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Psychosocial Impact of the COVID-19 Pandemic on Smoking Behavior Among University Students in Indonesia

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Abstract

The COVID-19 pandemic has profoundly affected mental health and health-related behaviors, including tobacco use. University students represent a vulnerable group due to academic disruptions, social isolation, and lifestyle changes. This cross-sectional study examined the psychosocial impact of the COVID-19 pandemic on smoking behavior among Indonesian university students. An online survey of 62 respondents assessed demographics, smoking status, changes in smoking patterns, and psychosocial factors such as anxiety, stress, mood, and sleep problems. Among participants, 29% were smokers, mostly male (94%) and aged 20–23 years (61%). Conventional tobacco use predominated (83%), while e-cigarettes accounted for 17%. During the pandemic, 61% reported no change in smoking frequency, 33% a moderate increase, and 6% a heavy increase. Interestingly, students with unchanged smoking habits reported higher psychosocial distress, while those who increased smoking reported fewer complaints, suggesting diverse coping strategies. These findings highlight the complex relationship between stress and tobacco use among Indonesian students and underscore the need for integrated mental health and smoking prevention programs in universities.

KEYWORDS

covid-19; psychosocial impact; smoking behavior; university students; indonesia.

Introduction

The COVID-19 pandemic has reshaped global health dynamics, not only through its biological impact but also through its profound effects on mental health and behavioral adaptations. Since early 2020, universities across the world have faced unprecedented disruptions to academic and social life. Students were forced to transition to online learning, adapt to limited mobility, and confront financial and emotional uncertainty (Lima et al., 2020). These changes have contributed to significant increases in stress, anxiety, depressive symptoms, and sleep problems among young adults (Savage et al., 2020; Sundarasen et al., 2020; Wang et al., 2020). Consequently, the pandemic has evolved into not only a health crisis but also a psychosocial crisis that disproportionately affected university students as one of the most vulnerable demographic groups.

Smoking behavior, a long-standing public health concern, has received renewed attention during the pandemic. According to the World Health Organization (World Health Organization, 2021), tobacco-related diseases remain responsible for over eight million deaths annually, and approximately 80% of smokers live in low- and middle-income countries. The pandemic added a psychological layer to this health burden, as smoking became intertwined with stress regulation, boredom management, and emotion control (Dubey et al., 2020). In periods of crisis, tobacco use often serves as an immediate coping mechanism for distress, even among populations aware of its health risks.

From a behavioral science perspective, two dominant frameworks can explain variations in smoking during crises: the Health Belief Model (HBM) and the Stress and Coping Theory. The HBM posits that an individual's engagement in health-related behaviors depends on four central constructs—perceived susceptibility, perceived

severity, perceived benefits, and perceived barriers (Champion & Skinner, 2008; Rosenstock, 1974). In the context of COVID-19, individuals who perceived themselves as vulnerable to severe infection or respiratory complications were more likely to attempt smoking cessation or reduction (Patanavanich & Glantz, 2020). Conversely, students who felt less threatened or who experienced high psychological burden might have increased smoking to relieve anxiety.

Lazarus & Folkman (1984) theory of stress and coping further complements this framework by emphasizing the cognitive appraisal process. Under intense stress, individuals evaluate potential threats (primary appraisal) and their available coping resources (secondary appraisal). When adaptive coping mechanisms—such as social support or problem-solving—are unavailable, maladaptive behaviors like smoking can emerge as temporary emotional regulation strategies. This perspective aligns with the self-medication hypothesis, which suggests that nicotine may transiently alleviate negative affect by stimulating dopaminergic pathways, although it ultimately reinforces dependence (Harris, 2020; Nguyen et al., 2024).

Globally, studies reveal mixed trends in smoking behavior during the pandemic ("Systematic Review of Smoking Behavior Changes during COVID-19," 2022). In high-income countries, some evidence points to reductions in smoking due to heightened health consciousness and mobility restrictions. E-Cigarette Use among Youths in the United States during COVID-19 (2021) For instance, longitudinal studies in the United States and United Kingdom documented decreases in both cigarette and e-cigarette use during lockdowns, attributed to reduced social opportunities and increased health awareness "(Chen, 2022; "Decreases in Smoking and Vaping during COVID-19 Lockdowns: Evidence from Longitudinal UK Surveys," 2022). Similarly, meta-analyses found that individuals with strong perceived vulnerability to COVID-19 were more likely to quit or reduce smoking ("How Did the COVID-19 Pandemic Change Cigarette Smoking? A Systematic Review," 2024; "Tobacco Smoking Changes during Pre-Vaccination Phases of COVID-19," 2022).

However, other studies demonstrate increases in tobacco consumption among specific populations—particularly young adults, men, and individuals under psychological stress (Truth Initiative, 2023). Surveys in Western Europe, East Asia, and North America reported a subset of smokers who increased their consumption during confinement as a means of coping with anxiety, isolation, or boredom (Busse et al., 2021; Kim & Park, 2023; Lee et al., 2022). Nguyen et al. (2024) observed that pandemic-related stress was positively associated with smoking frequency among vulnerable groups, even among individuals with prior attempts to quit. These patterns highlight how smoking functions both as a health-risk behavior and a maladaptive coping mechanism within stressful environments.

In addition to traditional cigarette use, patterns of e-cigarette consumption also changed ("Tobacco Consumption Behavior Change during COVID-19 Pandemic: A Meta-Analytic Review," 2024). Research showed that perceived risk of COVID-19 infection influenced vaping behaviors, as individuals who underestimated their vulnerability tended to maintain or increase e-cigarette use during lockdown (Adebayo et al., 2024). This underscores how perception of health risks—an HBM construct—can shape behavioral outcomes beyond conventional tobacco use.

The situation in Southeast Asia provides a distinct cultural and policy context. Tobacco use remains socially embedded in many Asian societies, where smoking is often associated with masculinity, social bonding, and cultural identity (Rahman et al., 2022). Despite increasing awareness campaigns, the social acceptability of smoking remains high, particularly among men. In countries like Indonesia, where cigarette affordability and accessibility remain among the highest globally, smoking has been normalized as part of daily social interaction. During the pandemic, these cultural and structural factors may have moderated behavioral responses to stress, making it less likely for individuals to change smoking habits despite rising health concerns.

In Indonesia specifically, smoking prevalence is alarmingly high. The National Basic Health Survey (R.I.S.K.E.S.D.A.S., 2021) reported that 33.8% of adults were active smokers, and nearly one in five individuals aged 15–24 regularly consumed tobacco. The high prevalence among young men reflects deep-rooted cultural acceptance, aggressive tobacco marketing, and limited policy enforcement. Hanafi et al. (2021) found that cigarette and alcohol consumption among Indonesian youth remained stable during pandemic lockdowns, suggesting that restrictions did not significantly alter substance use behavior. Similarly, Amalia et al. (2023) emphasized that peer influence and social norms play central roles in sustaining smoking among university students, regardless of health education exposure.

Recent national findings confirm that dependency levels among student smokers remained relatively high throughout the pandemic, further highlighting the resilience of smoking habits in this group (Ramadhani et al., 2023). This persistence reflects not only the social normalization of smoking but also the limited effectiveness of public health messaging during periods of crisis.

Several Indonesian studies have highlighted the psychological burden experienced by students during COVID-19. Kadir et al. (2023) identified significant increases in anxiety, stress, and depressive symptoms among university students due to academic disruptions and social isolation. The absence of structured mental health services in many universities likely exacerbated emotional distress, leaving students to rely on individual coping mechanisms. This psychosocial vulnerability creates conditions conducive to maladaptive behaviors, including smoking, overeating, and reduced physical activity (Savage et al., 2020).

Beyond cultural influences, longitudinal research has shown that psychological distress and economic uncertainty were key predictors of increased smoking during the pandemic. Individuals experiencing job insecurity and financial worries demonstrated higher odds of smoking escalation, reflecting stress-related coping behaviors. This relationship underscores the importance of contextual factors—economic, psychological, and environmental—in shaping health behaviors.

Interestingly, not all behavioral responses to pandemic stress were negative. Some young adults developed adaptive coping strategies such as increased religious activities, mindfulness practices, or online peer interactions (Zhou et al., 2023). Others turned to digital coping tools like social media engagement or online gaming, which in some cases mitigated loneliness but in others reinforced sedentary lifestyles (Suwartono et al., 2024; Zhang et al., 2023). These alternative behaviors illustrate the complex spectrum of coping responses among university students facing prolonged uncertainty.

Comparative evidence from other middle-income countries in Asia shows similar patterns. A longitudinal study in Iran reported that social and familial stressors during early adulthood significantly predicted continued smoking, highlighting the importance of social determinants and early prevention (Rezazadeh et al., 2023). Such findings align with the Indonesian context, where familial modeling and peer norms reinforce tobacco use among male youth.

Recent behavioral studies also suggest that broader

lifestyle factors, such as diet and sleep patterns, are associated with smoking initiation and persistence among university students. A Japanese cohort study, for instance, found that irregular breakfast habits were linked to higher smoking initiation rates, implying a shared behavioral risk profile among young adults (Kishimoto et al., 2024). These insights underscore the interconnectedness of mental health, lifestyle, and smoking behavior during transitional life stages such as university life.

Despite abundant global research, there remains a lack of local evidence exploring the psychosocial determinants of smoking behavior among Indonesian university students during the pandemic. While studies have examined smoking prevalence, few have directly linked psychosocial variables—such as anxiety, mood, sleep, and stress—with specific changes in smoking intensity. Understanding this relationship is critical, as it can inform the design of integrated prevention strategies that address both mental health and substance use.

Moreover, smoking behavior during crises reflects broader social determinants of health. Economic instability, gender expectations, and social isolation each contribute to how individuals perceive and respond to stressors (Dubey et al., 2020; Nguyen et al., 2024). For example, male students may experience greater pressure to conform to masculine norms that equate smoking with maturity or control (Amalia et al., 2023; Rahman et al., 2022). Conversely, female students, though less likely to smoke, may exhibit higher psychological distress, highlighting gendered coping differences (Kadir et al., 2023; Lee et al., 2022).

Given these multidimensional influences, it is essential to contextualize smoking behavior within a holistic psychosocial framework. The interplay between stress, coping, cultural norms, and policy environments determines whether individuals adopt or modify smoking habits under duress. As such, this study aims to examine the psychosocial impact of the COVID-19 pandemic on smoking behavior among Indonesian university students. Specifically, it investigates how variables such as anxiety, stress, mood changes, and sleep disturbances relate to smoking frequency and behavioral adjustments.

By integrating psychological theory with cultural analysis, this research contributes to a nuanced understanding of health-risk behaviors among young adults in Indonesia. Its findings are expected to guide universities and policymakers in developing targeted interventions that combine mental health promotion with smoking prevention programs—particularly during times of widespread crisis.

Methods

This cross-sectional survey targeted Indonesian university students. A total of 62 respondents participated through convenience sampling using an online questionnaire. Eligibility criteria included being enrolled in a university in Indonesia and providing informed consent.

Instrument

The questionnaire comprised two sections:

1. Demographics (age, gender, type of activity, religion). Instead of "occupation," responses were categorized as students without additional paid work and students with paid part-time/full-time work.
2. Smoking behavior (smoker/non-smoker, type of cigarette, and changes during the pandemic). Changes were categorized as:
   - o No change
   - o Moderate increase (1–4 extra cigarettes/day or 1–5 e-cigarette puffs/day)
   - o Heavy increase (≥5 extra cigarettes/day or ≥6 e-cigarette puffs/day)

Psychosocial variables

Included anxiety, stress, depressive mood, euphoria, cervical pain, sleep disturbances, appetite loss, and digestive problems, rated on a 5-point Likert scale (1 = never, 5 = very often). Items were adapted from validated instruments (Chen, 2022; Hanafi et al., 2021).

Ethics

Approval was obtained from the Faculty of Medicine, Universitas Nahdlatul Ulama Surabaya. Participation was voluntary with online informed consent.

Data Analysis

Descriptive statistics (frequencies, percentages) and cross-tabulations were used to explore associations between smoking behavior and psychosocial variables.

Result and Discussion

A total of 62 students participated in this study (Table 1). Slightly more than half were male (52%), and the majority were aged 20–23 years (68%). Most were students without additional paid work (72%). All respondents identified as Muslim.

Among all respondents, 29% were smokers (Table 2). Tobacco was more common than e-cigarettes, and during the pandemic, most smokers reported no change in smoking frequency, while a smaller proportion increased their consumption.

Table 1. Demographic characteristics of respondents

Variable	Category	n	%
Gender	Male	32	52.0
	Female	30	48.0
Age group (years)	16–19	8	13.0
	20–23	42	68.0
	24–26	12	19.0
Work status	No paid work	45	72.0
	Paid part-time/full-time	17	28.0
Religion	Islam	62	100.0

Table 2. Smoking status, type of cigarette, and changes in smoking habits

Variable	Category	n	%
Smoking status	Non-smoker	44	71.0
	Smoker	18	29.0
Type of cigarette (n=18)	Tobacco	15	83.0
	E-cigarette	3	17.0
Change in smoking habit	No change	11	61.0
	Moderate increase	6	33.0
	Heavy increase	1	6.0

Table 3. Psychosocial factors by smoking behavior

Psychosocial factor	No change (n=11)	Moderate increase (n=6)	Heavy increase (n=1)
Anxiety	Frequently	Rarely	Rarely
Stress	Frequently	Rarely	Rarely
Depressive mood	Frequently	Occasionally	Rarely
Sleep disturbances	Frequently	Occasionally	Rarely
Euphoria	Occasionally	Rarely	Occasionally
Cervical pain	Occasionally	Rarely	Frequently
Appetite loss	Occasionally	Rarely	Rarely
Digestive problems	Occasionally	Occasionally	Rarely

Psychosocial symptoms showed variation according to smoking behavior (Table 3). Students who reported no change in smoking were more likely to experience anxiety, stress, depressive mood, and sleep disturbances. Those who increased smoking tended to report fewer complaints, while the single heavy-increase respondent reported only physical discomfort.

This study examined the psychosocial impact of the COVID-19 pandemic on smoking behavior among Indonesian university students. The main findings indicate that the majority of student smokers did not change their smoking frequency during the pandemic, while a smaller proportion reported increases. Interestingly, those who increased smoking reported fewer psychosocial complaints, suggesting that tobacco use may have functioned as a short-term coping mechanism. These findings contribute to the understanding of how psychosocial stress interacts with smoking behavior in young adults, particularly in the Indonesian context, where research on this issue remains limited.

Smoking Behavior Stability During the Pandemic

Our results demonstrate that most Indonesian university student smokers maintained their usual smoking frequency during the COVID-19 pandemic. This stability mirrors findings from studies conducted in Germany and Türkiye, which also reported little to no change in smoking rates among university students during lockdowns and remote learning (Bostan et al., 2022; Busse et al., 2021). In Indonesia, Hanafi et al. (2021) similarly found that cigarette and alcohol consumption among young people remained stable during quarantine periods, suggesting that the pandemic did not necessarily trigger large-scale changes in substance use behaviors.

The persistence of smoking behaviors during crises may reflect deeply ingrained habits, cultural acceptance of tobacco use, and the accessibility of cigarettes in Indonesia. Unlike in some countries where pandemic restrictions reduced access to tobacco products, cigarettes remained widely available in Indonesia, which may explain the absence of significant declines in smoking prevalence among students.

Evidence of Increases in Smoking

Although most students did not change their smoking habits, about one-third reported moderate increases. This pattern is consistent with international surveys indicating that a substantial proportion of smokers increased consumption during the early phases of the pandemic (Hussong et al., 2023; Nguyen et al., 2024). Increased smoking in these cases has been attributed to elevated stress, anxiety, and social isolation caused by pandemic restrictions (Dubey et al., 2020; Kadir et al., 2023).

The finding that Indonesian students who increased smoking reported fewer psychosocial complaints may be interpreted as a short-term "self-medication" effect. Students experiencing stress may have turned to smoking as a coping strategy, temporarily alleviating anxiety, tension, or sleep problems. This aligns with prior research showing that nicotine can provide transient mood regulation, although it ultimately exacerbates stress and anxiety in the long term (Amalia et al., 2023; Harris, 2020).

Evidence of Decreases in Smoking Elsewhere

Conversely, several studies have reported reductions in smoking during the pandemic, particularly in contexts where social interaction plays a central role in tobacco use. For example, surveys in U.S. universities indicated declines in smoking and vaping, attributed to decreased peer interaction and limited product access during lockdowns ("Decreases in Smoking and Vaping during COVID-19 Lockdowns: Evidence from Longitudinal UK Surveys," 2022; "Preliminary Impact of the COVID-19 Pandemic on Health Behavior," 2020). Some students may have viewed the pandemic as an opportunity to quit smoking due to heightened health awareness, especially given the established link between smoking and increased risk of severe COVID-19 outcomes (Patanavanich & Glantz, 2020; World Health Organization, 2021).

This contrast with our findings highlights the influence of cultural, social, and structural factors. In Indonesia, smoking is highly normalized, especially among men, and the absence of strict restrictions on cigarette availability may have prevented decreases in smoking.

Psychosocial Stress and Smoking Patterns

One of the more striking findings of this study is that students who reported no change in smoking were more likely to experience higher levels of psychosocial distress, including anxiety, stress, and sleep disturbances. Meanwhile, students who increased their smoking reported fewer such complaints. This paradox suggests that smoking may have provided temporary relief for those experiencing stress, thereby masking or reducing the perception of psychological burden.

However, reliance on nicotine as a coping mechanism is problematic. Research indicates that while smoking may reduce stress acutely, it contributes to long-term vulnerability by impairing adaptive coping and reinforcing dependence (Harris, 2020; Nguyen et al., 2024). Over time, this cycle may exacerbate mental health problems and make cessation more difficult. The apparent short-term benefits of smoking therefore represent a maladaptive coping strategy that poses significant risks to both mental and physical health.

Cultural and Contextual Factors

Cultural context plays an important role in shaping smoking behaviors during crises. In Indonesia, smoking is socially acceptable and often embedded in male student culture (Amalia et al., 2023). This cultural backdrop may explain why even during a public health crisis, smoking behaviors largely persisted or even increased. By contrast, in countries where smoking is less normalized and where public health campaigns are stronger, reductions in smoking were more common.

Moreover, the pandemic disrupted academic and social routines, leading to heightened uncertainty and stress among students (Kadir et al., 2023; Sundarasen et al., 2020). In the absence of widespread psychosocial support services in Indonesian universities, students may have resorted to smoking as an accessible coping mechanism. This underscores the need for culturally tailored interventions that consider local norms and the availability of healthier coping strategies.

Implications for Health Promotion

The findings of this study have several important implications. First, university health services should integrate smoking cessation initiatives with mental health support programs. Addressing smoking behavior in isolation may be less effective than tackling the underlying psychosocial stressors that drive substance use.

Second, public health campaigns should highlight the long-term risks of relying on smoking as a coping mechanism. Given the association between smoking and severe COVID-19 outcomes (Patanavanich & Glantz, 2020; World Health Organization, 2021), targeted messages are particularly urgent in times of crisis. Campaigns should not only emphasize health risks but also provide practical stress-management alternatives such as counseling, peer support, or mindfulness-based interventions.

Third, preventive interventions should focus on resilience-building among students. Universities can play a pivotal role by offering stress management workshops, online counseling, and peer-support groups. Creating a supportive environment where students can adopt healthier coping strategies may reduce the reliance on smoking during stressful periods.

Limitations

This study has several limitations. First, the cross-sectional design prevents causal inference between psychosocial distress and smoking behavior. Longitudinal studies are needed to clarify whether stress leads to changes in smoking or vice versa. Second, the use of self-reported measures introduces potential biases, including underreporting or overreporting of smoking behavior and psychosocial symptoms. Third, the relatively small and region-specific sample limits generalizability to the broader Indonesian student population.

Despite these limitations, this study provides valuable insights into the psychosocial determinants of smoking behavior among Indonesian university students during the COVID-19 pandemic. Future research should expand to larger and more diverse samples and incorporate longitudinal designs to better understand the dynamic interplay between mental health and smoking ("Smoking and COVID-19: A Systematic Review of the Evidence," 2021).

Conclusion

This study highlights the complex relationship between psychosocial stressors and smoking behavior among Indonesian university students during the COVID-19 pandemic. Most smokers did not change their smoking habits, but those who maintained smoking tended to report higher psychosocial distress. In contrast, increased smoking was linked with fewer complaints, indicating its role as a coping mechanism. Interventions should address both mental health and smoking prevention, particularly during public health crises.

Author contributions

Aldillah Esa Fitri conceptualized the study, collected the data, and drafted the manuscript. Rika Hardiyanti Hanifa, Mega Astri, and Misbakhul Munir assisted with data analysis and interpretation. M. Idham Cholid provided statistical consultation and manuscript revision. Hafid Algristian contributed to the conceptual framework and critical review of the manuscript. Anna Purnamasari Sugijanti supervised the project, validated the methodology, and finalized the manuscript. All authors approved the final version of the manuscript.

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Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this case report.

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