Contextual Effect of School and Other Determinants of Non Smoking Behavior among High School Students in Bantul, Yogyakarta: A Multilevel Analysis

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ABSTRACT

Background: Adolescence is a period of initiation of smoking and not smoking behavior. Non-smoking behavior in adolescents is influenced by factors of knowledge, attitudes, subjective norms, perceptions of behavioral control, intention, parental support, teacher support, peer support, and information media exposure. The purpose of this study was to analyze the contextual influence of schools on non-smoking behavior in adolescents in Bantul Regency, Yogyakarta.

Subjects and Method: This was a cross sectional study conducted on 13 high schools and 12 vocational high schools in Bantul Regency, Yogyakarta, from September to October 2019. A sample of 200 male adolescents aged 15-18 years was selected by stratified random sampling. The dependent variable was non-smoking behavior in adolescents. The independent variables were knowledge, attitudes, subjective norms, behavioral control perceptions, intentions, parental support, teacher support, peer support, and information media exposure. The data collections were performed using a questionnaire and analyzed using multilevel multiple logistic regression with Stata 13.

Results: Non-smoking behavior in adolescents increases with high adolescent knowledge (b= 3.09; 95% CI= 0.86 to 5.33; p= 0.007), positive attitude (b= 2.92; 95% CI= 0.79 to 5.06; p= 0.007), norm subjective supportive (b= 2.81; 95% CI= 0.72 to 4.92; p= 0.009), perception of strong behavioral control (b= 3.60; 95% CI= 1.22 to 5.99; p = 0.003), non-smoking intention is strong (b= 3.09; 95% CI= 0.92 to 5.27; p= 0.005), strong family support (b= 2.80; 95% CI= 0.76 to 4.85; p= 0.007), strong teacher support (b= 2.98; 95% CI= 0.75 to 5.21; p= 0.009), strong peer support (b= 2.58; 95% CI= 0.04 to 5.13; p= 0.046), and exposed to information media (b= 2.27; 95% CI= 0.45 to 4.09; p= 0.014). There was contextual effect of schools non-smoking behavior (ICC = 20.92%).

Conclusion: Non-smoking behavior in adolescents is influenced by knowledge, attitude, subjective norm, perceived behavioral control, intention, parental support, teacher support, peer support, and information media exposure. School has a contextual influence on non-smoking behavior in adolescents.

Keywords: smoking, teenage behavior, school

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BACKGROUND

Smoking behavior has become a habit of the general public especially starting in the teens. Peterson and Hecht (2017) state that the initiation of smoking in adolescents increases the risk of nicotine addiction. In 2014, Global Youth Tobacco Survey (GYTS) presents 32.1% of teenagers who use tobacco products in Indonesia. Adolescents 13-15 years old started smoking 12-13 years old at 43.2%, aged 14-15 years at 11.4% and aged ≤7 years at 8.9%. The prevalence of tobacco use in junior high school, senior high school and college adolescents aged 15-19 years was 38.4% in 2010 (WHO, 2015).

The prevalence of smoking at the age of 10-18 years has increased by 7.2% in 2013, increasing to 8.8% in 2016 and in 2018 of 9.1% (Riskesdas, 2018). The prevalence of tobacco consumption among male population aged ≥15 years was 65.8% in 2010, increased to 66% in 2013, and decreased to 62.9% in 2018 (Riskesdas, 2018).

Factors that influence the initiation of smoking in adolescents according to Wellman et al. (2016) namely an increase in smoking risk associated with an increase in age, lower socioeconomic status, poor academic performance, sensation seeking, intention, acceptance of tobacco promotion, smoking vulnerability, having smoker's family and friends, and media exposure. In contrast to Purnaningrum et al. (2017) smoking behavior in adolescents is associated with exposure to cigarette advertisements, peer groups, parental education, family income, and pocket money.

Tobacco use control is done to support the reduction in the prevalence of smoking. Identifying determinants of non-smoking behavior in adolescents can be used as a basis for guidelines for health promotion (Hanson, 2018). Health promotion that can be implemented is tobacco prevention programs through education. This intervention is more effective in educating adolescents to identify social influences and refusing smoking skills so as to prevent smoking initiation (Nurumal et al., 2019). The way to control through education-based health promotion aims to support non-smoking behavior by adolescents in secondary schools thereby reducing the prevalence of cigarette use (Hanson, 2018).

SUBJECTS AND METHOD

1. Study Design
This was an observational analytic study with a cross sectional approach, carried out in 13 Senior High Schools and 12 Vocational High Schools in Bantul Regency, Yogyakarta. The study was conducted from September to October 2019.

2. Population and Sample
The population was all adolescents in Bantul Regency, Yogyakarta. The sample consisted of 200 male adolescents. The sampling was carried out using stratified random sampling technique.

3. Study Variables
The dependent variable was non-smoking behavior in adolescents. The independent variables wer knowledge, attitudes, subjective norms, behavioral control perceptions, intentions, parental support, teacher support, peer support, and information media exposure.

4. Operational Definition of Variables
Knowledge was information about cigarettes known by someone. The measuring instrument used was a questionnaire. The scale of the data was continuous and for analysis purposes, the data was converted into a dichotomy with code 0 = low; 1 = height.

Attitude was the response of adolescents related to the assessment of the ease and obstacles that affect non-smoking behavior in the form of a negative and positive assessment. The measuring instrument used was a questionnaire. The scale of the data was continuous, and for analysis purposes, the data was converted into a dichotomy with code 0 = negative; 1 = positive.

Subjective norms were the beliefs of adolescents who originate from the social environment, family, and friends that influence decision making on non-smoking behavior. The measuring instrument used was a questionnaire. The scale of the data was continuous, and for analytical purposes, the data was converted into a dichotomy with code 0 = not supporting; 1 = supporting.

Perceived Behavior Control was the assumption of adolescents about easy or dif-

ficult to do non-smoking behavior that is controlled by the support of family, friends, and the surrounding environment. The measuring instrument used was a questionnaire. The scale of the data was continuous, and for analysis purposes, the data was converted into a dichotomy with code 0 = weak; 1 = strong.

Intention was the desire of adolescents to engage in non-smoking behavior. The measuring instrument used was a questionnaire. The scale of the data was continuous, for analysis purposes, the data was converted into a dichotomy with code 0 = weak; 1 = strong.

Family support was the response of adolescents about the behavior of people who live at home, especially parents to provide encouragement or advice about non-smoking behavior. The measuring instrument used was a questionnaire. The scale of the data was continous, and for analysis purposes, the data was converted into a dichotomy with code 0 = weak; 1 = strong.

Teacher support was the response of adolescents about giving encouragement or advice by teachers regarding non-smoking behavior. The measuring instrument used was a questionnaire. The scale of the data was continous, for analysis purposes, the data was converted into a dichotomy with code 0 = weak; 1 = strong.

Peer support was the response of adolescents about encouraging others with the same level of age and maturity towards non-smoking behavior. The measuring instrument used was a questionnaire. The scale of the data was continous, and for analysis purposes, the data was converted into a dichotomy with code 0 = weak; 1 = strong.

Information media exposure was adolescent exposure to cigarette products through health warning pictures on cigarette deaths, cigarette advertisements and warning writing on various media. The measu-

ring instrument used was a questionnaire. The scale of the data was continous, and for analytical purposes, the data was converted into a dichotomy, code 0 = not exposed; 1 = ≥ exposed.

Non-smoking behavior was a habit of not smoking in teenagers. The measuring instrument used was a questionnaire. The scale of the data was categorical, and for analysis purposes, the data was converted into a dichotomy with code 0= smoking; 1= not smoking.

5. Data Analysis

Univariate analysis was carried out to describe in general the variables studied which included knowledge, attitude, subjective norm, perceived behavioral control, intention, parental support, teacher support, peer support, and media information exposure to produce the distribution and percentage of each variable.

Bivariate analysis was conducted to explain the effect of an independent variable (knowledge, attitude, subjective norm, perceived behavioral control, intention, parent support, teacher support, peer support, and information media exposure) on a de-pendent variable (non-smoking behavior in teenager).

Multilevel analysis was carried out to explain the effect of more than one independent variable, namely knowledge, attitude, subjective norm, perceived behavioral control, intention, parental support, teacher support, peer support, and exposure to information media. The variable at level one is individuals, in this study are teenagers. The variables at the second level studied were school contextual.

6. Research Ethics

This study was conducted based on several research ethics that were considered by authors including informed consent, anonymity, confidentiality, and ethical worthiness. Ethics licensing for this study was ob-

tained from the Health Research Ethics Commission of Dr. Moewardi Regional Hospital, Surakarta, Indonesia, No.1.065 / IX / HREC / 2019.

RESULTS

1. Univariate Analysis

Univariate data analysis is divided into two namely continuous and categorical data.

The univariate frequency distribution of study variables explains the general picture of variables including knowledge, attitudes, subjective norms, perceived behavioral control, intention, family support, teacher support, peer support, exposure to information media.

Table 1. Univariate analysis of the subject of continuous data research

Variables	N	Mean	SD	Min.	Max.
Knowledge	200	8.28	1.09	6	10
Attitude	200	32.44	5.33	20	40
Subjective Norms	200	21.42	3.54	14	26
Behavioral control perception	200	21.44	2.20	16	26
Intention	200	22.39	3.98	14	30
Family Support	200	6.01	1.02	4	7
Teacher's Support	200	6.14	1.09	3	7
Peer Support	200	5.43	1.25	3	7
Exposure to information media	200	6.4	0.83	5	7

Tabel 2. Univariate analysis of the characteristics of categorical data research subjects

Variables	Frequency	Percentage (%)
Knowledge		
Low (<8)	45	22.5
High (≥8)	155	77.5
Attitude		
Negative (<32)	44	22
Positive (≥32)	156	78
Subjective Norms		
Not supporting (<21)	46	23
Supporting (≥21)	154	77
Behavioral control perception		
Weak (<21)	37	18.5
Strong (≥21)	163	81.5
Intention		
Weak (<22)	42	21
Strong (≥22)	158	79
Family Support		
Weak (<6)	54	27
Strong (≥6)	146	73
Teacher's Support		
Poor (<6)	36	18
Strong (≥6)	164	82
Peer Support		
Weak (<5)	42	21
Strong (≥5)	158	79
Exposure to information media		
Not exposed (<6)	44	22
Exposed (≥6)	156	78

Table 2 shows the results of univariate analysis of the characteristics of study subjects based on categorical data which explains that the majority of adolescent boys have high knowledge of 155 (77.5%). Most of the study subjects were positive namely 156 (78%). Most study subjects have subjective norms that support amounting to 154 (77%). Most study subjects had strong behavioral control perceptions of 163 (81.5%). Most of the study subjects have strong intentions amounting to 158 (79%). Most of the study subjects have strong family support amounting to 146 (73%). Most study subjects have strong teacher support namely 164 (82%). Most study subjects have strong peer support at 158 (79%). Most study subjects were exposed to information media namely 156 (78%).

2. Bivariate Analysis

Table 3. Bivariate analysis with chi-square test determinants of smoking behavior in adolescents

Independent variable	Smoking		No Smoking		Total		OR	p
	N	%	N	%	N	%		
Knowledge								
Low (<8)	26	57.8	19	42.2	45	100	7.85	<0.001
High (≥8)	23	14.8	132	85.2	155	100		
Attitude								
Negative (<32)	26	59.1	18	40.9	44	100	8.35	<0.001
Positive (≥32)	23	14.7	133	85.3	156	100		
Subjective Norms								
Not supporting (<21)	21	45.7	25	54.3	46	100	3.78	<0.001
Supporting (≥21)	28	18.2	126	81.8	154	100		
Behavioral control perception								
Weak (<21)	20	54.1	17	45.9	37	100	5.43	<0.001
Strong (≥21)	29	17.8	134	82.2	163	100		
Intention								
Weak (<22)	23	54.8	19	45.2	42	100	6.15	<0.001
Strong (≥22)	26	16.4	132	83.6	158	100		
Family Support								
Weak (<6)	26	48.1	28	51.9	54	100	4.96	<0.001
Strong (≥6)	23	15.8	123	84.2	146	100		
Teacher Support								
Weak (<6)	19	52.8	17	47.2	36	100	4.99	<0.001
Strong (≥6)	30	18.3	134	81.7	164	100		
Peer Support								
Weak (<5)	22	52.4	20	47.6	42	100	5.33	<0.001
Strong (≥5)	27	17.1	131	82.9	158	100		
Exposure to information media								
Not exposed (<6)	26	59.0	18	40.9	44	100	8.35	<0.001
Exposed (≥6)	23	14.7	133	85.3	156	100		

Table 3 shows knowledge (OR= 7.85; p <0.001), attitude (OR= 8.35; p<0.001), subjective norms (OR= 3.78; p<0.001), perceived behavioral control (OR= 5.43; p<0.001), intention (OR = 6.15; p <0.001), family support (OR= 4.96; p<0.001), teacher support (OR= 4.99; p<0.001), peer support (OR= 5.33; p<0.001), and exposure information media (OR = 8.35; p <0.001).

3. Multivariate Analysis

Multivariate analysis in this study was conducted by multilevel multiple logistic regression analysis method using the Stata 13 program.

Table 4 shows that there is an influence of knowledge, attitudes, subjective norms, perceptions of behavioral control, intentions, parental support, teacher support,

peer support, and information media exposure to non-smoking behavior in adolescents.

Table 4. Multilevel multiple logistic regression analysis of non-smoking behavior in adolescents

Independent Variable	Regression Coefficient (b)	95% CI		p
		Lower Limit	Upper Limit	
Fixed Effect				
Knowledge (high)	3.09	0.86	5.33	0.007
Attitude (positive)	2.92	0.79	5.06	0.007
Subjective Norms (supporting)	2.81	0.72	4.92	0.009
Perception of behavioral control (strong)	3.60	1.22	5.99	0.003
Intention not to smoke (strong)	3.09	0.92	5.27	0.005
Family Support (strong)	2.80	0.76	4.85	0.007
Teacher Support (strong)	2.98	0.75	5.21	0.009
Peer Support (strong)	2.58	0.04	5.13	0.046
Exposure to information media (exposed)	2.27	0.45	4.09	0.014
Random Effect				
School				
Variation (constanta)	1.18	0.06	12.6	
n observation = 200				
Log likelihood= -31.72				
LR test vs. logistic regression p= 0.163				
Intra Class Correlation (ICC)= 20.92%				

High adolescent knowledge (b = 3.09; 95% CI= 0.86 to 5.33; p= 0.007), positive attitude (b= 2.92; 95% CI= 0.79 to 5.06; p= 0.007), supporting subjective norms (b= 2.81 ; 95% CI= 0.72 to 4.92; p= 0.009), perception of strong behavioral control (b= 3.60; 95% CI= 1.22 to 5.99; p= 0.003), strong non-smoking intention (b= 3.09; 95% CI= 959 0.92 to 5.27; p= 0.005), strong family support (b= 2.80; 95% CI= 0.76 to 4.85; p= 0.007), strong teacher support (b= 2.98; 95% CI= 0.75 to 5.21; p= 0.009), strong peer support (b= 2.58; 95% CI= 0.04 to 5.13; p= 0.046), and exposure to information media (b= 2.27; 95% CI= 0.45 to 4.09; p= 0.014) increases the likelihood of non-smoking behavior in a teenager.

Schools have a contextual effect on smoking behavior in adolescents with an ICC of 20.92%, meaning that variations in non-smoking behavior in adolescents as much as 20.92% are determined at the school level.

DISCUSSION

1. The effect of knowledge on non-smoking behavior in adolescents

Knowledge has a significant influence on non-smoking behavior in adolescents. Adolescents with high knowledge increase the probability of not smoking as much as 3.09 units higher than adolescents with low knowledge.

Information can produce knowledge (Nick, 2016). According to Huang et al. (2016), knowledge of the dangers of tobacco use is well known to adolescents, but this understanding must be detailed in order to minimize the misconceptions that are the reasons for starting smoking.

In contrast to Aryal et al. (2014) insufficient knowledge, risk and hazard perception. People in the immediate environment must support the complication of smoking and make termination services easily accessible. Knowledge about the effects of smoking on health is included in the lessons for

the control and prevention of cigarette use (Kasim, 2016).

The level of knowledge affects the size of the knowledge they have, so it is not surprising that the prevalence of non-smoking behavior in high-knowledge adolescents is higher when compared to adolescents who have a low level of knowledge.

2. The effect of attitudes on non-smoking behavior in adolescents

Attitude has a significant influence on non-smoking behavior in adolescents. Adolescents who behaved positively increased the likelihood of not smoking as much as 2.92 units higher than adolescents who behaved negatively.

Attitudes towards behavior are positive or negative assessments that are determined from behavioral beliefs carried out by individuals (Ajzen, 2005). Attitudes can improve smoking prevention behavior in children. The positive effects of children's attitudes towards smoking can be assessed through the continuing effectiveness of smoking prevention programs that are linked to the regular curriculum throughout the year by measuring changes in attitude (Kim et al, 2019).

Hanson (2018) stated that there is a direct relationship between attitude and intention to not smoke. Teens state that it is not beneficial to have a positive attitude towards smoking they report intention not to smoke. Negative attitudes towards smoking believe that others will refuse smoking. Having positive self-belief refusing smoking will increase the intention not to smoke.

In contrast to Au et al. (2016) stated that the failure to ban smoking was not caused by the refusal of smokers but because of the inadequate efforts of national and local governments in educating the public and lack of policy enforcement.

3. The effect of subjective norms on non-smoking behavior in adolescents

Subjective norms have a significant influence on non-smoking behavior in adolescents. Adolescents who support subjective norms increase the possibility of not smoking as much as 2.81 units higher than adolescents who do not support subjective norms.

Subjective norms are perceptions of someone doing or not doing behavior that is influenced by social pressure on behavior (Ajzen, 2005). Subjective norms can be measured through the influence of social groups. Measurement of subjective norms through peer groups ie someone who smokes in front of a friend who is not a smoker will feel ashamed. Measurement of subjective norms through family that is someone who starts smoking will be reprimanded by their parents. Measurement of subjective norms through society or culture is the existence of no-smoking regulations (Sulaeman, 2016).

Subjective norms act as the control and social order of individuals to comply with social pressure (Murti, 2018). Teenagers will not smoke if the level of behavior influence from social environment control is strong, but if behavior control from social environment is weak it can increase the desire to smoke (Su et al., 2015). Hilley et al. (2018) stated that subjective norms do not affect a person's intention to behave not smoking. This is influenced by the lack of support from the surrounding social environment that causes someone to be affected.

4. The effect of perception of behavioral control on non-smoking behavior in adolescents

Behavioral control perception has a significant influence on non-smoking behavior in adolescents. Adolescents with strong perceptions of behavioral control increase the

likelihood of not smoking as much as 3.60 units higher than adolescents with low perceptions of behavioral control.

Someone has control to conduct behavior. Someone will behave after conducting a positive evaluation, the presence of social pressure, have confidence in being able to conduct behavior and there is an opportunity to behave (Sulaeman, 2016). Control refers to an individual's perception of doing or avoiding behavior. Adolescents with weak perceptions of behavioral control will assume that smoking is a natural thing to do and will ultimately strengthen the intention of trying to smoke so that it will shape the behavior (Tantri et al., 2018).

Perceptions about health risks and beliefs can drive one's behavior. Smokers, former smokers, and never smokers greatly underestimates the risk of lung cancer in smokers. Perceptions about the health consequences of smoking in terms of relative risks, smoking rates may be reduced if perceptions about the relative risks of smoking and self-confidence are stronger (Tsai et al., 2018).

Hanson (2018) stated that perception of behavioral control is an important variable in predicting non-smoking intentions. Someone who has the perception of not smoking, is able to control smoking behavior and considers non-smoking behavior more likely to report that they have no intention of smoking. The determinants of smoking initiation vary in early and late teens.

In contrast to Hilley et al. (2019) revealed that the perception of behavioral control influences a person's intention to behave non-smoking is higher in nonsmokers but the perception of behavioral control has less effect in the intention to not smoke in smoker's behavior.

5. The effect of intention on non-smoking behavior in adolescents

Intention has a significant effect on non-smoking behavior in adolescents. Teenagers with strong intentions increase the likelihood of not smoking as much as 3.09 units higher than teens with weak intentions.

Hock et al. (2014) suggested that having smoker friends, social influence, and poor knowledge about health effects due to smoking shows a significant relationship with the intention to smoke in the future among nonsmokers. In contrast to Atmodjo (2017), stated that efforts to stop smoking is not an easy effort because tobacco addiction is a group of behavioral, cognitive, and physiological phenomena.

Exposure to the smoking environment compared to a non-smoking environment results in a greater desire, faster smoking, and more smoking. Conversely, stronger rejection related to the number of cigarettes smoked has an effect on non-smoking intentions (Stevenson et al., 2017). Adolescence is a period of growth so that brain development is sensitive to the effects of nicotine in cigarettes so that it affects adolescent's intention to smoke or not (Zhong et al., 2016).

Hilley et al. (2018) stated that TPB is useful in predicting non-smoking intentions, but is different for smokers and nonsmokers. Susceptibility factors for the initiation of smoking in someone who has never smoked include expectations of smoking outcomes, curiosity about smoking behavior, willingness, and intention to start smoking in the future (Stone, 2017).

6. The effect of family support on non-smoking behavior in adolescents

Family support has a significant influence on non-smoking behavior in adolescents. Adolescents who have strong family support increase the possibility of not smoking

as much as 2.80 units higher than adolescents who have weak family support.

Sarafino (2016) stated aspects of instrumental support in the form of direct assistance. Aspects of information support in the form of providing advice, direction, and feedback along with ways of solving problems. Families can influence smoking behavior. Families with smokers' parents can influence because parents are role models for children (Pandayu et al., 2017). Family support is able to influence the reasons for adolescent smoking behavior (Panduwinata et al., 2018).

Teenagers with low family support for smoking according to Arifianti et al. (2019) can reduce smoking behavior compared with adolescents with high family support for smoking behavior. Increased risk of teen smoking is related to parental smoking. This increase can be attenuated if adolescents refuse their parents' smoking behavior. Refusal of adolescents to smokers can reduce the effects of smoking behavior (Ho et al., 2018).

Having a family member of a current smoker can influence smoking intentions in the next five years (Su et al., 2015). Family-based smoking cessation interventions in adolescents according to Chan et al., (2016) are effective in increasing smoking abstinence. Participation in face-to-face counseling with family increases the help and support of mothers to fathers.

7. The effect of teacher support on non-smoking behavior in adolescents

Teacher support has a significant effect on non-smoking behavior in adolescents. Adolescents who have strong teacher support increase the likelihood of not smoking as much as 2.98 units higher than adolescents who have weak teacher support.

Higher school involvement and cognitive competency in seventh grade predict that adolescents are less likely to smoke in ninth grade. Disengagement of higher schoolwork and difficulty of school work predicts adolescent smoking. Non-smoking and adolescent smoking effects are mediated through academic achievement in school. Release of student behavior with schoolwork and school difficulties is a risk of smoking initiation. Smoking often continues in adulthood (Minkkinen et al., 2019).

The presence of teachers in increasing competence can support the implementation of tobacco-free programs in schools (Chatterjee, 2017). The role of the teacher is needed to implement the tobacco-free teacher program through tobacco-free communities through schools. This intervention provides the basis for an effective and low-cost approach to the promotion of smoking cessation through schools (Pednekar, 2018).

8. The effect of peer support on non-smoking behavior in adolescents

Peer support has a significant influence on non-smoking behavior in adolescents. Adolescents who have strong peer support increase the likelihood of not smoking as much as 2.58 units higher than adolescents who have weak peer support.

Peers influence individual beliefs to smoke or not smoke. Teenagers tend to change their own beliefs so that they are more similar to their friends. Those who are friends with smokers are more likely to have positive beliefs about smoking. Moral approval from friends influences cigarette use through individual beliefs, while friends' expectations for smoking affect cigarette use directly or through individual beliefs. Peer beliefs about smoking affect cigarette use directly or through its effects on individual beliefs (Ragan, 2016).

A study conducted by Li et al. (2016) proves that the similarity of tobacco use

among Chinese adolescents and their friends. Boys are more like their friends in tobacco use than girls. Tobacco use in adolescent boys to the next change according to the use of their friends.

Teenage male and female smokers alike trust more than their non-smoker colleagues that smoking helps people feel more comfortable in social gatherings. Having friends who express their disapproval of smoking can support public health efforts towards reducing the prevalence of smoking among adolescents (Hanson, 2018).

9. The effect of information media exposure on non-smoking behavior in adolescents

Exposure to information media has a significant effect on non-smoking behavior in adolescents. Adolescents who were exposed to information media increased the likelihood of not smoking as much as 2.27 units higher than adolescents who were not exposed to information media.

Vallone et al. (2017), stated that a brand is a logo in marketing a product and advertising. The brand has been used in the field of health communication. Building a brand for health promotion serves to enhance health messages and can influence individual behavior.

Cigarette advertising can be a predictor of smoking intentions in adolescents (Lee et al., 2013). A study by Krisnasari (2016) stated that pictorial warnings on cigarette packs, a supportive social environment and perceptions of the dangers of smoking can lead to smoking cessation intentions and intention to not start smoking in nonsmokers. Warning pictures on cigarette packs should be used in anti-smoking health promotion through print media, billboards and banners.

A higher level of ad exposure to the dangers of smoking affects smoking initiation lower in adolescents than in less exposed adolescents. The effect of advertising is able to prevent as many as 380,000-587,000 adolescents aged 11-19 years from starting smoking (Duke et al., 2019).

10. The effects of school on non-smoking behavior in adolescents

Schools have a significant influence on non-smoking behavior in adolescents. The results obtained that there is a school contextual influence on smoking behavior by 20.92%.

Adolescents are obliged to complete learning tasks at school and comply with rules that limit attitudes and behavior as students. Researchers in this study chose schools based on schools that have implemented smoking regulations and schools that have not fully implemented smoking regulations.

Tobacco use control needs to be done to strengthen and continue the downward trend in smoking prevalence. Identification of determinants of non-smoking behavior in non-smoking adolescents needs to be done as a basis for health promotion to encourage and support non-smoking behavior by high school adolescents so as to reduce the prevalence of cigarette use in adolescents (Hanson, 2018).

Health promotion through educational institutions can be delivered by applying policies. The policy is the implementation of smoking prevention programs through education. Nurumal et al. (2019) stated that smoking prevention interventions through education are more effective in educating adolescents identifying social influences and rejecting skills so as to prevent smoking initiation.

School programs that focus on developing skills to recognize and counter negative effects, intensive use of media and technological equipment, health warnings and

excise taxes can be effective tools in reducing tobacco use (Bafunno, 2019).

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CONFLICT OF INTEREST

There was no conflicts of interest

REFERENCE

Ajzen I (2005). The theory of planned behavior. Retrieved from https://people.umass.edu/aizen/tpb.html.

Arifianti T, Soemanto RB, Prasetya H (2019). The contextual effect of school on smoking behavior among male high school students. J Health Promot Behav. 4(1): 76-84 https://doi.org/10.26911/thejhpb.2019.04.01.08.

Aryal UR, Petzold M, Bondjers G, Krettek A (2014). Correlates of smoking susceptibility among adolescents in a peri urban area of Nepal: a population based cross sectional study in the jhaukhel duwakot health demographic surveillance site. Glob Health Action. 7(1): 1-14. doi: 10.3402/gha.v7.24488.

Atmodjo JT, Soemanto RB, Murti B (2017). Determinants of successful smoking cessation in Surakarta. J Health Promot Behav. 2(4): 332-344.. https://doi.org/10.26911/thejhpb.2017.02.04.05

Au WW, Ma W, Zhu Q, Chen H, Tang L (2016). Problems with cigarette smoking and attitudes towards the ban of smoking in Shantou, China. Public Health. 134(6):46-53. doi: 10.1016/j.puhe.2016.01.019.

Bafunno D, Catino A, Lamorgese V, Pizzutilo P, Di Lauro A, Petrillo P, Lapadula V, Mastrandrea A, Ricci D, Galetta D (2019). Tobacco control in Europe: A review of campaign strategies for teenagers and adults. Crit Rev Oncol Hematol. 138(6):139-147. doi: 10.1016/j.critrevonc.2019.01.022.

Chan SSC, Cheung YTD, Fong DYT, Emmons K, Leung AYM, Leung DYP, Lam TH (2017). Family based smoking cessation intervention for smoking fathers and nonsmoking mothers with a child: a randomized controlled trial. J Pediatr. 182(18):260-266. doi: 10.1016/j.jpeds. 2016.11.021.

Chatterjee N, Kadam R, Patil D, Todankar P (2017). Adherence to the tobacco-free school policy in Rural India. Asian Pac J Cancer Prev. 18(9): 2367-2373. doi: 10.22034/APJCP.2017.18.9.2367.

Hanson MJS (2018). Attitudes and perceptions about cigarette smoking among nonsmoking high school students. J Am Acad Nurse Prac. 30(2): 60-63. doi:10.1097/jxx.00000000005.

Hilley C, Johnson SL, Royce S, McGough FM (2018). Understanding factors related to nonsmoking intention among college students. J Am Coll Health. 67(6): 523-530. doi: 10.1080/074484-

81.2018.1498345.

Ho SY, Chen J, Wang MP, Lam TH (2018). Parental smoking, rejection of parental smoking, and smoking susceptibility and behaviors in Hong Kong adolescents. Addict Behav. 82-(7): 19-22. doi:10.1016/j.addbeh.2018.02.019.

Hock LK, Ghazali SM, Cheong KC, Kuay LK, Li LH, Huey TC, Ying CY, et al (2014). Prevalence and factors associated with smoking intentions among nonsmoking and smoking adolescents in Kota Tinggi, Johor, Malaysia. Asian Pac J Cancer Prev. 15(10): 59–66. doi: 10.7314/apjcp.2014.15.10.4359.

Kim S, Kim H (2019). Effectiveness of smoking prevention programs for preschool children in South Korea at post intervention. Children and Youth Services Review. 101: 80-86. https://doi.org/10.1016/j.childyouth.2019.03.042.

Krisnasari S (2016). Hubungan peringatan bergambar pada kemasan rokok dengan intensi berhenti merokok atau intensi tidak mulai merokok pada masyarakat di Kabupaten Sleman. Thesis. Universitas Gadjah Mada Yogyakarta. Retrieved from http://etd.repository.ugm.ac.id/index.php?mod=penelitian_detail&sub=PenelitianDetail&act=view&typ=html&buku_id=106893&obyek_id=4.

Lee J, Jhonson C, Rice J, Warren CW, Chen T (2013). Smoking beliefs and behavior among youth in South Korea, Taiwan, and Thailand. Int J Behav Med. 20(3): 319-26. doi: 10.1007/s12-529-012-9236-3.

Li L, Lu T, Niu L, Feng Y, Jin S, French DC (2016). Tobacco use by middle and high school Chinese adolescents and their friends. J Youth Adolesc. 46(6): 1262–1274. doi:10.1007/s10964-016-

0563-6.

Minkkinen JL, Kinnunen JM, Karvonen S, Hotulainen RH, Lindfors PL, Rimpela AH (2019). Low schoolwork engagement and schoolwork difficulties predict smoking in adolescence?. Eur J Public Health. 29(1): 44–49. doi:10.1093/eurpub/cky179.

Murti B (2018). Teori promosi dan perilaku kesehatan edisi kesatu. Karanganyar: Bintang Fajar Offset.

Nick P (2016). From information to knowledge. Protoplasma. 253(1): 1-2. doi: 10.1007/s00709015-0924-0.

Nurumal MS, Zain SHM, Mohamed MHN, Shorey S (2019). Effectiveness of school-based smoking prevention education program (SPEP) among nonsmoking adolescents: a quasi experimental study. J Sch Nurs. doi:10.1177/1059840519871641.

Pandayu A, Murti B, Pawito (2017). Effect of personal factors, family support, pocket money, and peer group, on smoking behavior in adolescents in Surakarta, Central Java. J Health Promot Behav. 2(2):98-111. https://doi.org/10.26911/thejhpb.2017.02.02.01.

Panduwinata AW, Murti B, Pawito (2018). Multilevel analysis of the effect of school and peer group on smoking behavior in adolescents in Banjarnegara. J Health Promot Behav. 3(3): 166-178. https://doi.org/10.26911/thejhpb.2018.03.03.04.

Pednekar MS, Nagler EM, Gupta PC (2018). Scaling up a tobacco control intervention in low resource settings: a case example for school teachers in India. Health Educ Res. 33(3): 218-231. doi:10.1093/her/cyy011.

Peterson LA, Hecht SS (2017). Tobacco, e-cigarettes, and child health. Curr Opin Pediatr. 29(2): 225-230. doi:10.1097/MOP.0000000000000456.

Purnaningrum WD, Joebagio H, Murti B (2017). Association between cigarette advertisement, peer group, parental education, family income, and pocket money with smoking behavior among adolescents in karanganyar district, central java. J Health Promot Behav. 2(2): 150-160. https://doi.org/10.26-911/thejhpb.2016.02.02.05150.

Ragan DT (2016). Peer beliefs and smoking in adolescence: A longitudinal social network analysis. Am J Drug Alcohol Abuse. 42(2): 222–230. doi:10.3109/-00952990.2015.1119157.

Sarafino EP (2016). Health psychology: biopsychosocial interactions ninth edition. USA: Wiley.

Stevenson JG, Oliver JA, Hallyburton MB, Sweitzer MM, Conklin CA, McClernon FJ (2016). Smoking environment cues reduce ability to resist smoking as measured by a delay to smoking task. Addict Behav. 67(3): 49-52. doi:10.10-16/j.addbeh.2016.12.007.

Stone MD, Audrain MJ, Leventhal AM (2017). Association of anhedonia with adolescent smoking susceptibility and initiation. Nicotine Tob Res. https://-doi.org/10.1093/ntr/ntw177.

Su X, Li L, Griffiths SM, Gao Y, Lau JT, Mo PK (2015). Smoking behaviors and intentions among adolescents in rural China: the application of the theory of planned behavior and the role of social influence. Addict Behav. 48: 44-51. https://doi.org/10.1016/j.addbeh.-2015.04.005.

Sulaeman ES (2016). Pembelajaran model dan teori perilaku kesehatan konsep dan aplikasi. Surakarta: UNS Press.

Tantri A, Nur AF, Feranita U (2018). Hubungan persepsi terhadap peringatan bahaya merokok pada kemasan rokok dengan perilaku merokok pada remaja laki-laki di Kota Palembang. Jurnal Ilmu Kesehatan Masyarakat. 9(1): 74-82. https://doi.org/10.26553/jikm.2-018.9.1.74-82.

Vallone D, Greenberg M, Xiao H (2017). The effect of branding to promote healthy behavior: reducing tobacco use among youth and young adults. Int J Environ Res Public Health. 14(12): 1-13. doi:10.3390/ijerph14121-517.

World Health Organization (2015). Global Youth Tobacco Survey (GYTS): Indonesia Report, 2014. WHO Regional Office for South-East Asia. Retrieved from https://apps.who.int/iris/handle/10665/205148.