policies in this study cannot be explained solely by knowledge; it is also linked to social control, an academic culture that fosters healthy living, and the existence of institutional regulations. Implementing smoke-free areas within educational settings has the potential to shape new social norms that view smoking as incompatible with maintaining health and collective comfort. This aligns with WHO recommendations, which position smoke-free policies as a key tobacco control strategy specifically for protecting the public from secondhand smoke and reducing smoking prevalence among the youth. Consequently, the high level of compliance observed in this study serves as a positive indicator that smoke-free policies contribute to creating a healthier, safer, and more comfortable campus environment for the academic community. This consistency in compliance is also evident when analyzing respondent characteristics. Compliance with smoke-free regulations was relatively similar between male and female students and showed no significant differences based on level of education. These findings indicate that gender and education level are not the primary determinants of compliance with smoke-free policies. Instead, factors likely playing a more significant role include individual knowledge and awareness regarding the importance of air quality, the creation of a healthy environment, and an understanding of the health risks associated with secondhand smoke exposure. This is supported by research on the relationship between knowledge and compliance

with smoke-free policies, which yielded a p-value of 0.001 ($p<0.05$), suggesting that individuals with higher levels of knowledge tend to exhibit higher compliance (Abdullah et al., 2022). These findings also align with research indicating that compliance with smoke-free policies is linked to heightened awareness of collective well-being and public health protection (Lutfianah, 2025).

On the other hand, findings regarding e-cigarette use and smoking behavior within the campus environment must be viewed in the context of regulatory evolution. Rector's Regulation No. 29/P/SK/HT/2008 was enacted prior to the widespread adoption of e-cigarettes seen today. Consequently, the relevance of the terminology used in the regulation regarding novel nicotine products warrants attention. If products such as e-cigarettes are not explicitly mentioned, ambiguity may arise regarding the scope of the prohibition. This situation could potentially lead some e-cigarette users to believe that vaping in Smoke-Free Areas (KTR) does not constitute a violation of campus regulations. However, this possibility cannot be confirmed by the current study and requires further investigation through qualitative research specifically exploring students' understanding of the scope of existing regulations.

From an institutional perspective, Universitas Gadjah Mada has implemented the "Health Promoting University" program, which aims to create a health-supportive campus environment, including through the enforcement of smoke-free policies. Therefore, the high level of student compliance with KTR policies observed in this study can be viewed as an early indicator of the program's success. Rector's Regulation No. 29/P/SK/HT/2008 has also played a crucial role in fostering student discipline and promoting a smoke-free campus environment. Nevertheless, the sustainability of this policy requires continuous awareness-raising, tangible monitoring, and consistent enforcement to ensure it remains relevant to current trends in nicotine products and smoking behaviors. While this study provides insights into smoking behavior characteristics and compliance with KTR policies, it is limited by the use of the GN-SBQ instrument to measure smoking behavior. This instrument does not capture all aspects of the respondents' smoking activities and habits; thus, it is possible that certain forms of smoking behavior were not optimally identified through the questionnaire employed. Based on these findings and limitations, future research should focus on a more comprehensive evaluation of the implementation of Rector's Regulation No. 29/P/SK/HT/2008 at both the university and faculty levels. This evaluation needs to address the roles and responsibilities of stakeholders regarding the application and enforcement of the smoke-free area policy, the various barriers affecting student compliance, the effectiveness of monitoring and sanctions, and the alignment of smoke-free zones with university regulations and national laws. Furthermore, future studies should delve deeper into students' understanding of the policy's scope, particularly concerning e-cigarettes and novel nicotine products. Longitudinal research could also be conducted to identify factors influencing the onset of smoking behavior, the development of nicotine dependence, and changes in compliance levels with the smoke-free policy over time. The results of such evaluations are expected to serve as a basis for strengthening policy implementation, improving compliance, and ensuring the creation of a healthy Universitas Gadjah Mada environment free from exposure to cigarette smoke.

Implications

The findings of this study have important implications for strengthening the enforcement of government regulations and Universitas Gadjah Mada policies on Smoke-Free Areas (SFA), particularly within higher education learning environments. By identifying gaps in the implementation of smoke-free campus policies at both the faculty and university levels, the study provides valuable evidence for policymakers and university administrators to improve policy implementation, monitoring, and enforcement. These findings can also support the development of more consistent and effective strategies, including strengthened institutional commitment, clear enforcement mechanisms, regular monitoring and evaluation, and increased awareness among students, faculty, and staff. Ultimately, addressing the identified implementation gaps may contribute to creating a healthier, safer, and more supportive smoke-free campus environment.

Research contribution

This study contributes to the more effective implementation of smoke-free campus policies by addressing four critical dimensions: responsible policy management, availability of supporting

facilities, strategic socialization approaches, and enforcement mechanisms at both faculty and university levels. By examining these interconnected elements, the research provides practical guidance for university administrators to translate smoke-free regulations from formal policies into sustainable campus practices. The findings offer a structured framework that supports the institutionalization of smoke-free campus regulations, enhancing compliance while minimizing secondhand smoke exposure among students and staff.

Limitations

This study has several limitations. First, the sample was not proportionally distributed across all faculties and vocational programs due to the absence of reliable data on the actual number of smokers in each unit; consequently, sampling relied on proportions derived from previous studies, which may have excluded eligible respondents. Second, the use of Google Forms as the sole data-collection instrument may have introduced response bias, as ambiguous items could not be clarified in real time.

Suggestions

The university administration should designate clear responsible parties at both the faculty and university levels to oversee the implementation of smoke-free campus regulations. This should be accompanied by regular monitoring and evaluation mechanisms, as well as the establishment of transparent reward and punishment systems for students who violate smoking bans within the campus environment. For future researchers, it is recommended to conduct comprehensive surveys without relying solely on proportional sampling techniques, thereby enabling the recruitment of a larger respondent pool that more closely approximates the actual population. Additionally, the incorporation of interview methods in data collection should be considered to obtain deeper insights into the underlying reasons why students continue to smoke on campus.

CONCLUSION

Based on the research results, it can be concluded that the majority of smokers among Universitas Gadjah Mada students are male, although the proportion of female smokers is also quite high using various types of cigarettes, both conventional and electronic, as well as dual. This study shows compliance with the Smoke-Free Area (SFA) regulations in the majority of students do not smoke in areas that have been designated as smoke-free areas. Student compliance with the Smoke-Free Area reflects an awareness of the importance of a healthy, comfortable environment free from exposure to cigarette smoke. This compliance also shows the initial success in implementing the Smoke-Free Area policy through the Health Promoting University program at Gadjah Mada . However, there are still a small number of students who have not fully complied with the Smoke-Free Area regulations, emphasizing the need to to strengthen policy enforcement, supervision, and ongoing socialization regarding the dangers of smoking and the importance of smoke-free areas as an effort to increase student compliance and support the creation of a healthy campus environment in a sustainable manner.

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AUTHOR CONTRIBUTION STATEMENT

PW initiated the research topic, designed the research concept, identified and selected instruments used in previous studies, secured research funding, provided consultation and guidance throughout the research process, identified relevant references and comparable previous

studies, and prepared the initial draft of the manuscript. FA was responsible for field data collection, statistical analysis of the data, and graphical presentation. FA also refined the manuscript draft, prepared the article according to the journal template, and translated the manuscript into English. ZA was involved in data collection and analysis, supervised the implementation of the research, reviewed the research methodology, assisted with the English translation, contributed to the preparation of the Results and Discussion sections, and critically revised the manuscript for important intellectual content.

AI DISCLOSURE STATEMENT

Artificial intelligence (AI) techniques were not used in the preparation of the research proposal, the presentation of the research results, or the discussion. However, AI-assisted tools were used solely to facilitate the identification and retrieval of references from previous studies, primarily to improve the efficiency and speed of the literature search. The interpretation, selection, and use of the references were conducted by the authors.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest related to this study. The authors' research focus is on the implementation of regulations concerning smoking prohibitions among students, teachers, and university students. The study was independently conducted, and the authors have no financial, professional, or personal interests that could have influenced the design, conduct, analysis, or reporting of the research. The research was funded through a competitive grant provided by the faculty and academic program.

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