The Relationship Between Risky Behaviors and Lifestyle and Socioeconomic Factors in Indonesian Urban Areas

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Abstract

Assessment of determinants of risky behaviors, such as smoking, vaping, alcohol consumption, and drug abuse, is critically important to be conducted. Nonetheless, previous studies only looked at the role of socioeconomic factors and their relationship to risky behaviors in young people, but did not consider the lifestyle. To address this issue, we utilized microdata from the Narcotics Board of Indonesia (BNN), namely the Indonesia Urban Lifestyle Community Survey 2018, to determine which characteristics, in terms of lifestyle and socioeconomic factors, are related to the conduct of smoking, vaping, alcohol consumption, and drug abuse among young adolescents in Indonesia. Using the logistic regression method, we discovered that risky behaviors are a vicious circle. Peer effect has been linked to a higher likelihood of engaging in risky behaviors as well as nightclub visits. Gender, education, and parental education were all significant socioeconomic factors for some behaviors. This result implies that the effort to alleviate the prevalence of risky behaviors must be integrated and comprehensive.

Keywords: Adolescent, Risky Behavior, Lifestyle, Sociodemography, Logistic Regression

JEL Classification: C35, I12, J13

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I. Introduction

1.1. Background

Along with time, young people have been transformed in terms of behaviors, influenced by the rapid growth of globalization. Apart from the positive effect, negative behaviors were also exhibited by this generation. In this case, we talk about young people's behaviors when it comes to smoking, vaping, alcohol consumption, and drug abuse. Their unawareness on the effects of these behaviors affects their long-term human capital outcomes, including health and education. Andrade & Jarvinen (2017) stated that early exposure to alcohol, cigarettes, cannabis, and sexual activity among adolescents is associated with negative events later in life, like not being in education, employment, or training. In the case of alcohol, those who have been drinking for the past 30 years are more likely to miss school (Miller & Plant, 2003). Hence, it affects their return on education since schooling is a signal in the labor market. Apart from the effect on education, those behaviors can also affect young people's health. Smoking is associated with non-communicable diseases, like lung cancer, type-2 diabetes, and chronic obstructive pulmonary disease (Dai et. al., 2022), while alcohol consumption can increase the risk of getting cancer, hypertension, and dementia (Zhong et. al., 2022). Drug abuse effects are related to mental health problems (Schulte & Hser, 2014).

By knowing its effect on long-term human capital accumulation, the next step is to reduce the adverse impacts by finding the root of the problem regarding smoking, vaping, alcohol consumption, and drug abuse. Many studies have found the determinants of each risky behavior among young people in various settings. Smoking, for example, is mostly influenced by peer influence (Smet et. al., 1999; Reda et. al., 2012; Cheng, Guo, & Jin, 2022), as well as gender and respondent age. In the context of vaping, people who come from disadvantaged socioeconomic families (i.e. low education level, occupational status, and low income) are likely to use vape, as well as prior smoking status and personal income (Bigwanto et. al., 2019; Green et. al., 2020). Interestingly, alcohol consumers are also determined by prior smoking behavior besides family conflict, education level, and other socioeconomic factors, like gender and age (Muli & Lagan, 2017; Gajda et. al., 2021; Sata et. al., 2021). For drug abuse, age, gender, ethnicity, and socioeconomic status are determinants for young people who are exposed to such behaviors (Mohammadnezhad, Thomas, & Kabir, 2020).

Many studies have determined the factors related to risky behaviors among young people in Indonesia, such as Rahim, Suksaroj, & Jayasvasti (2016), Elsa & Nadjib (2019), and Arfines et. al. (2022). However, we found only one study focused on drug abuse among young people in Indonesia, it is in Veronica, Langi, & Joseph (2018). Unfortunately, those studies in Indonesia do not address the role of other personal behavior, which may influence their risky behaviors. In this case, the studies in Indonesia have not included the role of peer influence and social

interaction of young people and their surroundings. This would result in the problem of omitted variable bias in the previous study.

Based on that situation, this research attempts to determine the personal behaviors and socioeconomic factors regarding risky behaviors, such as smoking, vaping, alcohol consumption, and drug abuse, in young people and look at their differences across socioeconomic sub-groups of gender and quartile of pocket money received. To deal with the issue, we utilized the dataset of the Indonesia Urban Lifestyle Community Survey 2018, released by the National Narcotics Board (BNN) in cooperation with the Indonesian Institute of Sciences (LIPI) (now the National Research and Innovation Agency or BRIN). The datasets cover about 5,200 respondents, which are proportionally distributed into 400 samples for each of the 13 big cities in Indonesia. There are two main independent variables used in this study, which are the respondent's lifestyle and socioeconomic condition. Four binary outcome variables, such as smoking, vaping, alcohol consumption, and drug abuse status, are being used to represent the risky behaviors, with values equaling 1 if the respondent is currently or ever doing those behaviors. We also carried out the separation of estimation based on gender and quartile of pocket money received by the respondent. Because the outcome variables represented a binary response, we used a multivariate logistic regression for the whole estimation and calculated the marginal effect of each independent variable.

We found a variation in the conduct of risky behaviors based on socioeconomic status among adolescents. We also found that risky behaviors are a vicious circle. People who smoke have a higher probability to conduct other risky behaviors, and so on and so forth with other risky behaviors. Peer influence contributes significantly to affecting individuals to engage in those behaviors. If their surrounding peers are mostly smokers, the individual tend to become a smoker themselves. Gender, education, and parental education were all significant socioeconomic factors for some risky behaviors. Even though we found some limitations in the analysis, this evidence provides some suggestions for the improvement of preventive and curative interventions to risky behaviors so that young people do not engage in such behaviors.

1.2. Research Purpose

The purposes of this research are to describe and analyze the status quo & the determinants of risky behaviors (smoking, vaping, alcohol consumption, and drug abuse), including smoking, vaping, alcohol consumption, and drug abuse among adolescents in Indonesia. This study will also find the correlation between lifestyle & socioeconomic status and adolescents' engagement in risky behaviors as well as their differences across gender and wealth.

II. Data and Methodology

2.1. Data

We utilized the dataset of the Indonesia Urban Lifestyle Community Survey 2018, released by the National Narcotics Board (BNN) in cooperation with the Indonesian Institute of Sciences (LIPI) (now the National Research and Innovation Agency, or BRIN). The dataset contains information regarding risky behaviors conducted by

respondents, including their socioeconomic characteristics and detailed information on drug abuse. This survey was carried out in 13 big cities around Indonesia using the probability proportional to size sampling technique. The cities included in the survey are Banda Aceh, Medan, Palembang, Batam, Jakarta, Bandung, Surabaya, Yogyakarta City, Denpasar, Samarinda, Pontianak, Makassar, and Jayapura. A total of 5,200 respondents have been recorded in the dataset, and every city has a proportionally 400 respondents. The survey selected four junior high schools, six senior high schools, and six universities at random for each city. For every educational level, the survey randomly selected 100, 150, and 150 respondents, respectively, for junior high school, senior high school, and university in each city. We have legally obtained permission to process the data based on letter number B/362/XII/DT/DT.00.01/2022/BNN issued on December 14, 2022, from the Head of Research, Data, and Information Center, National Narcotics Board of Indonesia.

There are four main outcome variables in the form of binary variables. Four outcomes include the status of smoking, vaping, alcohol consumption, and drug abuse. The variables are equal to 1 if they currently or ever exhibit those risky behaviors. We obtained the variable based on a survey question about respondent behaviors in those cases. Our predictor variables are divided into two parts: the respondent's lifestyle and socioeconomic characteristics. We divided the socioeconomic component into two categories: individual and family characteristics. Detailed information regarding variables used in this study is shown in Table 1.

Name of Variables	Type	Description
Smoking	Binary	=1 if the respondent currently smokes
Vaping	Binary	=1 if the respondent currently vapes
Alcohol	Binary	=1 if the respondent currently consumes alcohol
Drugs	Binary	=1 if the respondent ever abused drugs
Active Drugs	Binary	=1 if the respondent currently abuses drugs
No Activity	Binary	=1 if the respondent does not have any extracurricular activity outside of the academic activities
Smoking Intensity	Categorical	=0 if no smokers around respondent, =1 if less smokers, =2 if many smokers
Vaping Intensity	Categorical	=0 if no vapers around respondent, =1 if less vapers, = 2 if many vapers
Alcohol Intensity	Categorical	=0 if no alcohol consumers around respondent, =1 if less alcohol consumers, =2 if many alcohol consumers
Nightclub Visit	Categorical	=0 if respondent is never visiting nightclub, =1 if sometimes visiting nightclub, =2 if often visiting nightclub
Emotional Attachment	Categorical	=0 if respondent is emotionally attached to both parents, =1 if only to one parent, =2 if emotionally attached to other than parent(s)
Exposed	Binary	=1 if the respondent is ever exposed to Preventive and Eradication of Narcotics Abuse and Circulation or P4GN program
Gender	Binary	=1 if the respondent is male, and =0 if female
Education	Categorical	=0 if the respondent is currently studying at Junior High School, =1 if in Senior High School, =2 if in university
Stay	Binary	=1 if the respondent is currently living without parents' family, =0 otherwise
Family Status	Categorical	=0 if parents are still married, =1 if parents are divorced, =2 if parent is widowed

Father's Education	Categorical	=0 if father had no education, =1 if father completed primary education, =2 if father completed secondary education, =3 if the father completed higher education
Mother's Education	Categorical	=0 if mother had no education, =1 if mother completed primary education, =2 if mother completed secondary education, =3 if the mother completed higher education
Father's Working Status	Binary	=1 if the father is currently working
Mother's Working Status	Binary	=1 if the mother is currently working
Pocket Money	Continuous	Pocket money received by the respondent for every month
Log of Pocket Money	Continuous	Log of pocket money received by the respondent for every month

Table 1. Description of Variables

We have also calculated the descriptive statistics of each variable used in this study as follows:

Variables	Obs.	Mean	Std. Dev.	Min.	Max
Smoking	5,200	0.2048077	0.4035998	0	1
Vaping	5,200	0.1121154	0.3155387	0	1
Alcohol Consumption	5,200	0.1317308	0.3382304	0	1
Ever Drug Abuse	5,200	0.0580769	0.2339113	0	1
Currently Drug Abuse	5,200	0.0319231	0.1758122	0	1
No Activity	5,200	0.1809615	0.3850233	0	1
Smoke Intensity	5,197	1.049067	0.7853166	0	2
Vaping Intensity	5,194	0.5589141	0.662679	0	2
Alcohol Intensity	5,192	0.2964176	0.5656332	0	2
Nightclub Visit	5,200	0.1332692	0.3686723	0	2
Emotional Attachment	5,196	1.277906	0.7244797	0	2
Exposed	5,200	0.8455769	0.3613886	0	1
Male	5,200	0.4688462	0.4990765	0	1
Education	5,200	1.111731	0.777408	0	2
Stay	5,200	0.2230769	0.4163495	0	1
Family Status	5,197	0.2074274	0.5642672	0	2
Father's Education	5,194	2.155564	0.7616234	0	3
Mother's Education	5,188	2.073246	0.7740946	0	3
Father's Working Status	5,145	0.0373178	0.1895578	0	1
Mother's Working Status	5,176	0.426391	0.4945998	0	1
Pocket Money	5,007	749,781.8	1,141,801	12,000	30,000,000
Log of Pocket Money Received	5,007	13.18684	0.7634416	0	17.21671

Table 2. Descriptive Statistics

Some of the variables have a missing value like emotional attachment and pocket money received and it is more than 1% from all the observations. We treat those missing variables using a dummy variable that equals 1 if the variables have a missing value and 0 if otherwise in the estimations.

2.1. Methodology

For the estimation, we used logistic regressions since the dependent variables are in the form of a binary response, which is equal to 1 if the respondent is currently or has ever engaged in risky behaviors such as smoking, vaping, alcohol consumption, or drug abuse. Logistic distribution is used for the whole estimation. Hence, we developed the model as shown below:

$$logit(P) = \log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k$$

We derived the equation above to obtain the probability of *y* event happens. Then, we get the formula of probability *y* happens ($P(Y = 1)$:

$$p = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta k X_k)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta k X_k)}$$

For the result, we estimate the average marginal effect instead of the odds ratio to obtain the probability that independent variables influence the conduct of risky behaviors. For the whole estimation, we used Stata version 17, including for the data visualization. However, we dropped the missing observation in the independent variables, which covered less than 1% of all observations. The robust option is used for the estimation in Stata.

For this research, we acknowledge some of the limitations faced by the researcher. The lifestyle variable might have a reverse causality. A nightclub visit, for example, can reveal whether the respondent smokes or vapes. On the other hand, there is a possibility where they were already smoking, and they visit a nightclub to gather with other smokers. Hence, we have a problem with the estimation. We are aware that further advanced methods must be taken, like using an instrumental variable approach. However, the dataset is not designed for the advanced method, so we are unable to do so. If we continue to use logistic regression, we may encounter the issue of reverse causality, which results in an underestimated or overestimated coefficient. We also found the issue of endogeneity in the variable since some of the variables might have correlations with each other.

III. Result and Discussion

3.1. Risky Behaviors Among Adolescents in Indonesia

The Figure (1) below shows us the prevalence of each risky behavior in Indonesia. We then separated the prevalence of each risky behavior based on the cities surveyed in the dataset as shown in Table (3)

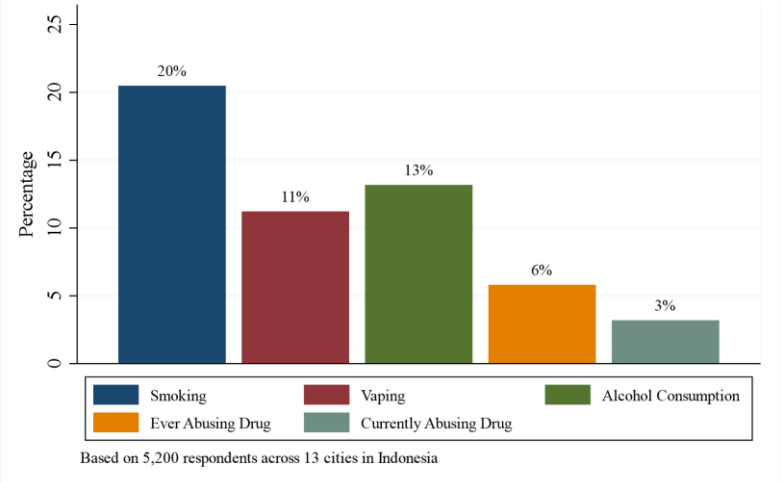

Figure 2. Prevalence of Risky Behaviors in Indonesia

No	Name of Cities	Smoking	Vaping	Consuming Alcohol	Ever Abusing Drug	Currently Abusing Drug
1	Banda Aceh	21.25%	13.25%	2%	4.5%	2.5%
2	Medan	17.75%	8.25%	11.25%	3.25%	2.5%
3	Palembang	24.75%	13.25%	6.75%	6.25%	2.25%
4	Batam	20%	10%	10.25%	5.5%	2.5%
5	Jakarta	34.5%	19.25%	18%	7.5%	4%
6	Bandung	22.5%	13.75%	19.25%	8.25%	4.5%
7	Surabaya	20.25%	11%	14.5%	11%	7.5%
8	Yogyakarta	16%	12.5%	15.25%	6.25%	3.75%
9	Denpasar	14.5%	10.25%	31%	0.75%	0.25%
10	Samarinda	30.75%	18.25%	12.75%	9.75%	5.25%
11	Pontianak	12%	3.5%	9%	2.25%	1.25%
12	Makassar	18.75%	7%	6.75%	6.25%	3.5%
13	Jayapura	13.25%	5.5%	15%	4%	1.75%

Table 3. Prevalence of Risky Behaviors Based on the Cities Surveyed

According to our dataset, the average prevalence of smoking among adolescents in Indonesia is 20%. Jakarta has the highest prevalence of smoking at 34.5%, while the lowest prevalence is in Pontianak at 12%. In the case of vaping, Jakarta still has the highest prevalence of that behavior at 19.25%. The city with the lowest prevalence of smoking is Pontianak, at 3.5%. Interestingly, two cities (Makassar and Jayapura) located in East Indonesia have a lower prevalence of vaping compared to other cities in the dataset. It might happen due to the distribution of vaping commodities, or the local culture is unfamiliar with modern electronic cigarettes. We discovered that Denpasar is the top city with the highest prevalence of alcohol consumption. We expected this result since Denpasar is a popular tourist destination and many foreigners come to visit. The foreign tourists' cultures of consuming alcoholic beverages is met by the tourism services in Bali. This is as simple as the saying that the demand creates the supply. On the other hand, Banda Aceh has the lowest prevalence of alcohol consumption. This is due to the Islamic law implemented by the Aceh Province that forbids alcohol distribution. In Islam, consuming alcohol is a sin.

The average prevalence of ever- and currently-abusing drugs in Indonesia, respectively, are 5.81% and 2.79%. Samarinda is the city with the highest prevalence of both past and current drug abuse. Denpasar, on the other hand, has the lowest prevalence of ever and current drug abuse. Since Denpasar is filled with many types of people (domestic and foreigners) with the potential for high crime, the law enforcers may pay specific attention to Denpasar, thus limiting people's opportunity to conduct crime. Hence, it may explain the low rate of people abusing drugs in Denpasar.

No	Type of Behaviors	Min.	Max.	Mean
1	Smoking	4	25	14.26
2	Vaping	5	42	15.88
3	Consuming Alcohol	5	23	16.11

Table 4. The Age at Which the Respondent First Engaged in Risky Behavior

Our dataset also found that the average age of people to first engage in risky behaviors is below the legal age of 17 years old. Surprisingly, their first time experimenting with those behaviors was at 4–5 years old or about

0.19%, 0.17%, and 0.65% for smoking, vaping, and consuming alcohol, respectively. They were exposed to smoking, vaping, and alcohol at a very young age. Regardless of the respondent's community culture, this finding is worrying.

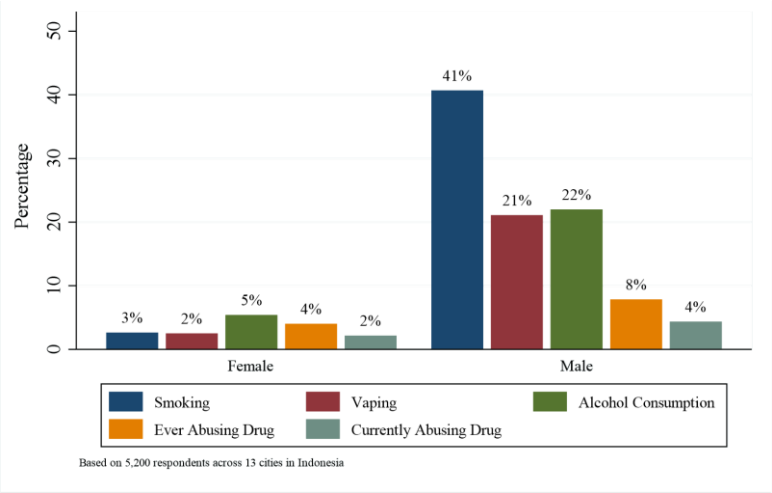

Figure 3. Prevalence of Risky Behaviors Based on Gender

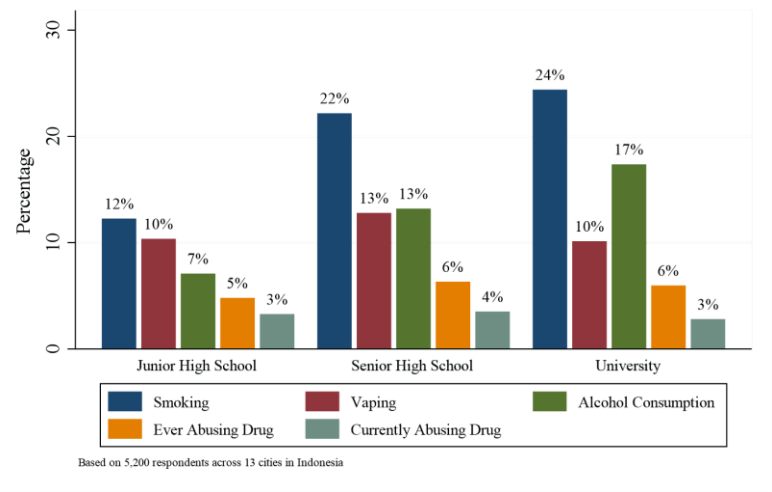

Figure 4. Prevalence of Risky Behaviors Based on Current Education Enrollment

In Figure (3) and (4) above, we have the first evidence of the relationship between risky behaviors by gender and the current education enrollment of respondents. Males are more likely to engage in risky behavior compared to females. The deviation between males and females is quite large, and on average they have 16 percentage point differences. We will see the statistical association between gender and risky behaviors below. Moreover, the current education enrollment of the respondents has no specific pattern for determining the conduct of risky behaviors. However, we found that smoking and alcohol consumption prevalence tends to increase along with the increase in educational level. Our concern now is the prevalence of risky behaviors among junior high school

students, which is high. For example, about 3–5% of junior high school students have experience in drug abuse—bad news for our educational system. The efforts to prevent the conduct of risky behaviors need to be emphasized again among middle school students.

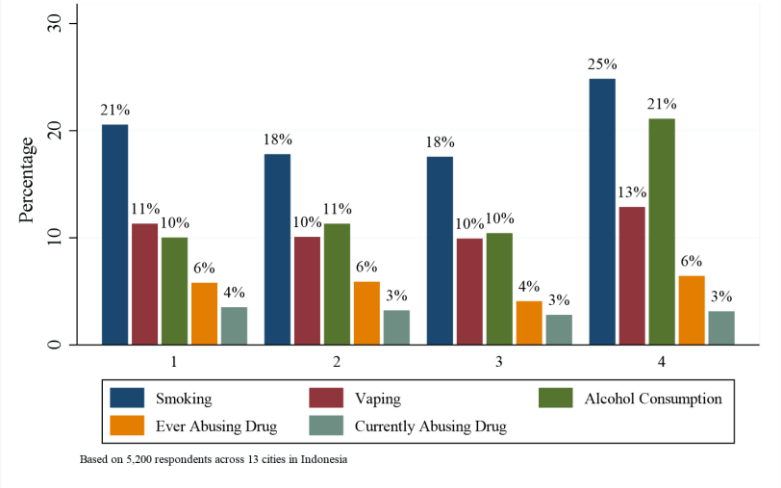

Figure 5. Prevalence of Risky Behaviors Based on Quartile of Pocket Money

Figure (5) shows us the prevalence of risky behaviors based on the quartile of pocket money received by the respondent. There are no statistically significant differences between quartiles 1 and 3. However, it increases when the respondent has pocket money in quartile 4. Smoking and consuming alcohol prevalence is significantly higher compared to the lower quartile. This evidence indicates that money is most likely a factor in determining the conduct of risky behaviors among young people. If they have more pocket money every month, they are most likely to allocate their money to cigarettes and alcoholic beverages. To confirm this finding, we used advanced statistical tools presented in the following section.

No	Type of Behaviors	Don't Know	No Risk	Less Risky	Very Risky
1	Smoking	15.21%	8.28%	37.05%	39.46%
2	Vaping	22.43%	10.76%	37.93%	28.88%
3	Consuming Alcohol	16.75%	3.99%	23.05%	56.22%

Table 5. The Perception of the Risky Behaviors

Even though respondents are aware of the risks associated with risky behaviors, it is unrelated to their conduct in risky behaviors. According to our findings, most current alcohol consumers (56.22%) believe that drinking alcoholic beverage is extremely dangerous. However, people's perception of vaping is different from that of smoking. People believed that vaping was less dangerous than smoking. Hence, only 28.88% of the respondents said that vaping is a very risky behavior. This perception is half-correct; vaping itself is not free from any harmful substance. According to the Centers for Disease Control and Prevention (2023), vaping liquid can contain nicotine, heavy metals like lead, volatile organic compounds, and cancer-causing agents.

3.2. General Result

Our general results are also shown in Table (5). Instead of coefficient or odd ratio, we used the average marginal effect for the interpretation. For dummy variables, the average marginal effect is the percentage point of variables if it changes from 0 to 1.

Independent Variables	Dependent Variable: =1 if they ever or currently undertaking a risky behavior				
	Smoking	Vaping	Consuming Alcohol	Ever Abusing Drug	Currently Abusing Drug
	(1)	(2)	(3)	(4)	(5)
1 if smoking		**0.267*****	**0.135*****	**0.0398*****	**0.0174****
		(0.0196)	**(0.0155)**	**(0.0117)**	**(0.00794)**
1 if vaping	**0.322*****		**0.0453*****	**0.0241****	0.0132
	(0.0213)		**(0.0138)**	**(0.0107)**	(0.00815)
1 if consuming alcohol	**0.141*****	**0.0385*****		**0.0665*****	**0.0468*****
	(0.0158)	**(0.0117)**		**(0.0138)**	**(0.0119)**
1 if not currently involved in extracurricular activity	-0.0139	-0.00162	-0.00949	0.00136	0.00197
	(0.0110)	(0.00995)	(0.0104)	(0.00854)	(0.00680)
Smoking Intensity Surrounding (Base: No Smokers)					
Less Intensity	**0.117*****	**-0.0491*****	**-0.0361*****	0.00468	0.00765
	(0.0102)	**(0.0123)**	**(0.0124)**	(0.00830)	(0.00587)
High Intensity	**0.146*****	**-0.0569*****	-0.0225	**0.0188***	0.0105
	(0.0125)	**(0.0136)**	(0.0144)	**(0.0103)**	(0.00778)
Vaping Intensity Surrounding (Base: No Smokers)					
Less Intensity	**-0.0587*****	**0.0767*****	**-0.0280*****	-0.0120	**-0.0105***
	(0.00963)	**(0.0100)**	**(0.0107)**	(0.00810)	**(0.00638)**
High Intensity	**-0.0676*****	**0.107*****	**-0.0612*****	**-0.0214****	**-0.0169****
	(0.0150)	**(0.0190)**	**(0.0136)**	**(0.0109)**	**(0.00808)**
Alcohol Drinkers Intensity Surrounding (Base: No Drinkers)					
Less Intensity	-0.0155	0.00460	**0.107*****	0.00675	0.00706
	(0.0110)	(0.00987)	**(0.0139)**	(0.00887)	(0.00701)
High Intensity	-0.0124	-0.00230	**0.175*****	**0.0341***	**0.0342****
	(0.0199)	(0.0163)	**(0.0275)**	**(0.0188)**	**(0.0173)**
Nightclub Visit (Base: Never Visits)					
1 if sometimes	**0.0652*****	**0.0438*****	**0.166*****	**0.0396*****	**0.0286*****
	(0.0148)	**(0.0125)**	**(0.0157)**	**(0.0118)**	**(0.00938)**
1 if often	**0.127****	**0.0696***	**0.291*****	0.0531	0.0111
	(0.0590)	**(0.0377)**	**(0.0573)**	(0.0324)	(0.0176)
Emotional Attachment					
1 if only to one parent	0.0180	-0.00227	**-0.0224***	0.00110	0.00539
	(0.0119)	(0.0109)	**(0.0117)**	(0.00922)	(0.00701)
2 if both parents	0.00249	-0.0125	-0.0105	-0.00676	-0.00303
	(0.0117)	(0.0108)	(0.0118)	(0.00913)	(0.00682)
1 if exposed to P4GN	-0.00685	0.00484	0.000821	-0.00661	-0.00149
	(0.0107)	(0.00985)	(0.0106)	(0.00869)	(0.00663)
1 if Male	**0.265*****	**0.0706*****	**0.0790*****	-0.00469	-0.000942
	(0.0107)	**(0.0101)**	**(0.00938)**	(0.00816)	(0.00609)
Current Education					
Senior High School	**0.0510*****	**-0.0180***	**0.0281*****	-0.00113	-0.00840
	(0.0108)	**(0.0101)**	**(0.0101)**	(0.00871)	(0.00724)
University	**0.0616*****	**-0.0575*****	**0.0486*****	-0.0102	**-0.0175****
	(0.0122)	**(0.0110)**	**(0.0116)**	(0.0101)	**(0.00839)**
1 if currently stayed without parents or family	0.0159	**-0.0326*****	0.000629	0.00994	0.00524
	(0.0106)	**(0.00884)**	(0.00978)	(0.00864)	(0.00703)
Family Status					
Divorced	0.0250	-0.00246	0.0209	0.0137	0.00186
	(0.0195)	(0.0146)	(0.0187)	(0.0138)	(0.00985)
Widowed	0.0148	-0.00933	0.0191	0.00676	0.0107

	(0.0179)	(0.0151)	(0.0167)	(0.0120)	(0.0102)
Father's Education					
Primary Education	0.0120	-0.0217	-0.0232	-0.0262	-0.0115
	(0.0248)	(0.0229)	(0.0278)	(0.0179)	(0.0159)
Secondary Education	-0.0112	-0.00945	-0.0379	-0.00669	-0.00846
	(0.0227)	(0.0209)	(0.0256)	(0.0167)	(0.0144)
Higher Education	-0.0175	-0.0117	-0.0241	-0.0190	-0.00997
	(0.0244)	(0.0222)	(0.0270)	(0.0181)	(0.0155)
Mother's Education					
Primary Education	**0.0397***	-0.0223	**0.0427****	**-0.0538****	-0.00880
	(0.0223)	(0.0224)	**(0.0177)**	**(0.0220)**	(0.0135)
Secondary Education	0.0131	-0.00105	**0.0546*****	**-0.0435****	-0.00439
	(0.0203)	(0.0212)	**(0.0160)**	**(0.0217)**	(0.0126)
Higher Education	-0.0119	-0.00740	**0.0601*****	**-0.0457***	-0.00295
	(0.0224)	(0.0229)	**(0.0180)**	**(0.0235)**	(0.0141)
1 if father is not currently working	-0.0203	0.0255	0.0249	0.00192	-0.00360
	(0.0197)	(0.0196)	(0.0220)	(0.0158)	(0.0121)
1 if mother is not currently working	**-0.0203****	-0.00597	0.000797	-0.00490	-0.00306
	(0.00851)	(0.00771)	(0.00834)	(0.00662)	(0.00505)
Log of Pocket Money Received	-0.00578	0.00348	**0.0159*****	**-0.00963****	**-0.00788****
	(0.00627)	(0.00553)	**(0.00589)**	**(0.00408)**	**(0.00321)**

*Average Marginal Effect (AME), Standard error in parentheses, *p < 0.10, ** p < 0.05, *** p < 0.01*

Table 6. Average marginal effects: correlates of engagement in risky behaviors

In the table above, almost all the risky behaviors exhibited by the respondent may influence their decision to engage in other risky behaviors. On the other hand, if someone falls into one of the risky behaviors, such as smoking, vaping, or alcohol consumption, the probability of engaging in another risky behavior tends to be higher. It can be explained as a "vicious circle" of risky behaviors. For example, the likelihood of a respondent being a smoker increases when they also vape and consume alcohol. Hence, the intervention to reduce the probability of someone falling into one of the risky behaviors needs to be an integrated effort, not only focusing on one risky behavior.

Vaping and consuming alcohol significantly determines someone to be a smoker. This is quite interesting since there are no studies discussing the relationship between smoking and vaping, including in Indonesian context. Our result also found that peer effect, as represented in smoking intensity, significantly increases the probability of a respondent being a smoker. If the intensity is getting higher, the probability of being a smoker increases compared to the respondent who has no smokers around them. Interestingly, vaping intensity has the opposite effect from smoking intensity, indicating a probability of a substitution effect. The intensity of vaping around the respondent has a negative effect on smoking behavior. If the intensity of vaping is getting higher, the probability of smoking among respondents decreases. However, the magnitude is lower compared to the smoking intensity. We have no evidence to support the intensity of alcohol and its association with smoking behavior. Regardless of the magnitude, we can see that peer effect may have a strong relationship in altering the behavior of the respondent. If one's surroundings are dominated by smokers, one tends to be a smoker. Similarly, when one's surroundings mostly vapes, one tends to vape instead of smoking. These findings emphasize the result from Mposiou et al. (2018) and Leshargie et al. (2019) on the effect of peer influence and risky behaviors exhibited by young people. However, for the result on the other risky behavior's intensity, we are filling a gap that has never been discussed before since there were no supporting studies on this result.

The lifestyle of the respondent, represented in this case by the frequency of nightclub visits, has a strong association with smoking behavior. If the frequency is higher, the probability of the respondent being a smoker also increases. This is not surprising since nightclubs are often used for cigarette promotion as seen by Trotter, Wakefield & Borland (2002). Hence, people in nightclubs are highly exposed to tobacco products, which affects their decision to smoke. Nevertheless, the magnitude itself might have an endogeneity issue because we have a reverse causality problem. People who visit nightclubs probably have already started smoking, so they gather with the other smokers who are concentrated in the nightclub area. On the other hand, people can also become smokers because of their involvement in nightclub activity. Further exploration must be conducted to address this issue. Regardless of the reverse causality issue, this result is in line with the findings from Trotter, Wakefield, & Borland (2002) on the association between pub visits and smoking behavior among respondents. Advertisements that are commonly published in a nightclub truly affect the decision of the respondent to smoke. Also, its association has been persistent until today, since the latest study to discuss it was published in 2002. For the role of extracurricular activities, we found no evidence to support the association between those activities and smoking behavior and the result from Adachi-Mejia et al. (2014) does not apply to our result.

We see no effect of the respondent's emotional attachment to their smoking behavior. The P4GN program for preventing drug abuse among Indonesians also exhibits no significant effect on the probability of respondents smoking. However, it must be further explored using appropriate tools for impact evaluation. Besides, no previous study has ever discussed the effect of P4GN on smoking behavior in the context of Indonesia. Even though the P4GN itself is focused on the effects of drug abuse, the exploration regarding its effect on smoking behavior is quite interesting since our result indicates the relationship between all the risky behaviors observed in this study. We also seek the effect of socioeconomic factors on smoking behavior. Males are more likely to smoke compared to females. Males are more susceptible to smoking, and they may be more sensitive to smoke if exposed to a tobacco-related product. This finding is in line with the previous study regarding the gender associated with smoking by Chinwong et. al. (2018) and Ritchie (2019). Our result is persistent with the prior study regarding this issue.

Respondent's current education has also been associated with a higher probability of being a smoker. We argue that the high concentration of people smoking in university might influence university students to smoke. Based on our descriptive statistics, we found that respondents who are surrounded by many smokers are majorly concentrated in university education at 52.7%, compared to senior high school and junior high school, respectively, at 34.33% and 12.96%. Abdulrahman et al. (2022) have studied smoking habits among college students. It found that college students start to smoke after they enter university. The status of respondents living status—whether they lived with or without family—is not associated with smoking. We found no supporting evidence of this result. Respondents who live alone may have a higher probability of smoking. This is the same as the family status of the respondent, which shows no significant result. This is the opposite finding from Dagdas (2019).

Adolescent smoking behavior can be influenced by parental education. Previous studies from Chassin et al. (1992) and Assari et al. (2020) have emphasized this statement. However, we found the opposite result. Except for the mother's completion of primary school, almost all the variables representing the parents' education are not statistically significant. Lower parents' education indicates lower knowledge regarding risky behaviors, which leads

to a low preventive act of restricting their children from smoking. Although it is not significant, parents with higher education can lead to a decrease in their children's probability of being smokers as we see a negative sign on parents' education. Moreover, unemployed mothers will result in a lower probability of their children being smokers. In this case, a mother's affection is important because unemployed mothers spend a lot of time at home caring for their children. However, it lies on the assumption that the mother is currently living and become a housewife. This result on the effect of unemployed mothers is a new finding since we did not find supporting research in the prior study.

Another finding from the regression is that the respondent's pocket money has no relationship with smoking behavior. This implies that even if someone has low pocket money received every month, they still have a probability of smoking, and this does not differ from a respondent with higher pocket money received. Therefore, cigarettes probably are not becoming a luxurious good for the respondent in the context of Indonesia. This result is different from the study by Perelman et al. (2017) in the context of six European countries, which indicates smoking behavior is influenced by the quantile of income among respondents. However, this is not apple-to-apple compared to developing countries like Indonesia since they have different prices for cigarettes. The price of cigarettes in developed countries tends to be higher compared to developing countries. In a developed country, cigarettes can be classified as luxurious goods because only people who have a higher income can afford them. The developed country has restricted the regulation of cigarettes so that eligible people in terms of age and income can access them. In Indonesia, there are many types of cigarettes ranging from the cheapest to the most expensive. Thus, all levels of people regardless of their income and age can buy it easily.

Vaping behavior is influenced by other risky behaviors. This result is the same as for smoking behavior. People who are smoking and consuming alcohol have a higher probability of vaping as well as the intensity of those risky behaviors. If the intensity of vapers surroundings is getting higher, the probability of someone vaping is also increasing. This is in line with the findings from Groom et al. (2021). However, we found that smoking intensity has the opposite effect on vaping, meaning that the higher intensity of smoking will result in a decreased probability of someone vaping. Instead of vaping, the respondent tends to smoke and "blend" with their surroundings if there are more smokers. We find no statistically significant effect for alcohol intensity. Our findings on the substitution effect emphasize the relationship between the risky behavior's intensity to the other risky behavior exhibited by the respondent. In terms of lifestyle, our findings show the relationship between nightclub visits and vaping behavior. If the respondent frequents nightclubs, their likelihood of vaping increases. Not only cigarettes were advertised by the company in the nightclub, but other tobacco-related products, like vapes, were probably also introduced to the club guests. This result would be the first evidence of the association between vaping and nightclub visits. Nevertheless, this will be the same as the smoking association, which contains a reverse causality between them.

Males have a higher likelihood to smoke than females. This result is in line with the findings from Gaiha, Rao, & Halpern-Felsher (2022) regarding males and their association with vaping. The current education of respondents is associated with a low probability of vaping so when they have a higher degree, the probability of not vaping is increasing. This non-vaping tendency is compared to the respondent who is currently in junior high school. The status of living among respondents has an association with vaping behavior. In other words, those who are not

currently living with family have a lower likelihood to vape. Parents' education has no association with vaping behavior, as does the pocket money received by the respondent every month. Unfortunately, we are unable to find a prior study regarding these socioeconomic factors and vaping behavior among adolescents, meaning this is the evidence from the research gap on vaping behavior in the literature.

Like smoking and vaping, alcohol consumption among respondents is influenced by other risky behaviors. Respondents who are currently smoking and vaping have a higher probability of consuming alcohol. We found that the intensity of both smoking and vaping have a negative association with alcohol consumption. The intensity of alcohol consumers around the respondent will result in a higher probability of being an alcohol consumer. This is interesting and it means that peer effect has a strong association with the decision of the respondent to exhibit the risky behavior and it emphasizes the prior findings in smoking and vaping. Our findings support the study resulted from Jiang, Lee, & Ling (2014) regarding the association between smoking and drinking.

Without a doubt, we expect that nightclub visits are associated with a higher probability of respondents being alcohol consumers. It is because the club itself is promoting alcoholic beverages as the complementary commodity of the club service, which is sold to the guests. As Hobbs et. al in Tutenges & Bohling (2019) stated that clubs as a venue for drinking puts pressure on people to consume more alcohol. However, we might find the endogeneity issue since the nightclub visit and consuming alcohol have a reverse causality. Because of that, we are unable to capture the right magnitude of the effect of nightclub visits and consuming alcohol using the given dataset.

One of the socioeconomic factors related to alcohol consumption is gender. Males have a higher probability of consuming alcohol compared to females. White (2020) revealed evidence of the domination of males in this behavior. Straightly, he stated that alcohol consumption is a male-dominated activity. The respondents' current education enrollment has a positive association with consuming alcohol. Compared to junior high school students, respondents from senior high school and university have a higher probability of consuming alcohol. Parents' education has no significant effect on consuming alcohol, except the mother's education. However, the sign is positive, meaning that educated mothers tend to have a higher probability of respondents consuming alcohol. In this case, we have no theory or argumentation to support this finding, except the study from Wells & Ostberg (2018) which shows that educated parents tend to increase the likelihood of young people drinking more frequently. Our result also found that the pocket money received by the respondent has a positive association with the respondent consuming alcohol. If the money received is higher, the probability is increased. We further explored this finding in the sub-group analysis of pocket money received based on the respondent's quartile of pocket money.

We divided this part into two classifications: people who have ever abused drugs and people who currently abuse drugs. Both classifications have been significantly influenced by other risky behaviors, such as smoking, vaping, and alcohol consumption. This result emphasizes our hypothesis regarding the vicious circle of risky behaviors among respondents: if the respondents fall into only one risky behavior, then they are most likely to conduct the other risky behaviors. Hence, risky behaviors are "riskier" than we expected before. When compared to smoking and vaping, alcohol consumption has the highest likelihood of causing the respondent to abuse drugs currently or ever.

Surprisingly, there is evidence that the intensity of risky behavior does not always influence drug abuse behavior. Only vaping and high-intensity alcohol consumption have been linked to ongoing drug abuse. Vaping intensity indicates a negative relationship with drug abuse, meaning that the intensity of a risky behavior may have the opposite effect on the other risky behavior. This is the same as the prior findings in smoking, vaping, and alcohol consumption. However, alcohol consumption is only found to be significant if the intensity is higher and there is a positive association between them. This could be the good complementing effect of drugs and alcohol: if there is drug abuse, it will be followed by alcoholic beverages. Probably, the respondent prefers the combined effect of those things, which amplifies the hallucination effect for whoever conducts it. Nightclub visits are only significant for "occasional" visits. We argued that it might be precautionary behavior since drug abuse is illegal in Indonesia. People who exhibit it tend not to do it in nightclubs. Usually, they consume the drug in a place where they are not within the public eyes. Therefore, the law enforcer is unable to detect their behavior. This explains why people who frequent nightclubs are usually not drug users. However, it is possible that someone who often visits the nightclub also abuses drugs, but we cannot prove it in our dataset. Still, we are facing the problem of reverse causality in this variable of nightclub visits.

We discovered no socioeconomic factors associated with drug abuse, implying that drug abuse is unrelated to the respondent's socioeconomic status, except for the mother's education in "ever" drug abuse status and the respondent's current education status. The study from Veronica, Langi, & Joseph (2018) regarding the socioeconomic factors on drug abusers does not apply to the dataset used in this study, like gender. Nonetheless, we only discovered that respondents who are currently enrolled in university are less likely to be drug users. In this case, education is critical to preventing someone from exhibiting risky behavior, particularly drug abuse. Education is an important factor not only on the respondent but also on the respondent's mother in determining the respondent's likelihood of abusing drugs. When compared to a mother with no education, the probability of the respondent being a drug abuser is decreasing if they have an educated mother. It is, however, only relevant to the mother's education, not the fathers. Finally, we discovered evidence of a link between the respondent's pocket money and the likelihood of being a drug abuser. For both classifications, pocket money is negatively significant to be associated with being a drug abuser. If the pocket money is higher, the probability will decrease. This is quite interesting because there are some explanations regarding this phenomenon. First, it can be transmitted through the welfare of the respondent. If the respondent has higher pocket money, they tend to have better welfare compared to the respondent who received lower pocket money. Hence, this gives us a signal that they are most likely to be educated and have a broad knowledge regarding the consequences of risky behaviors. Therefore, the relationship would be negatively associated. Second, we could argue that this result is underestimated since the question regarding whether the respondent is abusing drugs is quite sensitive. As a result, the dataset only captures a small number of people who are abusing the drugs and it affects the regression result. We are not confident enough whether the sign of average marginal effect is true as we do not know the transmission itself. Further exploration must be conducted.

We also extend the analysis into two forms; risky behaviors based on gender and monthly pocket money received. The male result is similar with our general result. However, we found that female respondents tend to not

easily be influenced by risky behaviors in their surroundings. Besides, if she has a parent who is widowed, she tends to smoke compared to those who have complete set of parents. Female with emotional attachment to either father or mother and both parents would result on the less likely to conduct vaping compared to female who has emotional attachment to other than their parent(s). Female respondents' father would reduce the probability of the female respondent to smoke and vape, but it applies only for primary and secondary education. In the case of pocket money, we found that only 4th quartile of respondent would result on the higher probability consuming alcohol with positive sign. It might be the effect of the price of alcoholic beverages in Indonesia. On the other hand, it only the 4th quartile of respondent would have significant effect on ever and currently abusing drugs with negative sign.

IV. Conclusion

4.1. Recommendation

Based on the findings, some conclusions are described below. The prevalence of smoking, vaping, consuming alcohol, ever abusing drugs, and currently abusing drugs, respectively, are 20%, 11%, 13%, 6%, and 3%. Males have a higher prevalence of those behaviors compared to females. Unfortunately, the findings also found that there is quite a high prevalence of risky behaviors among adolescents who are currently enrolled in junior high school. For smoking and consuming alcohol, the prevalence increases with every additional level of education. In the quartile of the pocket money graph, there is no pattern to the prevalence of risky behaviors except for the 4th quartile. In the 4th quartile, the prevalence of smoking and consuming alcohol is significantly higher. On the other hand, adolescents' knowledge regarding the risks of smoking, vaping, and consuming alcohol differs. Most alcohol consumers, or 56.22% of respondents, thought that consuming these beverages as very risky, while only 28.88% thought that vaping as very risky. Besides, about 22.43% of people who are vaping do not know the risks of that behavior. This kind of variation suggests that there is asymmetrical information regarding the risk of smoking, vaping, and consuming alcohol among adolescents.

The result found that risky behaviors are a vicious circle. People who conduct only one of those behaviors are most likely to have a higher probability of conducting the other risky behaviors. This result is consistent for every type of risky behavior, meaning that all these behaviors are related to each other. In addition, the peer effect, represented by the number of people around who also conduct the same behaviors, is significantly associated with the conduct of risky behaviors. Interestingly, different types of risky behaviors exhibit different results. For example, people who are smoking are influenced by the high intensity of smokers around them, but there is a negative association between the intensity of vaping and consuming alcohol. The result is consistent across different types of risky behaviors. In addition, nightclub visits are associated with a higher probability of doing risky behaviors, and this does not differ between "sometimes" and "often" visits. The results also found that P4GN interventions do not have a significant effect on reducing the probability of respondents engaging in risky behaviors.

In the case of socioeconomic factors, some variables are indicated to be significant, like male status, current education enrollment, and parents' education, especially for the mother. Some of the others are only significant for specific risky behaviors, so it is a unique characteristic. Unemployed mothers resulted in a lower probability of adolescents being smokers. All the results on socioeconomic factors emphasize the findings from the prior study,

and some of them give a new contribution to the literature regarding the socioeconomic factors that relate to the conduct of risky behaviors.

We recommend some of the policy implications based on our findings above:

1. Stakeholders, including BNN, must collaborate with other institutions that relate to the issues that caused the risky behaviors. For example, BNN can collaborate with National Family Planning Coordinating Board (*Badan Koordinasi Keluarga Berencana Nasional*, BKKBN) to strengthen the family in Indonesian households because some of the reasons of risky behaviors are rooted in family problems. In addition, BNN should collaborate with law enforcers, like the police and the Civil Service Police Unit (*Satuan Polisi Pamong Praja*, Satpol PP), to prevent the community, especially in places that could not be fully monitored by the stakeholders, from engaging in these behaviors. Furthermore, intervention towards females must include the emotional-based approach since they tend to be more sensitive emotionally compared to the males as indicated in our findings.
2. The program of P4GN must be transformed from not mere communication or introduction to the impact of drugs but also to introduce the other risky behaviors with innovative approaches. Even if we do not find any evidence of the relationship between P4GN and risky behaviors, we suggest that stakeholders must consider the other risky behaviors to be included in the P4GN program so there will be a comprehensive program to prevent the conduct of risky behaviors. Scaling up the P4GN program would be beneficial, and it needs a huge collaboration from the stakeholders. This includes the BNN itself and related government ministries or bodies in Indonesia. Besides, the scope of the program must inclusively include all the potential segments of youth, including their current education enrolled, wealth status, etc.
3. The regulation regarding the existence of nightclubs in Indonesia must be emphasized only for those who are eligible to visit, which is the age of above 18 years old. This rule is to ensure that those under the age of 18 years old cannot access the tobacco products and alcoholic beverages which are often promoted within the club. As indicated in the findings, we found that exposure to nightclubs, even in occasional visit, significantly increases the probability of someone engaging in risky behaviors, such as smoking, vaping, and consuming alcohol.

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