

## Multilevel Analysis of the Effect of School and Peer Group on Smoking Behavior in Adolescents in Banjarnegara

Annisa Widya Panduwinata<sup>1)</sup>, Bhisma Murti<sup>1)</sup>, Pawito<sup>2)</sup>

<sup>1)</sup>Masters Program in Public Health, Universitas Sebelas Maret

<sup>2)</sup>Faculty of Social and Political Sciences, Universitas Sebelas Maret

### ABSTRACT

**Background:** Smoking remains a public health problem in the world, especially in Indonesia. Indonesia is the third country with the largest number of smokers, especially among teenagers. School and peers are one of the factors that influence smoking behavior in adolescents. This study aims at analyzing the influence of schools and peers on smoking behavior in adolescents.

**Subjects and Method:** This was an analytic observational study with a cross sectional design. It was conducted in Banjarnegara, Central Java, from October to November 2018. A sample of 200 adolescents was selected by simple random sampling. The dependent variable was smoking behavior. The independent variables were intention, attitude, subjective norm, perceived behavior control, pocket money, media exposure, peer, and family intimacy. The data were collected by questionnaire and analyzed by multilevel regression.

**Results:** Smoking behavior was positively affected by intention ( $b = 1.49$ ;  $CI_{95\%} = 0.25$  to  $2.73$ ;  $p = 0.019$ ), peer group ( $b = 1.20$ ;  $95\% CI = 0.12$  to  $2.28$ ;  $p = 0.030$ ), and media exposure ( $b = 1.97$ ;  $95\% CI = 0.87$  to  $3.08$ ;  $p < 0.001$ ). Smoking behavior was negatively affected by family intimacy ( $b = -1.34$ ;  $95\% CI = -2.44$  to  $-0.24$ ;  $p = 0.017$ ), attitude ( $b = -1.44$ ;  $95\% CI = -2.43$  to  $-0.44$ ;  $p = 0.005$ ), subjective norm ( $b = -1.84$ ;  $95\% CI = -2.87$  to  $-0.81$ ;  $p < 0.001$ ), perceived behavior ( $b = -1.91$ ;  $95\% CI = -3.03$  to  $-0.79$ ;  $p = 0.001$ ). Smoking behavior was negatively affected by money pocket ( $b = -0.77$ ;  $95\% CI = -1.85$  to  $0.30$ ;  $p = 0.158$ ) but it was statistically non-significant. School had contextual effect of smoking behavior in adolescents ( $ICC = 13.8\%$ ).

**Conclusion:** Smoking behavior is positively affected by intention, peer group, and media exposure. Smoking behavior is negatively affected by family intimacy, attitude, subjective norm, perceived behavior. Smoking behavior is not associated with money pocket. School has contextual effect of smoking behavior in adolescents.

**Keywords:** smoking behavior, school, adolescents, multilevel analysis

### Correspondence:

Annisa Widya Panduwinata. Masters Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami No. 36 A, Surakarta, Central Java. Email: annisawidya20@gmail.com.

Mobile: +6285326744630.

---

### BACKGROUND

Smoking is still one of the biggest public health problems in the world (WHO, 2017). In 2015, it is estimated that more than one billion people smoke. About 80% of the world's smokers live in developing countries namely low-income countries and middle-income countries (Alsubaie, 2018).

Smoking behavior in everyday life is often found in various places. Smoking habits generally begin at the age of adoles-

cence, because in this period, they are very vulnerable to be affected, want to try new things and consider as a means to help physical, cognitive, and emotional changes that occur during the life phase (Duncan et al, 2017).

Many factors influence adolescents to smoke, one of them is exposure to the media. By looking at advertisements on television and the mass media, teens begin to know and try to smoke (Ariani, 2011).

The percentage of smokers with a large number of people in ASEAN countries is in Indonesia, which is 46.16%. According to WHO 2014 data, Indonesia is the third country with the largest number of smokers in the world after China and India. The increase in cigarette consumption has an impact on the higher burden of diseases caused by smoking and the increase in mortality due to smoking. At present 50% of deaths from cigarettes are in developing countries (Ministry of Health of Republic of Indonesia, 2015a).

According to *Riskesmas* data in 2010, the smoking prevalence of adolescents aged 15-24 is 36.7%. Data from various surveys found that the age group 15-19 years was the highest age at starting smoking, the proportion reached 43.3%, followed by the age of 20-24 years with a proportion of only 14.6% (Demographic Institute, 2017).

The incidence of smoking in adolescents is caused by the weak control and closeness of parents to their children. Parents consider that they are a source for children not as a model for children, impose freedom in carrying out actions, and giving discipline that is not consistent (Fullingrum et al, 2017). The lack of parental monitoring of the use of children's pocket money also triggers the behavior of buying cigarettes freely with easy access. The higher the socio-economic status of the parents is, the better the chance for children to buy cigarettes without supervision is (Kumar, 2014 in Pandayu, 2017).

Indonesia as the country with the highest adolescent smokers in the world, according to the Global Youth Tobacco Survey in 2014 as many as 36.2% of adolescent boys and 4.3% of adolescent girls consume tobacco (WHO, 2015). Banjarnegara Regency ranks the third highest with the proportion of smokers every day aged 10 years and over in several

cities in the Central Java region. Banjarnegara Regency also has the highest proportion according to the age of starting smoking, namely adolescents in the age range of 10-14 years 34.2% and ages 15-19 years at 39.8% (Ministry of Health, 2013b).

Individuals who start smoking before the age of 18 are more likely to be smokers or nicotine addicts than those who start smoking as adults (Kim & Chun, 2018).

In general, adolescents have a tendency to violate the rules and oppose the rules, underestimate the meaning of education, violate discipline and order at home and at school. School regulations that are deemed not in accordance with his wishes, give rise to the intention to violate these rules such as smoking habits in school (Sutopo, 2011).

Family and peer factors also influence smoking behavior in adolescents. Family is the primary unit that functions to transfer social and cultural factors while friends become a source of identity formation in adolescents (Liem, 2014).

Predicting the risk factors that influence smoking behavior is done by using Theory of Planned Behavior (TPB). This theory states that a person's behavior is influenced by intention to behave that is determined by attitudes, subjective norms and perceptions of behavioral control (Ajzen, 1991 in Droomers et al, 2016).

---

## SUBJECTS AND METHOD

---

### 1. Study Design

This was an analytic observational study with a cross sectional design. It was conducted in 25 senior high schools in Banjarnegara, Central Java, from October to November 2018.

### 2. Population and samples

The source population in this study was male adolescent in senior high schools in Banjarnegara, Central Java. A 200 adolescent was selected by random sampling.

### 3. Study variables

The dependent variable was smoking behavior. The independent variables were media exposure, peers, pocket money, family intimacy, intentions, attitudes, subjective norms, and perceived behavioral control.

### 4. Operational definition of variables

Smoking behavior was defined as smoking behavior carried out by adolescents. Media exposure was defined as teenage exposure through various types of mass media, electronic media related to advertising/ promotion of cigarettes.

Peers support was defined as individual interactions in adolescents who smoke with the same age level and involve relatively large familiarity between groups. Family intimacy was defined as a feeling of mutual trust, close, open, bound, interconnected that is joined because of blood relations.

Pocket money was defined as money that comes from giving parents or other family members to meet the needs of adolescents. Intention was defined as the desire of adolescent to choose whether or not to do smoking behavior.

Attitude was defined as an adolescents response in the form of a positive or negative assessment related to the ease or obstacles affecting adolescents in doing smoking behavior. Subjective norms was defined as belief about the support felt by adolescents from the social environment, family members and peers who have an influence on adolescent decisions in smoking behavior. Perception of behavior control was defined as the assumption of adolescents related to smoking behavior.

### 5. Study Instrument

The instrument in this study was a questionnaire. The questionnaire was first tested by testing the validity and reliability test. Validity test consists of face validity and content validity. Reliability testing in

this study was conducted on 20 school teenagers who then carried out grains-total and cronbach alpha correlations.

### 6. Data Analysis

Univariate analysis was done to see frequency distribution and percentage characteristics of research subjects. Bivariate analysis was carried out to study the effect of smoking behavior with independent variables using the chi-square test and calculation of odds ratios (OR) with a confidence level (CI) of 95%. Furthermore, multivariate analysis used a multilevel logistic regression run on Stata 13.

### 7. Research Ethics

Research ethics include informed consent, anonymity, confidentiality, and ethical clearance. Ethical clearance was obtained from Research Ethics Committee, Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Central Java, with the protocol number 01/18/10/288.

---

## RESULTS

---

### 1. Sample characteristics

Table 1 showed sample characteristics. Table 1 showed that the majority of the sample that were exposed to high media were 106 people (53.0%) while 94 people were exposed to low media (47.0%). In this study most of the teens had low allowances of 131 people (65.5%) while 69 people (34.5%) have high criteria. Most teenagers have friends who majority do not smoke 107 people (53.3%) and adolescents who have the majority of friends smoke by 93 people (46.5%). In the variable of family intimacy, adolescents who have a strong family intimacy relationship there are 89 people (44.5%) and adolescents who have a weak family intimacy relationship there are 111 people (55.5%). Likewise with teenagers who have strong intention to smoke 152 people (76.0%) and those who have a weak intention to smoke there are 48 people

(24.0%). Likewise with attitudes, adolescents who have negative attitudes 99 people (49.5%) and positive attitudes there are 101 people (50.5%). Some teenagers have weak subjective norms, there are 116 people (58.0%) while adolescents who have strong subjective norms have 84 people (42.0%). Likewise the perception of behavioral

control, adolescents who have a perception of weak behavioral control over smoking behavior 112 people (56.0%) and 88 people (44.0%) have a perception of strong control, and based on the data above the study sample smoked 113 (56.5%) while 87 (43.5%) do not smoke.

**Table 1. Sample characteristics**

Variable	N	Percentage (%)
<b>Media Exposure</b>		
Low	94	47.0
High	106	53.0
<b>Allowance</b>		
Low<Rp 10.000	131	65.5
High>Rp 10.000	69	34.5
<b>Peers</b>		
The majority are not smoking	107	53.3
The majority are smoking	93	46.5
<b>Family Intimacy</b>		
Weak	111	55.5
Strong	89	44.5
<b>Intention</b>		
Weak	48	24.0
Strong	152	76.0
<b>Behavior</b>		
Negative	99	49.5
Positive	101	50.5
<b>Subjective Norm</b>		
Weak	116	58.0
Strong	84	42.0
<b>Perceived Behavior Control</b>		
Weak	112	56.0
Strong	88	44.0
<b>Smoking behavior</b>		
Not smoking	87	43.5
Smoking	113	56.5

**2. Bivariate Analysis**

Table 2 showed the results of bivariate analysis. Based on table 2, there are about 78.3% of adolescents who smoke often get exposure to cigarette advertisement media while 68.1% of teens who do not smoke rarely get exposure to cigarette advertisement media. The results of the analysis showed that there was a significant effect between media exposure and smoking behavior on adolescents (OR = 7.70; 95%

CI= 4.08 to 14.5; p<0.001) so that adolescents who are often exposed to cigarette advertising risk 7.7 times more big for smoking behavior compared to teenagers who rarely get exposure to cigarette advertising media.

There are about 56.5% of teens who smoke get low allowance or <10,000 while teens who do not smoke amounting to 43.5% get allowance <10,000. The results of the analysis show that there is no sig-

nificant effect between allowance and smoking behavior on adolescents (OR= 1.00; 95% CI= 0.55 to 1.80; p= 1.000) so that teenagers who have less allowance or more of it can be interpreted as not affect smoking behavior in adolescents.

There are around 77.4 teens who smoke have peers who are the majority who smoke meanwhile teens who do not smoke amount to 61.7%. The results of the analysis showed that there was a significant influence between peers and smoking behavior in adolescents (OR = 5.52; 95% CI= 2.96 to 10.2; p<0.001) so that adolescents who had the majority smoking peers had 5.5 times

more risk big for smoking behavior compared to teenagers who have friends who majority do not smoke.

There are about 77.5% of teenagers who smoke have weak family intimacy while non-smoking teens 69.7% have strong family intimacy. The results of the analysis showed that there was a significant influence between family intimacy and smoking behavior in adolescents (OR= 0.12; 95% CI= 0.06 to 0.23; p<0.001) so that teenagers with strong family intimacy could be protected 88% more good for avoiding smoking behavior compared to teens who have weak family intimacy.

**Table 2. The results of bivariate analysis**

Variable	Smoking Status				Total		OR	95% CI	p
	Smoking		Not smoking		N	%			
	n	%	n	%					
<b>Media Exposure</b>									
Low	30	31.9	64	68.1	94	100	7.70	4.08 - 14.5	< 0.001
High	83	78.3	23	21.7	106	100			
<b>Allowance</b>									
Low<Rp 10.000	74	56.5	57	43.5	131	100	1.00	0.55 - 1.80	1.000
High>Rp 10.000	39	56.5	30	43.5	69	100			
<b>Peers</b>									
The majority are not smoking	41	38.3	66	61.7	107	100	5.52	2.96 - 10.2	< 0.001
The majority are smoking	72	77.4	21	22.6	93	100			
<b>Family Intimacy</b>									
Weak	86	77.5	25	22.5	111	100	0.12	0.06 - 0.24	< 0.001
Strong	27	30.3	62	69.7	89	100			
<b>Intention</b>									
Weak	12	25.0	36	75.0	48	100	5.94	2.84 - 12.3	< 0.001
Strong	101	66.4	51	33.6	152	100			
<b>Behavior</b>									
Negative	78	78.8	21	21.2	99	100	0.14	0.07 - 0.27	< 0.001
Positive	35	34.7	66	65.3	101	100			
<b>Subjective Norm</b>									
Weak	93	80.3	23	19.8	116	100	0.07	0.03 - 0.15	< 0.001
Strong	20	23.8	64	76.2	84	100			
<b>Perceived Behavior Control</b>									
Weak	86	76.8	26	23.3	112	100	0.13	0.07 - 0.25	< 0.001
Strong	27	30.7	61	69.3	88	100			

There are around 66.4% of adolescents who smoke have a strong intention to

smoke while non-smoking teens 33.6% have a weak intention to smoke. The results

of the analysis show that there is a significant influence between intention and smoking behavior in adolescents (OR= 5.94; 95% CI = 2.84 to 12.3; p<0.001) so that teenagers who have strong intention to smoke have a risk of 5.9 times more great for smoking behavior compared to teenagers who have weak intentions.

There were around 78.8% of teenagers who smoked had a negative attitude while 65.5% of teenagers who did not smoke had a positive attitude. The results of the analysis showed that there was a significant influence between attitudes and smoking behavior in adolescents with values (OR = 0.14; 95% CI = 0.07 to 0.27; p <0.001) so that adolescents who had a positive attitude had 86% better protection to avoid from smoking behavior compared to teenagers who have negative attitudes.

There are around 80.2% of adolescents who smoke have weak subjective norms while 76.2% of non-smokers have strong subjective norms. The results of the analysis show that there is a significant influence between subjective norms and smoking behavior in adolescents (OR= 0.07; 95% CI= 0.03 to 0.15; p<0.001) so that adolescents who have strong subjective norms have 93% better protection to avoid smoking behavior compared to adolescents who have weak subjective norms.

There are about 76.8% of teens who smoke have a perception of weak beha-

vioral control while teenagers who do not smoke amounting to 69.3% have a perception of strong behavioral control. The results of the analysis showed that there was a significant influence between perceptions of behavioral control and smoking behavior in adolescents (OR = 0.13; 95% CI= 0.07 to 0.25; p<0.001) so that adolescents who had perceptions of behavioral control had 87% protection and it is better to avoid smoking behavior compared to teens who have a perception of weak behavioral control.

**3. Multilevel Analysis**

Table 3 showed the result of multilevel logistic regression. Table 3 showed that there was a positive effect of high media exposure on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of media exposure score would increase the smoking behavior score by 1.97 units and the effect was statistically significant (b= 1.97; 95% CI= 0.87 to 3.08; p< 0.001).

There was a negative effect of low pocket money on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of pocket money score would decrease the smoking behavior score by 0.77 units and the effect was statistically non-significant (b= -0.77; 95% CI= -1.85 to 0.30; p= 0.158)

**Table 3. The result of multilevel logistic regression**

Independent Variables	Regression Coefficient b	CI 95%		P
		Lower Limit	Upper Limit	
<b>Random Effect</b>				
- High media exposure to cigarette advertisement	1.97	0.87	3.08	< 0.001
- Pokcket money >Rp 10,000	- 0.77	- 1.85	0.30	0.158
- The majority of peers are smokers	1.20	0.12	2.28	0.030
- Weak family intimacy	-1.34	2.44	- 0.24	0.017
- Strong intention to smoke	1.49	0.25	2.73	0.019
- Negative attitude	- 1.44	- 2.43	- 0.44	0.005
- Weak subjective norm	- 1.84	- 2.87	- 0.81	< 0.001

- Weak perceived behavior control	- 1.91	- 3.03	- 0.79	0.001
<b>Stratified Effect</b>				
School Level	0.52	0.05	5.39	
n observation = 200				
Log likelihood = - 59.24				
LR test vs. logistic regression, p= 0.132				
ICC = 13.8 %				

There was a positive effect of peers who were smokers on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of peer score would increase the smoking behavior score by 1.20 units and it was statistically significant. (b= 1.20; 95% CI= 0.12 to 2.28; p= 0.030).

There was a negative effect of weak family intimacy on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of family intimacy score would decrease the smoking behavior score by 1.34 units and it was statistically significant (b= -1.34; 95% CI= -2.44 to -0.24; p= 0.017).

There was a positive effect of strong intention to smoke on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of intention score would increase the smoking behavior score by 1.49 units and it was statistically significant (b= 1.49; 95% CI= 0.25 to 2.73; p= 0.019).

There was a negative effect of negative attitude on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of attitude score would decrease the smoking behavior score by 1.44 units and it was statistically significant (b= -1.44; 95% CI= -2.43 to -0.44; p= 0.005).

There was a negative effect of weak subjective norm on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of subjective norm score would decrease the smoking behavior score by 1.87 units and it was

statistically significant (b=-1.84; 95% CI= -2.87 to -0.81; p<0.001)

There was a negative effect of weak perceived behavioral control on smoking behavior among adolescents. An increase of perceived behavioral control decreased smoking behavior by 1.91 units and it was statistically significant. (b= - 1.91; CI95%= -3.03 to -0.79; p= 0.001).

The result of data analysis was ICC= 13.8%. The indicator showed that that schools have a contextual effect of 13.8%. This number was greater than the standard 8-10% rule of thumb, therefore, the contextual effects shown from multilevel analysis were very important to note. The table also showed that the score of p= 0.132, this mean that the multilevel model was statistically significant different from the regular logistic regression model.

## DISCUSSION

### **1. The effect of media exposure on smoking behavior among adolescents**

The result of this study showed that there was a positive effect of media exposure of cigarette advertisement on smoking behavior among adolescents. Adolescents who were often exposed to cigarette advertising can strengthen their decision to have the intention to smoke compared to adolescents who rarely exposed to cigarette advertising media. These results supported a study of Donaldson (2017) which stated that exposure to information media affected smoking behavior in adolescents. The media was a more important source of

information than parents and peers, mass media, both print and electronic that display writings or images that can make people to imitate what they see.

Media exposure to cigarette advertisements as a potential promotional media to shape adolescents' smoking attitudes and behavior. The effect could be caused by the intention to smoke (Rachmat et al, 2013). In addition, electronic media also has a negative impact on adolescent knowledge, especially regarding smoking. In printed media, the adolescents could only read, see pictures and imagine, while in electronic media they could see the pictures and also hear, the more sensing an object, the greater the influence of the object on the individual and indirectly raised the intention to smoke (Yang, 2015).

## **2. The effect of pocket money on smoking behavior among adolescents**

There was a negative effect of pocket money on smoking behavior among adolescents. The regression coefficient for each increase of 1 unit of pocket money score would decrease the smoking behavior score by 0.77 units. Adolescents who have less or more pocket money did not affect smoking behavior in adolescents. Pocket money management that they have was for smoking and buying the needs, most of the subjects claimed that they bought cigarettes on a daily basis that they took from their pocket money or chose to save the money at the beginning of the month to buy 1 pack of cigarettes.

High family income would affect children's pocket money. Parents give the money in order to fulfill the needs of their children. It was expected that children can use pocket money with positive things. The large amount of pocket money did not affect the intention of the study subjects to stop smoking (Ma et al, 2013). This was

because the research subjects used their pocket money for their daily needs such as buying food and others. Pocket money which was not used for positive things would lead to the intention of quitting smoking such as seeking information about the effects of smoking in the mass media or on the Internet (Dzul et al, 2017).

## **3. The effect of peers on smoking behavior among adolescents**

The result of this study showed that there was a positive effect of peer on smoking behavior among adolescents. Adolescents who have friends who were smokers would be affected by smoking behavior than adolescents who have peers who did not smoke. These results supported the study from Rahma (2018) which showed that there was an effect of peer on smoking behavior in male high school students. The tendency of adolescents to equate behavior with their peers was called conformity, the more people was conformistic to their peers, the higher the tendency to show smoking behavior.

Peer influence was a strong influence in affecting smoking behavior because in this time, people were still vulnerable and easily affected by the surrounding environment (Isa et al, 2017). Adolescents tend to change their own behavior, and tend to choose friends who were in accordance with their desires, if their peers supported smoking behavior, adolescents tend to follow that behavior (Millan et al, 2018). This supported the social cognitive theory (SCT) which explained that smoking habits were not only influenced by individual willingness but also caused by social environmental factors such as peers.

## **4. The effect of family intimacy on smoking behavior among adolescents**

The result of this study showed that there was a negative effect of family intimacy on



smoking behavior among adolescents. Adolescents who have strong family intimacy were more likely to avoid smoking behavior than adolescents who have weak family intimacy. This was in line with a study done by Joung *et al.* (2016) which stated that the higher the family intimacy, the lower the smoking behavior compared to adolescents who have weak family intimacy. The result of this study was in accordance with Santrock (2002) that children who grew up in good family intimacy would be an individual who has higher self esteem and better emotional welfare.

Adolescence would be very susceptible to emotional instability, if they experienced strong pressure, they need to have a handle in facing the pressure. With a good intimacy between adolescents and their families, adolescents would feel that they have a handle in dealing with the crisis. The fulfillment of the need for support in the development of adolescence would lead to a positive attitude so that adolescents have a stable emotional welfare. Therefore, adolescents would not fall to deviant behaviors such as smoking behavior or drug abuse (Hei, 2018)

### **5. The Effect of Intention on Smoking Behavior Among Adolescents**

The result of this study showed that there was a positive effect of intention on smoking behavior among adolescents. Adolescents who have a strong intention to smoke have a greater risk of smoking behavior compared to adolescents who have weak intentions. This was consistent with the research conducted by Al Qodri *et al.* (2016) which showed that there was a relationship between intention and smoking behavior among adolescents.

Strong intention to smoke was a very big influence to make someone to smoke, if the majority of their peers were smokers,

people have the intention to smoke, and vice versa, if the majority of peers did not smoke, then they would have the intention to stop smoking. The intention of adolescents to smoke was because adolescence was a stage of growth so that they were easily affected by surrounding environment, and the effects of nicotine in cigarettes make the adolescents to keep smoking (Ra *et al.*, 2017).

The intention to smoke can be caused by external factors, namely friends or relatives who smoke. This study supported the TPB which stated that intention was formed from the existence of attitudes toward behavior, subjective norms and perceived behavioral control possessed by individuals, these three components interacted and became determinants of the formation of intentions that would or would not be done (Xuefen *et al.*, 2015).

### **6. The effect of attitude on smoking behavior among adolescents**

The result of this study showed that there was a negative effect of attitude on smoking behavior among adolescents. Adolescents who have positive attitude have a good effect to avoid smoking behavior compared to adolescents who have negative attitudes. This study was supported by a study done by Dzul *et al.* (2017) which showed that there was an effect of attitude on smoking behavior among adolescents. The formation of attitude did not happen by itself. The formation always took place in human interaction, and with regard to certain objects. Social interactions within groups and outside such as culture or communication tools could change the attitude or form new attitude.

Attitude was a personal judgment, this supported the theory of planned behavior which showed that behavior was formed because of the influence of strong intention from within a person and was

determined by one of the concepts namely attitude (Yu-Fang *et al*, 2017).

### **7. The effect of subjective norm on smoking behavior among adolescents**

The result of this study showed that there was a negative effect of subjective norm on smoking behavior among adolescents. Adolescents who have strong subjective norm would have a good effect to avoid smoking behavior compared to adolescents who have weak subjective norm. This study was supported by a study by Delpia *et al*. (2016) which stated that there was an effect of subjective norm on smoking behavior among adolescents. The effect was caused by the intention to smoke. Adolescents would not smoke if the effect level of the control behavior of their social environment was strong on cigarettes, otherwise if the behavior control in the environment was weak, it could increase the desire to smoke (Xuefen *et al*, 2015).

Norms have an important role as social control and social order by applying social pressure to individuals to obey it (Murti, 2018). This supported the theory of planned behavior which stated that behavior was formed by the effect of strong intentions in the individual which determined by subjective norms (Shi *et al*, 2014).

### **8. The effect of perceived behavioral control on smoking behavior among adolescents**

The result of this study showed that there was a negative effect of perceived behavioral control on smoking behavior among adolescents. Adolescents who have strong perceived behavioral control have a good effect to avoid smoking behavior compared to adolescents who have weak perceived behavioral control. This study was supported by a study by McKelvey *et al*, (2016) which stated that there was an effect of

perceived behavioral control on smoking behavior among adolescents, a teenager felt that smoking was natural, adolescents tend to try cigarettes because they felt capable so that the individual's intention to smoke became strong, so that it could shape smoking behavior in adolescents.

Perceived behavioral control refer to the beliefs of individuals to be able or not to do a behavior. Adolescents who have a weak perceived behavioral control would assume that smoking was a natural thing to do and would eventually strengthen the intention to try smoking so that it would form a behavior. The theory of planned behavior stated that intentions were formed from attitudes toward behavior, subjective norms, and perceived behavioral control possessed by individuals that affect the individual to take an action or not (Tantri *et al*, 2018)

### **9. The effect of school on smoking behavior among adolescents**

The result of analysis was ICC= 13.8%. The indicator showed that schools have a contextual effect of 13.8% on adolescent smoking behavior. In a school environment, an individual met many friends from various cultures and different behaviors from each individual. Even though they have good knowledge and their schools have established regulations related to smoking behavior, some research subjects still chose to smoke even though they have to hide. Adolescents at school were more likely to have smoking behavior, a friend who has smoking habit would influence his/her friends outside the school environment to smoke. According to the Social Development Model, when entering secondary school, the influence of friends would be greater than the family because of the individuation process in adolescents (Schreuders *et al*, 2017).

---

**REFERENCE**

---

- Alsubaie ASR (2018). Prevalence and determinants of smoking behavior among male school adolescents in Saudi Arabia. *Int J Adolesc Med Health*. doi: 10.1515/ijamh-2017-0180.
- Al qodri, Rafiah BM, Syamsulhuda, Riyanti, Emmy (2016). Beberapa faktor yang berhubungan dengan niat merokok siswa Smp Di Kota Semarang. *Jurnal Kesehatan Masyarakat*. 4(3)1.
- Ariani R (2011). Hubungan antara iklan rokok dengan sikap dan perilaku merokok pada remaja. *Artikel Ilmiah*. Program Pendidikan Kedokteran Fakultas Kedokteran Universitas Diponegoro.
- Delpia YV, Murti B, Suryani N (2016). Theory of planned behavior: analysis of factors affecting the preventive behaviors. *Journal of Health Promotion and Behavior*. 1(2): 62-69.
- Duncan LR, Pearson ES, Maddison R. (2017). Smoking prevention in children and adolescents: a systematic review of individualized interventions. *Patient Educ Couns*. 101(3):375-388. doi: 10.1016/j.pec.2017.09.011.
- Droomers M, Huang X, Fu W, Yang Y, Li H, Zheng P (2016). Educational disparities in the intention to quit smoking among male smokers in China; A Cross-Sectional Survey On The Explanations Provided By The Theory Of Planned Behavior. *BMJ open*. 6(10): e11058. DOI: 10.1136/bmjopen-2016-011058.
- Donaldson E, Allison C H, Izabella Z, Kelly D. Blake (2017). Media exposure and tobacco product addiction beliefs: Findings from the 2015 Health Information National Trends Survey (HINTS–FDA 2015). *Addictive Behaviors*. 72; 106–113.
- Akmal D, Widjanarko B, Nugraha P (2017). Sikap mempengaruhi niat berhenti merokok pada remaja SMA di Kota Bima. *Jurnal Promosi Kesehatan Indonesia*. 12 (1): 85-89.
- Mak HW (2017). Parental belief and adolescent smoking and drinking behaviors: A propensity score matching study. *Addictive Behaviors Reports*. S2352-8532(17): 30132-3 doi:10.1016/j.abrep.2018.04.003.
- Isa L, Lestari H, Afa JR (2017). Hubungan tipe kepribadian, peran orang tua dan saudara, peran teman sebaya, dan peran iklan rokok dengan perilaku merokok pada siswa Smp Negeri 9 Kendari tahun 2017. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2 (7): 2.
- Ra JS, Jung MS (2017). School-related factors affecting smoking intention among Korean middle school students. *Applied Nursing Research*. S0897-1897(17): 30187-8. doi:10.1016/j.apnr.2017.10.007
- Joung MJ, Han MA, Park J, Ryu SY(2016). Association between Family and Friend Smoking Status and Adolescent Smoking Behavior and E-Cigarette Use in Korea. *Int J Environ Res Public Health*. 13(12).doi:10.3390/ijerph13121183.
- Kemenkes RI (2013). Riset Kesehatan Dasar Dalam Angka Provinsi Jawa Tengah 2013. Badan Penelitian dan Pengembangan Kesehatan. Jakarta: Kemenkes RI. ISBN: 978-602-235-556-3.
- \_\_\_\_\_ (2015). *InfoDatin: Perilaku Merokok Masyarakat Indonesia*. Jakarta: Kemenkes RI. ISSN: 2442-7659.
- Kim HH-S, Chun JS (2018). Analyzing Multilevel Factors Underlying Adolescent Smoking Behaviors: The Roles of Friendship Network, Family Rela-

- tions, and School Environment. *Journal of School Health*, 88(6); 434.
- Lembaga Demografi (2017). Ringkasan Studi Prioritaskan Kesehatan Reproduksi Remaja Untuk Menikmati Bonus Demografi. Jakarta: FEB UI.
- Liem A (2014). Pengaruh Media Massa, Keluarga, dan Teman Terhadap Perilaku Merokok Remaja di Yogyakarta. *Makara Hubs-Asia*. 18(1): 41-52. DOI: 10.7454/mssh.v18i1.3460.
- Ma J, Zhu J, Li N, He Y, Cai Y, Qiao Y, Redmon P, Wang Z (2013). Cigarette smoking in Chinese adolescents: importance of controlling the amount of pocket money. *Public Health*. 127(7): 687-93. doi: 10.1016/j.puhe.2013.04.016.
- McKelvey K, Halpern-Felsher B(2016). Adolescent Cigarette Smoking Perceptions and Behavior: Tobacco Control Gains and Gaps Amidst the Rapidly Expanding Tobacco Products Market From 2001 to 2015. *J Adolesc Health*.60(2):226-228. doi: 10.1016/j.jadohealth.2016.09.025.
- McMillan C, FelmleeD, Osgood DW (2018). Peer influence, friend selection, and gender: How network processes shape adolescent smoking, drinking, and delinquency. 55: 86–96. doi: 10.1016/j.socnet.2018.05.008.
- Murti B (2018). Teori Promosi Dan Perilaku Kesehatan Edisi kesatu. Karanganyar: Bintang Fajar Offset
- Pandayu A (2017). Effect of Personal Factors, Family Support, Pocket Money, and Peer Group, on Smoking Behavior in Adolescents in Surakarta, Central Java. *Journal of Health Promotion and Behavior*, 2(2): 98-111.
- 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. *Journal of Health Promotion and Behavior* (2017), 2(2): 148 158. <https://doi.org/10.26911/thejhp.2017.02.02.05>.
- Rahmah S, Ahmad M (2018). Konformitas Teman Sebaya Dan Health Belief Model Terhadap Perilaku Merokok Siswa SMA. *Jurnal Penelitian Kesehatan*. 9(1): 1-2.
- Rahmat M, Thaha RM, Syafar M (2013). Perilaku Merokok Remaja Sekolah Menengah Pertama. *Jurnal Kesehatan Nasional*. 7(11): 502-508.
- Santrock JW (2002). Life-span development: perkembangan masa hidup-Edisi Kelima. Jakarta: Erlangga.
- Schreuders M, Nuyts PAW, van den Putte B, Kunst AE(2017).Understanding the impact of school tobacco policies on adolescent smoking behaviour: A realist review. *Social Science & Medicine*. 183: 19-27.
- Shi Y, Ehlers S, Warner DO (2014). The theory of planned behavior as applied to preoperative smoking abstinence. *PLoS ONE* 9(7): e103064. doi: 10.1371/journal.pone.0103064
- Sutopo I (2011). Perilaku merokok pada siswa kelas VIII SMP Negeri 2 Selogiri Wonogiri. Fakultas Keguruan Dan Ilmu Pendidikan Universitas Sebelas Maret Surakarta.
- 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.
- World Health Organization (WHO) (2015). Regional Office for South-East Asia. Global Youth Tobacco Survey (GYTS):

Indonesia report. New Delhi: WHO-SEARO, ISBN: 978-92-9022-487-7.

\_\_\_\_\_. (2017). Media centre. Tobacco: Fact sheet. Available at: <http://www.who.int/mediacentre/factsheets/fs339/en/>.

Yang F, Salmon CT, Pang JS, Cheng WJ (2015). Media exposure and smoking intention in adolescents: a moderated mediation analysis from a cultivation

perspective. *Journal of Health Psychology*. 20(2): 188–197.

Xuefen Su, Liping Li, Sian M, Yang Gao, Joseph TF, Phoenix KH (2015). Smoking behaviors and intentions among adolescents in rural china: the application of the theory of planned behavior and the role of social influence. *Addictive Behaviors*. 48; 44-51.