RESEARCH ARTICLE

Editorial Process: Submission:04/09/2025 Acceptance:25/08/2026 Published:26/09/2026

Knowledge, Attitudes, and Perceived Impact of the Single-Stick Cigarette Ban: A Cross-Sectional Study in Indonesia

Abdillah Ahsan[1]*, Fitri Kurnia Rahim[2], Indah Suci Widyahening[3,4], Depi Yulyanti[5], Witri Dewi Mentari[6], Yudita Ingga Hindiarti[7], Humaira Anggie Nauli[8], Ernoiz Antriyandarti[9], Made Adhyatma Prawira Natha Kusuma[10], Maulida Gadis Utami[1], Yuyu Buono Ayuning Pertiwi[1], Ella Kurnia[1], Anisa Salsabila[11]

Abstract

Objective: This study aimed to investigate public perceptions (knowledge, attitudes, and perceived impact) of the single-stick cigarette sales ban in Indonesia, and to identify sociodemographic and behavioral factors associated with these outcomes. **Methods**: A cross-sectional survey study was conducted among 714 respondents in seven selected districts in Indonesia, utilizing the Knowledge, Attitude, and Perception (KAP) framework. Multivariable analyses were performed using binary logistic regression for knowledge and ordered logistic regression for attitude and perception. Robust standard errors were applied, and findings are reported as adjusted odds ratios (aORs) with 95% confidence intervals (95% CIs). **Result:** Most respondents (66.11%) were unaware of the regulation. Older adults (≥55) had lower knowledge (aOR = 0.47, 95% CI: 0.28–0.79), and active smokers opposed the ban (aOR = 0.35, 95% CI: 0.23–0.51). Higher education (aOR = 2.16, 95% CI: 1.00–4.63) and urban residence (aOR = 1.65, 95% CI: 1.08–2.51) correlated with supportive attitudes. Knowledge (aOR = 1.90, 95% CI: 1.25–2.87) and supportive attitudes (aOR = 2.86, 95% CI: 1.56–5.22) were the strongest predictors of perceiving the ban as effective for public health. **Conclusion:** The implementation of the single-stick cigarette ban in Indonesia has been ineffective, primarily due to a lack of public awareness of the regulation. Smokers and older adults demonstrate significantly limited knowledge of and acceptance toward the policy. These findings highlight the need for increased public awareness campaigns and targeted interventions to improve knowledge and compliance with the single-stick cigarette sales ban in Indonesia.

Keywords: Single-stick cigarette ban, public perceptions, knowledge, attitudes, Indonesia

Asian Pac J Cancer Prev, **27 (9)**, 3185-3191

Introduction

Indonesia has a severe tobacco burden with a very high prevalence of smoking, particularly among males. In 2025, the World Health Organization (WHO) estimated that Indonesia's tobacco smoking prevalence would be the highest in Asia at 37.3%, with over 70% of males and a growing number of youths engaging in tobacco use [1]. According to the Indonesian Health Survey, the prevalence of smoking has increased from 7.2% in 2013 to 7.4% in 2023, with the absolute number surging from 2 million to 5.9 million during the same period. Furthermore, smoking initiation occurs at younger ages, with 2.6% starting at the ages of 4–9 years, followed by 44.7% (10–14 years), and 52.8% (15–19 years) [2, 3]. In addition, adolescent smokers consume approximately 8–9 cigarettes daily [4]. Smoking behavior has also responsible for a significant proportion of premature deaths and disabilities each year, with around 225,700 Indonesians dying prematurely due to tobacco use, accounting for about 15% of all deaths in

*[1]Department of Economics, Faculty of Economics and Business, University of Indonesia, Depok, West Java, Indonesia. [2]Department of Public Health, Faculty of Health Sciences, Bhakti Husada Indonesia University, Kuningan, West Java, Indonesia. [3]Department of Community Medicine, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia. [4]Primary Health Care Research and Innovation Center, Indonesia Medical Education and Research Institute (IMERI), Faculty of Medicine, University of Indonesia, Jakarta, Indonesia. [5]Study Program of Hospital Administration, Faculty of Health Sciences, Bakti Tunas Husada University, Tasikmalaya, West Java, Indonesia. [6]Study Program of Public Health, Faculty of Health Sciences, Sebelas April University, Sumedang, West Java, Indonesia. [7]Study Program of Midwifery, Faculty of Health Sciences, Galuh University, Ciamis, West Java, Indonesia. [8]Study Program of Public Health, Ibn Khaldun University, Bogor, West Java, Indonesia. [9]Study Program of Agribusiness, Faculty of Agriculture, Sebelas Maret University, Surakarta, Central Java, Indonesia. [10]Study Program of Occupational Health and Safety, International University of Bali, Denpasar, Bali, Indonesia. [11]Department of Public Health, Faculty of Public Health, Andalas University, Padang, West Sumatra, Indonesia. *For Correspondence: ahsanov@yahoo.com*

the country [3].

One of the main problems of this crisis is the widespread availability of single-stick cigarettes. The sale of single-stick cigarettes ("loose" or "kiddy packs") refers to all types of cigarettes, except cigars and electronic cigarettes, that are sold individually without commercial packaging [5, 6]. According to the 2021 Global Adult Tobacco Survey (GATS), approximately 16% of 70 million adult smokers consistently purchase cigarettes individually. Female smokers show a higher tendency of this behavior, with 41.6% reporting frequent purchases of loose cigarettes compared to male smokers [7].

The availability of single-stick cigarettes significantly hinders efforts to reduce smoking initiation among children and adolescents [8, 9]. They often purchase single cigarettes due to their lower cost and ease of access, especially from informal retailers such as small grocery stores and street-side stalls [10]. The price of a cigarette pack varies by type, ranging from IDR 18,134 to IDR 25,679 (approximately USD 1) for hand-rolled, machine-made clove, and machine-made white cigarettes [11]. Single-stick cigarettes are more affordable, costing around Rp1,581.58 or $0.11 per stick [8]. This affordability makes them highly accessible, with some adolescents reportedly spending IDR 30,000–200,000 (US$2–13) per week on loose cigarettes, accounting for over half of their allowance [9]. Higher density of cigarette retailers in residential and school areas increases the likelihood of cigarette availability and access for students. The affordability and accessibility of cigarettes to smokers, some of which are enabled by credit purchases, are key factors that drive individuals to buy single cigarettes [8, 9].

In response, the Indonesian government enacted national legislation that aligns with some of the principles outlined in Article 16 of the Framework Convention on Tobacco Control (FCTC), which encourages countries to ban the sale of single cigarettes and regulate the sizes of packaging [12]. This regulation has been in effect since July 2024, Government Regulation No. 28 of 2024 (PP No. 28/2024), Article 443, which prohibits the sale of tobacco near educational institutions and playgrounds, raises the minimum legal purchasing age to 21 years, and prohibits the sale of single cigarettes [5].

Although government regulations prohibit the sale of single cigarettes, there is no direct fine or criminal penalty for retailers selling single-stick cigarettes. Instead, the regulation imposes administrative sanctions on producers and importers who violate specific packaging regulations and quantities of shredded tobacco [5]. Furthermore, the retailers are aware of the prohibition but continue to sell cigarettes individually due to persistent consumer demand. This ongoing non-compliance highlights the challenges of enforcement at the retail level and underscores the need for a more robust policies framework [13–15].

The effectiveness of prohibiting single-stick cigarette sales depends on public understanding and response. Public awareness, acceptance of policy rationale, and perceptions of potential health impacts affect both policy legitimacy and compliance. The Knowledge, Attitude, and Practice (KAP) framework offers a conceptual approach for examining these factors. Within this framework, awareness of a regulation shapes attitudes and influences perceptions of its broader social or health value [16].

Despite these insights, a critical gap remains in understanding public perceptions of recent regulations on single-stick cigarette sales in Indonesia. Previous research has primarily addressed accessibility, youth behavior, and retailer density, without comprehensively examining societal perceptions and compliance with the new regulation. This study aims to assess public knowledge, attitudes, and perceptions regarding the single-stick cigarette ban and to identify sociodemographic and behavioral factors associated with these outcomes.

Materials and Methods

Study Design

This study employed a quantitative, cross-sectional approach using household survey data. We administered questionnaires to household heads in seven districts and cities in Indonesia, including Bogor, Kuningan, Sumedang, Tasikmalaya, Ciamis, Sleman, and Badung, between January and February 2025.

Variables

Dependent variables of this study are knowledge, attitude, and perceived public health impact. The knowledge was evaluated by a question that was asked: "Are you aware of the following tobacco sales and advertising regulations, specifically the ban on single-stick cigarette sales?" (Yes/No). Attitudes toward the policy were measured as an ordinal variable with three categories with Disagree, Neutral, and Agree by the question: "What is your opinion regarding the ban on the sale of single-stick cigarettes?". Moreover, perceptions of the policy's impact were assessed with the question: "Do you think the following regulation will have an impact on public health?" and was categorized as No Impact, Neutral, or Impact. Independent variables including the socio-demographic variables (gender, employment status, level of education, age group, marital status, smoking status, area classification, and district/city).

Statistical Analysis

Descriptive statistics were used to summarize respondent characteristics. Bivariate associations between independent variables and each outcome were examined using Pearson's chi-square test. For multivariable analysis, binary logistic regression was used to estimate factors associated with knowledge, while ordered logistic regression was used for the ordinal outcomes of attitude and perceived impact toward the regulation. All multivariable models were estimated using robust standard errors. Results were reported as adjusted odds ratios (aORs) with 95% confidence intervals (95% CIs). All statistical tests were two-sided, and $p < 0.05$ was considered statistically significant. Variables with p-values between 0.05 and 0.10 were interpreted as showing marginal significance. For the ordered logistic regression models, the proportional odds assumption was assessed using the Brant test. Where relevant, this assumption was further explored through sensitivity analysis using

generalized ordered logistic regression (gologit2) with the autofit option.

Results

This survey involved 714 respondents, comprising 434 males (60.78%) and 280 females (39.22%), with different employment status, education levels, age groups, and marital status. Table 1 presents the respondents' characteristics and responses. Most respondents (78.43%) were employed with more than half of the participants (58.26%) had a medium level of education and were middle-aged (35-54 years). A large majority of respondents were married (88.38%), and more than half identified as smokers (56.7%). Regarding the study outcomes, two-thirds of the respondents (66.11%) were unaware of all the rules, yet they also agreed with the implementation of this rule (67.65%). Concerning the perceived impact, almost 75% of the respondents stated that this regulation had a substantial impact on public health.

Model 1: Factors Associated with Knowledge of the Regulation

Table 2 presents the results of the multivariable logistic regression model. This study identified that age and area classification were significantly associated with appropriate knowledge of single-stick cigarette ban sales. Compared with respondents aged 15–34 years, those aged 35–54 years exhibited a 44% reduction in the odds of awareness of the regulation (aOR = 0.56; 95% CI: 0.35–0.89), and those aged 55 years and older exhibited a 53% reduction (aOR = 0.47; 95% CI: 0.28–0.79). In contrast, there were no statistically significant associations observed for gender, education level, marital status, employment status, smoking status, and area classification.

Model 2: Factors Associated with Attitude Toward the Regulation

In the ordered logistic regression model, higher education level and smoking status were significantly associated with more favorable attitudes toward the regulation. Respondents with higher levels of education had higher odds of expressing more favorable attitudes than those with lower levels of education (aOR = 2.16; 95% CI: 1.00–4.63). By contrast, smokers had substantially lower odds of reporting more favorable attitudes toward the regulation than non-smokers (aOR = 0.35; 95% CI: 0.23–0.51). Urban residents were also more likely than rural residents to report favorable attitudes (aOR = 1.65; 95% CI: 1.08–2.51). No significant associations were found for gender, age group, marital status, employment status, area classification, or knowledge of the regulation.

Model 3: Factors Associated with Perceived Public Health Impact

The final ordered logistic regression demonstrated the sequential validity of the KAP framework. Both prior awareness and supportive attitudes functioned as strong, independent drivers of perceived policy efficacy. Both prior awareness and supportive attitudes functioned as strong, independent drivers of perceived policy efficacy. Respondents who were aware of the regulation had significantly higher odds of perceiving the policy as beneficial for public health (aOR = 1.90; 95% CI: 1.25–2.87). Compared with respondents who disagreed

Table 1. Sociodemographic Characteristics and Distribution of Responses Regarding the Prohibition of Single-Stick Cigarette Sales

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	434	60.78
Female	280	39.22
Age Group		
15–34 years	114	15.97
35–54 years	364	50.98
55+ years	236	33.05
Education Level		
Low	220	30.81
Medium	416	58.26
High	78	10.92
Marital Status		
Not Married	83	11.62
Married	631	88.38
Employment Status		
Unemployed	154	21.57
Employed	560	78.43
Smoking Status		
Non-Smoker	309	43.28
Smoker	405	56.72
Area Classification		
Rural	483	67.65
Urban	231	32.35
District/City		
Bogor	115	16.11
Badung	14	1.96
Sleman	120	16.81
Tasikmalaya	120	16.81
Ciamis	112	15.69
Kuningan	116	16.25
Sumedang		
Knowledge of the regulation		
No	472	66.11
Yes	242	33.89
Attitude toward the regulation		
Disagree	99	13.87
Neutral	132	18.49
Agree	483	67.65
Perceived impact of the regulation		
Not Impact	91	12.75
Neutral	93	13.03
Impact	530	74.23

Table 2. Multivariable Regression Analysis of Knowledge, Attitude, and Perceived Public Health Impact Regarding the Prohibition of Single-Stick Cigarette Sales

Variable	Knowledge aOR (95% CI)	Attitude aOR (95% CI)	Perceived Impact aOR (95% CI)
Gender			
Male (ref)	—	—	—
Female	1.29 (0.81–2.06)	1.25 (0.78–2.01)	1.62 (0.98–2.67) *
Age Group			
15–34 years (ref)	—	—	—
35–54 years	0.56 (0.35–0.89) **	0.60 (0.35–1.04) *	1.16 (0.65–2.09)
55+ years	0.47 (0.28–0.79) ***	0.62 (0.34–1.11)	1.61 (0.86–3.03)
Education Level			
Low (ref)	—	—	—
Medium	1.26 (0.86–1.85)	0.80 (0.55–1.16)	1.25 (0.81–1.91)
High	1.23 (0.64–2.38)	2.16 (1.00–4.63) **	1.20 (0.56–2.59)
Marital Status			
Not married (ref)	—	—	—
Married	0.91 (0.55–1.51)	1.06 (0.58–1.95)	1.03 (0.55–1.92)
Employment Status	—	—	—
Not working (ref)	0.71 (0.43–1.17)	0.86 (0.49–1.51)	0.61 (0.34–1.10)
Working	—	—	—
Smoking Status			
Non-smoker (ref)	—	—	—
Smoker	1.20 (0.80–1.81)	0.35 (0.23–0.51) ***	0.93 (0.58–1.49)
Area Classification			
Rural (ref)	—	—	—
Urban	1.28 (0.86–1.90)	1.65 (1.08–2.51) **	0.62 (0.39–0.99) **
District/City			
Bogor (ref)	—	—	—
Badung	1.54 (0.47–5.04)	1.23 (0.40–3.84)	1.32 (0.42–4.19)
Sleman	0.75 (0.39–1.46)	1.82 (0.93–3.54) *	0.56 (0.27–1.14)
Tasikmalaya	1.15 (0.61–2.17)	1.88 (0.96–3.69) *	5.72 (2.55–12.84) ***
Ciamis	1.23 (0.67–2.26)	1.01 (0.53–1.93) *	2.07 (1.08–3.97) **
Kuningan	1.61 (0.92–2.83) *	1.08 (0.55–2.09)	2.54 (1.21–5.33) **
Sumedang	1.62 (0.89–2.95)	0.68 (0.36–1.26)	2.03 (1.04–3.96) **
Knowledge of the regulation			
No (ref)	—	—	—
Yes	—	0.96 (0.67–1.38)	1.90 (1.25–2.87) ***
Attitude Toward the regulation			
Disagree (ref)	—	—	—
Neutral	—	—	0.62 (0.33–1.15)
Agree	—	—	2.86 (1.56–5.22) ***

Note: aOR, Adjusted Odds Ratio; CI, Confidence Interval; Ref, Reference category. * p < 0.05, ** p < 0.01, *** p < 0.001.

with the regulation, those who agreed had nearly three times the odds of perceiving a positive public health effect (aOR = 2.86; 95% CI: 1.56–5.22).

In contrast to the attitude model, urban residency was inversely associated with perceiving a positive impact in Model 3 (aOR = 0.62, 95% CI: 0.39–0.99). Geographic variations were highly pronounced in the perception model; compared to the reference district (Bogor), respondents in Tasikmalaya (aOR = 5.72, 95% CI: 2.55–12.84), Kuningan (aOR = 2.54, 95% CI: 1.21–5.33), Ciamis (aOR = 2.07, 95% CI: 1.08–3.97), and Sumedang (aOR = 2.03, 95% CI: 1.04–3.96) exhibited significantly higher odds of anticipating positive public health outcomes. No significant associations were identified for age groups, education level, marital status, employment status, or smoking status.

Discussion

The perception, attitudes, and knowledge concerning

the impact of single-stick cigarettes demonstrates variation across different contexts, influenced by socio-demographic factors such as gender, educational attainment, employment status, marital status, area classification and district. In general, this research found that respondents' awareness regarding the single-stick prohibition in Indonesia remains low, with only one-third of respondents recognizing it. This finding correlates with a previous study in Karnataka and Bidar city, India, which found that most cigarette users were unaware of the ban on single-stick cigarettes [17, 18]. Despite the low levels of awareness, this study found that respondents' support and positive perception regarding the single-stick sales of cigarettes was remarkably high, with more than half of respondents believing this rule would decrease numbers of smokers. This can be achieved, as seen in the temporary tobacco sales ban in South Africa during the COVID-19 lockdown, which led to 9% of smokers in the study quitting during the ban, and most intended to remain abstinent afterward [19].

The study examines the determinants of knowledge, attitudes, and perceptions regarding the ban on single-stick cigarette sales. A key finding was that the older respondents demonstrated lower levels of understanding and knowledge of the policy, while urban residents were more likely to report good knowledge. Additionally, individuals who smoked were less likely to express favorable attitudes toward the regulation, whereas respondents with higher education were more likely to support it. Furthermore, urban areas, districts with good knowledge, and favorable attitudes were associated with a greater perceived impact of the regulation on public health.

Factors Associated with Knowledge of the Regulation

The findings indicated that older respondents had lower levels of knowledge compared with younger respondents. This may reflect lower exposure among older individuals to policy-related communication and reduced engagement with more recent health promotion channels. In contrast, younger respondents may be more frequently exposed to public health information through digital media, social networks, and community-based campaigns, which could contribute to their higher level of knowledge. This is consistent with a study in India that found that most respondents in the young adult age group show significant awareness of the ban rules [17]. Younger adults (aged 15-24) are often considered a generation who have grown up with unlimited access to the internet and social media platforms, which exposes them to dissemination of the policy such as the sales single-stick cigarette prohibition. Studies show that social media significantly influences adolescent attitudes and beliefs about health-related behaviors [20].

Youth are a key target for tobacco control interventions, as well as government-employed public health campaigns and educational initiatives aimed at increasing awareness among this demographic [21]. This finding is supported by a study in India where youth believe a single-stick ban would minimize the smoking prevalence in their country [22]. This finding highlights the need for age-sensitive dissemination strategies, especially for older population groups.

Factors Associated with Attitude Toward the Regulation

Attitudes toward tobacco prohibitions are strongly differentiated by smoking status, with smokers demonstrating substantially lower odds of expressing favorable attitudes toward policies such as the prohibition of single-stick cigarette sales. This observation aligns with the expectation that individuals directly affected by tobacco control measures are less likely to support such policies, particularly when they limit the affordability of cigarette access. Because single-stick cigarette purchases are commonly linked to affordability and convenience, smokers are more likely to regard the regulation as burdensome rather than protective [22].

This finding align with the studies from Lebanon and rural Bangladesh reported that higher knowledge scores about health risks and positive attitudes toward smoking bans were significantly associated with a reduced likelihood of being a current smoker [23]. Furthermore, a survey conducted across 12 European countries indicated that non-smokers consistently express more positive attitudes and greater support for smoke-free legislation in both indoor and outdoor environments than smokers [24, 25]. In contrast, smokers who oppose sales prohibitions often question the policy's effectiveness, suggesting that bans may not significantly reduce smoking rates but could instead drive consumers toward illicit trade channels [24, 26].

Respondents with higher education were more likely to have favorable attitudes towards the regulation. Higher educational attainment may be associated with greater awareness of the harms of smoking, stronger health literacy, and a better understanding of the rationale for tobacco control policies. Individuals with higher education demonstrated sufficient knowledge and strong support and agreement with the ban. A longitudinal study in the Netherlands found that highly supportive, educated smokers were in favor of a point-of-sale cigarette display ban [27]. Higher education is often associated with enhanced health literacy, improved critical thinking skills, and increased access to reliable information sources. This strong correlation between higher education and policy support is commonly observed in public health studies, as education can increase awareness of the harmful effects of risky health behaviors and facilitate healthier choices [28]. This suggests that educational backgrounds may shape how individuals interpret and evaluate public health regulations.

Factors Associated with Perceived Public Health Impact

A notable pattern emerged in the perception model. Although knowledge of the regulation did not independently predict policy support, both knowledge and agreement were strongly associated with perceiving the regulation as beneficial for public health. Respondents who were aware of the regulation and those who supported it were significantly more likely to believe it would have a meaningful impact. This finding is consistent with the Knowledge, Attitudes, and Practices (KAP) framework, suggesting that public validation of the policy may

depend on both awareness and acceptance of its purpose. This observation is further supported by studies in rural Bangladesh, which found that satisfactory knowledge and attitude scores substantially reduce the likelihood of youth smoking, highlighting that awareness alone is insufficient without a corresponding shift in public attitudes [24].

Geographic and spatial disparities present significant challenges for policy enforcement. Urban residents were 65% more likely to support the policy, yet were significantly less likely (aOR = 0.62) to believe it would improve public health. One possible explanation is that urban residents may support the regulation in principle but remain skeptical about its practical effectiveness, especially in contexts where policy implementation and enforcement are perceived as inconsistent. This interpretation aligns with previous literature indicating that support for smoke-free policies does not always translate into strong confidence in their implementation or perceived effectiveness [29].

Pronounced variations were observed across districts, with regions such as Tasikmalaya, Kuningan, Ciamis and Sumedang exhibiting exceptionally high odds of perceiving positive impacts. Although this study does not analyze regulatory differences across districts, it examines variations that may reflect the baseline prevalence of single-stick purchasing, historical exposure to tobacco control advocacy, or distinct regional retail structures. Comparable sub-national disparities have been documented in India, where the successful prohibition of loose cigarettes depends heavily on local distribution networks and requires a combination of tailored legislative measures to effectively deter specific vendors [22]. Therefore, policymakers should adopt comprehensive and multi-layered strategies that integrate robust public education campaigns with accessible cessation support services to strengthen public understanding and acceptance of the policy. In addition, to address geographic disparities in enforcement, policy frameworks should include context-sensitive and locally targeted measures that focus on regional distribution and supply chains rather than relying primarily on punitive approaches toward individual consumers.

In conclusion, this study demonstrates low public awareness of the single-stick cigarette sales ban in Indonesia. However, the majority of respondents also support the regulation and anticipate positive public health outcomes. Greater support was identified among females, non-smokers, younger individuals, and those with higher education, suggesting that the ban could reduce tobacco consumption if paired with effective awareness campaigns and enforcement. Furthermore, knowledge, attitudes, and perceptions regarding the prohibition were influenced by distinct but interconnected factors. Older age and rural residence correlated with lower policy knowledge, while smoking status and education were significant predictors of attitude. A positive perception of the regulation's public health impact was closely linked to both knowledge and supportive attitudes. These results highlight the need to integrate regulatory measures with targeted communication and public education initiatives to enhance the acceptance and effectiveness of tobacco control policies.

Limitations

This study also acknowledges several limitations. The survey was conducted in only three provinces and may not fully represent Indonesia's diverse population. They were based on self-reported responses and may be subject to reporting bias. Moreover, the study could not capture changes in smoking behavior or cigarette sales following the ban. Future research should adopt longitudinal designs and broader, more representative samples to evaluate behavioral changes and long-term health outcomes.

Author Contribution Statement

AA contributed to project conceptualization, data collection, monitored all stages of the project, project supervision, and proofread the manuscript; ISW contributed to project conceptualization; FKR and DY were responsible for data collection, writing the original draft; DY, WDM, YIH, HAN, EA, MAPNK were responsible for data collection; MGU, YBAP, and Eku were responsible for data cleaning and analysis; AS prepared and revised the manuscript; All authors agree with the manuscript.

Acknowledgements

Funding Statement

This research was supported by the Faculty of Economics and Business, University of Indonesia, Research Grant 2024.

Ethical Declaration

The study protocol was approved by the Ethics Committee, Faculty of Medicine, Universitas Indonesia (KET-1475/UN2.F1/ETIK/PPM.00.02/2024).

Data availability statement

The data supporting this study is not publicly available.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. World Health Organization. Estimate of current tobacco smoking prevalence (%) age-standardized rate. 2024.
2. Health Development Policy Agency. Indonesian Health Survey: Individual Questionnaire. Jakarta; 2023.
3. Martini S, Artanti KD, Hargono A, Widati S, Ahsan A, Prabandari YS. Association between percentage of smokers and prevalence of smoking attributable morbidity in indonesia: One decade after implementation of smoke-free area regulation. BMC Public Health. 2022;22(1):2202. https://doi.org/10.1186/s12889-022-14435-8.
4. Health Development Policy Agency. Indonesian Health Survey (IHS) in Figures 2023. Jakarta: Ministry of Health of the Republic of Indonesia; 2024.
5. Republic of Indonesia. Government Regulation Number 28 of 2024 concerning Implementing Regulations of Law Number 17 of 2023 concerning Health. Jakarta, Indonesia:

State Secretariat; 2024.
6. Stopping Tobacco Organizations and Products. Single Sticks Fact Sheet. Stopping Tobacco Organizations and Products; 2023. Available from: https://exposetobacco.org/wp-content/uploads/single-sticks-cigarettes-fact-sheet.pdf
7. World Health Organization Regional Office for South-East Asia. Global Adult Tobacco Survey (GATS) Indonesia Report 2021. Jakarta, Indonesia: World Health Organization Regional Office for South-East Asia; 2022.
8. Hartono RK, Meirawan RF, Nurhasana R, Dartanto T, Satrya A. Retailer's density and single stick cigarette's accessibility among school-age children in indonesia. Asian Pac J Cancer Prev. 2023;24(2):675-82. https://doi.org/10.31557/apjcp.2023.24.2.675.
9. Melinda G, Kamilah FZ, Rizki Amelia S, Nida S, Kusuma D, Adrison V. Loose cigarette purchase and adolescent smoking in Indonesia: A mixed-methods study. BMJ Open. 2025;15(1):e087786. https://doi.org/10.1136/bmjopen-2024-087786.
10. Azzahro EA, Dewi D, Puspikawati SI, Handayani RP, Ayodya G, Prayogi ARY, et al. Two tobacco retailer programmes in Banyuwangi, Indonesia: A qualitative study. Tob Control. 2021;30:e50–5. https://doi.org/10.1136/tobaccocontrol-2020-055834.
11. BPS-Statistics Indonesia. National Consumer Prices of Selected Goods and Services 2024. Jakarta: BPS-Statistics Indonesia; 2025.
12. World Health Organization. WHO Framework Convention on Tobacco Control. Geneva; 2003.
13. Fagbule OF, Egbe CO, Ayo-Yusuf OA. Tobacco vendors' perceptions and compliance with tobacco control laws in nigeria. Int J Environ Res Public Health. 2023;20(22):7054. https://doi.org/10.3390/ijerph20227054.
14. Mallya S, Kumar P, Bhagawath R, Jahan A, Nayak R, Kulkarni M. Compliance to select sections of Cigarettes and other Tobacco Products Act (COTPA) around POS and perception of tobacco vendors about tobacco control policies and vendor licensing: A mixed method study from four districts of a South Indian State. Clin Epidemiol Glob Heal. 2025;33:101999. https://doi.org/10.1016/j.cegh.2025.101999.
15. Singh A, Ross H, Dobbie F, Gallagher A, Kinnunen T, Logo DD, et al. Extent of illicit cigarette market from single stick sales in Ghana: Findings from a cross-sectional survey. BMJ Open. 2023;13(3):e062476. https://doi.org/10.1136/bmjopen-2022-062476.
16. Fauzi A, Saefi M, Kristiana E, Adi W, Muchson M, Setiawan ME, et al. Validating of knowledge, attitudes, and practices questionnaire for prevention of COVID-19 infections among undergraduate students: A RASCH and factor analysis. Eurasia J Math Sci Technol Educ. 2020;16:em1926. https://doi.org/10.29333/ejmste/9352.
17. Ezhumalai S. Awareness about loose tobacco ban among tobacco users and vendors: A cross-sectional study. Indian J Dent Sci. 2022;14:121-6. https://doi.org/10.4103/ijds.ijds_25_21.
18. Ezhumalai S, Shanmugam B, Chand PK, Murthy P. Compliance with Section 7 (2) of the Cigarettes and Other Tobacco Products Act (COTPA) 2003, Ban of Sale of Loose Tobacco, in Karnataka: A Cross-Sectional Study. Indian J Psychol Med. 2023;45(2):139-45. https://doi.org/10.1177/02537176221127139.
19. Filby S, van der Zee K, van Walbeek C. The temporary ban on tobacco sales in south africa: Lessons for endgame strategies. Tob Control. 2022;31(6):694-700. https://doi.org/10.1136/tobaccocontrol-2020-056209.
20. Cavazos-Rehg P, Li X, Kasson E, Kaiser N, Borodovsky JT, Grucza R, et al. Exploring how social media exposure and interactions are associated with ENDS and tobacco use in adolescents from the PATH study. Nicotine Tob Res. 2021;23(3):487-94. https://doi.org/10.1093/ntr/ntaa113.
21. Satpathy N, Jena PK, Sahoo M, Agarwal SJ, Raut K, Sahu M, et al. Changes in smoking patterns in Turkey before and after the ban on loose cigarettes: An ecological perspective from global tobacco surveillance data. Cureus. 2024;16(9):e69657. https://doi.org/10.7759/cureus.69657.
22. Kapoor S, Mehra R, Yadav A, Lal P, Singh RJ. Banning loose cigarettes and other tobacco products in india: A policy analysis. Asian Pac J Cancer Prev. 2021;22(S2):51-7. https://doi.org/10.31557/apjcp.2021.22.S2.51.
23. Forden CL, Carrillo AM. Smoking and attitudes toward smoking policy at a university in egypt. J Ethn Subst Abuse. 2016;15(4):329-45. https://doi.org/10.1080/15332640.2015.1066288.
24. Haddad C, Sacre H, Hajj A, Lahoud N, Akiki Z, Akel M, et al. Comparing cigarette smoking knowledge and attitudes among smokers and non-smokers. Environ Sci Pollut Res Int. 2020;27(16):19352-62. https://doi.org/10.1007/s11356-020-08162-z.
25. Nogueira SO, Fu M, Lugo A, Tigova O, Henderson E, López MJ, et al. Non-smokers' and smokers' support for smoke-free legislation in 14 indoor and outdoor settings across 12 european countries. Environ Res. 2022;204(Pt C):112224. https://doi.org/10.1016/j.envres.2021.112224.
26. Rahman KMM, Gietel-Basten S. Influence of knowledge and attitudes on youth smoking in rural areas of the Mymensigh districts of Bangladesh: A cross-sectional study. SAGE Open. 2024;14:1-8. https://doi.org/10.1177/21582440241252489.
27. Van Mourik DJA, Candel M, Nagelhout GE, Willemsen MC, Fong GT, Hummel K, et al. Support for a point-of-sale cigarette display ban among smokers: Findings from the International Tobacco Control (ITC) Netherlands Survey. BMC Public Health. 2018;18(1):740. https://doi.org/10.1186/s12889-018-5666-4.
28. Viinikainen J, Bryson A, Böckerman P, Kari JT, Lehtimäki T, Raitakari O, et al. Does better education mitigate risky health behavior? A mendelian randomization study. Econ Hum Biol. 2022;46:101134. https://doi.org/10.1016/j.ehb.2022.101134.
29. Boderie NW, Sheikh A, Lo E, Sheikh A, Burdorf A, van Lenthe FJ, et al. Public support for smoke-free policies in outdoor areas and (semi-)private places: A systematic review and meta-analysis. EClinicalMedicine. 2023;59:101982. https://doi.org/10.1016/j.eclinm.2023.101982.