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Health Promotion Model Non-Smoking among Adolescents: A Path Analysis Evidence from Indonesia

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Abstrak

Perilaku merokok merupakan ancaman bagi kesehatan masyarakat. Penelitian ini mengidentifikasi faktor-faktor yang mempengaruhi perilaku tidak merokok di kalangan remaja. Tujuannya adalah untuk mengetahui pengaruh paparan media, pengetahuan tentang bahaya merokok, modal sosial, akses ke rokok di kalangan remaja dengan menggunakan Theory of Planned Behavior (TPB). Penelitian ini berbentuk cross-sectional, dilakukan di Kabupaten Kulon Progo, Provinsi Yogyakarta, Indonesia, pada bulan April - Mei 2018. Variabel dependen adalah perilaku tidak rokok. Variabel independen adalah niat untuk tidak merokok, sikap merokok, pengetahuan tentang penggunaan tembakau, norma subyektif tidak merokok, kontrol perilaku yang dirasakan untuk tidak merokok, paparan media untuk iklan rokok, akses ke rokok dan modal sosial di kalangan remaja. Data dikumpulkan dengan kuesioner dan dianalisis dengan analisis jalur menggunakan program Stata 13.Hasil dari penelitian ini adalah ada pengaruh secara langsung sikap tidak merokok (b = 1,15; 95% CI = 0,55 -1,75; p <0,001), norma subyektif untuk tidak merokok (b = 1,56; 95% CI = 0 , 96 - 2,16; p <0,001), dan kontrol perilaku yang dirasakan untuk tidak merokok (b = 1,99; 95% CI = 1,39 - 2,60; p <0,001) terhadap niat untuk tidak merokok, dan akhirnya pada perilaku tidak rokok. Paparan iklan rokok memiliki dampak tidak langsung pada perilaku tidak merokok melalui sikap terhadap tidak merokok (b = -0,82; 95% CI = -1,28 hingga -0,37; p <0,001) dan niat untuk tidak merokok. Paparan iklan rokok ini juga memiliki dampak tidak langsung pada perilaku tidak merokok melalui rendahnya pengetahuan tentang merokok (b = -0,45; 95% CI = -0,47 hingga -0,03; p = 0,037). Modal sosial yang lemah memiliki dampak tidak langsung pada perilaku tidak merokok melalui norma subyektif tidak merokok (b = 0,64; 95% CI = 0,25 -1,05; p = 0,001) dan niat untuk tidak merokok. Pengetahuan tentang merokok yang buruk berdampak pada kontrol perilaku yang dirasakan untuk tidak merokok (b = 1,59; 95% CI = 1,15 - 2,03; p <0,001) dan berpengaruh terhadap sikap positif terhadap tidak merokok (b = 1,60; 95% CI = 1,16 - 2,05; p <0,001).

Model promosi kesehatan dengan Theory of Planned Behavior (TPB) dapat digunakan untuk menjelaskan perilaku tidak merokok di kalangan remaja.

Kata Kunci*: perilaku tidak merokok; remaja; akses ke rokok*

Abstract

Smoking behavior is a threat to public health. This study identified factors that influence non-smoking behavior among adolescents. The aim is to determine the effect of media exposure, knowledge of the dangers of smoking, social capital, and access to cigarettes among adolescents by using Theory of Planned Behavior (TPB). This cross-sectional study was conducted in Kulon Progo Regency, Yogyakarta Province, Indonesia, in April - May 2018. The dependent variable is non-smoking behavior. Independent variables were intention to stop smoking attitude to smoking, knowledge of tobacco use, subjective

norms of not smoking, control of perceived behaviors to stop smoking, media exposure to cigarette advertising, access to cigarettes and social capital among teenagers. Data were collected by questionnaire and analyzed by path analysis carried out in Stata 13. This study resulted in an attitude towards not smoking (b = 1,15; 95% CI = 0,55 to 1,75; p< 0,001), subjective norm for not smoking (b = 1,56; 95% CI = 0,96 to 2,16; p <0,001), and perceived behavioral control for not smoking (b = 1,99; 95% CI = 1,39 to 2,60; p <0,001), which affects the intention of not smoking, and finally on non-smoking behavior. Exposure to tobacco advertising has an indirect impact on non-smoking behavior through attitudes toward non-smoking (b = -0,82; 95% CI = -1,28 to -0,37; p< 0,001) and the intention not to smoke. This exposure to cigarette advertising also has an indirect impact on non-smoking behavior through low knowledge about smoking (b = -0,45; 95% CI = -0,47 to -0,03; p = 0,037). Weak social capital has an indirect impact on non-smoking behavior through subjective norms of smoking (b = 0,64; 95% CI = 0,25 to 1,05; p = 0,001) and the intention not to smoke. Knowledge about tobacco smoking (poor) impact on perceived behavior control not to smoke (b = 1,59; 95% CI = 1,15 to 2,03; p <0,001) and influential to attitude positive toward no smoking (b = 1,60; 95% CI = 1,16 to 2,05; p <0,001). Health promotion model with Theory of Planned Behavior (TPB) can be used to explain not smoking behavior among adolescents.

Keywords*: not smoking; adolescents; access to cigarettes*

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INTRODUCTION

The active smokers of the Indonesian population aged 10 years and over the prevalence nationally in 2013 was 29.3% and in 2018 the national prevalence was 28.8%. The 2019 National Medium-Term Development Plan targets the prevalence of smoking in residents aged 10-18 years in the 2007-2018 period of 5.4%. Smoking behavior of the population aged 15 years and over still has not decreased, from 2007 to 2013, there was even a tendency to increase from 34.2% in 2007 to 36.3% in 2013. There were 64.9% of male sex and 2.1% of female sex Indonesian residents who still smoked cigarettes in 2013 (1). Teenage smoking behavior is caused by a high curiosity for all things (2). A study in Malaysia stated that the minimum age for smoking is 10 years while the maximum age is 40 years. Most participants start smoking at the age of <20 years with a higher frequency of 18 years. More than half of the participants 58.5% stated that peer influence to use smoking (3).

Smoking can provide pleasure to the smoker himself, but on the other hand it can also have a negative impact on the smoker himself and for those around him. Someone who is exposed to cigarette smoke for eight hours is comparable to direct smoking as many as 20 cigarettes a day. A study says that heavy smokers are more susceptible to autonomic dysfunction and can cause the development of cardiovascular disease in smokers (4)30-moderate, 30-severe, can also causes hypertension (5)International Physical Activity Questionnaire, and Smoking Questioner. Data was analyzed using Chi-Square and the result was junk food consumption leading to 4 times risk for hypertension (OR, 4,083, lung cancer and adenocarcinoma (6). The efforts of the central and regional governments by making regulations on smoke-free areas.

The Kulon Progo regent has even made regulations regarding the prohibition of cigarette advertisements in the form of billboards on the street protocol.

The teenagers hope that who are already smoking can gradually reduce the frequency of smoking and even stop smoking after knowing a lot of the harmful ingredients in cigarettes. Research conducted in India regarding nicotine content in cigarettes caused a person to become addicted by doing in-vitro development and evaluation of nicotine troches for smoking cessation (7). The purpose of this study was to identify ~~the~~ factors that influence non-smoking behavior in adolescents in Kulon Progo Yogyakarta.

MATERIALS AND METHODS

This research uses cross-sectional design conducted in Kulon Progo Regency, Yogyakarta Province, Indonesia. Data is collected in the April-May 2018 period.

The population is 11-21 years old who attend junior and senior high school. The sample was chosen based on smoking and non-smoking status. Non-smoking status is the dependent variable studied. The sample size in this study consisted of 400 subjects, namely 200 smoking subjects and 200 non-smoking subjects. Sample data was analyzed using a path analysis model, to have confidence in the goodness of fit test. The sample size 100 to 200 recommended (8).

The dependent variable is non-smoking behavior, while the independent variables are intention not to smoke, access to cigarettes, attitudes toward smoking, knowledge of tobacco use related to health, subjective norms of not smoking, perceived behavioral control for smoking, media exposure (for example exposure to cigarette advertising), and social capital among adolescents of the same age. The research subjects responded to a 20 minutes questionnaire about smoking behavior (9).

This study uses path analysis to run data analysis using Stata 13. Path analysis is a statistical technique that allows examination of causal relationships between one or more independent variables, either continuous or categorical, and one or more dependent variables, either continuous or categorical. Path analysis is used in this data analysis because it allows estimation of direct and indirect relationships between variables. Analysis of direct and indirect relationships between variables is not possible if multiple regression analysis models are used instead (8).

RESULTS AND DISCUSSION

Sample Characteristics

Table 1 shows that respondents who smoke have 200 teenagers with an average of 3.31 cigarettes per day. The smoker teenagers spend minimum 1 cigarette and maximum 20 cigarettes. The average age of the respondents is 15, 26 years old, the youngest is 11 years old and the oldest is 21 years old.

Table 2 shows that the majority of male respondents are 85.3%. Most parents' income <Rp. 1,400,000 per month there is 51%. Teenagers exposed to cigarette advertisements are in the frequent category of 64.5%. Adolescent knowledge about the dangers of smoking in the good category is 61.2%. The social capital of peer group in the weak category is 53.5%. Intention to stop smoking in the weak category

Table 1. Description of Sample Characteristics (continue data)

Variable	Mean	Median	SD	Min	Max
Cigarette comsumption per day (n= 200)	3.31	2	3.36	1	20
Age (n=400)	15.26	15	1.69	11	21

is 52.5%. Subjective norm toward smoking in acceptable category is 54.2%. Attitude toward smoking category negative is 52.2%. Perceived behavior control to stop smoking in strong category is 50.8% and access to cigarette easy category is 53.5%.

Table 2. Description of Sample Characteristics (categorical data, n= 400)

Variable	Frequency (n)	Percent (%)
Gender		
Male	341	85.3
Female	59	14.8
Total	400	100
Parental income (per month)		
< Rp 1,400,000	204	51
≥ Rp 1,400,000	196	49
Total	400	100
Exposure to cigarette commercials		
Low <49	142	35.5
High ≥49	258	64.5
Total	400	100
Knowledge on smoking hazard		
Poor <17	155	38.8
Good≥17	245	61.2
Total	400	100
Social capital of peer group		
Weak <29	214	53.5
Strong ≥29	186	46.5
Total	400	100
Intention to stop smoking		
Strong <31	190	47.5
Weak ≥31	210	52.5
Total	400	100
Subjective norm toward smoking		
Acceptable < 19	217	54.2
Unacceptable ≥ 19	183	45.8
Total	400	100
Attitude toward smoking		
Positive < 51	191	47.8
Negative≥ 51	209	52.2
Total	400	100
Perceived behaviour control to stop smoking		
Weak <30	197	49.2
Strong ≥30	203	50.8
Total	400	100
Access to cigarette		
Difficult <8	186	46.5
Easy ≥8	214	53.5
Total	400	100

Path analysis

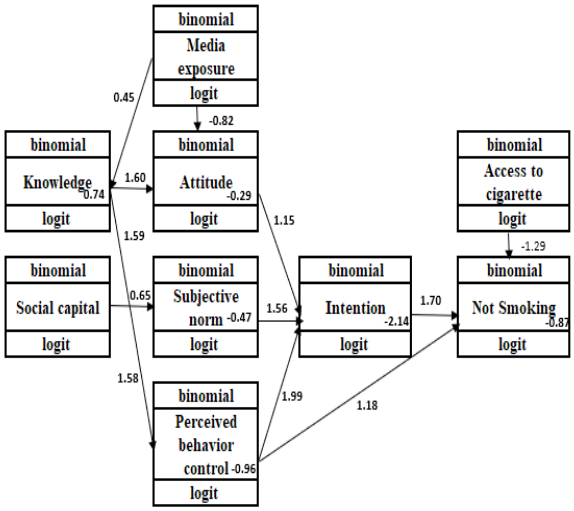

Figure 1. Path diagram on the determinants not smoking among adolescent

Table 3 shows the results of the final path model analysis, the path analysis table is divided into two panels, consisting of direct effects on the top panel and indirect effects on the bottom panel. On the direct effect, there is a positive and statistically significant relationship between intention not to smoke and initiation of non-smoking behavior. Adolescents with strong intention not to smoke had a log odd of not smoking as much as 1.70 points higher than those with weak intentions (b = 1.70; 95% CI = 1.12 to 2.28; p <0.001). There is a negative and statistically significant relationship between access to cigarette and initiation of non-smoking behavior. Adolescents with access to cigarette who find it difficult to get cigarettes have log odd smoking of 1.29 points lower than those who have easy access to cigarettes (b = -1.29; 95% CI = -1.79 to -0, 78; p <0.001). There is a positive and statistically significant relationship between perceived behavioral control for not smoking and initiation of non-smoking behavior. Teenagers with behavioral control that was felt to be strong for not smoking had not been logged as much as 1.18 higher than those who had weak behavioral control perceptions (b = 1.18; 95% CI = 0.60 to 1.75; p <0.001).

Table 3 indirect effects shows that intention to stop smoking has a positive and statistically significant relationship with attitudes, subjective norms to stop smoking and perceived non-smoking control behavior. Adolescents with an attitude that does not support smoking have a logodd of intention to not smoke as much as 1.15 points higher than those who have an unpleasant attitude towards not smoking (b = 1.15; 95% CI = 0.55 to 1.75; p < 0.001). Similarly, adolescents with subjective norms that smoke can be accepted have an intention to not smoke as much as 1.56 points higher than those who have subjective norms that smoking is not acceptable (b = 1.56; 95% CI = 0.96 to 2,16; p < 0.001). The intention to not smoke has a positive and statistically significant relationship with perceived behavioral control for not smoking. Adolescents with strong behavioral control for not smoking have a logodd of intention to not smoke as much as 1.99 points higher than those who have weak behavioral control not to smoke (b = 1.99; 95% CI = 1.39 to 2, 60; p <0.001).

Favorable attitudes towards non-smoking have a positive and statistically significant relationship with knowledge about the dangers of smoking. Adolescents with good knowledge about the dangers of smoking have a logodd of favorable attitudes towards non-smoking as much as 1.60 points higher than those who have bad knowledge about the dangers of smoking (b = 1.60; 95% CI = 1.16 to 2.05; p <0.001). A favorable attitude towards non-smoking has a negative and statistically significant relationship with exposure to cigarette advertisements. Adolescents with high exposure to cigarette advertisements have a logodd of good attitudes towards non-smoking as much as 0.82 points lower than those who have low exposure to cigarette advertisements (b = -0.82; 95% CI = -1.28 to - 0.37; p <0.001).

On the indirect effects, Table 3 also shows that perceived behavioral control for not smoking

Table 3. The results of path analysis on the determinants not smoking among adolescent

Dependent variable		Independent variable	Path coefficient (b)	95% CI		p
				Lower limit	Upper limit	
Direct effect						
No Smoking	←	Intention not to smoke (strong)	1.70	1.12	2.28	<0.001
No Smoking	←	Perceived behavior control (not to smoke)	1.18	0.60	1.75	<0.001
No Smoking	←	Access to smoke	-1.29	-1.79	-0.78	<0.001
Indirect effect						
Intention not to smoke (strong)	←	Attitude (positive toward no smoking)	1.15	0.55	1.75	<0.001
Intention not to smoke (strong)	←	Subjective norm (no smoking acceptable)	1.56	0.96	2.16	<0.001
Intention not to smoke (strong)	←	Perceived behavior control (not to smoke)	1.99	1.39	2.60	<0.001
Attitude (positive toward no smoking)	←	Knowledge about tobacco smoking (poor)	1.60	1.16	2.05	<0.001
Attitude (positive toward no smoking)	←	Media exposure (e.g. cigarette smoking commercials)	-0.82	-1.28	-0.37	<0.001
Perceived behavior control (not to smoke)	←	Knowledge about tobacco smoking (poor)	1.59	1.15	2.03	<0.001
Subjective norm (no smoking acceptable)	←	Weak social capital (trust, norm of reciprocity, social network)	0.64	0.25	1.05	0.001
Knowledge about tobacco smoking (poor)	←	Media exposure (e.g. cigarette smoking commercials)	-0.45	-0.87	-0.03	0.037
N observation= 400						
Log likelihood = -1374.00						

has a positive and statistically significant relationship with knowledge about the dangers of smoking. Adolescents with high knowledge about the dangers of smoking have a logodd of perceived behavioral control for not smoking as much as 1.59 points higher than those who have low knowledge about the dangers of smoking (b = 1.59; 95% CI = 1.15 to 2, 03; p <0.001).

In additional, subjective norms that smoking cannot be accepted have a positive and statistically significant relationship with peer group social capital. Adolescents with high social capital from peer groups have a logistical subjective norm that is unacceptable as much as 0.64 points higher than those who have low social capital from the peer group (b = 0,64; 95% CI = 0,25 to 1,058; p = 0,001).

On the indirect effect, knowledge about the dangers of smoking has a negative and statistically significant relationship with the media information about cigarette advertising. Teenagers with information media about high cigarette advertisements have logodd knowledge of the dangers of smoking as much as 0.45 points lower than those who have knowledge about the dangers of low smoking (b = -0,45; 95% CI = -0,87 to -0,03; p = 0,037).

Discussion

Adolescence is a transition period between childhood and adulthood. Social life at the level of adolescence is characterized by prominent intellectual and emotional functions. This situation, according to Erickson, is referred to as a period of identity crisis, which is a very complex process of forming self-identity and self-concept of adolescents (10). This study aims to test the hypothesis of using Theory of Planned Behavior (TPB) that the stronger the intention not to smoke, the more likely someone is not to smoke. In addition to the intention, there are also other factors that will be discussed in this study.

Non-Smoking behavior and intention

The results of path analysis show that there is a direct influence between adolescent's intention not to smoke on non-smoking behavior with a positive correlation coefficient. This study provides empirical evidence that supports TPB. This finding is consistent with previous research which said that 78% of students in Iran in 2014 who did not smoke were controlled by the intention not to smoke, while 22% were again influenced by behavioral control factors (11). Someone who has a strong intention to stop smoking, then the smoking behavior gradually will also decrease (12).

Non-Smoking behavior and attitude

There is an indirect relationship between unfavorable non-smoking attitudes and non-smoking behavior through the intention not to smoke. Attitude is a form of someone's idea that is closely related to emotion so as to encourage someone to take certain actions in social situations. This study is in accordance with research that says that there is a relationship between attitude and intention to stop smoking in young people in China (13). Similar research which says that the positive attitudes of adolescents to stop smoking immediately are derived from various moral messages delivered in detail and are very effective in taking into account the negative effects of consuming cigarettes (14)(b.

Non-Smoking behavior and perceived behavior control (PBC)

According to TPB, the effect of PBC on behavior can be direct or indirect. This is consistent with research that states that there are 22% perceived behavioral control that can affect someone to behave smoking (11). Another study said that there was a perceived behavioral control on the intention of adolescents

to smoke (15). Encouragement for strong individuals not to smoke should be actualized immediately, because if it is postponed, it is possible for someone to change their mind to change their behavior, this is possible because of environmental factors, family, community friends are also very influential. Smoking initiation in adolescents is caused by factors of parents whose education is low, the influence of relatives and close friends who behave smoking (16).

Non-Smoking behavior and subjective norm

The results of this analysis show that there is a positive influence on subjective norms non-smoking against the intention not to smoke. Subjective norms are a person's belief in the demands of others who are considered important to him so that individuals are willing to display or not display a certain behavior in accordance with the demands that exist in the social community. Similar studies report that there is no direct effect of subjective norms on cigarette use behavior, but report that subjective norms have a statistically significant indirect effect on intention through perceived attitudes and control of behavior (17).

Non-Smoking behavior and knowledge

The results of path analysis show that there is a positive influence between knowledge about the dangers of smoking non-smoking attitudes and perceptions of non-smoking behavior control. Knowledge is something that is present in the soul and mind of a person, due to the reaction of the stimulus and the relationship between the person and the surrounding environment. The results of the study using multiple regression analysis are estimated to only have a direct effect of knowledge and attitudes towards smoking behavior. It does not treat attitude, perceived behavioral control, and intention, as an intermediate variable between knowledge and smoking behavior as in this study (13). Similar studies also reported that subjects with greater knowledge of smoking had a lower risk of smoking (OR = 0.88; 95% CI = 0.86-0.91), but this characteristic is reduced after adjusting for potential confounders (18).

No-Smoking behavior and media exposure

The results of path analysis show that there is a negative influence between exposure to information media about cigarettes to adolescent attitudes to not smoking. Promotional media for cigarettes in the form of massive advertisements carried out by every cigarette producer is very potential to shape the attitudes and behavior of teenagers to smoke. A similar study was stated that policies on anti-tobacco, advertising, promotion and sponsorship of cigarettes could reduce the number of smokers in students / adolescents in Africa from 16% to 14%, whereas in Botswana Africa the behavior of adolescent smoking does not experience a decrease due to the existence of advertisements and promotions about smoking and the influence of friends who smoke and parents who smoke (19).

Non-Smoking behavior and social capital

The results of path analysis show that there is a positive influence between social capital and subjective norms of non-smoking. Smoking is the door to the beginning of adolescents to carry out other negative activities, such as drinking, drugs and so on (20). This finding is consistent with the results of other studies that active social participation is positively related to smoking cessation (OR = 1,39; 95% CI = 1,07 to 1,82) (21).

Non-Smoking behavior and access to cigarette

The results of path analysis show that there is a negative influence between access to cigarette on non-smoking behavior. The

Government of the Republic of Indonesia conducts campaigns and enhances regional advocacy and guidance in implementing regional policies without smoking. Smoking causes carcinogens (20) , in Scotland, the prevalence of adolescent smoking is caused by cultural factors, access and availability of cigarettes which are very easily achieved by teenagers (23)with rural areas having a higher prevalence than urban areas in some countries, and a lower prevalence in others. These differences are most likely due to substantive differences in rurality between countries in terms of their social, built and cultural geography. Previous studies in the UK have shown an association between lower socioeconomic status and smoking. The Scottish Health Behaviour in School-aged Children study surveyed 15 year olds in schools across Scotland between March and June of 2010. We ran multilevel logistic regressions using Markov chain Monte Carlo method and adjusting for age, school type, family affluence, area level deprivation and rurality. We imputed missing rurality and deprivation data using multivariate imputation by chained equations, and re-analysed the data (N=3577. The results of other studies on the impact of tobacco on health, taken a policy to ban cigarette advertising in various mass media both print and electronic so that people are not easy to access cigarettes (24).

CONCLUSION AND RECOMMENDATION

The construction of TPB includes attitudes towards non-smoking, subjective norms on not smoking, and perceived behavioral control for not smoking, impacts on the intention not to smoke, and finally on non-smoking behavior. These findings can be used to design health promotion program to prevent and reduce smoking behavior among adolescents.

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