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Associations Between Self-Efficacy, Stress, Anxiety, Depression, and Smoking Dependence

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Abstract

Background: Smoking remains a prevalent health issue, particularly among adults in low- and middle-income countries. Psychological factors such as stress, anxiety, depression, and self-efficacy are believed to influence smoking behavior and nicotine dependence, especially during periods of societal disruption such as the COVID-19 pandemic.
Objective: This study aimed to examine the relationship between self-efficacy, psychological distress (stress, anxiety, and depression), and the level of smoking dependence among adult smokers in the community surrounding Sukawarna Public Health Centre, Indonesia.
Methods: A cross-sectional study was conducted from May to July 2022, involving 171 adult smokers aged 26–45 years selected through random sampling. Data were collected using validated instruments: the Indonesian version of DASS-21 for stress, anxiety, and depression; SEQ-12 for self-efficacy; and the CDS-12 for smoking dependence. Statistical analysis included descriptive statistics, Spearman correlation, Mann–Whitney U test, and multiple linear regression.
Results: Most participants were male (88.3%), with a mean age of 31.9 years and an average smoking duration of 14.3 years. Moderate levels of stress and anxiety were reported by a significant portion of respondents. Smoking dependence was positively associated with age, smoking duration, stress, anxiety, and depression, while self-efficacy showed a significant negative correlation (p < 0.05). Gender differences in dependence levels were also statistically significant.
Conclusion: Smoking dependence among adults is influenced by both psychological and demographic factors. Higher stress, anxiety, and depression levels are linked to greater dependence, whereas stronger self-efficacy is associated with reduced smoking dependence. Interventions that address emotional well-being and enhance self-efficacy may support smoking reduction efforts, particularly during public health crises.

Keywords: Smoking dependence, self-efficacy, stress, anxiety, depression, adult smokers, Indonesia

INTRODUCTION

Indonesia has a high smoking prevalence compared with other middle-income countries. The smoking prevalence rate in Indonesia reached 37.6% in 2020, consistently increasing from year to year (IDN, 2022). According to the Global Adult Tobacco Survey conducted by the Indonesia Ministry of Health in 2021, the number of smokers had increased by 8.8 million during the past decade (KOMNAS PT, 2020). Thus, it is not

surprising that Indonesia's five leading causes of death are associated with tobacco consumption (Zheng et al., 2018)

During covid 19 pandemic, Indonesia is also battling the consequences of the COVID-19 pandemic on health and the economy since the first case was reported. Indonesia has become the country with the highest number of covid 19 infections in Southeast Asia, with more than 131,491 deaths and an incidence rate of 4 million (Kemenkes RI, n.d.). In response to the case and in line with the WHO's recommendations, the Indonesian government concurrently implemented a health strategy to reduce the transmission rate of covid 19, such as social distancing and partial lockdown (Kemenkes RI, 2021). These recommendations, however, may affect people's health and living conditions and behavioral changes such as increased cigarette consumption (Malta et al., 2021).

Traumatic events and crises have been previously linked to the use of tobacco (Pericot-Valverde et al., 2018). An increase in tobacco consumption was reported during the previous economic crisis (Gallus et al., 2015), and covid 19 pandemic crisis may also lead to the rise of this substance. The reported increase in cigarette consumption during the Covid-19 pandemic had previously been discovered in the population of various countries (Guignard et al., 2021; Koopmann et al., 2021). However, studies of smoking behaviors during the pandemic have shown increases, decreases, and constant smoking rates across various populations (Klemperer et al., 2020; Stanton et al., 2020).

In Indonesia, according to a survey conducted by the National Committee for Tobacco Control in 2020, the smoker attained a 50.2% increase in smoking intensity (KOMNAS PT, 2020). Another study showed that 35.7 percent reported their cigarette smoking was constant, while 45.5 percent stated that it had increased (Ruhyat, 2021). In line with another study, around 20.1% of smokers increased the number of cigarettes consumed (Hanafi et al., 2021).

Increased consumption of cigarettes may associate with a level of dependence on cigarettes. Addiction to cigarettes is a problem in the brain caused by the nicotine in cigarettes, which might affect how the brain works and is characterized by relapses to persist in using these substances (Risdiana & Proboningrum, 2019). A study on smoking dependence reported that the significant factor associated with smoking dependence was increased and unchanged cigarette use during a pandemic (Clendennen et al., 2021). Before the pandemic, the level of smoking dependence was 26.9 percent at most in the deficient dependency category. Still, it changed during the pandemic, when the most dependency was the very high category with 27.9 percent (Fidancı et al., 2021).

Given the evidence that the pandemic has increased stress, anxiety, and depression and that these mental health conditions are associated with higher smoking rates, it could be expected that smoking rates would increase during the pandemic (Loud et al., 2021). Moreover, these pandemic-induced adverse psychological outcomes may increase the risk of addictive substance abuse and engagement in addictive behaviors (Sun et al., 2020). The research showed that the higher the stress score, the higher nicotine dependence on cigarettes occurred among smokers (Sim et al., 2021), and vice versa (El-Sherbiny & Elsary, 2022).

On the other hand, the decreased levels of smoking dependence were associated with self-efficacy as one of the factors. Based on research in 2015, self-efficacy affects nicotine dependence (Chae & Choi, 2015). A study showed that the respondents with high self-efficacy were significantly associated with low nicotine dependence (Gaur et al., 2021). Hence, improving smoking abstinence self-efficacy was more likely to have lower nicotine dependence (Ma et al., 2020).

Although many past studies have been conducted to assess tobacco dependence amid a crisis or the COVID-19 epidemic, few studies have addressed situations in Indonesia. Considering nicotine dependence and its accompanying determinants, there is a need to understand how mental health

conditions, self-efficacy, and tobacco dependency have evolved throughout the covid 19 epidemic and how these outcomes interact with one another.

METHODS
Study Design
This study employed a quantitative cross-sectional design, conducted from May to July 2022. The aim was to examine the association between self-efficacy, psychological distress (stress, anxiety, and depression), and smoking dependence among adult smokers residing in the community surrounding Sukawarna Public Health Centre, Indonesia.

Sample
The target population included active smokers aged between 26 and 45 years. Participants were eligible for inclusion if they met the following criteria: (1) identified as an active smoker, (2) aged 26–45 years, (3) able to read and write in Bahasa Indonesia, and (4) provided informed consent. Individuals with significant cognitive or literacy impairments that hindered their ability to complete the questionnaire were excluded.

The required sample size was calculated using G*Power version 3.1.9.7 with the statistical test set to Multiple Linear Regression: Fixed model, R² deviation from zero. With an assumed medium effect size (f^2 = 0.15), $α$ = 0.05, power = 0.95, and seven predictors, the minimum sample size required was 153 participants. To account for potential non-response or withdrawal, an additional 10% was added, resulting in a final target sample of 168 participants. A random sampling technique was applied to select eligible respondents from the community registry maintained by the public health center.

Instruments
Depression Anxiety Stress Scale (DASS-21) to measure psychological distress, the Indonesian version of the DASS-21 was utilized. The instrument consists of 21 items, divided into three subscales measuring depression, anxiety, and stress, each containing 7 items. Respondents rated items using a 4-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much or most of the time"). Scores for each subscale are summed and multiplied by two to obtain final severity ratings. The Indonesian version has demonstrated acceptable validity and reliability in previous studies (Kinanthi et al., 2020), with Cronbach's alpha values exceeding 0.80 across subscales.

Smoking Self-Efficacy Questionnaire (SEQ-12) used to measure elf-efficacy in resisting the urge to smoke was assessed using the SEQ-12, which includes 12 items grouped into two domains: internal stimuli (emotional situations) and external stimuli (social situations). Each item is rated on a 5-point scale from 1 ("Not at all sure") to 5 ("Absolutely sure"). Higher scores reflect stronger confidence in the ability to refrain from smoking. The Bahasa Indonesia version of SEQ-12 has been validated with high internal consistency (Hadiyani et al., n.d.)

Smoking dependence was measured using the Cigarette Dependence Scale (CDS-12), originally developed by Etter et al. (2003). This instrument comprises 12 items that evaluate multiple dimensions of nicotine dependence. The original English version was professionally translated into Bahasa Indonesia for this study using a forward-backward translation method. Although the translated version has not been psychometrically validated, expert reviews confirmed face and content validity. Responses are scored on a Likert scale, and higher total scores indicate greater dependence on cigarettes.

Procedure
Participants completed the self-administered questionnaires in a private, supervised setting to ensure confidentiality and assist with any clarifications. Upon completion, participants were provided with brief verbal feedback regarding stress or smoking behavior management strategies, along with a printed health education leaflet. All data were anonymized and stored securely for analysis.

Data Analysis
Data were analyzed using SPSS version 19.0. Descriptive statistics were used to summarize participant demographics and instrument scores. An independent samples t-test was performed to compare smoking dependence between male and female participants. Spearman's rank correlation was used to explore the relationship between self-efficacy, psychological distress variables (depression, anxiety, and stress), and

smoking dependence. A multiple linear regression analysis was conducted to identify the most significant predictors of smoking dependence. Statistical significance was set at p < 0.05, with a 95% confidence level.

Ethical consideration

This study received ethical approval from the Institutional Review Board of. Following approval, the research team coordinated with community leaders and the local public health center to disseminate study information and recruit eligible participants. Individuals who met the inclusion criteria were invited to participate, and written informed consent was obtained before data collection.

RESULTS

A total of 171 participants were included in the analysis. Descriptive data on age, smoking behavior, and gender are summarized in Table 1. The mean age of respondents was 31.9 years (SD = 5.1), with an average smoking duration of 14.3 years (SD = 5.0). The majority of participants were male (88.3%), while female respondents accounted for 11.7%.

Table 1. Demographic Characteristics of Participants (N = 171)

Variable	Mean (SD)	Frequency (n)	Percentage (%)
Age (years)	31.9 (5.1)		
Smoking duration (years)	14.3 (5.0)		
Gender			
Male		151	88.3%
Female		20	11.7%

Stress, anxiety, and depression levels were measured using the DASS-21 instrument and are presented in Table 2. Approximately 36.8% and 38.6% of respondents exhibited normal levels of stress and anxiety, respectively. In contrast, a greater proportion−75.4%−showed normal levels of depression. A small percentage of respondents exhibited moderate to extremely severe psychological symptoms, with stress being more prominent than anxiety and depression.

Table 2. Levels of Stress, Anxiety, and Depression Among Respondents (N = 171)

Variable	Category	Frequency (n)	Percentage (%)
Stress	Normal	63	36.8%
	Mild	15	8.8%
	Moderate	24	14.0%
	Severe	36	21.1%
	Extremely Severe	33	19.3%
Anxiety	Normal	66	38.6%
	Mild	51	29.8%
	Moderate	29	17.0%
	Severe	21	12.3%
	Extremely Severe	4	2.3%
Depression	Normal	129	75.4%
	Mild	34	19.9%
	Moderate	8	4.7%

Self-efficacy and smoking dependence scores are presented in Table 3. The mean self-efficacy score was 35.6 (SD = 13.2), while the average score for smoking dependence was 32.7 (SD = 10.9). Higher

smoking dependence scores reflect stronger tobacco addiction, whereas higher self-efficacy scores indicate greater confidence in resisting smoking in social and emotional situations.

Table 3. Self-Efficacy and Smoking Dependence Scores (N = 171)

Variable	Mean (SD)	Score Range
Self-efficacy (SEQ-12)	35.6 (13.2)	12 – 60
Smoking dependence (CDS-12)	32.7 (10.9)	12 – 60

Correlation and group difference analyses were conducted to explore associations between selected variables and smoking dependence. Results are summarized in Table 4. Significant positive correlations were found between smoking dependence and age, smoking duration, stress, anxiety, and depression, indicating that higher levels of these factors were associated with increased dependence. Conversely, self-efficacy was negatively correlated with smoking dependence, suggesting that individuals with stronger self-efficacy reported lower levels of dependence. Gender differences were statistically significant, with males showing higher smoking dependence scores compared to females.

Table 4. Correlation and Group Differences with Smoking Dependence (N = 171)

Independent Variable	r / t / z	p-value	Test Type
Age	.287**	< 0.001	Spearman correlation
Smoking duration	.266**	< 0.001	Spearman correlation
Gender (male vs. female)	-3.39*	0.003	Mann–Whitney U test
Stress	.251**	0.001	Spearman correlation
Anxiety	.230**	0.002	Spearman correlation
Depression	.192*	0.012	Spearman correlation
Self-efficacy	–.156*	0.042	Spearman correlation

Note: *$p < 0.05$, **$p < 0.01$ (2-tailed).

DISSCUSSION

Perceived stress is the emotion or thought a person has about how much-unwanted stuff they have accumulated over time. This study showed that the majority of the participant had normal level of stress. It is common that during the pandemic, most people feel uncertain environments, pressure, and crisis. Perceived stress includes uncertainty, how frequently one has to deal with unwelcome problems, and confidence in one's ability to deal with problems or difficulties (Gaur et al., 2021).

Stress is a normal part of life that everyone experiences regularly. Exhaustion after work, fear of not being accepted for work, or feeling the heart beat faster after physical activity. Moreover, adults are vulnerable to stress due to carrying increasingly heavy burdens, frustration, significant life disturbances/events, or even social and economic status (Ananda & Apsari, 2020). The Covid-19 pandemic has caused widespread fear and concern in the community (Pratama et al., 2021).

Anxiety during the Covid-19 pandemic can be influenced by several factors, such as the lack of public knowledge about Covid-19 and, how to implement clean and healthy living behavior during the Covid-19 pandemic, and the uncertainty of sudden changes (Zhang et al., 2020). Suddenly have a significant influence on people's lives, a lack of knowledge about physical and psychological health, and a lack of psychological coping in society. To overcome the anxiety during this pandemic, the public can access accurate information about Covid-19 from trusted sources, think positively, do fun activities, exercise, and still comply with health protocols (Rinaldi & Yuniasanti, 2020).

Depressive during a pandemic is defined as a strong emotion that affects a person during the Covid-19 pandemic (Mukhtar, 2020). People are at high risk for depression during the Covid-

19 outbreak. The reasons behind the level of depression in the community during the pandemic include staying at home, maintaining physical and social distance, and even doing quarantine to prevent the spread of the Covid-19 virus. Not just an appeal but strict regulations and prohibitions for carrying out activities outside the home have hampered economic and social-community activities during the Covid-19 outbreak (Maulida et al., 2020).

Study findings showed that the average self-efficacy of the respondents was in the medium category. Self-efficacy reflects a person's belief in his ability to overcome difficulties or obstacles encountered in specific tasks and situations. Self-efficacy is a fundamental and valuable construct in psychology because self-efficacy relates to a person's ability to perform various challenging behaviors, including disease prevention and behavioral management. Self-efficacy is context specific and appears to be especially important when individuals face adversity. When a person has positive beliefs, it is associated with increased motivation and persistence and an increased likelihood of resisting negative thoughts about one's abilities (Diana & Noviekayati, 2021).

Self-efficacy is the smoker's assumption that smokers can manipulate their smoking activities, so self-efficacy can be considered an essential component in healthy behavior change (Gaur et al., 2021). Self-efficacy is an individual's belief in organizing and implementing a program of action needed to produce a certain level of achievement (Diana & Noviekayati, 2021).

The findings from the present study indicate that demographic characteristics may be related to psychosocial variables that have been demonstrated to play a role in smoking practices. This study showed that age had an association with the level of smoking dependence. In line with research in 2019, the older a person is, the higher the dependency level they are. Compared with adolescent, elderly smokers had a moderate to high dependence on smoking (Risdiana & Proboningrum, 2019). There may be a number of reasons why older smokers have higher dependence levels. One of the reasons might be the low confidence in their ability to quit smoking successfully. With the long smoking history, perhaps older smokers assume they will encounter more significant difficulties in quitting.

Regarding the sex variable, men and women significantly differed in smoking dependence levels. Smoking addiction rates are generally higher among men than women. This is similar to other studies that state that gender affects smoking dependence, where smoking rates and addiction rates are generally higher among men than women (Fidancı et al., 2021). Cigarette consumption in men is higher than in women, and the average number of cigarettes consumed is 14.69 per day (Maulida et al., 2020). Due to Indonesian's strong social values around smoking, women are less likely to smoke than men. Smoking is common for men and has become a social facilitator in many social gatherings. From the self-absorption, habit/addiction dimension, men scored significantly lower than women, which is consistent with the feature that men smoke more than women. Hence, addiction rates among men are more serious(Ma et al., 2020).

In this study, there was also a significant relationship between the length of smoking and the level of smoking dependence. This is in line with a previous study conducted in 2010, which showed that the increase in the average score of the cigarette dependency questionnaire was in line with the longer a person smoked. Smokers who had consumed cigarettes for 15 years got the highest average score on the questionnaire on the level of cigarette dependence (Artana & Rai, 2010). The longer the use of cigarettes, the higher the smoking dependence. Adolescent

smokers tend to have a smoking period is less than five years with a percentage of 47%, so that these adolescent smokers enter into low dependence, while in elderly smokers (>60 years), the most extended smoking period is more than ten years with the percentage of 100% so that more older adults enter into high dependence (Risdiana & Proboningrum, 2019).

A recent study showed a significant relationship between stress levels and smoking dependence with a positive direction and feeble relationship strength, meaning that the higher the stress level, the higher the smoking dependence level. The results of this study are in line with the study in 2021, which showed that stress levels affect cigarette dependence, the higher stress score is associated with, the higher nicotine dependence on cigarettes (Sim et al., 2021). In line with other studies that show a statistically significant relationship exists between nicotine dependence on cigarettes and stress levels in smokers. Smokers with high levels of nicotine dependence showed severe and very severe stress levels of 26.1% and 22.7%, respectively (El-Sherbiny & Elsary, 2022).

A recent study showed a significant relationship between anxiety and the level of smoking dependence with a positive direction, and the strength of the association was feeble, meaning that the higher the level of anxiety, the higher the level of smoking dependence. Research conducted in 2021 also showed a relationship between the level of nicotine addiction in cigarettes and the level of anxiety. The correlation indicates that the higher the level of nicotine addiction in cigarettes, the higher the level of anxiety (Fahrizal et al., 2021). The association between anxiety and level of smoking dependence might be because increased nicotine dependence will cause more severe withdrawal symptoms that can make it difficult for them to quit smoking. On the other hand, research conducted by Sherbiny in 2022 showed no significant relationship between the level of dependence and anxiety (El-Sherbiny & Elsary, 2022).

The results showed a significant relationship between the level of depression and the level of smoking dependence, with the direction of a positive relationship, meaning that the higher the level of depression, the higher the level of smoking dependence. Similar results were also obtained in the study in 2022, which showed a statistically significant relationship between nicotine dependence on cigarettes and the level of depression in smokers. Smokers with high dependence levels exhibited rates of severe depression of 12.5% and 19.3%, respectively (El-Sherbiny & Elsary, 2022). In line with other studies that, depression rates tend to be higher in participants with high nicotine dependence (Sim et al., 2021).

The results showed that there was a significant relationship between self-efficacy and the level of smoking dependence in the direction of the negative association and the strength of the relationship was very weak, meaning that the higher the self-efficacy, the lower the smoking dependence level, on the other hand, the lower the self-efficacy, the higher the smoking dependence level. Similar results were reported in a previous study that the use of negative coping styles can lead to increased nicotine dependence on one hand. On the other hand, negative coping techniques can lead to reduced levels of abstinence self-efficacy and thus increased nicotine dependence[26] (Ma et al., 2020). Another study also showed that respondents with high self-efficacy were significantly associated with low nicotine dependence (Gaur et al., 2021; Jeong et al., 2021).

Self-efficacy is an important psychological determinant of smoking cessation. It is well recognized that increased nicotine dependence can enhance withdrawal symptoms, especially during the early phase of cessation, and could thus predispose to a relapse (Jeong et al., 2021). More importantly, increasing self-efficacy for cessation should be prioritized in lowering smoking dependence.

CONCLUSION

In summary, this study found that during the COVID-19 pandemic, smoking dependence among adults was moderate on average. Greater smoking dependence was associated with higher levels of stress, anxiety, and depression. Conversely, individuals with higher self-efficacy demonstrated lower dependence levels. These findings highlight the need for integrated smoking cessation interventions that target both psychological well-being and self-efficacy, particularly during times of societal disruption. Strengthening psychological resilience and confidence in resisting smoking may serve as key strategies for reducing tobacco use in vulnerable populations.

Conflict of Interest

Funding

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