

Beliefs about the smoking effect on COVID-19 as significant factors in smoking cessation efforts

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ABSTRACT

Owing to the various scientific evidence linking smoking to the increased risk of developing severe disease and death from the COVID-19 pandemic, now is a critical time for smokers to cut back or quit. This study aimed to analyze the influence of beliefs about smoking effects in relation to COVID-19 and attempts to quit smoking among university student smokers in Jakarta, Indonesia. This study was conducted in three different universities. As many as 198 respondents who were conveniently selected participated in this study. The health belief model (HBM) was adopted to determine the independent variables in this study. Having had a previous infection of COVID-19 influenced the smoking quitting attempts (AOR: 3.87, 1.49–10.0). Moreover, the belief that smoking increased COVID-19 severity, having a friend who reminded the respondents to not smoke during the pandemic, and having the ability to terminate smoking also increased the possibility for respondents to have a quit smoking attempt. However, perceived barriers such as feeling uncomfortable without smoking (AOR: 0.31, 0.15-0.6) were a protective factor against the attempt to quit smoking. Increasing smokers' confidence to quit smoking and education about the risk of smoking during the pandemic should be intensified to support smokers in successfully quitting the smoking habit.

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1. INTRODUCTION

Smoking is a risk factor and is widely known to cause many adverse health outcomes, including lung cancer in men and women [1], among others. A previous meta-analysis study reported that smoking was also a risk factor for other types of cancer, such as laryngeal, pharyngeal, upper digestive tract, and oral cancer [2]. Moreover, smoking is the cause of more than 20% of deaths in men and 5% of deaths in women [3]. Smoking could also increase the risk of contraction and progression of corona virus disease (COVID-19), a worldwide pandemic. A study by Tattan-Birch and colleagues [4] in England suggested that current smokers and long-term ex-smokers had higher odds of self-reported COVID-19. A study by Cai and colleagues also reported that smoking upregulated the expression of the pulmonary angiotensin-converting enzyme 2 (ACE2) gene, the SARS-Cov-2 receptor [5]. This suggests that smokers are more susceptible to COVID-19 compared to non-smokers. Among those who contracted COVID-19, smoking was found to be a

risk factor for the progression of the disease [6], [7]. Patients who smoked had a higher mortality risk than non-smoking patients (HR: 1.897, 95% CI 1.058-3.402) [6].

Indonesia has the highest prevalence of male smokers in the world [8]. The Indonesian National Health Survey reported that one-third of Indonesians above 15 years old were active smokers [9], with an increasing prevalence of young adult smokers (aged 10-18 years) from 2013 to 2018 [9]. However, despite the devastating effects of cigarette smoking, particularly during the pandemic, a study found that the number of Indonesian active smokers during the COVID-19 pandemic had increased compared to the pre-pandemic period [10]. More so, the National Committee of Tobacco Control (NCTC) reported that half of the smokers had not changed their smoked cigarette numbers, whereas 15.2% had increased their smoked cigarette numbers during the pandemic [11]. A study in Indonesia showed that smoking cigarettes increased the risk of developing acute respiratory distress syndrome (ARDS) among COVID-19 patients [12].

Given that a lot of evidence suggests that smoking increases the risk of serious illness and death from COVID-19, this could be a decisive time for smokers to decrease and quit the smoking habit. A number of studies investigating the socio-demographic determinants of smoking cessation among adults during the COVID-19 pandemic found that quitting smoking during the COVID-19 period was associated with having higher education levels, having an underlying chronic disease, and not living with smokers [13]. Being a female smoker, residing in a rural area, and having a shorter smoking history were associated with a higher ability to reduce the smoking habit [14]. Another study assessed the COVID-19 situation with quitting smoking and found having knowledge about the harmful relationship and effect of tobacco use with COVID-19 significantly affected smokers' attempts to smoke cessation [15]. However, growing misinformation that smoking protects against COVID-19 infection could influence smokers' smoking habits. A similar study by Pettigrew and colleagues suggested that the intention to quit smoking was higher among smokers who received information explicitly mentioning the COVID-19-related risk [16]. The fear of a negative combination of the COVID-19 pandemic with related smoking risks could increase people's intention to quit smoking [17].

Although different studies provided insightful information about factors affecting cessation of smoking in the general adult population, research targeting young adult populations such as university students remained understudied. Nevertheless, early cessation of smoking could prevent these young adults from becoming lifetime smokers and reduce the disease burden. Therefore, studies to identify attempts at smoking cessation among young adult smokers remain a critical step in gaining insight to develop a better approach for young adult smokers who consider quitting smoking. This study aimed to investigate the determinants of university students' attempts to quit smoking in Jakarta, Indonesia. According to the National Socio-Economic Survey (Susenas) conducted by the Central Statistics Agency (BPS) in March 2019, the number of smokers in DKI Jakarta reached 26% for those aged 15 years and over and spent an average of 72 cigarettes per week or 10.3 cigarettes per day [18]. In addition, young smokers in Jakarta are also quite high. The 2018 Indonesian Basic Health Research shows that around 30% of Jakarta's population aged 20-24 are active smokers [9].

2. RESEARCH METHOD

2.1. Study design and setting

This cross-sectional study was performed at three different universities located in the Jakarta area. Jakarta was chosen as our study location considering it has the highest number of COVID-19 cases (more than 800,000 total cases during data collection) among all the Indonesian areas [19]. Choosing university students for this study was done owing to data from a previous study that showed 48.2% of Indonesian smokers to have been in the 15-24-year age group [9]. More so, data from the Indonesian Global Adult Tobacco Survey also showed that the same age group wanted to quit smoking the most compared to other age groups [20].

2.2. Population and sample

The population of this study was registered university students at the three universities. A convenience, non-probability sampling method was used in this study, whereas the inclusion criteria for the study sample were: i) being active students; ii) being active cigarette smokers who began smoking before the pandemic and had begun smoking before the pandemic. Among the 406 respondents who participated in the study, 208 respondents who did not meet the criteria were excluded, and finally 198 respondents were included in this study as shown in Figure 1. Ethical clearance was obtained prior to the study.

2.3. Data collection

Face-to-face interviews during data collection were difficult to implement due to the imposed community mobility restrictions by the Indonesian government. Data collection in this study was therefore done using online questionnaires from August to September 2021. Four trained research assistants aided in the data collection by explaining the research procedure and provision to the respondents. Respondents who agreed to participate in the study approved the consent form, whereas non-consenting respondents were neither sanctioned nor forced. Electronic money (1 USD/15,000 IDR) was rewarded to the students who participated in the study as an appreciation for their spared time (answering the questionnaire). Anonymity and confidentiality were ensured during the research process, whereas ethical clearance was obtained prior to data collection. Ethical clearance was obtained from the Ethic Committee of the Faculty of Health Sciences of Universitas Islam Negeri Syarif Hidayatullah Jakarta, Indonesia (approval number: Un.01/F.10/KP.01.1/KE.SP/08.08.087/2021).

2.4. Measurement

This study adopted the health belief model (HBM) theory, particularly in determining dependent variables. The HBM theory is one of the most broadly used models to comprehend various diseases' prevention behaviors [21]. Based on the theory, people's perception of the treat of health problems (perceived susceptibility and perceived severity), the benefits of preventing the disease, and factors determining the choice to act (perceived barriers, cues to action, and self-efficacy) influenced people's health-related behavior [22]. The questionnaire was developed through a rigorous literature review. The questions in the HBM frameworks were measured on a 1 (strongly agree) to 6 (strongly disagree) scale, where negative items were scored in reverse. In this study, a cigarette smoker was defined as someone who had smoked cigarettes in the previous 30 days, including white cigarettes, kretek (unfiltered clove cigarettes), and hand-rolled cigarettes. A "quit attempt" was defined as an attempt to stop smoking that lasted for 24 hours and was made by a respondent during the pandemic [23].

2.5. Data analysis

Data analysis was done using SPSS Statistics 22.0 software. Descriptive analysis of variables in this study was done by calculating frequencies and percentages. The dependent variable in this study was categorized as having an attempt to quit smoking or not having attempts to quit smoking during the pandemic. A Chi-square test was used to determine the association between independent and dependent variables. Independent variables with a p-value <.25 in the bivariate analysis were included in the multivariate analysis [24]. A logistic binary regression was used for multivariate analysis, while a backward elimination analysis was performed to show the best predictors of the smoking cessation attempt.

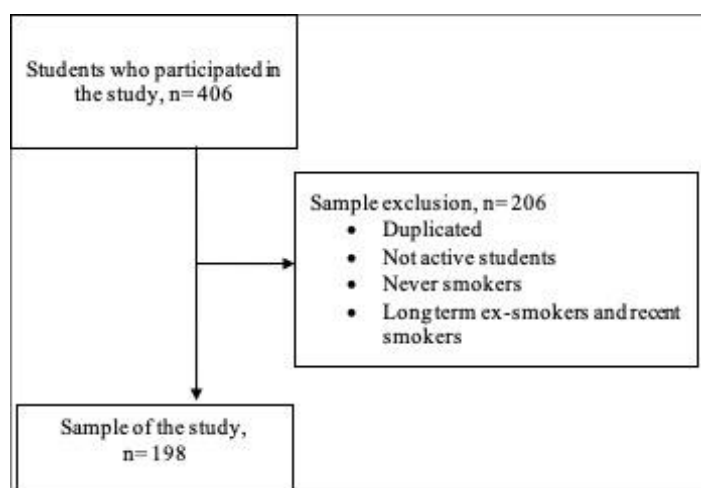


Figure 1. Study sample selection

3. RESULTS AND DISCUSSION

In this study, 80.3% of respondents were over 20 years old, whereas most respondents were male (95.5%). Most respondents were from the social humanities faculty (52.5%), while 84.3% of them resided in

the Jakarta area. As many as 25.3% of respondents had been infected with COVID-19, while two thirds (67.7%) of the respondents tried to quit smoking during the pandemic. More females tried to quit smoking than males (88.9% and 66.7%, respectively). Respondents from the Faculty of Medicine and Health (78.7%) made more attempts to quit smoking compared to respondents from other faculties, 69.7% from the Faculty of Natural Sciences and Technology and 60.6% from the Faculty of Social Humanities as shown in Table 1. Medical and health science students were more likely to be exposed to information concerning the harmful consequences of smoking since it was likely included in their study curriculum. This finding was supported by another similar study in Serbia, which reported that students from the medical faculty received adequate health training and had sufficient knowledge about the harmful effects of smoking compared to non-medical faculty students [25].

Table 1. Effort to quit smoking based on the socio-demographic of respondents

Characteristics	Total	Quit smoking attempt duration		
		More than a month	Less than a month	Never tried to quit
Total		57 (28.8)	77 (38.9)	64 (32.3)
Age				
≤ 20 years	39 (19.7)	8 (20.5)	18 (46.2)	13 (33.3)
> 20 years	159 (80.3)	49 (30.8)	59 (37.1)	51 (32.1)
Sex				
Male	189 (95.5)	49 (25.9)	77 (40.7)	63 (33.3)
Female	9 (4.5)	8 (88.9)	0 (0.0)	1 (11.1)
Science cluster				
Medical and health	61 (30.8)	24 (39.3)	24 (39.3)	13 (21.3)
Science and technology	33 (16.7)	11 (33.3)	12 (36.4)	10 (30.3)
Social humanities	104 (52.5)	22 (21.2)	41 (39.4)	41 (39.4)
Family income				
≥ 5 million IDR	97 (49.0)	28 (28.9)	40 (41.2)	29 (29.9)
< 5 million IDR	101 (51.0)	29 (28.7)	37 (36.6)	35 (34.7)
Area of residence				
Jakarta	167 (84.3)	48 (28.7)	70 (41.9)	49 (29.3)
Non-Jakarta	31 (15.7)	9 (29.0)	7 (22.6)	15 (48.4)
Have been infected with COVID-19				
Yes	50 (25.3)	21 (42.0)	21 (42.0)	8 (16.0)
No	148 (74.7)	36 (24.3)	56 (37.8)	56 (37.8)

Respondents used different techniques to quit smoking as shown in Figure 2, with most respondents using self-help techniques, which basically do not use specific programs or techniques to quit smoking (n=107). In addition, 14 respondents switched to electronic cigarettes as an endeavor to quit smoking. Respondents also talked to health professionals, used traditional and medical prescriptions, nicotine replacement therapy, and patch gum to help them stop smoking.

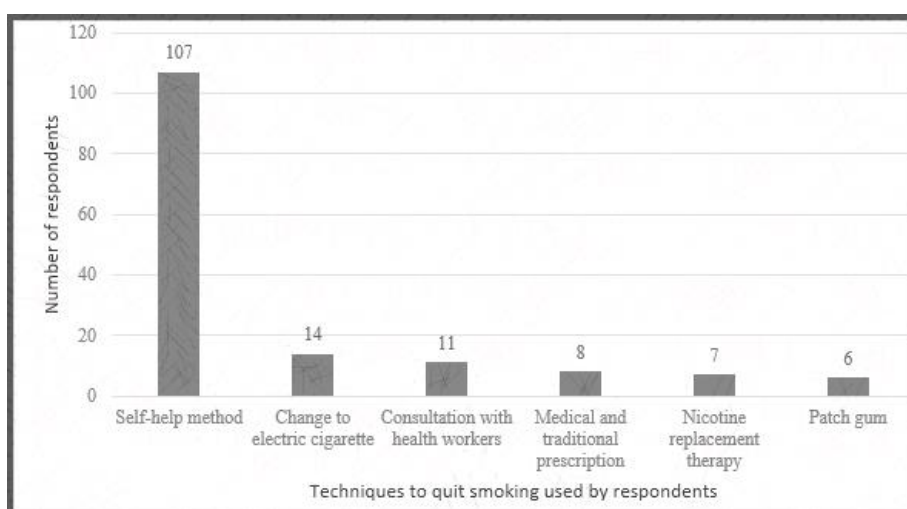


Figure 2. Technique practiced during quit smoking attempt

Respondents who believed that smoking increased COVID-19 severity had significantly higher ORs for having an attempt to quit smoking. Several perceived barriers, such as feeling anxious, finding it hard to concentrate, and feeling uncomfortable if the respondent did not smoke, were protective factors against the attempt to quit smoking. Having a friend, family member, or lecturer who supported respondents not to smoke was more likely to influence respondents to make an attempt to quit smoking. Furthermore, having the ability and confidence to quit smoking significantly increased the probability of having a quit attempt as presented in Table 2.

Table 2. Bivariate analysis of determinants of quit smoking attempt among respondents

Variables	n (%)	Quit smoking attempt		OR	p-value
		Yes	No		
Perceived susceptibility					
I have ever been infected with COVID-19	50 (25.3)	42 (84.0)	8 (16.0)	3.20 (1.40-7.30)	.007
I believed that smoking increases COVID-19 infection	83 (41.9)	62 (74.7)	21 (25.3)	1.76 (0.95-3.29)	.101
Perceived severity (I believe that smoking is ...)					
Dangerous during the pandemic	161 (81.3)	113 (70.2)	48 (29.8)	1.79 (0.86-3.73)	.168
Causing death	168 (84.8)	117 (69.6)	51 (30.4)	1.75 (0.79-3.88)	.235
Increasing COVID-19 severity	138 (69.7)	106 (76.6)	32 (23.2)	3.79 (1.99-7.20)	.000
Perceived benefits (I believe that smoking could ...)					
Prevent COVID-19	44 (22.2)	26 (59.1)	18 (40.9)	1.63 (0.81-3.25)	.231
Prevent severity of COVID-19	53 (26.8)	35 (66.0)	18 (34.0)	1.11 (0.57-2.16)	.899
Perceived barrier (I feel ... if do not smoke)					
Anxious	104 (52.5)	56 (53.8)	48 (46.2)	0.24 (0.12-0.46)	.000
Hard to concentrate	113 (57.1)	8 (60.2)	45 (39.8)	0.44 (0.23-0.82)	.014
Uncomfortable	116 (58.6)	67 (57.8)	49 (42.2)	0.31 (0.16-0.60)	.001
Cues to action					
My friend reminds me not to smoke	83 (41.9)	64 (77.1)	19 (22.9)	2.17 (1.15-4.08)	.024
My family does not let me to smoke	120 (60.6)	88 (73.3)	32 (26.7)	1.91 (1.04-3.51)	.035
My family sanction me if I smoke	43 (21.7)	35 (81.4)	8 (18.6)	2.48 (1.07-5.70)	.047
My lecturer reminds me not to smoke	86 (43.4)	66 (76.7)	20 (23.3)	2.14 (1.14-4.00)	.025
Self-efficacy (I have/know ... to quit smoking)					
The ability	183 (92.4)	130 (71.0)	53 (29.0)	6.75 (2.06-22.13)	.001
The confidence	182 (91.9)	128 (70.3)	54 (29.7)	3.95 (1.37-11.41)	.016
The technique	179 (90.4)	125 (69.8)	54 (30.2)	2.57 (0.99-6.69)	.083
The service	154 (77.8)	109 (70.8)	45 (29.2)	1.84 (0.92-3.67)	.118

Multivariate logistic regression analysis as presented in Table 3 showed the Hosmer-Lemeshow test to be higher than the significance value of 0.05 (i.e., 0.80). The Nagelkerke R square in this study was 0.316, which was considerably low. This could be because the study did not examine a variety of factors that could influence a quit-smoking attempt. Respondents who believed that smoking increased the COVID-19 severity were 3.6 times more likely to have attempted to quit smoking (AOR: 3.62, CI 95%: 1.75-7.51), whereas those who had the ability to terminate cigarette smoking during the pandemic were 8.3 times more likely to have attempted to quit smoking (AOR: 8.32, CI 95%: 2.16-32.13). Moreover, feeling uncomfortable without smoking was a protective factor against the quit attempt.

Table 3. Multivariate analysis of determinants of the smoking quit attempt

Variables	Estimate	SE	Wald	p-value	AOR (95% CI)
I have ever been infected with COVID-19	1.35	0.49	7.73	.005	3.87 (1.49-10.06)
I believe smoking increased COVID-19 severity	1.29	0.37	11.94	.001	3.62 (1.75-7.51)
I feel uncomfortable if I do not smoke	-1.17	0.38	9.35	.002	0.31 (0.15-0.66)
My friend reminds me not to smoke	0.65	0.37	3.12	.077	1.92 (0.93-3.96)
I have the ability to terminate cigarette smoking	2.12	0.69	9.47	.002	8.32 (2.16-32.13)

In comparison to respondents who had not been infected with COVID-19, the study found that those who had a prior infection with COVID-19 tended to have a higher rate of attempts to quit smoking (AOR:

3.87, CI 1.49-10.06). People diagnosed with COVID-19 were admitted to a health care facility or received home care treatment depending on the severity of their case. Moreover, in addition to the pharmaceutical therapies, respondents were advised to have a healthy lifestyle that included eating good foods and quitting smoking. People who had been infected with COVID-19 may therefore have attempted to quit smoking.

Our data suggested a relatively high proportion of respondents who attempted to quit smoking during the pandemic (28.8% of respondents for more than a month, while 38.9% for less than a month). Results from this study show a resemblance inconsistent with the national representative data showing a slight decrease in the prevalence of smoking among Indonesians above 15 years of age from 29.03% (2019) to 28.96% (2021) [26]. The percentage of smokers who attempted to stop was greater than that in a Pakistani study, where 37% of smokers attempted to quit smoking at least once during the COVID-19 pandemic [27]. A cohort study of adult Mexican smokers found that 39.6%-43.1% sought to quit smoking during the initial pandemic period [28], whereas a similar study in Israel reported 14% of adult current smokers who attempted to stop smoking in the early stages of the pandemic [13].

Respondents who perceived that smoking caused COVID-19 severity were more likely to try to quit smoking (AOR: 3.62, CI 1.75-7.51). This finding was consistent with previous research from Israel, Mexico, and the United States, which found that those who believed smoking could cause an increase in COVID-19 severity were more likely to try to quit [13], [28]–[30]. Misinformation about the benefits of smoking as a protection against COVID-19, on the other hand, could make it harder for the respondent to decide to stop smoking [20]. Having a strong support system was a key element in the respondents' attempts to quit smoking. Respondents who were reminded to quit smoking by friends, family, or a lecturer were more likely to try quitting. Similar results from a previous study in Pakistan established that among the important reasons for quitting smoking were encouragement from family, friends, or coworkers [31]. Respondents in this study engaged with their friends, family, and lecturers on a regular basis as university students. It is worth noting that many students have started smoking (in the first place) because of peer pressure [25]. Moreover, it is noteworthy that developing a smoke-free university program may have the benefit of preventing students from becoming regular smokers [32]. Therefore, it is critical to have appropriate support from these groups of individuals, friends, family, and lecturers, since they could serve as sources of information and guidance to the respondents before making major life decisions, including the decision to continue smoking or quitting.

In terms of perceived barriers, respondents stated that quitting smoking was uncomfortable, which could deter individuals from attempting to quit (AOR: 0.31, CI 0.15-0.66). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), there are seven symptoms of nicotine withdrawal, i.e., irritability/anger/frustration, anxiety, depressed mood, difficulty concentrating, increased appetite, insomnia, and restlessness [33]. Following the discontinuation of chronic use of nicotine-containing products, unpleasant abstinence symptoms develop 4–24 hours later. Symptoms peak on the third day and fade gradually over the next three to four weeks [34]. Moreover, previous research showed that smoking was aimed at relieving psychological pressure [35]. Given these consequences, it would be necessary for smokers to obtain assistance when experiencing nicotine withdrawal symptoms. According to a study in Germany, an attempt to stop smoking that was not backed up by evidence-based methods was more likely to fail [36].

Unsurprisingly, young adult smokers who felt that they had the capacity to quit smoking were more inclined to try to quit cigarette smoking (AOR: 8.32, CI 2.16-32.13). According to a meta-analysis study, self-efficacy had a moderate to high link with smoking cessation [37]. Several studies have proposed various methods to help smokers increase their self-efficacy in quitting smoking, including peer education [38], blended learning [39], and digital mobile application [40]. These methods could be used in addition to counseling, which is already used to help smokers feel more confident in their ability to quit.

Due to movement constraints during the COVID-19 pandemic, this study was limited to online data collection, which could result in a tendency to include in this study only participants who had access to the internet, while excluding non-internet users who qualified to join the study. Further research from a larger and more dispersed sample size could be beneficial. It is also necessary to monitor the relapse among participants after a period of quitting and its determining factors.

4. CONCLUSION

Variables like having ever gotten a COVID-19 infection, perceiving that smoking increased COVID-19 severity, having had friends, family, or lecturers reminded to not smoke, and having self-efficacy to stop smoking, increased the possibility of attempts to quit smoking during the pandemic. Education, particularly for smokers, related to the effects of smoking during the pandemic should be carried out continuously. Simultaneously, increasing the self-efficacy of smokers to quit is one of the significant strategies to support smokers in successfully quitting smoking.

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