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Knowledge, attitude and practice of cigarette smoking among senior secondary school students in Depok, Indonesia

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Abstract:

Background: Smoking behavior is primarily initiated and established during adolescence. Understanding the social context of smoking behavior among young people is required for developing strategies in preventing first tobacco use.

Objective: This study aimed at exploring the determinants of smoking behavior among senior secondary school students in Depok, Indonesia by identifying knowledge regarding smoking-related adverse outcomes, perception and attitude toward smoking behavior and tobacco control policy.

Methods: This study employed a cross-sectional design method. A total of 587 students from six senior secondary schools in Depok, Indonesia participated in this study. Univariate and multivariate statistical analyses were conducted to determine associations between cigarette smoking and independent variables.

Results: Respondents ranged from 14 to 19 years old students. The proportion of current cigarette smokers were 99 students (17.0%) where the majority of the smokers were male (35.5%). The majority of the students, both smokers and non-smokers, were aware that cigarette smoking causes health problems. The present study found that attitudes that may lead to smoking behavior, in most cases, have been found to be significantly different between smokers and non-smokers. The perception of smoking behavior of smokers and non-smokers, such as smoking makes one more confident, cool, makes it easier to make friends, can relieve stress, symbolizes adulthood and masculinity, was statistically significant to smoking behavior.

Conclusion: The study highlights the importance of changing youths' image of cigarette smoking than merely educating students regarding the health hazards of smoking when they already possessed a good knowledge about those issues.

Keywords: attitude, cigarette smoking, Indonesia, knowledge, secondary school students

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Introduction

Tobacco use is the leading cause of preventable mortality, morbidity and disability and harms almost all the organs of the body [1], [2]. Developing tobacco control strategies for youth plays an important role for preventing first tobacco use. Several research studies revealed that the starting age of smoking is usually before and reaches a peak at 17 years of age [3], [4], [5].

This is related to adolescent behavior characteristics which are indicated by increased risk taking behaviors, novelty-seeking, sensation-seeking and increased focus on social status as a result of hormonal changes at the onset of puberty [6], [7]. Young adults who experienced dramatic changes in living arrangements, school, work and social settings possibly would increase the susceptibility to smoke [8].

As one of the middle-income countries, Indonesia has 34.7% of adult smokers and this figure contributes to 51% of smokers among the Association of Southeast Asian Nations (ASEAN) countries [9]. The prevalence of tobacco smokers in Indonesia is predicted to get worse in the future, if tobacco control efforts remain at the

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same intensity; the World Health Organization (WHO) has projected smoker prevalence will reach 45% in 2045 [10]. Indonesia is the only country in the WHO South-East Asia Region that has not yet signed the Framework Convention on Tobacco Control [11], [12].

Furthermore, the prevalence of tobacco use among youths in Indonesia is also very high. This is based on 2014 Global Youth Tobacco Survey, which revealed that 20.3% of all students are currently active tobacco smokers [12]. Many factors determined adolescent smoking behavior in Indonesia in which several studies stated that the perception and attitude toward tobacco advertising and promotion, susceptibility to smoke and have smoker friends and family members, attitudes, social norms, self-efficacy and accessibility factors were significantly associated with smoking behavior [13], [14] whereas another study revealed peers were the most dominant variable affecting smoking behavior [15].

One model that has been broadly used to examine health problems is the knowledge, attitude and practice (KAP) model [16]. This model based on the principle that changing attitudes and practice to minimize disease burden resulted in increasing knowledge [17]. A previous study that used the KAP model in Japan revealed that knowledge about the health effects of tobacco use is high among both the ever smoked and non-smoking groups and interestingly, the majority from both groups have a positive attitude towards tobacco control activities [18]. Another study identified the KAP of tobacco smoking among medical students in Saudi Arabia and stated that the majority of students were aware of the harmful effects of tobacco and also the majority of respondents thought that smoking should be banned in public areas and they would advise their parents to quit smoking [19].

The KAP model has become one of the most useful models to be widely used for studying human attitudes and behavior [20], [21]. Furthermore, employing this model correctly in research could generate informative, profound and widely useful data that can help public health program managers in making a plan for conducting advocacy, communication and social mobilization activities [22]. Although many studies identifying determinants of youth smoking behavior in Indonesia have been undertaken, little has been done to focus comprehensively on the knowledge, attitude and practice of smoking behavior. The present study aimed at exploring the determinants of smoking behavior among senior secondary school students in Depok, Indonesia. This is conducted by identifying knowledge regarding smoking-related adverse outcomes, perceptions and attitudes toward smoking behavior and tobacco control policies. Those variables are adopted from the KAP model.

Materials and methods

This study employed a cross-sectional design method. Data were collected at six senior secondary schools that were managed by a socio-religion organization in Indonesia namely Muhammadiyah. Muhammadiyah is an organization that has millions of members and manages thousands of schools, hospitals, orphanages and mosques all over Indonesia [23]. The schools were in Depok, a city located on the southern border of Jakarta with a population of around 2 million people [24]. Data were collected in January, 2018. A sample size was determined with 5% level of significance and 90% power; the minimum sample was 552. A total of 587 students ranging from grades 10–12 participated in this study. A consecutive sampling method was employed in selecting the respondents.

The respondents were asked to fill in a self-administered questionnaire containing a total of 28 questions. The questionnaire was developed from a rigorous literature review. It was then measured for reliability by calculating Cronbach's α . The Cronbach's α for knowledge, attitude and perception questions were, 0.601, 0.644 and 0.719, respectively. The questionnaire was designed to elicit respondents' characteristics, cigarette smoking behavior status and determinant factors of smoking behavior based on the respondents' knowledge, attitude and perception towards smoking behavior.

The questionnaire consisted of five parts in which the first part comprised of questions dealing with socio-demographic variables, including sex, age, school type and school grade. The second part contained questions regarding cigarette smoking behavior; this study defined cigarette smokers as a person who smoked cigarettes, hand-rolled cigarettes and *kretek* (clove cigarettes) in the last 30 days. The third part of the questionnaire was the knowledge part containing five questions. The respondents were asked questions on the hazards of cigarette smoking; each question in this part was answered by choosing a "yes" or "no" answer. On the fourth part of the questionnaire, nine questions were provided to measure the attitude toward cigarette smoking behavior and tobacco control policy; each statement in this part was provided with two possible responses: "yes" and "no". The last part of the questionnaire consisted of eight questions to measure perception on cigarette smoking behavior with a 2-point Likert scale: "disagree" and "agree".

Four trained research assistants were employed during the data collection process. The assistants explained the information regarding the research procedure to the respondents prior to data collection and those who

agreed to participate in the study signed a consent form. The study was conducted by using a self-administered questionnaire in the classroom setting without the presence of teachers. The respondents who had filled the questionnaires returned them to the research assistants in the class. Anonymity and confidentiality had been ensured during the research process. Prior to data collection, institutional permissions were obtained from the schools and ethical clearance was obtained from the Ethic Committee of the University of Muhammadiyah Prof. Dr. Hamka.

Data were analyzed using Stata Version 12 (StataCorp, Texas, US). Descriptive statistics were employed to describe the demographic status and smoking patterns. A chi-square and t-test were conducted to determine associations between dependent and independent variables. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated for all factors. Independent variables that have p-values $p < 0.25$ in the bivariate analysis were included in the multivariable analysis. Later, the test to determine the interaction between independent variables was carried out. Logistic regressions analysis was used for determining the predictors of smoking behavior and presenting adjusted odds ratio (AOR).

Results

A total of 667 students were present during the classroom surveys. All present students were invited to participate this study. A total of 587 students participated in this study and 583 of them completed the questionnaire. The respondent characteristics are described in Table 1. The majority of respondents were female (55.6%) and 39.5% of them were 16 years old. The number of current cigarette smokers was 99 students (17.0%). The majority of smokers were male. From current smokers, 74 students smoked less than five cigarettes per day.

Table 1: Respondent characteristics.

Characteristics	Frequency		
	Total	Smokers	Non-smokers
	n = 583 (%)	n = 99 (%)	n = 484 (%)
Sex			
Male	259 (44.4)	92 (35.5)	167 (64.5)
Female	324 (55.6)	7 (2.2)	317 (97.8)
Age			
14	9 (1.5)	0 (0.0)	9 (100)
15	173 (29.7)	20 (11.6)	153 (88.4)
16	230 (39.5)	35 (15.2)	195 (84.8)
17	136 (23.3)	32 (23.5)	104 (76.5)
18	27 (4.6)	9 (33.3)	18 (66.7)
19	8 (1.4)	3 (37.5)	5 (62.5)
School grade			
10	281 (48.2)	37 (13.2)	244 (86.8)
11	206 (35.3)	42 (20.4)	164 (79.6)
12	96 (16.5)	20 (20.8)	76 (79.2)
School type			
General school	439 (75.3)	71 (16.2)	368 (83.8)
Islamic school	104 (17.8)	20 (19.2)	84 (80.8)
Islamic vocational school	40 (6.9)	8 (20.0)	32 (80.0)
Cigarette consumption per day			
≤5		74 (74.8)	
6–10		12 (12.1)	
>10		13 (13.1)	

Table 2 reports on the relationship of students' knowledge on smoking-related health hazards to smoking status. The majority of students, both smokers and non-smokers, were aware that cigarette smoking causes harm during pregnancy, causes lung cancer, addiction, heart diseases and health problems for second hand smokers despite the fact that current smokers were less likely than non-smokers to believe in the health hazards of smoking. No significance differences were found between smokers and non-smokers concerning their knowledge about smoking hazards causing lung cancer, heart diseases, addiction and for second hand smokers. Knowledge that smoking harms a pregnancy was found to be significantly associated with cigarette smoking.

Table 2: Knowledge of cigarette smoking-related hazards.

	Smoking status			OR (95% CI)	p-Value
	Total	Smoker	Non-smoker		
	n = 583 (%)	n = 99 (%)	n = 484 (%)		
Smoking harms pregnancy					
No	41 (7.0)	12 (29.3)	29 (70.7)	2.16 (1.06–4.01)	0.033
Yes	542 (93.0)	87 (16.1)	455 (83.9)		
Smoking causes lung cancer					
No	51 (8.7)	12 (23.5)	39 (76.5)	1.58 (0.79–3.13)	0.195
Yes	532 (91.3)	87 (16.4)	445 (83.6)		
Second-hand smoke causes health problems					
No	45 (7.7)	11 (24.4)	34 (75.6)	1.65 (0.81–3.39)	0.169
Yes	538 (92.3)	88 (16.4)	450 (83.6)		
Cigarette smoking causes addiction					
No	38 (6.5)	10 (26.3)	28 (73.7)	1.83 (0.86–3.90)	0.118
Yes	545 (93.5)	89 (16.3)	456 (83.7)		
Smoking causes heart diseases					
No	30 (5.1)	7 (23.3)	23 (76.7)	1.53 (0.64–3.66)	0.345
Yes	553 (94.9)	92 (16.6)	461 (83.4)		

Table 3 shows the attitudes of students toward smoking behavior with regards to smoking status. Attitudes that may lead to smoking behavior, in most cases, have been found to be significantly different between current smokers and non-smokers. Smokers were found to be significantly more curious about smoking cigarettes than non-smokers ($p < 0.001$). Students who were curious about smoking cigarettes and who did not feel disturbed when someone smoked near them were 10.3 and 3.4 times more likely to smoke than those who were not curious (OR, 10.3; 95% CI, 5.00–21.41), and those who were disturbed when someone smoked near them (OR, 3.44; 95% CI, 2.20–5.36). Students who accepted their family members smoking cigarettes were 2.0 (OR, 2.03; 95% CI, 1.21–3.42) times more likely to smoke than those who did not accept their family member smoking cigarettes.

Table 3: Attitude towards cigarette smoking behavior and tobacco control policy.

	Smoking status			OR (95% CI)	p-Value
	Total	Smoker	Non-smoker		
	n = 584 (%)	n = 99 (%)	n = 484 (%)		
I am curious about smoking cigarette					
Yes	35 (6.0)	22 (62.9)	13 (37.1)	10.35 (5.00–21.41)	0.000
No	548 (94.0)	77 (14.1)	471 (85.9)		
I am disturbed when someone smokes near me					
No	189 (32.4)	56 (29.6)	133 (70.4)	3.44 (2.20–5.36)	0.000
Yes	394 (67.6)	43 (10.9)	351 (89.1)		
I accept if my family member smokes cigarettes					
Yes	94 (16.1)	25 (26.6)	69 (73.4)	2.03 (1.21–3.42)	0.008
No	489 (83.9)	74 (15.1)	415 (84.9)		
I support someone to quit smoking					
No	80 (13.7)	31 (38.8)	49 (61.3)	4.05 (2.41–6.79)	0.000
Yes	503 (86.3)	68 (13.5)	435 (86.5)		
I prefer a non-smoking boy/girlfriend					
No	81 (13.9)	17 (21.0)	64 (79.0)	1.36 (0.76–2.44)	0.302
Yes	502 (86.1)	82 (16.3)	420 (83.7)		
I have a right to breathe air without tobacco smoke exposure					
No	194 (33.3)	37 (19.1)	157 (80.9)	1.24 (0.79–1.95)	0.343
Yes	389 (66.7)	62 (15.9)	389 (84.1)		
I support the smoke-free public place policy					
No	73 (12.5)	20 (27.4)	53 (72.6)	2.06 (1.17–3.63)	0.013
Yes	510 (87.5)	79 (15.5)	431 (84.5)		
I will support if government increases cigarette prices					
No	180 (30.9)	58 (32.2)	122 (67.8)	4.20 (2.68–6.58)	0.000
Yes	403 (69.1)	41 (10.2)	362 (89.8)		
I will support if government bans all cigarette advertisement					

No	209 (35.8)	49 (23.4)	160 (76.6)	1.98 (1.28–3.07)	0.002
Yes	374 (64.2)	50 (13.4)	324 (86.6)		

Smokers, compared to non-smokers, tended not to support some tobacco control policies, such as the implementation of smoke-free public places, increased cigarette price, banning all cigarette advertisement; results obtained in this regard were statistically significant. Students who did not support the government increasing cigarette prices were 4.20 times (AOR, 4.20; 95% CI, 2.68–6.58) to smoke than who supported the government increasing cigarette prices. Nevertheless, there was no statistically significant difference ($p = 0.302$) between smokers and non-smokers in preferring non-smoking boy/girlfriends. Similarly, no statistically significant difference was found in the perception regarding having a right to breathe air without tobacco smoke exposure ($p = 0.343$).

Significant differences on perceptions toward smoking between current smokers and non-smokers are shown in Table 4. More smokers, compared to non-smokers, agreed that smoking made one more confident, cool and made it easier to make friends, it symbolizes adulthood and masculinity, and could relieve stress. Students who agreed that smoking could reduce stress were 4.9 times to be more likely to smoke (OR, 4.97; 95% CI, 3.04–8.11). As to whether or not the participants thought smoking is a non-productive activity, non-smokers agreed more significantly that smoking was a non-productive activity ($p < 0.001$). Students who disagreed that smoking was a non-productive activity were 7.64 times more likely to smoke (OR, 7.64; 95% CI, 4.58–12.75). From a financial perception, there was a statistically significant difference in which 44.3% of smokers and 55.7% of non-smokers disagreed that smoking was a wasteful financial activity.

Table 4: Perception on cigarette smoking behavior.

	Smoking status			OR (95% CI)	p-Value
	Total n = 584 (%)	Smoker n = 99 (%)	Non-smoker n = 484 (%)		
Smoking makes one more confident					
Agree	62 (10.6)	26 (41.9)	36 (58.1)	4.43 (2.53–7.77)	0.000
Not agree	521 (89.4)	73 (14.0)	448 (86.0)		
Smoking symbolizes adulthood					
Agree	57 (9.8)	29 (50.9)	28 (49.1)	6.75 (3.79–12.01)	0.000
Not agree	526 (90.2)	70 (13.3)	456 (86.7)		
Smoking can reduce stress					
Agree	95 (16.3)	39 (41.1)	56 (58.9)	4.97 (3.04–8.11)	0.000
Not agree	488 (83.7)	60 (12.3)	428 (87.7)		
Smoking makes someone look cool					
Agree	66 (11.3)	25 (37.9)	41 (62.1)	3.65 (2.10–6.36)	0.000
Not agree	517 (88.7)	74 (14.3)	443 (85.7)		
Smoking makes it easier to make friends					
Agree	57 (9.8)	25 (43.9)	32 (56.1)	4.77 (2.68–8.51)	0.000
Not agree	526 (90.2)	74 (14.1)	452 (85.9)		
Smoking symbolizes masculinity					
Agree	67 (11.5)	22 (32.8)	45 (67.2)	2.79 (1.59–4.90)	0.000
Not agree	516 (88.5)	77 (14.9)	439 (85.1)		
Smoking is a non-productive activity					
Not agree	82 (14.0)	41 (50.0)	41 (50.0)	7.64 (4.58–12.75)	0.000
Agree	501 (85.9)	58 (11.6)	443 (88.4)		
Smoking is financially wasteful					
Not agree	61 (10.5)	27 (44.3)	34 (55.7)	4.96 (2.83–8.72)	0.000
Agree	522 (89.5)	72 (13.8)	450 (86.2)		

Table 5 presents influence of knowledge, attitude and perception on smoking behavior. A higher score on knowledge means respondents have a good knowledge regarding the health hazards of smoking and a higher score on attitude and perception means respondents have a belief about the negative consequences or lack of benefit of smoking behavior. Students who are smokers had a lower knowledge (mean 94.7 vs. 96.84; p -value = 0.002), attitude (mean 82.3 vs. 90.6; p -value = 0.000) and perception (mean 82.2 vs. 96.0; p -value = 0.000) score than non-smokers in which those variables were statistically significant with smoking behavior. The tests

also showed that there was no interaction between independent variables. Multiple logistic regressions result showed that attitude (AOR = 1.03) and perception (AOR = 1.06) to be significant predictors of smoking behavior.

Table 5: Regression analysis result of knowledge, attitude and perception on smoking behavior.

Variables ^a	AOR ^b	(95% CI)	p-Value
Knowledge	1.00	(0.96–1.05)	0.849
Attitude	1.03	(1.00–1.06)	0.038
Perception	1.07	(1.04–1.10)	0.000

^aKnowledge, attitude and perception scores ranged from 0 to 100. ^bAdjusted OR was adjusted for sex, age and school type. CI, Confidence interval.

Discussion

The study found that the prevalence of student smokers was 17%; this figure was less than the national prevalence in the same age group (26.6%) [25]. The number of current-smokers found in this study was also lower than that in Banten and Semarang, Indonesia (29.6% and 38.7%, respectively) [14], [26]. The lower numbers of smokers in this study might be caused by the fact that this study was conducted in the Muhammadiyah School and the Muhammadiyah has issued a *fatwa* (religious rulings or opinions) that all smoking is *haram* (forbidden for its followers) [27]. Therefore, Muhammadiyah leaders promote and encourage students, teachers and staff in the Muhammadiyah School not to smoke and sometimes punish students who smoke.

Divided by gender, the proportion of smokers was much higher in males (35.5%) compared to their female counterparts (2.2%). Several studies also showed that males were more likely to smoke than females [14], [15], [28], [29]. This was because male students tended to show masculinity through smoking and considered it as a tool for socializing and making friends as these variables were significantly correlated with students' perception of smoking. In addition, the lower proportion of smokers in women than in men was attributed to the social disapproval of women smokers. Women who smoke were relatively viewed as unacceptable in Indonesia, particularly among Muslim women.

The common age of tobacco smoking was 15–17 years old so mostly occurred in the 11th grade of secondary school. Other studies also reported that smoking behavior was initiated at 12–18 years of age [29], [30], [31]. The adolescent period is a critical stage for humans to initiate a smoking debut. Adolescents are in a transitional period between childhood and adulthood and thus are in a crucial developmental stage for mental wellbeing [32], but it also brings instability like emotional stress that can drive young people to deviant behaviors, including substance abuse [33]. Smoking initiation at a young age determined further smoking patterns, such as number of cigarettes smoked and difficulty in quitting [33], [34], [35]. This finding highlights the urgency of the need for effective health education from the early age and should be integrated with the school programs.

The decision of secondary school students to smoke is not influenced by their knowledge. This study found that there was no difference between smokers and non-smokers in acknowledging the smoking-related adverse outcomes, such as lung cancer, heart diseases, and health and pregnancy problems where both smokers and non-smokers had a good knowledge about those issues. It is consistent with a study in Japan revealing that general health knowledge among both ever-smokers and non-smokers was high, yet they continued to smoke [18]. One study conducted in Yogyakarta, Indonesia also stated that having sufficient knowledge regarding the harm of tobacco had no relationships with smoking initiation [13]. It indicated that people have high awareness regarding the harm tobacco causes. This may be learned from the health warning on the package of the cigarette and its advertisement. Nonetheless, it is not sufficient to create positive sustainable behavior as it is influenced by other factors.

Interesting findings were found in the participants' attitude toward smoking behavior. Of smokers, 14.1% were incurious about smoking, yet they still smoked. A previous study by Smith and Umenai stated that curiosity about smoking was the second biggest influencer to initiate smoking [18]. Although being smokers, 16.3% of participants opted to have non-smoking boy/girlfriends. It may be challenging for them to find boy/girlfriends as 83.7% of non-smokers also preferred non-smoking boy/girlfriends. This was in line with the smoking behavior study in Japan reporting that both smokers and non-smokers preferred non-smoking boy/girlfriends [18].

It is apparent that students who smoked basically supported the government policy in controlling smoking behavior, except for the increased price. Of the smokers 15.5% expressed their support of a smoke-free public policy indicating that they actually wanted to have clean air. Subramaniam and Shahwan suggested that the

smokers' supported the smoking policy because they perceived the smoking policy made them responsible smokers [36]. However, more than half of the smokers disagreed to an increased in the price of cigarettes. A previous study conducted in Saudi Arabia also revealed that those who smoked a higher number of cigarettes were less likely to agree with an increased cigarette price policy [37].

The perception of smoking behavior between smokers and non-smokers was statistically significant to smoking behavior. The smoker group thought that smoking could reduce stress levels. A research study by Bigwanto also reported that one-third of students perceived that smoking reduced their stress and thereby they smoked [14]. Additionally, the smoker group were also more likely to agree that smoking increased confidence, made someone look cool and symbolized adulthood and masculinity. The feeling of becoming a true gentleman was reported to be a major supporter of their smoking behavior [36], [38]. Further, 43.9% of smokers and 56.1% of non-smokers agreed that smoking helped them to make friends. Many studies also found that smoking was considered as a social tool and a way to "fit in" [36], [39]. Smith and Umenai's study reported that such a perception was because smokers considered smoking behavior as a stress-reliever and fun activity [18]. Our study suggests the Department of Education and teachers should design extracurricular activities that can divert their students' focus on smoking as well as to provide appropriate knowledge on the downside of cigarette smoking.

Overall, the present study found that the smoker group is more likely to have perceptions and attitudes about the positive consequences of smoking behavior compared to the non-smoker group. This is congruent with the smokers' smoking behavior. The results of this research study suggest that health promotion and education programs should be conducted with the objectives of changing the public image toward smoking behavior. The ultimate goal would be to make smoking a less acceptable social practice rather than merely educate students regarding health hazards of smoking because they have already possessed high awareness about those issues. As the majority of non-smokers and also around half of smokers agreed with the tobacco control policy, such as banning all cigarette advertisement, establishing a smoke-free public place policy and increasing the price of cigarettes, this indicates that government should implement the tobacco control policy more intensively. As demonstrated by several research studies, intervention by altering the social context about smoking cigarette has the greatest impact on reducing the tobacco use [40].

This study used a cross-sectional design; hence, the data did not completely explain the process of behavior change. The sites of this study were schools organized by a socio-religion organization, namely the Muhammadiyah, as such the schools did not represent all students in general secondary senior high schools in Indonesia. Therefore, the prevalence of smokers may have been under-reported. Also, a self-administered questionnaire used in this study was the only source for all respondents in providing their response.

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