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Original Research

# Implementation of the Smoke-Free Area (SFA) Policy in Islamic University

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**Abstract**

**Background:** Indonesia's high prevalence of active smoking among young adults, despite WHO recommendations, underscores the need for Smoke-Free Area (SFA) in educational institutions to promote healthier environments.

**Objective:** This investigation aimed to evaluate adherence to Smoke-Free Area (SFA) regulations across three Islamic universities in Indonesia and analyze the associated tobacco use behaviours among students and faculty members.

**Methods:** The study used a cross-sectional design, conducting structured interviews with 7.040 participants from Universitas Islam Negeri Sumatera Utara, Universitas Islam Negeri Syarif Hidayatullah Jakarta, and Universitas Islam Negeri Wali Songo Semarang. The research focuses on the dissemination of information about the dangers of smoking, designated smoking areas, and cigarette butts. The study used a structured questionnaire and JASP version 19 software for data analysis, including spatial analysis with QGIS.

**Results:** Universitas Islam Negeri Sumatera Utara has the lowest overall compliance with regulations, while Universitas Islam Negeri Syarif Hidayatullah and Universitas Islam Negeri Wali Songo show moderate compliance. Health Studies has the lowest adherence, particularly in "Signage." Education Studies leads in implementing smoking prevention measures, while Social Studies effectively disseminates information about smoking dangers. This data provides insights into smoking behavior and prevalence.

**Conclusion:** The Smoke-Free Area (SFA) implementation and adherence varied among three Islamic universities in Indonesia, with Universitas Islam Negeri Sumatera Utara showing the lowest compliance rates, while Universitas Islam Negeri Syarif Hidayatullah and Universitas Islam Negeri Wali Songo showed moderate to high adherence.

**Keywords:** health promotion; smoke-free area (SFA); smoking; students; university

## Background

Tobacco smoking among young adults remains a critical public health concern, with 22% of U.S. adults aged 18–24 currently smoking (Seo, 2011). Despite a decline in smoking rates among college students, the tobacco industry continues to target this demographic through aggressive marketing and promotional strategies. Smoking prevalence among university students remains concerning, with reported rates of 32.3% in Iran, 80.2% in Arab countries, and 29% in Malaysia (Olson, 2024). In Indonesia, Cigarettes symbolise a sense of brotherhood for friends, ancestors, fellow villagers

and friends. Cigarettes are also a symbol of respect for people who come to traditional events (Afifudin, 2018); (Hayati, 2023).

In Indonesia, the prevalence of active smoking among adolescents aged 10–18 is alarmingly high, particularly within the 15–19 age group, where it reaches 56.5%. The Global Youth Tobacco Survey (GYTS) 2019 documented a rise in smoking prevalence among adolescents aged 13–15, with significant exposure to secondhand smoke. Additionally, the use of electronic cigarettes has increased. Despite these trends, 81.1% of adolescent smokers expressed a desire to quit, indicating an awareness of the negative impact of smoking on their health. However, without sufficient support, they are likely to return to smoking. Therefore, a more comprehensive approach in the form of education, regulation, and smoking cessation assistance services is needed to support students to completely give up the habit (WHO, 2020).

The World Health Organization (WHO) Framework Convention on Tobacco Control advocates for smoke-free legislation in indoor workplaces, public transportation, and public spaces. Many governments have extended these measures to outdoor public spaces through novel Smoke-Free Area (SFA) to mitigate secondhand smoke exposure. Support for smoke-free legislation increased most significantly for train stations (+16%), theme parks (+12%), beaches (+10%), and terraces (+10%). Meanwhile, the average support exceeded 65% across all types of smoke-free environments, peaking at 91% for private vehicles with children. Support for novel smoke-free places in the Netherlands is high and increasing, in particular for places frequented by children (Boderie, 2022); (Marpaung, 2022a). In the Netherlands, support for such policies was lower among certain subgroups, including smokers and individuals with low socioeconomic status (SES). Although support within these groups did not grow significantly, it remained relatively high overall. Smoke-free automobile rules correlate with decreased instances of reported kid tobacco smoke exposure in vehicles, it can prevent respiratory health advantages. The smoke-free automobile rules correlate with decreased instances of reported kid tobacco smoke exposure in vehicles, it can prevent respiratory health advantages (Siregar, 2022). The study also found a decrease in exposure to cigarette smoke on school grounds following the smoke-free school policy (Radó, 2021).

Secondhand smoke exposure among college students remains a pressing concern due to its adverse health effects on both young adults and the general population (Nurhayati, 2022). College students are particularly vulnerable in social venues and housing settings, with 83% reporting recent exposure to secondhand smoke (Yang, 2022). Smoke-free legislation and other MPOWER policies have demonstrated significant benefits for child health, as evidenced by numerous studies (Faber, 2017). WHO declared MPOWER are a set of six cost-effective and high impact measures that help countries reduce demand for tobacco (Atchesco, 2023). These measures include Monitoring tobacco use and prevention policies, Protecting people from tobacco smoke, Offering help to quit tobacco use, Warning about the dangers of tobacco, Enforcing bans on tobacco advertising, promotion and sponsorship, Raising taxes on tobacco (Lorenza, 2024); (Mumtaz, 2024). Adolescents and students must adhere to strict cigarette use policies, particularly those regulating advertising and prices (Hafidah, 2024).

The National Prevention Agreement (NPA), a comprehensive initiative involving government and societal stakeholders, incorporated the goal of achieving a smoke-free generation to address tobacco use, problematic alcohol consumption, and obesity (Yunarman et al., 2021). However, while the NPA outlined aspirations for regulating smoking in outdoor areas of educational institutions, it fell short of formalizing Smoke-Free Area (SFA), instead focusing on broad objectives without a legal framework. Smoke-Free Area (SFA) in educational institutions provide numerous benefits. These measures protect students from secondhand smoke exposure, a known risk factor for respiratory diseases and cancer(Garritsen, 2022). Additionally, smoke-free environments encourage healthier lifestyle choices among students, reducing the likelihood of tobacco initiation. Such policies also increase awareness of the health risks associated with smoking and the importance of cultivating healthy habits from an early age.

In Indonesia, smoke-free area policies are governed by Law No. 36 of 2009 on Health and Government Regulation No. 109 of 2012. The study found a 44% SFA compliance rate in Medan City, North Sumatra province, surpassing Jayapura City's 17% in 2018, but below Bogor City's 78% in 2011 (Nasution, 2022); (Wahyuti, 2019); (Asyary, 2018). These policies aim to reduce smoking prevalence, safeguard public health, and foster healthier environments for future generations.

Smoke-free university policies are particularly effective in reducing exposure to tobacco smoke, which may improve respiratory health among children and young adults (Wray, 2021); (Trisnowati, 2018). The implementation of tobacco bans on campuses has been associated with increased support for such policies, the normalization of anti-smoking attitudes, and a decline in self-reported tobacco use, aligning with the proposed theory of behavioral change (Wray, 2021). Higher education institutions, including community colleges, have implemented smoke- and tobacco-free policies, but rural areas are less likely to adopt these measures, raising health equity concerns (Lui, 2024). Smoke-free campus policies have demonstrated positive outcomes, including high levels of acceptance, improvements in campus environments, and reductions in smoking prevalence (Olson, 2024). Schoolteachers and lecturer are an important factor in controlling students' smoking behavior (Marice, 2022).

Indonesia must strengthen its Smoke-Free Area (SFA) to extend beyond enclosed public spaces and workplaces, addressing skepticism regarding the effectiveness of smoke-free zones in outdoor areas and overcoming enforcement challenges (Radó, 2021). Many areas have smoke-free regulations but lack effective monitoring mechanisms. Meanwhile, light sanctions or the absence of a deterrent effect cause violations to continue to occur (Syam, 2024). The lack of rehabilitation facilities for smokers who want to quit is also an obstacle. Therefore, it is necessary to increase the number of officers in charge of enforcing Smoke-Free Area (SFA) in public places and increase fines for individuals or institutions that violate the rules (Kahendra, 2023).

Secondhand smoke exposure (SHE) in well-ventilated spaces, including outdoor areas adjacent to enclosed zones, remains a significant health risk (Leung, 2015); (Ellis-Suriani, 2021). Implementing Smoke-Free Area (SFA) in large open areas or private settings, such as cars and college campuses, poses practical enforcement difficulties but holds potential for mitigating secondhand smoke exposure related health risks (Brooks, 2020); (Passey, 2016). Understanding trends in public support is critical for policymakers seeking to implement effective Smoke-Free Area (SFA) (Nasution, 2022). Annual surveys in Indonesia reveal widespread support for the concept of a Smoke-Free Generation (Yunarman, 2020); (Marpaung, 2022b). However, limited research exists on the evolution of public support within this context. Previous studies suggest that public support data is vital for driving policy adoption and ensuring its successful implementation.

Educational institutions such as schools and campuses play a strategic role in enforcing smoke-free area (SFA) policies. These institutions not only designate their buildings, grounds, and other facilities as smoke-free zones but also actively educate students, staff, and parents about the dangers of smoking and the benefits of a smoke-free environment. This educational approach empowers the school community to make informed decisions about their health (Chadwick, 2024). In addition to promoting awareness, schools and campuses enforce sanctions for individuals who violate SFA policies, including students and staff who smoke in prohibited areas. However, implementing Smoke-Free Area (SFA) in educational settings faces several challenges, including persistent violations and insufficient infrastructure to support enforcement. The effectiveness of these policies relies heavily on active collaboration among stakeholders, including government agencies, educational institutions, parents, and the broader community.

# Methods

### Study design

This study utilized a cross-sectional design and quantitative methodology to assess the implementation of the smoke-free area policies on campus and examine smoking behaviors among students. This study will evaluate university students' compliance with the Smoke-Free Area (SFA) and analyze smoking behavior in Islamic universities.

### Setting

This study was conducted between April 2024 and November 2024, focusing on students from three Islamic higher education institutions in Indonesia: Universitas Islam Negeri Sumatera Utara, Universitas Islam Negeri Syarif Hidayatullah Jakarta and Universitas Islam Negeri Wali Songo Semarang. A total of 7.040 students participated in the study. Data collection was conducted with students who provided informed consent and agreed to participate in structured interviews.

### Sample

This study, with the primary objective of observing the implementation of smoke-free area policies, involved interviews with a comprehensive sample of 7.040 students across three campuses, employing a purposive sampling approach. The response rate in this study reached 100% because the researcher interviewed 7.040 Islamic university students.

This study employed a purposive sampling technique to ensure the inclusion of participants who met the specific criteria relevant to the study's objectives. Selecting students with sufficient exposure to campus environments was essential and could provide meaningful insights for the study. Participants were required to be in at least their third semester, have regularly attended campus on a Monday-to-Friday schedule over the previous 30 days, and have provided informed consent for participation. This approach allowed for selective individuals with relevant experiences, ensuring the collection of rich, targeted data. The research focused on three institutions: Universitas Islam Negeri Sumatera Utara, Universitas Islam Negeri Syarif Hidayatullah Jakarta, and Universitas Islam Negeri Wali Songo Semarang.

### Confounding Variable Control

To minimize bias, data on participants' socioeconomic status, gender, and field of study were collected and incorporated into the analysis. The study used multivariate regression models to assess the relationship between smoking behavior and compliance with SFA policies while controlling for these confounding factors. Additionally, subgroup analyses were performed to examine variations in compliance and smoking prevalence across different demographic groups.

**Instruments**

This study observed the implementation of a Smoke-Free Area (SFA) at three Islamic universities: Universitas Islam Negeri Sumatera Utara, Universitas Islam Negeri Syarif Hidayatullah Jakarta, and Universitas Islam Negeri Wali Songo Semarang. The Indonesian Ministry of Health established the Smoke-Free Area (SFA) indicators, which include signage indicating the dangers of tobacco, no-smoking signs, prohibition of tobacco sales and advertisements, absence of smoking activity, and removal of ashtrays. Campuses implementing the Smoke-Free Area (SFA) are required to meet all these indicators. The study also observed other aspects, such as the dissemination of information about the dangers of smoking, the presence of designated smoking areas, the absence of matches or lighters for smoking, the absence of cigarette butts, and the implementation of restrictions on smoking by campus visitors.

We conducted structured interviews with students at these universities using a pre-prepared questionnaire. The interviews covered topics such as student smoking behaviours, smoking locations, types of cigarettes consumed, smoking behaviours among faculty members, and smoking behaviours of administrative staff on campus. Using a structured questionnaire, the study also collected data on students' perceptions of essential SFA on campus and the disturbances caused by cigarette smoke. This research also took coordinates on campus to see the point of the study program with the campus.

To analyze the spatial distribution of compliance with the Smoke-Free Area (SFA), this study employed GPS waypoints to gather precise geolocation data from key campus areas, including faculty buildings, student gathering spots, and designated smoking zones. Each recorded location was classified based on compliance criteria, such as the presence of "no smoking" signage, absence of cigarette butts, and implementation of enforcement measures. These data points were subsequently mapped using QGIS software to visualize the patterns of compliance and non-compliance across university campuses. This study recorded coordinates using the GPS Waypoints application, categorizing them into three types: blue stars for campus or faculty points, red dots for non-compliant locations, and green dots for compliant locations. Compliance with the Smoking Free Area (SFA) policy was determined based on the absence of smoking activity, tobacco advertisements, cigarette sale, and cigarette butts at the location. We will visualize the collected data points by mapping them using QGIS software.

Spatial analysis yielded critical insights into policy enforcement by identifying high-risk smoking areas and gaps in adherence. For instance, clusters of non-compliant locations within specific faculties or near common student areas suggest potential deficiencies in enforcement or awareness campaigns. This study pinpointed areas requiring stricter monitoring and additional intervention strategies by overlaying the compliance data with campus maps. This data-driven approach facilitated a comprehensive assessment of SFA effectiveness and informed recommendations for targeted-policy improvements.

This study did not conduct validity and reliability tests, as the researchers used a standard questionnaire regarding the Smoke-Free Area (SFA) on campus. This study used questions from the Global Adult Tobacco Survey (GATS) questionnaire and an observation checklist from the Smoke-Free Area (SFA) of the Indonesian Ministry of Health. Three professional translators with relevant degrees and experience translated the questionnaire into Indonesian and back-translated it into English. An enumerator facilitated the online data collection coordinates using the GPS Waypoints application. The enumerator ensured that respondents completed the questionnaire independently without influence from other parties.

**Data analysis**

The JASP version 19 software processed and presented observational data on the smoking-free area policy implementation on campus through cross-tabulations. JASP version 19 also presented and analysed data on student smoking behaviour and that of faculty and campus staff in cross-tabulations. Additionally, this study conducted spatial analysis by mapping the Smoke-Free Area (SFA) implementation using the QGIS application.

**Ethical consideration**

This study was approved by the Ethical Review Board of Universitas Islam Negeri Sumatera Utara Medan. Informed consent was obtained from all participants, who were assured of their right to withdraw at any time.
Confidentiality and anonymity were maintained by assigning unique identification codes, ensuring no personally identifiable information was recorded. Data were encrypted and access was restricted to authorized researchers. To safeguard sensitive information, interviewers were trained in ethical practices, and data storage followed institutional and international ethical guidelines, including the Declaration of Helsinki and Indonesian Ministry of Health regulations.

## Results

Observations were conducted based on the criteria for Smoke-Free Area (SFA) established by the Indonesian Ministry of Health (Table 1).

**Table 1.** Compliance Rates of Smoke-Free Area (SFA) on Campus

| | N | Signage | No Smoking | No Sale | No Adv | No Smoke | No ashtrays | Compliance with all 6 |
|---|---|---|---|---|---|---|---|---|
| (a) Overall | | | | | | | | |
| Universitas Islam Negeri Sumatera Utara | 22 | 5 | 0 | 16 | 14 | 7 | 10 | 0 |
| Universitas Islam Negeri Syarif Hidayatullah | 12 | 12 | 2 | 12 | 12 | 2 | 10 | 0 |
| Universitas Islam Negeri Wali Songo | 8 | 2 | 8 | 8 | 8 | 8 | 8 | 6 |
| (b) Field of study | | | | | | | | |
| Health Studies | 4 | 0 | 2 | 4 | 4 | 3 | 2 | 0 |
| Education Studies | 13 | 13 | 2 | 12 | 11 | 2 | 2 | 2 |
| Islamic Studies | 12 | 9 | 4 | 7 | 7 | 9 | 12 | 4 |
| Social Studies | 13 | 1 | 2 | 13 | 12 | 3 | 12 | 0 |

The data presented in the table, which was collected over a six-month period from April to Desember 2024, reveals substantial variability in compliance with smoking-related regulations across three universities and four fields of study. Universitas Islam Negeri Sumatera Utara exhibits the lowest overall compliance, with no regulation fully implemented. Specifically, this university demonstrates deficient compliance in categories such as signage (5 out of 22), no smoking areas (0 out of 22), and the prohibition of tobacco sales (16 out of 22). Conversely, Universitas Islam Negeri Syarif Hidayatullah shows higher compliance, adhering to most regulations, although partial non-compliance is noted in the "No Sale" and "No Ashtrays" categories (2 out of 12). Universitas Islam Negeri Wali Songo demonstrates moderate compliance, especially in the "No Sale" and "No Smoking" categories, achieving full adherence in some areas (8 out of 8) but only partial compliance overall (6 out of 6).

When examining compliance across fields of study, Health Studies has the lowest adherence to regulations, particularly in the "Signage" category, where compliance is absent. This is concerning as it may lead to increased exposure to secondhand smoke, posing a significant health risk to students and staff. In contrast, Education Studies displays relatively high compliance, especially in the "Signage" category (13 out of 13) and "No Smoking" areas (12 out of 13). Islamic Studies demonstrates moderate compliance, with excellent adherence to most regulations, but fails to achieve full compliance. Social Studies shows a mixed pattern, with complete adherence in several categories but non-compliance in the "Signage" category.

The "Signage" category emerges as the best-performing across universities and fields of study, with high compliance levels, particularly at Universitas Islam Negeri Syarif Hidayatullah in Education Studies and Islamic Studies. This underscores the importance of clear and effective communication of smoking regulations. Conversely, the "No Smoking" category is the least compliant, particularly at Universitas Islam Negeri Sumatera Utara and Health Studies, where adherence is nearly absent. This underscores the urgent need for more robust enforcement mechanisms and more consistent management of smoking areas.

The data sheds light on the implementation of smoking prevention measures at three Islamic universities in Indonesia: Universitas Islam Negeri Sumatera Utara, Universitas Islam Negeri Syarif Hidayatullah, and Universitas Islam Negeri Wali Songo. The analysis covers four fields of study: Health Studies, Education Studies, Islamic Studies, and Social Studies. Among the universities, Universitas Islam Negeri Sumatera Utara shows the highest compliance with smoking prevention measures. It excels in providing information on the dangers of smoking, with 22 instances recorded, and in discouraging smoking among guests, with 20 instances. Universitas Islam Negeri Wali Songo demonstrates moderate implementation; while it effectively restricts cigarette butts (8 out of 8), its efforts to discourage guest smoking are weaker, recording only 5 out of 8 instances. In contrast, Universitas Islam Negeri Syarif Hidayatullah has the lowest compliance, showing limited efforts with only two instances of providing information about smoking dangers and four instances of discouraging smoking among guests.

**Table 2.** Compliance Rates of Smoke-Free Area (SFA) on Campus

| | N | Information about the dangers of smoking | Special smoking area. | No Matches or lighters for smoking. | No Cigarette butts | no smoking Guests. |
|---|---|---|---|---|---|---|
| (a) Overall | | | | | | |
| Universitas Islam Negeri Sumatera Utara | 22 | 7 | 16 | 20 | 1 | 20 |
| Universitas Islam Negeri Syarif Hidayatullah | 12 | 2 | 3 | 10 | 0 | 4 |
| Universitas Islam Negeri Wali Songo | 8 | 4 | 8 | 8 | 8 | 5 |
| (b) Field of study | | | | | | |
| Health Studies | 4 | 3 | 4 | 3 | 3 | 3 |
| Education Studies | 13 | 11 | 13 | 13 | 11 | 11 |
| Islamic Studies | 12 | 3 | 5 | 11 | 7 | 8 |
| Social Studies | 13 | 12 | 5 | 11 | 12 | 7 |

Regarding academic disciplines, Education Studies lead in implementing smoking prevention measures, achieving high scores across all categories with 11 to 13 instances for each measure. Social Studies also performs well in disseminating information about the dangers of smoking, achieving a perfect score of 13 out of 13, but shows variability in some measures, such as restricting matches or lighters, with only five instances recorded. Conversely, Islamic Studies and Health Studies exhibit moderate yet varied levels of implementation. While Health Studies consistently applies its measures, it operates on a smaller scale due to fewer participants.

**Table 3.** Smoking Behaviour, Smoking Spot and Cigarette Type on Campus

| | Universitas Islam Negeri Sumatera Utara | Universitas Islam Negeri Syarif Hidayatullah | Universitas Islam Negeri Wali Songo. |
|---|---|---|---|
| (a) Overall | | | |
| Students smoking | 2528 | 2368 | 2368 |
| Students smoking | 352 | 160 | 1472 |
| Campus staff smoking. | 1568 | 352 | 1920 |
| Important SFA in Campus | 3008 | 896 | 2816 |
| Disturbed by cigarette smoke | 3040 | 896 | 2880 |
| (b) Smoking spot. | | | |
| Toilet | 32 | 0 | 64 |
| Canteen | 352 | 64 | 512 |
| Parking lots | 416 | 32 | 512 |
| Social Studies | | | |
| (c)Cigarette type | | | |
| Kretek cigarettes | 448 | 0 | 384 |
| Vape | 320 | 0 | 96 |

The data provide valuable insights into smoking behaviour, its associated impacts, and the prevalence of smoking-related areas across three Islamic universities in Indonesia: Universitas Islam Negeri Sumatera Utara, Universitas Islam Negeri Syarif Hidayatullah, and Universitas Islam Negeri Wali Songo. Universitas Islam Negeri Sumatera Utara has the highest prevalence of smokers among students (2.528) and staff (1.568), surpassing Universitas Islam Negeri Syarif Hidayatullah (2.368 students and 352 staff) and Universitas Islam Negeri Wali Songo (2.368 students and 1.920 staff). The perception of the importance of Smoke-Free Area (SFA) is most pronounced at Universitas Islam Negeri Sumatera Utara (3.008 individuals), closely followed by Universitas Islam Negeri Wali Songo (2.816 individuals). In contrast, Universitas Islam Negeri Syarif Hidayatullah shows the lowest recognition of the importance of SFA, with only 896 individuals acknowledging its relevance. Notably, the highest number of individuals disturbed by cigarette smoke is reported at Universitas Islam Negeri Sumatera Utara (3.040), followed by Universitas Islam Negeri Wali Songo (2.880) and Universitas Islam Negeri Syarif Hidayatullah (896).

The most common smoking spots vary by campus. Universitas Islam Negeri Sumatera Utara reports the highest smoking in parking lots (416 instances) and canteens (352 instances). In contrast, Universitas Islam Negeri Wali Songo observes significant smoking activity in toilets (64 instances), canteens (512 instances), and parking lots (512 instances). Universitas Islam Negeri Syarif Hidayatullah reports minimal smoking activity, with no occurrences in toilets and only 64 instances in canteens.

Kretek cigarettes are the most commonly used type across the universities, with Universitas Islam Negeri Sumatera Utara reporting the highest usage (448 instances), followed by Universitas Islam Negeri Wali Songo (384 instances). Vaping is also observed, with Universitas Islam Negeri Sumatera Utara showcasing the highest adoption (320 instances), while Universitas Islam Negeri Wali Songo reports significantly lower usage (96 instances). Universitas Islam Negeri Syarif Hidayatullah shows negligible use of either Kretek cigarettes or vaping.


(a) (b)

**Figure 1.** Compliance Mapping of Smoke-Free Area (SFA) on the campus of the Universitas Islam Negeri Sumatera Utara. This figure demonstrates that numerous areas around the faculty buildings remain non-compliant with the Smoke-Free Area (SFA) in the Universitas Islam Negeri Sumatera Utara.

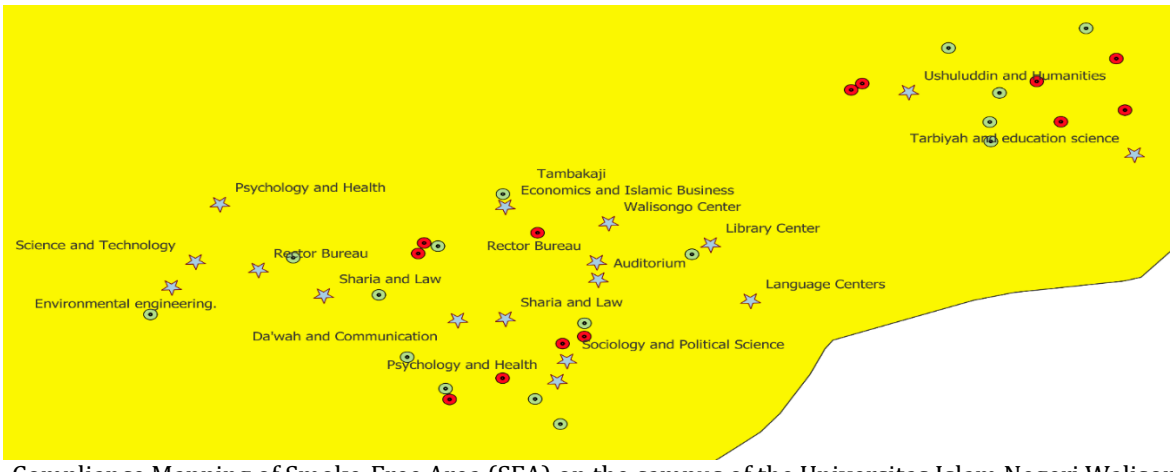


**Figure 2**. Compliance Mapping of Smoke-Free Area (SFA) on the campus of the Universitas Islam Negeri Walisongo.

This figure demonstrates that numerous areas around the faculty buildings remain non-compliant with the Smoke-Free Area (SFA) in the Universitas Islam Negeri Walisongo.

## Discussion

Universities serve as a unique environment for older adolescents and young adults, many of whom may still be in the initiation or establishment phases of smoking. The high prevalence of smoking among college students is concerning, yet there is limited literature on programs and interventions targeting tobacco use in these settings. This gap underscores the need for evidence-based strategies to effectively reduce tobacco consumption (Andreeva, 2016). This study examines smoking-related regulations across three universities and four academic fields, revealing significant variations in compliance.

A comparison of compliance levels among the universities highlights critical differences. Universitas Islam Negeri Sumatera Utara demonstrates the lowest compliance levels, particularly in terms of signage, designated no-smoking areas, and prohibitions on tobacco sales. In contrast, Universitas Islam Negeri Syarif Hidayatullah exhibits higher compliance, while Universitas Islam Negeri Wali Songo falls within a moderate range. These differences may stem from institutional policies, administrative enforcement, and cultural factors influencing smoking behavior on campus.

The effectiveness of smoke-free policies depends on robust legislation and enforcement. Research has shown that countries with comprehensive smoke-free laws tend to have lower smoking rates among students, emphasizing the importance of implementing and maintaining such policies as part of a broader tobacco prevention strategy (Agaku, 2015). Compliance with Point-of-Sale (POS) laws has been linked to a reduced risk of student tobacco use. However, while such regulations help decrease smokeless tobacco consumption, they do not significantly alter students' intentions to use tobacco or their perceived ease of access to these products (Mistry, 2019). Enhancing vendor compliance with POS laws and extending tobacco sales bans beyond 100 meters from educational institutions could further reinforce efforts to curb student tobacco use (Mistry, 2015).

The findings indicate that Universitas Islam Negeri Sumatera Utara has the highest smoking prevalence among students and staff, with a total of 2.528 individuals identified as smokers. This figure surpasses those recorded at Universitas Islam Negeri Syarif Hidayatullah (2.368 students and 352 staff) and Universitas Islam Negeri Wali Songo (2.368 students and 1.920 staff). The relevance of these statistics becomes evident when considering the impact of weak policy enforcement. Previous research indicates that despite policies being in place, their enforcement is often inadequate, leading to frequent violations (Ramachandran, 2020). Additionally, while tobacco sales restrictions exist, their inconsistent implementation further reduces their effectiveness. The rising use of electronic cigarettes among university students presents an additional public health concern. A study by Nazzal (2024) on Palestinian university students underscores the need for a multifaceted approach, combining educational initiatives, social interventions, and policy measures to address this growing issue.

A deeper analysis of existing literature reveals inconsistencies in findings regarding the effectiveness of smoke-free policies. Some studies report a significant reduction in smoking prevalence following policy enforcement (Sendall, 2020), whereas others indicate minimal impact, primarily due to weak enforcement mechanisms (Ramachandran, 2020). This discrepancy highlights the need for stronger administrative commitment and community engagement in ensuring policy adherence.

An important consideration in smoke-free policies is the perception and support among university communities. Among the universities studied, Universitas Islam Negeri Sumatera Utara and Universitas Islam Negeri Wali Songo report the highest perception of the importance of Smoke-Free Areas (SFA), with 3.008 and 2.816 individuals, respectively. Furthermore, the highest number of individuals disturbed by cigarette smoke is observed at Universitas Islam Negeri Sumatera Utara (3.040), followed by Universitas Islam Negeri Wali Songo (2.880) and Universitas Islam Negeri Syarif Hidayatullah (896). Martínez (2017) found that while students strongly support indoor SFAs (97.9%), their support for outdoor smoking restrictions on university campuses is significantly lower (39.3%). This discrepancy suggests that while awareness of smoking-related harm is high, attitudes toward restrictive policies vary.

Despite broad consensus on the necessity of SFAs, concerns persist regarding policy implementation, boundary delineation, and the rights of non-smokers. Additionally, there is ongoing debate about the need for designated smoking areas within campuses (Sendall, 2020). Barriers to effective implementation include inadequate enforcement, high population density, cultural norms favoring smoking, and limited administrative support (Chaaya, 2013). The varying levels of compliance observed in this study may be attributed to differences in institutional commitment, resource allocation, and cultural attitudes toward smoking. For instance, universities with stricter enforcement and educational initiatives tend to have better compliance rates. Furthermore, the broader sociocultural context in Indonesia, where smoking is deeply ingrained in social norms, poses an additional challenge for effective policy enforcement.

To establish a truly smoke-free university environment, systematic processes for implementing, maintaining, and enforcing tobacco control policies are necessary (Sendall, 2020). Clear policy communication, increased administrative support, and student involvement are essential to improving compliance. Raising awareness, establishing penalties for policy violations, and expanding cessation services are key to ensuring these policies' long-term effectiveness (Al-Jayyousi, 2021). Evidence suggests that indoor smoking bans have successfully reduced cigarette consumption and increased

cessation rates among students and faculty alike (Coskun, 2013). As such, educational institutions should implement comprehensive smoking cessation programs to promote a healthier and smoke-free academic environment (Agaku, 2015).

*Limitations*

The study's limitations include a focus on three Islamic universities, potential reporting bias, and a short data collection period, and it does not assess the effectiveness of cessation support programs, which could be crucial for Smoke-Free Area (SFA).

*Implications*

Strengthen enforcement mechanisms for Smoke-Free Area (SFA) through clear signage, designated areas, and monitoring. Universities should implement educational programs, collaborate with government agencies, and conduct longitudinal studies to evaluate long-term impact on health outcomes.

# Conclusion

The implementation and adherence to the Smoke-Free Area (SFA) varied significantly among three Islamic universities in Indonesia. Universitas Islam Negeri Sumatera Utara demonstrated the lowest compliance rates, particularly in signage and the prohibition of smoking areas. Conversely, Universitas Islam Negeri Syarif Hidayatullah and Universitas Islam Negeri Wali Songo exhibited moderate to high adherence. The findings underscore the frequent exposure of students and staff to tobacco smoke, particularly in designated smoking areas, thereby compromising the efficacy of SFA policies. These problems notwithstanding, how people at the university think about how vital SFA policies are shows that more robust enforcement mechanisms could lead to higher compliance.

**Declaration of conflicting interest**

We declare that there is no conflict of interest

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**Author contributions**

**Syamsu Nahar, Fitria Ulfah, Abdi Mubarrak Syam, Putra Apriadi Siregar, Rani Suraya, Syafran Arrazy** performed conceptualization, methodology, writing-original draft preparation, and visualization. Putra Apriadi Siregar and Rani Suraya performed data curation and investigation and supervised the study. Abdi Mubarrak Syam, Putra Apriadi Siregar and Syafran Arrazy were responsible for software and formal analysis.

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