

BEHAVIOUR HEALTH RISK AMONG ADOLESCENTS: A SCHOOL-BASED HEALTH SURVEY WITH THE FOCUS ON SMOKING IN MALE ADOLESCENTS AGED 12–15 IN DEPOK, WEST JAVA, INDONESIA

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ABSTRACT

Background: Health intervention for adolescents is very crucial as the investment in building healthy life style and quality of learning process. Studies on health risk issues on adolescents in school setting and its relationship to academic score is limited. This study aims to describe behaviour risk factors among adolescents aged 12 to 15 years, and in particular studying smoking behaviour among male students. **Method:** This is a cross sectional study in the school setting. Samples are adolescents aged 12 to 15 years. This cross sectional study used pre-constructed self administered questionnaire adapted from Global School-based Health Survey (GSHS) WHO and was conducted during July–August 2006. Total sample in this study was 1,651 students of 29 junior high schools in Depok, West Java, Indonesia. Descriptive data analysis was used to describe the proportion distribution of health risk issues and smoking behaviour. **Results:** The major behaviour health risk issues includes smoking, diet related risk behavior, unhygienic behavior, injury, physical activity and mental health related behaviour. The proportions were significantly different between male and female. The proportion of smoking 39.2% among males and 3.7% among females. In comparison with the male students who never smoked, those who smoke had significantly lower mean of academic score (mean: 6.90 (95%CI: 6.79–7.01) vs 7.13 (95% CI: 7.06–7.20) p-value: 0.001) and higher school absenteeism (6.4 vs 3.5, p-value: 0.001). **Conclusion:** Males and females adolescents had significantly different health risk issues. Involuntary smoking shows the highest proportion of health risk behaviour among both male and female adolescents. Smoking behaviour has significant relationship with the academic score among male adolescents.

Key words: smoking, adolescent, behaviour risk factors, school-based health survey

ABSTRAK

Latar belakang: Intervensi kesehatan untuk remaja sangat penting sebagai investasi dalam membangun gaya hidup sehat dan proses pembelajaran yang bermutu. Riset terhadap issue risiko kesehatan pada remaja dengan tempat sekolah dan hubungannya dengan nilai akademik masih terbatas. Studi ini bertujuan memberikan gambaran tentang faktor risiko kesehatan pada remaja umur 12 sampai dengan 15 tahun dan secara khusus meneliti perilaku merokok pada murid laki-laki. **Metode:** Penelitian ini merupakan studi potong lintang dengan tempat sekolah. Sampel adalah remaja berumur 12 sampai dengan 15 tahun. Survei menggunakan instrumen dari Global School-Based Health Survey (GSHS) WHO dan dilaksanakan antara Juli–Agustus 2006. Total sampel dalam penelitian ini adalah 1.651 murid yang berasal dari 29 SMP di Depok, Jawa Barat, Indonesia. Analisis data deskriptif digunakan untuk menggambarkan distribusi proporsi issue risiko kesehatan dan perilaku merokok. **Hasil:** Issue mengenai perilaku utama yang berisiko kesehatan meliputi merokok, perilaku diet berisiko, perilaku tidak higienis, perilaku yang berhubungan dengan cedera, aktifitas fisik dan gangguan mental. Terdapat perbedaan proporsi yang bermakna secara statistik antara laki-laki dengan perempuan. Proporsi merokok 39,2% pada laki-laki dan 3,7% pada perempuan. Dibandingkan dengan murid laki-laki yang tidak pernah merokok, remaja laki-laki yang merokok memiliki nilai mean akademik yang lebih rendah secara bermakna [mean: 6,90 (95% CI: 6,79–7,01) vs 7,13 (95% CI: 7,06–7,20), p-value 0,001] dan angka absensi sekolah yang lebih tinggi (6,4 vs 3,5, p-value: 0,001). **Kesimpulan:** Remaja laki-laki dan perempuan memiliki issue tentang risiko kesehatan yang berbeda bermakna. Merokok involunter menunjukkan proporsi yang tinggi baik pada laki-laki maupun pada perempuan. Perilaku merokok secara bermakna memiliki hubungan dengan nilai akademik pada remaja laki-laki.

Kata kunci: merokok, remaja, faktor risiko perilaku, survei kesehatan sekolah

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INTRODUCTION

Health behaviour during early age is one of the substantial measures in producing more productive and qualified human resources for the future. There are some leading risk factors of morbidity and mortality in adolescents worldwide, which are alcohol and other drug use, dietary behaviours, self hygiene, mental health, physical activity, sexual behaviours, tobacco use, violence and unintentional injury (WHO, 2004).^{15,16,17,18}

Personal, environmental, and societal pressures may put adolescents at greater risk for tobacco use, substance abuse, human immune deficiency syndrome (HIV/AIDS), sexually transmitted diseases (STDs), unwanted pregnancies, violence, unintentional injuries, and mental disorders. Those behaviours affect adolescents' health at present as well as in the future (see figure 1).⁵

Smoking is one of the major health behaviour problems among adolescent in Indonesia. A survey in Jakarta, Indonesia, showed that 69.3% of high school students have tried to smoke. The prevalence of smoking among boys aged 15 to 19 years was increase from 36.8% in 1997 to 42.6% in 2000.³ Result from Global Youth Tobacco Survey (GYTS) in 2004 in 50 schools in several provinces in Indonesia showed that the prevalence of student aged 12 to 15 years who ever smoke was 33%.³ However, information on smoking and academic function among school age adolescent is limited. Therefore it is important to study the proportion of particular risk behaviour among adolescents that can be used as evidence based for the local policy makers and decision makers to develop more effective strategy for adolescents health in the school setting. This paper aims to describe behaviour risk factors among adolescents aged 12 to

15 years, in the school based setting with the focus on smoking behaviour among male students and its effect on their academic function. This study focuses on male adolescents because smoking prevalence among female students was relatively very low.

METHODS

This is a cross sectional study to describe the proportion of smoking and other behaviour risk factors and the relationship between smoking and academic score among junior high school students.

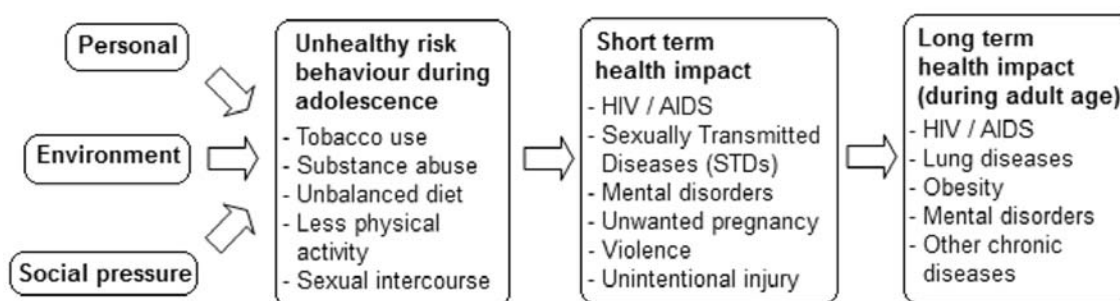
Population and Sample

Population in this study was the students aged 12 to 15 years who enrolled in the State Junior High School in Depok city. Sample of this study was students in the population who meet the inclusive criteria. The inclusive criteria include students aged 13 to 15 who enrolled in the selected schools.

The sample size was calculated using cross sectional sample size formula with the proportion of smoking risk factor prevalence of population aged 12 to 15 years was 22%. Total sample size was 2044 students, which includes 10% drop out and also analysis factors for sex and location criteria.

Sampling selection

List of schools was obtained from the Depok Education Office. The list consisted of 131 registered junior high schools in Depok for period of 2005/2006, with estimated total population of 43,000 students. With the estimation of number of student between 40 to 80 students, 30 schools were selected to meet the required sample size (2044 students). The schools were selected randomly by 'Probability Proportional to Size'.



Gambar 1. Factors affecting teen health behaviours (Hendarson et al, 1998)

The cumulative numbers were calculated from the list, and use three digit random number (699 was selected). Then, the interval number was calculated by divided number of total population and number of selected schools.

$$\text{Interval} = \text{total population}/30 = 42,996/30 = 1433$$

Schools were selected using the cumulative number and interval number. Selected schools were those that had cumulative number higher than the interval number. The class in the selected school was randomly chosen by systematic random sampling. The random number was calculated for each school using SPSS software. All the students registered in the selected class were the sample of this study. The number of the selected class varied in each school between one to two classes depended on the random number and number of eligible class in the selected school.

Variables

Variables in this study were behaviour risk factors that most commonly occurred during adolescent aged 12–15 years old, such as smoking, diet related behaviour, hygiene and sanitation, sexual behaviour, injury, physical activity, academic function (average academic score, number of truant, sex, type of school.

Data collection

The data was collected using anonymous pre-structured questionnaire or self reported questionnaire. This study using global standardized questionnaire of GSHS developed by WHO,¹⁴ with modification according to the local need, such as questions for smoking behaviour.

Questionnaire based survey

The students were filling in the questionnaire in the class room in each 29 schools. One teacher and one survey coordinator from research team were staying in the class to supervise. The students answered the questions in the provided answer sheets. All the answers were anonymous and the students were not allowed to put any identification including name or number or code in the answer sheet.

In average, it took 40 to 60 minutes for students in each class to complete all the questions.

Data Analysis

The data was analysed using SPSS 11, while epi info 6 was used for the data entry. Double entry was done for data verification. This study used chi square to statistical analysis to describe the proportion distribution between male and female adolescents and academic function. Academic function included school truant and average academic score. The academic score referred to the average score during the last six months prior to the data collection.

The ethical clearance for this study was approved by the Ethical Committee, National Institute of Health Research and Development, Ministry of Health Republic Indonesia.

RESULTS

Demography and Social Economy

This study was carried out in 29 Junior High Schools in Depok, West Java, Indonesia. This study was focused only for grade 7, 8, and 9 students, who were in aged 12 to 15 years. Response rate of this school health based survey is 81%, which are 1651 students out of 2044 students were participated. Mostly, the students who were not participated were having sick absent in the class or had other activities. The number of female students who participated in the survey was higher than the male students (53.8% and 46.1%). Meanwhile the students were mostly from grade 7 (37.1%), and grade 8 (34.4%), while the rest (28.4%) was from grade 9.

The social economy variable used in this study is based on the student's perception on their parents' income in qualitative scale, such as low, middle, and high. About 81% of the students assumed that their parents income is in the middle or average, while 13.9% presumed that their parents has high income for the family, and 5.1% of the students think that their parents has low income.

Behaviour Risk Factors

As mentioned in the introduction, the most common health-risk among adolescents worldwide, includes smoking, unhealthy diet, physical inactivity, emotional/mental health problems, unhygienic behaviour, sexual behaviours that contribute to HIV infection, and other STI, unintended pregnancy, violence, unintentional injury, alcohol and other drug use.

The proportions of health-risk issues among adolescents in Depok were provided on table 1. The proportions were significantly different between males and females in most of the health-risks.

The ten most common health-risk behaviours among females and males can be seen in figure 1 and 2. The ten highest reported health risk is slightly similar between males and females. However, in general males tend to have higher proportion than females for all of those health-risks except for mental health related issues (felt sad, lonely, worried, and suicide attempt). Involuntary smoking seems the main issue among both males and females. The only difference is about the physical activity, which does not appear in the ten highest health-risk behaviour among males, but it appears in females. Feeling lonely, sad and worried is the last tenth highest among males while it is in the fifth highest among females.

The ten most common health-risk behaviour in figures 1 and 2 can be grouped into five main related behaviours such as smoking, diet, hygiene, mental health related behaviour, and injury. The smoking behaviours included experience to try smoking and involuntary (passive) smokers. This paper focuses only on the smoking behaviour because smoking

appears to be the main issue, especially among male adolescents (39.2% of the students were ever smoked). The data only presented male data because of very few numbers of smokers among female (3.7%) students to be analysed. The analysis of the data was not aimed to test causal relationship since the survey was designed for descriptive analysis.

The smoking behaviours among male adolescents in Depok city can be seen on Table 2.

Almost half of the adolescents who smoke, started to smoke at aged 12–13 years, smoke mostly 1 to 2 days in the past 30 days prior to the survey, and smoke one of less cigarette per day. Surprisingly, the adolescents smoke *kretek* cigarette as high as filter cigarette (48.9% and 48.0% respectively). Among those who smoke every day during the past 30 days prior to the survey, more than half of them admitted that they had their father smoked. Meanwhile Table 3 describes that of male adolescents the proportion of having their father smoked is significantly higher among the students who smoke (60.8%) than never smoke (45%).

Table 4 and 5 show that male adolescents who smoke tend to have poorer class attendant and academic performance compared to those who do not

Table 1. Proportion Distribution of Health-risk Behavior among Male and Female Adolescents Aged 12–15 Years in Depok, West Java, Indonesia 2006

Health-risk behaviour	Proportion (%)			p value
	Males (n = 760)	Females (n = 888)	Total (n = 1648)	
During the past 30 days:				
– Often or always feel hungry but no food at home	2.7	1.7	2.2	0.022*
– Eat fruits less than once or never	37.1	24.5	30.4	0.000*
– Eat vegetables less than once or never	23.6	14.6	18.8	0.000*
– Never eat breakfast before going to school	13.7	15.1	14.5	0.290
– Buy food from street vendor most of the time & always	43.4	31.8	37.1	0.000*
– Never or not every day brush teeth	22.9	12.9	17.5	0.000*
– Never or rarely wash hands before eating	7.1	4.4	5.6	0.007*
– Never or rarely wash hands after use toilet	5.8	3.4	4.5	0.000*
– Miss classes 3 days or more	4.6	1.6	3.0	0.000*
– Feel neglected by parents	34.4	27.5	30.6	0.002*
– Ever smoke	39.2	3.7	20.1	0.000*
During the past 12 months:				
– Ever felt lonely, sad, worried, & want to suicide	11.4	19.6	15.8	0.000*
– Ever had injury	29.3	12.3	20.1	0.000*
During the past 7 days or typical week:				
– No physical activity	6.2	6.2	6.2	
– People smoke in your presence 1 to 7 days	62.4	58.9	60.5	0.08

Note: * statistically significant

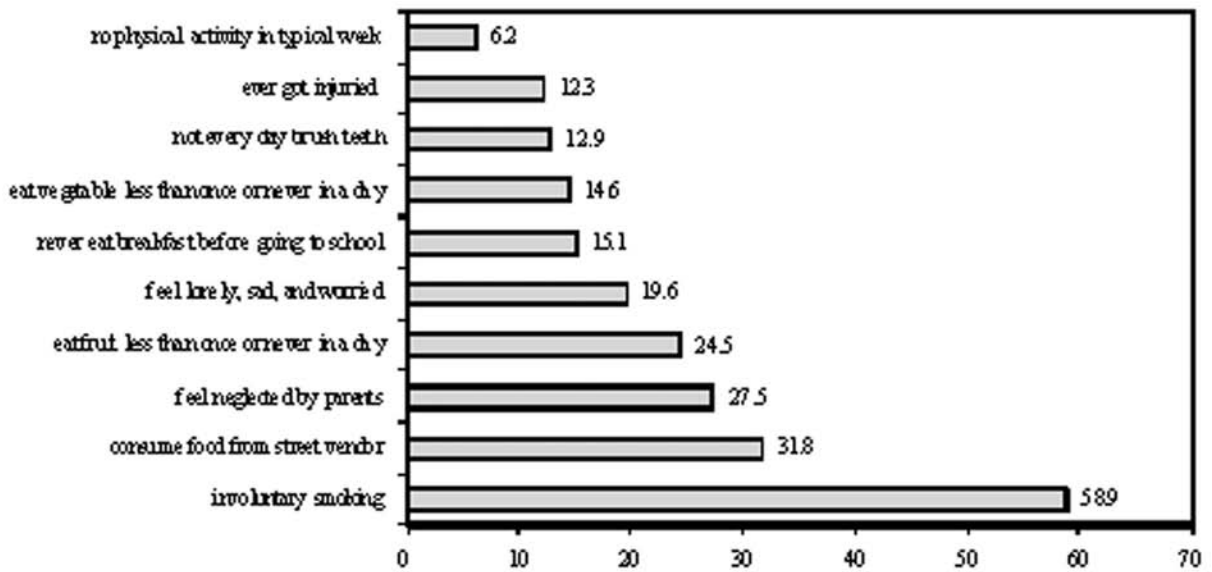


Figure 3. Ten highest health-risk behavior among females aged 12 to 15 years in Depok, West Java, Indonesia 2006 (total n = 888)

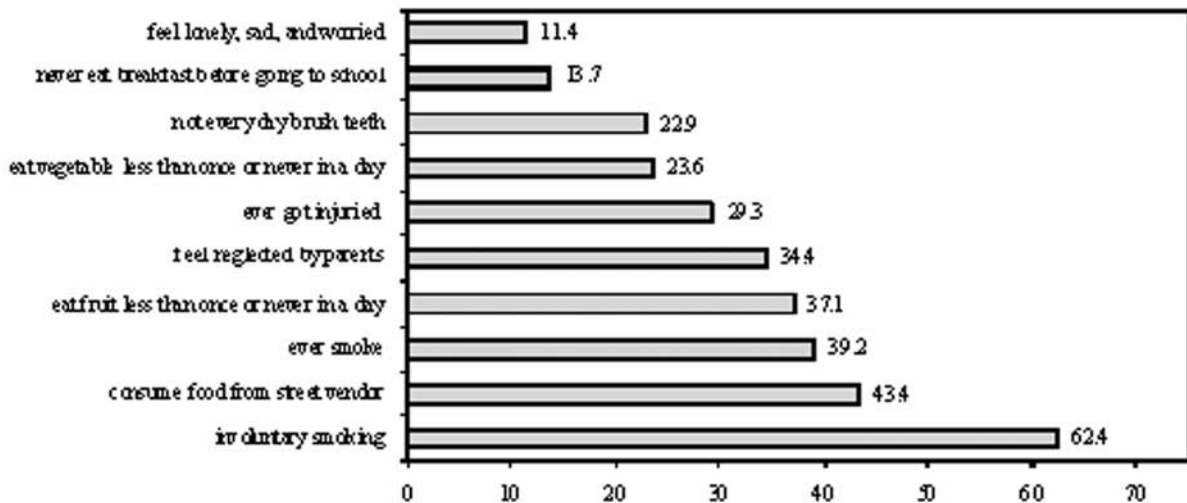


Figure 1. Ten highest health-risk behavior among males aged 12 to 15 years in Depok, West Java, Indonesia 2006 (total n = 760)

smoke. Males who smoke have significantly higher class absents (6.4%) than those who do not smoke (3.5%) ($p = 0.000$) and significantly have a lower average academic score (mean value: 6.91 vs 7.13 of 1 to 10 score) ($p = 0.001$). However, this doesn't refer to any causal relationship, because the data was not

designed for causality, and it will need further study to analyze causal relationships between smoking and academic performance and class absents. Other factors may have more direct effect on academic performance and class absents such as malnutrition, study motivation, study time, among others.

Table 2. Smoking behavior among male students aged 12–15 years old in Depok, West Java, Indonesia 2006

Smoking behavior among male adolescents	Smoking	n	%
	Yes	298	39.2
	Never	462	60.8
	Total n	750	
Within male adolescents who ever smoked	Age start smoking:		
	7 years old or younger	37	13.0
	8–9 years old	32	11.3
	10–11 years old	75	26.4
	12–13 years old	119	41.9
	14 years old and older	21	7.4
	Current smoking in the last 30 days:		
	No smoking	142	50
	1–2 days	88	31
	3–5 days	23	8.1
	6–9 days	9	3.2
	10–19 days	8	2.8
	20–29 days	3	1.1
	All 30 days	11	3.9
	Number of cigarettes:		
	< 1 cig per day	95	63.3
	1 cig per day	23	15.3
	2–5 cig per day	9	6.0
	6–10 cig per day	9	6.0
	> 10 cig per day	14	9.3
	Type of cigarettes:		
	Kretek	87	48.6
	Filter	86	48.0
	Other	6	3.4
Within students who smoke everyday	Tried to quit smoking		
	Yes	8	72.7
	no	3	27.3
	Parent smokes		
	Father or male guardian	6	54.5
	Mother or female guardian	1	9.1
	neither	4	36.4

Table 3. Father smoking behavior among male adolescents in Depok

Father smoking behavior	Smoking		Never smoked		Total n	p value
	n	%	n	%		
Father smokes	163	60.8	197	45.0	360	0.000*
Father not smoking	105	39.2	241	55.0	346	
Total	268	100.0	438	100.0	706	

Note: * statistically significant

Table 4. Smoking Behavior and Class Absent among Male Adolescents in Depok

Class absent	Smoking		Never smoked		Total n	p value
	n	%	n	%		
never	210	70.9	384	83.5	594	0.001*
1–2 days	67	22.6	60	13.0	127	
3 days or more	19	6.4	16	3.5	35	
Total	296		460		756	

Note: * statistically significant

Table 5. Smoking Behavior and Mean of Academic Score among Male Adolescents in Depok

	Smoking		Never smoked		Total n	p value
	n	Mean (95% CI)	n	Mean (95% CI)		
Mean of academic score	204	6.90 (6.79–7.01)	897	7.13 (7.06–7.20)	1011	0.001*

Note: * statistically significant

DISCUSSIONS

The adolescent's health-risk issues in adolescents can be associated to social pressure, environment and personal factors that are inter related to each other.⁵ In term of health-risk issues, the findings of this study show that the social pressure includes the protection factors that also relate to mental health aspects, such as students felt sad, lonely, worried and attempt suicide (15.8%) as well as feeling neglected by parents (30.6%). Personal factor in adolescents such as social and psychological development is another aspect that leads to risk taking behaviour. This can be shows from the smoking behaviour figure that is high among male students (39.2%). The physical environment determinant factors of health-risk in adolescents are related to dietary and hygiene aspects. School environment issues such as unhygienic food at school or from the street vendor (37.1%) and unhealthy toilet facilities are challenging concerns for the school. As it can be seen on Figure 1 and 2, more than half of both males and females junior high school students in Depok were exposed to the cigarette smoke.

Exposure to involuntary tobacco smoke is a major smoking related issue in Indonesia. Most of the students (89% in males and 84.3% in females) were exposed to the environmental tobacco smoke.² The proportion was the highest in Indonesia, followed by China (64.9% in males and 58.1% in females).²

Involuntary smoking, is one of the major health-risk issues in adolescents in Depok city. Specifically for adolescent, passive smoking of environment tobacco smoke (ETS) is the main smoking issue. ETS or involuntary smoking caused many illnesses among children including adolescents, such as respiratory diseases, asthma, pulmonary diseases, chronic cough and pneumonia. The ETS was mainly because the father smoked and most likely the peers and other adults surrounding them smoked.¹⁴ A study in Europe showed that expose to tobacco smoke related to allergic sensitisation among children which lead to higher school absenteeism.¹²

High proportion of involuntary smoking among junior high school students may lead to higher risk of smoking related illnesses, which may cause less quality of learning process and higher risk of becoming smoker. Peers and parents seem to be the role models among most of the adolescents. Intervention models for ETS should consider prohibit the smoking practice in the presence of infant children, adolescents, pregnant mothers, elderly and other vulnerable groups.

Specifically for smoking behaviour among male adolescents, this study shows that four out of ten of male adolescents ever smoke cigarettes. The proportion is actually lower compared to Java island in 2006 (62% for ever smoked) but it is higher compared to proportion in Java island in 2007 (23.4%).² The proportion of ever smoke in male adolescents in Depok on 2006 was actually lower compare to other

district in Indonesia which had applied similar survey during 2004 and 2005, such as in Bekasi (55.1%), Jakarta (53.9%), Medan (67.4%) and Surakarta (67.1%).² Although the proportion of male adolescents who ever smoke in Depok is lower than in other district in Indonesia, but it is higher compare to other countries such as in Taiwan (7.4%), Hong Kong (4.4%) and non-indigenous Australian (29%).^{3,13} The proportion is still alarming as without intervention, smoking behaviour during adolescents lead to higher risk becoming smoker when they get older. The proportion of everyday smoking among males is relatively low (3.9%) and they mostly smoke one or two cigarette per day (31%), the smoking issues among adolescents still crucial to be addressed by the health professionals because this may lead to greater risk of major chronic diseases as showed by studies in different countries.

A study of 1,398 adolescents and young adults showed that smoking, along with three other lifestyle habits, obesity, physical inactivity, and the use of butter were related to a 5.5 times higher risk of three cardiovascular risk factors: high LDL-cholesterol, low HDL-cholesterol, and high diastolic blood pressure. A study among aboriginal Canadian youth, showed that children who smoke six or more cigarettes per day after adjusting for age, sex, and BMI, were found to have a significantly higher mean of systolic blood pressure (p value: 0.036) and higher mean of plasma homocysteine level (p value: 0.008).¹¹ Also, tobacco in any category or product leads to higher levels of stress compared to nonusers and puts youth at an increased risk.¹

Regular smoking among adolescents most likely can be predicted by environmental smoking such as parents, peers and best friends (Otten *et al.*, 2009).⁹ Smoking initiation is associated with parental involvement as well as parental tobacco use and permissiveness of home tobacco use (Muilenburg *et al.*, 2006).⁸ A study in middle and high school students in Maryland, United State of America (USA), illustrated that the likelihood of youth being current smokers was positively associated with both parental smoking (in the comparison of parents with minimal concern versus strict concern about smoking: Odds Ratio: 2.3, 95% CI 2.1-2.4) (Kalesan *et al.*, 2006).⁵ It is imperative to include the environmental smoking in the prevention program for adolescents (Otten *et al.*, 2009).⁹ These explain the significantly higher proportion of father

smoke among the male adolescents who smoke compare to who don't smoke in this study. The parent that usually the role model in the family most likely shapes the children risks behaviour.

The high prevalence of tobacco smoking among Indonesian junior high school students might lead to low academic performance in term of high rate of school absence (due to smoking related illnesses) and it's effect on their academic scores. The mean of academic score among male adolescents who smoke is significantly lower than those who don't smoke. The relationship could be an indirect association. The class absent most likely leads to missing some of the important knowledge which may lead to lower academic score. A multivariate analyse to investigate the relationship between smoking and academic function using more variables such as nicotine test, cognitive skill, and other academic related variables may be useful to support smoking prevention program among school-age children and adolescents particularly among the decision makers in non health sectors such as education sector.

Generally, the limitation of this study includes the population representation and indicators for the academic function. The population of this study was limited to the adolescents who registered in the school and did not cover the adolescents who drop out school or street children who may obtain greater expose to the health risk. The academic function in this study should also includes other education related variables such as cognitive skill, study concentration, study time, study motivation among others, as well as other health aspects for instance the nutrition status.

CONCLUSION

The health behaviour risk factors were also mostly higher in males than in females. The different risk factors between males and females should be considered in developing the intervention strategy. Active smoking is one of the main health risk among male adolescents, while passive smoking is a health risk issue for both male and female adolescents.

Intervention focus needs to be directed to improve behaviour risk factors. The intervention should consider involving parents, peers and other school community in the school setting, especially to address the involuntary smoking issues. In addition, intervention program to reduce smoking prevalence

among young age requires more integrated and comprehensive approaches that involve strong support from government, private sectors as well as community member. Stop smoking program should also consider prohibiting any form of cigarette advertising (all kind of education and communication media as well as youth event sponsor), restricting cigarette selling only for adults, providing free smoking area for all public places including in offices, in house and transportation.

Smoking prevention and control program in the school setting, need to be developed with strong collaboration between education and health sectors. Cigarette and any tobacco products should be included in the health curriculum for grade 1 to 12 school children and adolescents.

Further multivariate analysis and more appropriate research design is required to determine deeper relationship between smoking and academic function using different indicators as well as composite index of biochemical and biological risk factors for adolescents in Indonesia to investigate the how severe the smoking behaviour relate to the learning process during adolescents and its long term impact on health.

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