Risk Analysis of Smoking Behavior on Indonesia Adolescents: Study on IFLS-5

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ABSTRACT

Background: *Indonesia is ranked the 4th largest in the use of cigarettes in the world after China, USA, and Russia. The number of cigarettes smoked in Indonesian population over 10 years old is 12.8 cigarettes per day on average. Understanding the risk factors associated with cigarettes smoked is essential for designing effective intervention strategies.* **Purpose:** *The aim of the study was to use sub-nationally representative survey data to examine the risk factors of cigarettes smoked in Indonesian adolescents* **Methods:** *We examined the risk factors associated with cigarettes smokeing, collected from 4410 respondents aged between 10 years and 20 years in the 2014 fifth wave Indonesian Family Life Survey (IFLS 5).* **Results:** *Cigarettes smoking was higher in families were there was smoker parent than non-smoker parent (p-value<0.049; OR = 1.38; 95%CI = 1.00 < OR < 1.92). The prevalence cigarettes smoking in Indonesian Adolescents was 48.59% in adolescent boys and 51.41% in adolescent girls which was far greater than the national prevalence of 7.2% among adolescents. Parent cigarette smoking history had a significant influence on the adolescent cigarette smoking.* **Conclusion:** *Adolescent were more vulnerable to have cigarettes smoking habit as a behavior induced from their parents. Substantial effort should be given to adolescents to create awareness about the side effects of cigarettes smoking.*

Keywords: adolescents, cigarettes smoking, parents, risk factors

1. INTRODUCTION

Tobacco epidemic due to cigarette becomes one of the greatest threats for public health in the world. Cigarette has high contribution in health problem since it causes death of more than seven million people per year. Death which is directly caused by cigarette smoking is around six million deaths, while 890,000 deaths were caused by exhaling the smoke indirectly. There is one of ten adults who experience death due to smoking in every six seconds (WHO, 2018).

The order for the biggest cigarette smoking based on WHO data is China (1,643 billion cigarettes), United States of America (451 billion cigarettes), Japan (328 billion cigarettes) and Rusia (258 billion cigarettes). Indonesia is placed at the fourth rank among the highest cigarettes smoking countries by reaching 260 billion cigarettes smoking in 2009 (WHO, 2017).

The Global Tobacco Epidemic is WHO report in 2009 which indicates that tobacco cigarette takes a role in the death of more than five million people every year in the world. Generally, the death happened in countries with low to middle income. If such thing is left behind, then cigarette is expected to kill more than eight million people in the world by 2030 and also happens in 80% of countries with low to middle income (WHO, 2013). According to WHO, active smoker is not the only one who is affected by the danger of cigarette smoking, however passive smoker (*second-hand smoker*) is affected as well. Cigarette smoke exhaled by passive smoker is expected to kill about 600,000 people every year. There is no safe threshold for passive smoker, and it is also expected than one third of the world population has become passive smoker (WHO, 2017).

Research regarding smoking behavior on adolescents conducted by Liozidou (2015) found that the proportion of smoking adolescent in junior high school was as much as 18.2%, with the proportion of male adolescent as much as 20.1% and female adolescent by 16.5%. There were around 2.9 million junior high school students who smoked in 2018. There is at least one in every 25 (4%) junior high school adolescents which are a daily smoker. There is substantial difference of race/ethnic and regional on smoker adolescent. White adolescent has more tendency to smoke than the black adolescent. In addition, in average, smoker adolescent mostly live in non-metropolitan area and countries under *Southern* and Midwestern areas (HHS, 2018).

Basic Health Research (Riskesdas) Data in 2018 indicates that cigarette smoking behavior on community aged 15 years old and above from 2007, 2010, 2013 to 2018 was still high. Prevalence data indicates that there was behavior fluctuation in consuming tobacco which was 34.2% in 2007, 34.7% in 2010, 36.3% in 2013, and 33.8% in 2018. Prevalence data of smoking at the age of 10-18 years old also increased from 2013 (7.2%) to 2018 (9.1%). The proportion of tobacco smoking on male is 62.9%, while on female is as much as 4.8%. The number of cigarettes smoked by the community aged >10 years old was about 12.3 cigarettes (a pack) per day (Ministry of Health of RI, 2018).

Behavior is a reaction or response from stimulus accepted by someone according to Skiner argument. Lawrence Green theory stated that the formation of behavior is based on three factors, which are predisposing factors, enabling factors and reinforcing factors. Kurt Lewin also stated that behavior is a function of an individual environment. This indicates that behavior is formed not only from the individual factor, but also fom the environmental factor (Notoatmodjo, 2007)

Adolescent is community entering the age of 10 to 19 years old. Adolescent is a transition from child to adult. Such transition affects not only on physical and psychological changes, but also on thinking pattern, attitude and behavioral pattern. At this period, adolescents try to find themselves and have a tendency to have behavior directing to temporal happiness (Poltekkes Depkes, 2010).

Someone who enters adolescent period has tendency to have behavior which cause temporal happiness. This happens because the adolescent enters the period of finding themselves. Such condition causes the adolescent to tend to be affected by his surrounding environment so that it makes opportunity for the adolescent to adopt the behavior of people around him (Poltekkes Depkes, 2010). This research was conducetd aiming to analyze the risk factor on Indonesian adolescents based on the database of Indonesian Family Life Survey-5 (IFLS-5).

2. MATERIALS AND METHOD

This research was an observational reseach by doing observation without giving any certain treatment on the research subject. The research type used was analytical study aiming to conduct risk factor analysis of smoking behavior on adolescents based on the psychological condition, participation in youth activities, participation in religious activities, and parent smoking history. The research design used was cross sectional since this research learned about the relationship between the outcome and exposure by observing the status of exposure and outcome simultaneously at one time point on the research subject.

The research was conducted on Indonesia adolescent population in 2014, which was about 19.92 million people (Indonesia Statistic, 2014). Research sample was taken from secondary data which is database of IFLS-5 survey done at the end of 2014 in 13 provinces, including North Sumatera, South Sumatera, Lampung, all provinces in Java, Bali, West Nusa Tenggara, all provinces in Kalimantan, South Sulawesi, and West Sulawesi. Samples analyzed were those belong to inclusion criteria, which are Indonesian people aged 10 to 20 years old was as many as 4,410 respondents.

The dependent variable in this research was the smoking behavior defined operationally as respondents' habit in smoking cigarette or cigar both at present time and in the past. This dependent variable resulted in nominal data in the forms of yes and no answer. The independent variable in this research included seven variables, which are gender, age, education level, psychological condition, participation in youth activity, participation in religious activity, and parent smoking history. The operational definition of gender is biological characteristic since born which indicates whether they are male or female. The operational definition of age is the living period of someone in year unit, calculated since he was born until the last birthday during the IFLS-5 data collection.

The operational definition of educational level (primary school, junior high school, senior high school, Higher Education, others) obtained during the data collection of IFLS-5. The operational definition of psychological condition is the feeling sensed by the respondents (poor, fair, and good) in the past week as the cumulative score of 10 questions about condition of the feeling sensed. Operational definition of participation in youth group activities (such as *karang taruna)* is the respondents' participation in the last 12 months. The operational definition of participation in religious is religious participation (such as religious lecture, church service, and ets) participated by the respondents in the last 12 months. The operational definition of parent smoking history is one or both smoker parents when the respondent is at the age of 12 years old.

This research is based on the survey data provided for public. Data use for this research was agreed by the Ethics Committee of Public Health Research, Public Health School, Universitas Airlangga. IFLS survey and its procedure were reviewed and agreed by the Institutional Review Board (IRBs) in United State of America (RAND) and Universitas Gadjah Mada (UGM) in Indonesia. Written Informed consent was obtained from all respondents before the data collection.

Data analysis process was started from the data preparation which was the cleaning of secondary data source used, data transformation, analysis and result interpretation. The descriptive statistic was used to describe the distribution of the frequency of gender, teeager's age with smoking behavior, education level, psychological condition, participation in youth activities, participation in religious activities, and parent smoking history using chi square test of 2x2 contingency table. Relationship was known by comparing the p-value and calculating the Risk Ratio with Confidence Interval of 95%.

3. RESULT AND DISCUSSION

Based on data of IFLS-5 conducted in 2014, it was obtained that there were as many as 4,410 adolescents respondents aged 13 years old to 20 years old containing 2,139 males and 2,271 female. The table 1. shows the characteristic that the number of female adolescent sample is a little bit more than the male. The smoking proportion based on the gender also shows that female (49.86%) is a little bit more than the male (46.6%). Samples aged at 13-16 years old is a little bit smaller than the age of 17-20 years old and the smoking proportion is bigger at the age of 17-20 years old (60.36%). Samples with Senior High Scool Education level is more than the other education level, and the biggest smoking adolescent proportion is at senior high school education which is by 40.11%. Sample with poor psychological condition is more than good and fair psychological condition, while the biggest smoking proportion is at the adolescent with less good psychological condition, which is by 71.92%.

Number of sample which do not participate in youth activity is more than those who participated, with smoking proportion is more in the adolescent group which do not participate in youth activity by 90%. The number of sample which do not participate in religious activity is more than those who participated, with the smoking proportion is bigger on the adolescents who did not participate in religious activity by 93.71%. The adolescent sample with parent smoking history is more than the adolescent with history of parents do not smoke with smoking proportion is bigger at the adolescent with parents smoking history by 63.21%.

Table 2. shows that the parents history factor is related to the adolescents' smoking behavior with p <0.05. The other risk factors which are gender, age, education level, psychological condition, participation in youth and religious activities does not have any significant relationship with the adolescents' smoking behavior. The adolescents' smoking occurs more on the adolescents who do not participate in youth activities compared to the adolescents who are active in participating in the youth activities. Similar thing occurs on the adolescents who are not active in partipating in religious activities who are more smokers than the adolescents who are active in participating in the religious activies.

Tabel 3. presents that parents history factor is related to the adolescents smoking behavior with significance value of 0.049. Odds ratio on the smoking parents history shows value of 1.38. It means that adolescents who have smoking parents history at the age of 12 years old have the risk of smoking by 1.38 more than the adolescents who do not have smoking parents history.

There are various risk factor which cause the adolescents to have smoking behavior. The behavior formed as the function of the environment and the individual related. This means that the emergence of somking behavior on the adolescents is not only a factor from the adolescents themselves but also from their environment. The individual factor can be seen from the socio-emography characteristics including age, gender, education, and the psychological condition which

related to the teeagers' development process. Adolescents period is a transition period from a child to an adult where this condition affects the thinking pattern, attitude, and behavioral pattern of someone (Poltekkes Depkes, 2010).

Table 2. shows that the variable of gender does not have any relationship with the adolescents' smoking behavior, both in male and female. Risk to smoke is the same between the male and female. It is in accordance with the research conducted by Pangestu, et al (20017) which stated that there is no relationship between the gender and the smoking behavior on Senior High School strudents, where the respondents in the research also belong to the adolescent category. The proportion of female smoking adolescents was also see to be a little bit higher than the male smoking adolescents. This indicates that not only male adolescents, but there were also many female adolescents who had ever smoked.

The test result indicates that the age variable does not have any relationship with the smoking behavior. Adolescents at the age of 10 years old to 20 years old have the same risk to have smoking behavior. This is in accordance with the research conducted by Pangestu, et al (2017) which mentioned that there was no relationship between the age variable and the smoking behavior on Senior High School students.

Test analysis indicates that education does not have any relationship with the smoking behavior on the adolescents. Adolescents in education level of Primary School, Junior High School, Senior High School and Higher Education have the same risks to smoke. This result is in accordance with the research conducted by Wijayanti, et al (2017) which mentions that there was no relationship between the education and smoking behavior on the adolescents. The proportion of adolescents at the education level of senior high school is higher than the other education level. This indicates that Indonesian adolescents who had ever smoked is more occurred at the education level of senior high school

Variable of psychological condition in this research indicates that it does not have any relationship with smoking behavior. This is in line with research performed by Kosasi (2018) where stress factor does not have any relationship with smoking behavior. Strees can become one of the factors which triggers an individual to smoke. However, not all stress will cause the individual to become smoker. Stress which causes an individual to smoke usually belongs to stress in finding solution from issues face so that the individual feels that they need to smoke in order to calm themselves (Kosasi, 2018).

Statistical test performed on the variable of participation in youth activity indicates that there is no relationship between the adolescents' participation in youth activities on the smoking behavior. Adolescents who are active and inactive in youth activities have the same risk to have smoking behavior. The youth activities mean are *karang taruna*, school extracurricular as adolescents' self-development media, and other activities which opens opportunity for the adolescents to interact a little bit more intensive with their peer. Based on the result, it was found that the smoking proportion occurs more on the adolescents who are inactive in participating in youth activities than adolescents who active in participating in youth activities. This indicates that there is a possibility that the adolescents' participation in various youth activities is able to protect the adolescent to not smoking.

This is in line with the research conducted by Anggarwati (2014) which argued that there is no relationship between interacting with peer and the smoking behavior. However, this is not in line with the research done by Alamsyah et al (2017) which stated that there relationship between extracurricular activities at school and the smoking behavior on the adolescents. School adolescents who join extracurricular activities will spend their time at school so that they will get strict monitor to smoke and vice versa. Based on the result, it was found that the smoking proportion was higher on the adolescents who are not active in participating in religious activities. It indicates that there is a possibility that various religious activities are able to protect the adolescents to not smoke.

Variable of participation in religious activities in this research indicates that it does not have relationship with smoking behavior. Adolescents who are active and non-active have the same risk to smoke. This is in accordance with the research conducted by Mhamdi (2011) in Tunisia which stated that antisocial adolescents has relationship with the smoking behavior. However, it is not in accordance with research conducted by Khoirunnisa et al (2019) conducted in boarding house environment, which stated that someone who obtains support from clerics regarding smoking behavior also have the risk to smoke.

Smoking parents' history is one of the factors which has a relationship with the smoking adolescents. This is in line with the research conducted by Rahayuningsih (2015) which mentioned that number of smoking family members has relationship with the smoking behavior of Vocational High School students. This is related to the environment which in this case is the family which can become a supporting factor for the adolescents to also smoke. Such smoking behavior emerges as an effect of environment stimulus from a strong environment and affect someone to be accepted by his environment.

Previous research done by Avenevoli and Merikanas (2003) argued that there is relationship between smoking parents and their children which cause smoking behavior in long term. Adolescents who are exposed to active smoker parents also cause the increase of the risk of smoking as well (Gilkman, et al., 2009). The parents' status which is also a smoker can initiate the adolescents' behavior in smoking so that it increases the risk of being addicted with nicotine (Bricker et al., 2005). The presence of a smoker parent (father/mother) is related to the emergence of smoking behavior on the adolescent (Liozidou, 2015). Smoking behavior on adult in adolescents' environment causes the adolescent to have a tendency to imitate their smoking behavior (Algoriness, 2016).

Wulan (2012) also stated that the adolescents smoking behavior emerges with the dominant main factor which is from the environment. One of the environment factors is from the parents, either from the father or mother or sibling. It is different from research implemented by Reda et al (2012) in which the research stated that living together with a smoker does not have any relationship with the smoking behavior on the adolescent. Research conducted by Agu et al (2018) also stated different result with this research that the initial age of smoking in Jamaiza does not have relationship with the parents smoking status.

4. CONCLUSION

Smoking behavior on adolescent is the result of environmental and individual function. This research indicates that there is a relationship between smoking parents history and the smoking behavior on adolescent. Meanwhile, there is no relationship between gender, age, education level, psychological condition, and participation of the adolescents in religious and youth activities with the smoking behavior on the adolescent.

REFERENCES

Agu, C.F, et.al. 2018. Are Adolescents Likely to Start Smoking Early if Their Parents are Smokers? A study of Jamaican High School Student. *Parental Cigarette Smoking and Age of Initiation of Smoking.* Vol:19 No:S1 Page:25-31.

Alamsyah, A dan Nopianto. 2017. Determinan Perilaku Merokok pada Remaja. *Journal Endurance*. Vol:2 No:1 Page:25-30

Algoriness, R.M et.al. 2016. Prevalence of Cigarette Smoking Usage among Adolescent Students in Northern Saudi Arabia. *Asian Pacific Journal of Cancer Prevention,* Vol:12 Page:3839-3843.

Anggarwati, A. 2014. *Hubungan antara Interaksi Teman Sebaya dengan Perilaku Merokok pada Remaja.* Surakarta: Fakultas Psikologi Universitas Muhammadiyah Surakarta.

Avenevoli S, Merikangas KR 2003. Familial influences on adolescent smoking. *Addiction*, 98, Page:1–20.

Badan Pusat Statistik. 2014. *Statistik Pemuda Indonesia 2014*. Jakarta: Badan Pusat Statistik.

Bricker JB, Rajan KB, Andersen MR, Peterson AV Jr 2005. Does parental smoking cessation encourage their young adult children to quit smoking? A prospective study. *Addiction*, 100, Page:379–86

Gilman, S.E, et.al. 2009. Parental smoking and adolescent smoking Initiation: an intergenerational perspective on tobacco control. *Pediatrics*, 123, Page:274-81.

Health & Human Services Department, US, 2018. Adolescents and Tobacco: Trends. Available at <https://www.hhs.gov/ash/oah/adolescent-development/substance-use/drugs/tobacco/trends/index.html> [Accessed on October 6, 2019]

Mhamdi, S.E et.al. 2011. Prevalence and predictors of smoking among adolescent schoolchildren in Monastir, Tunisia. *EMHJ* Vol:17 No:6 Page:523-528.

Notoatmodjo, S. 2011. *Ilmu Perilaku Kesehatan*. Jakarta: CV Rineka Cipta.

Kementerian Kesehatan Republik Indonesia. 2018. *Riset Kesehatan Dasar: RISKESDAS 2013.* Available at <https://dinkes.kalbarprov.go.id/wpcontent/uploads/2019/03/Laporan-Riskesdas-2018-Nasional.pdf> [Accessed on September 27, 2019]

Khoirunnisa, A., Priyadi N. P., Cahyo, K. 2019. Beberapa Faktor yang Mempengaruhi Praktik Merokok Santri di Pondok Pesantrem Darut Taqwa Kota Semarang. *Jurnal Kesehatan Masyarakat Universitas Diponegoro*. Vol:7 No:1 Page: 430-441.

Kosasi, H N. 2018. Hubungan Konformitas dan Stress dengan Perilaku Merokok pada Remaja Perempuan. *Psikoborneo*. Vol:6 No:3 Page:1-11

Liozidou, A, et.al. 2015. Prvelanece and Predictors of Cigarette Smoking among Greek Urban Adolescents: A Cross Sectional Study. *Tobacco Prevention & Cessation*. 4 Page:1-7.

Pangestu, A.W, Kusyogo, Kusumawati, A. 2017. Faktor-faktor yang Berhubungan dengan Perilaku Merokok Shisha pada Siswa SMA X di Kota Semarang. *Jurnal Kesehatan Masyarakat Universitas Diponegoro*. Vol:5 No:1 Page:489-498.

Rahayuningsih, F. 2015. Hubungan antara Persepsi Perilaku Merokok dengan Perilaku Merokok Siswa SMK X di Kota Semarang. *Jurnal Kesehatan Masyarakat Univversitas Diponegoro*. Vol:3 No:2 Page: 220-229.

Reda, A.A., et.al. 2012. Determinant of Cigarette Smoking among School Adolescents in Eastern Ethiopia: a Cross-sectional Study. *Harm Reduction Journal*. Vol:9 No:1 Page:1-6.

Tim Penulis Poltekkes Depkes Jakarta I. 2010. *Kesehatan Remaja: Problem dan Solusinya.* Jakarta: Penerbit Salemba.

Wijayanti, E., Dewi, C., Rifatussa'adah, R. 2017. Faktor-faktor yang Berhubungan dengan Perilaku Merokok pada Remaja Kampung Bojong Rawalele, Jatimakmur, Bekasi. *Global Medical & Health Communication (GMHC).* Vol:5 No:3 Page:194-198.

World Health Organization. 2013. *WHO Report on The Global Tobacco Epidemic,2013*. Luxembourg: WHO.

World Health Organization. 2017. *Global Health Observatory: NCD mortality and morbidity.* Available at <https://www.who.int/gho/ncd/mortality_morbidity/en/> [Accessed on September 27, 2019]

World Health Organization. 2018. *Fact Sheet of Tobacco*. Available at <https://www.who.int/news-room/fact-sheets/detail/tobacco> [Accessed on September 27, 2019]

Wulan, D.K. 2012. Faktor Psikologis yang Mempengaruhi Perilaku Merokok pada Remaja. *Humaniora*. Vol:3 No:2 Page:504-511.

Tables and Graphs

Table 1. Characteristics of Research Sample Based on Socio-Demography Characteristics and Smoking Risk Factor in Indonesia Adolescent in IFLS-5 Data

Characteristics	Number of Samples (n,%)	Smoking Proportion (%)
Gender		
Male	2139 (48.50)	46.64
Female	2271 (51.50)	49.86
Age		
13-16 years old	1648 (37.37)	36.14
17-20 years old	2762 (62.63)	60.36
Education Level		
Primary School	1001 (22.70)	21.85
Junior High School	851 (19.30	18.54
Senior High School	1831 (41.52)	40.11
Higher Level of Education	727 (16.49)	15.98
Psychological Condition		
Poor	3284 (74.47)	71.92

Fair	1018 (23.08)	22.15
Good	108 (2.45)	2.42
Participation in Youth Activities		
No	4111 (93.22)	90.00
Yes	299 (6.78)	6.50
Participation in Religious Activities		
No	4282 (97.10)	93.71
Yes	128 (2.90)	2.78
Parent Smoking History		
No	1533 (34.76)	33.28
Yes	2877 (65.24)	63.21

Table 2. Relationship between Socio Demography Characteristics
and Risk Factor with Smoking Behavior on Indonesian Adolescent
(Bivariate Analysis)

Variable	Smoking Behavior				Total		p-value
	No		Yes				
	n	%	n	%	n	%	
Gender							
Male	82	3.83	2057	96.17	2139	100	0.231
Female	72	3.17	2199	96.83	2271	100	
Age							
13-16 years old	54	3.28	1594	96.72	1648	100	0.547
17-20 years old	100	3.62	2662	96.38	2762	100	
Education Level							
Primary School	37	3.70	964	96.30	1001	100	
Junior High School	33	3.88	818	96.12	851	100	
Senior High School	62	3.39	1769	96.61	1831	100	0.794
Higher Level of Education	22	3.03	705	96.97	727	100	
Psychological Condition							
Poor	112	3.41	3172	96.59	3284	100	
Fair	41	4.03	977	95.57	1018	100	0.219
Good	1	0.93	107	99.07	108	100	
Participation in Youth Activities							
No	142	3.45	3969	96.55	4111	100	0.611
Yes	12	4.01	287	95.99	299	100	
Participation in Religious Activities							
No	149	3.48	4133	96.52	4282	100	0.796
Yes	5	3.91	123	96.09	128	100	
Parent Smoking History							

No	65	4.24	1468	95.76	1533	100	0.048
Yes	89	3.09	2788	96.91	2877	100	

Table 3. Relationship between Socio-Demography and Risk Factor with Smoking Behavior on Indonesian Adolescent (Multivariate Analysis)

Variable	OR	95% Conf. Interval	p-value
Gender			
Male	1		
Female	1.21	0.882-1.680	0.231
Age			
13-16 years old	1		
17-20 years old	0.90	0.643-1.262	0.547
Education Level			
Primary School	1		
Junior High School	0.95	0.589-1.535	0.838
Senior High School	1.09	0.723-1.657	0.668
Higher Level of Education	1.22	0.719-2.103	0.450
Psychological Condition			
Poor	1		
Fair	0.84	0.584-1.211	0.354
Good	3.77	0.522-27.311	0.188
Participation in Youth Activities			
No	1		
Yes	0.85	0.469-1.561	0.611
Participation in Religious Activities			
No	1		
Yes	0.88	0.357-2.201	0.796
Parent Smoking History			
No	1		
Yes	1.38	1.001-1.921	0.049