Original Research

Prevalence and associated factors of Smokeless Tobacco (SLT) use among adolescents in Indonesia: GYTS 2019 data analysis

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Abstract

Background: Smokeless tobacco (SLT) use is a new trend since the banning of smoking in many public places, including among adolescents. Many people believe that SLT is a harmful reduction method compared to cigarettes. However, there are many risks of using the SLT, such as Head and neck cancer (HNC), cancer of the mouth, and coronary heart disease.

Objective: This study aimed to examine the prevalence and the factors associated with SLT use among adolescents in Indonesia.

Methods: This study used the cross-sectional data from the Global Youth Tobacco Survey (GYTS) Indonesia 2019. The national school was selected by proportional random sampling. Around 8,828 students were eligible for this study.

Results: This study found the prevalence of SLT use was 3.25%. The bivariate test found each independent variable was significantly associated with the SLT use. However, the adjusted test found that age, smoking parent, smoking teacher, knowledge, and attitude were significantly associated with SLT use.

Conclusion: The variables mostly related to SLT use come from the family and school environment. The appropriate intervention needs to be arranged to reduce the prevalence of smokers, including SLT use.

Keywords: Smokeless tobacco (SLT); adolescent; Global Youth Tobacco Survey (GYTS); Indonesia

Background

Smokeless tobacco (SLT) is an alternative way of smoking, and the reduction of the effect is still debated (Centers for diseases control and prevention, 2020). SLT is the product in which the nicotine is put in the mouth so the nicotine will be absorbed through the lining of the mouth (Ebbert et al., 2015). Nicotine is the most ingredient containing tobacco, including SLT. The result of one

study found that nicotine addiction and millions of deaths per year worldwide increase due to cancer (Hecht & Hatsukami, 2022). In addition, the Centers for Disease Control and Prevention (CDC) reported the health problems that have an association with smokeless tobacco control, such as nicotine addiction, cancer of the mouth, esophagus, and pancreas, diseases of the mouth, early delivery, and stillbirth during pregnancy, nicotine poisoning in the children, and increase the risk for death from heart diseases and stroke (Centers for diseases control and prevention, 2020). There are several smokeless products such as snus, chew, dry snuff, moist snuff, and dissolvable (Delnevo et al., 2014; Skulberg et al., 2019).

The trend of smoke in developing countries, including Indonesia, is increasing since the cigarette price in Indonesia is very cheap, which was around 20.830 IDR on average in 2020 (Statista, 2020). A low tax has been applied, which leads to a higher number of new smokers (Prasetyo & Adrison, 2020). Compared with other countries, the tax for cigarettes in Indonesia is very low (Prasetyo & Adrison, 2020). The affordability of the student to purchase cigarettes is very dependent on the number of money pocketed (Saari et al., 2014). The higher number of Non-Communicable Diseases (NCD) since the phenomena is starting high from the epidemiological transition (Sylvestre et al., 2018). Being a passive smoker increases the probability of having NCD, which is higher than smoker (World Health Organization, 2019). As an alternative to reducing the health risk, some communities decided to use smokeless tobacco. However, the SLT does not exactly reduce the harmful ingredients because the nicotine is put in the mouth, so the risk of cancer of the mouth is high (Jalilian et al., 2015; Suryati & Tarigan, 2019; Wibowo et al., 2019). Another study using Indonesia GYTS (Global Youth Tobacco Survey) 2014 revealed that friends, parents, and teachers are the role model to influence a student to be a smoker (Jamal et al., 2020)

GYTS is a global project managed by World Health Organization. The Indonesia GYTS is designed to estimate the worldwide burden of tobacco use among adolescents (Eriksen et al., 2012). In Indonesia, the number of tobacco users in adolescent school age always increases. It increased a lot from 0.3% in 1995 to 2.0% in 2007 (Jalilian et al., 2015; Suryati & Tarigan, 2019). The data from Basic Health Research Indonesia in 2013, the prevalence of smokers among adolescents was 18.3% (Kementerian Kesehatan Republik Indonesia, 2018). Comparing the place of residence, in 2017, smokers in rural (1.55%) are higher than in urban (1.07%) (Syachroni et al., 2013). The main findings from GYTS 2019 revealed that 19.2% of students are using tobacco, but around 1% of them currently use smokeless tobacco products (Windiarto et al., 2018). This study focuses on smokeless tobacco use to find the prevalence and associated factors of SLT among adolescents using GYTS 19 data.

Methods

Study Design
The original survey, GYS 2019, is a cross-sectional study conducted in 34 provinces in 2019. GYTS aimed to control tobacco use among adolescents aged 13 to 17 years (World Health Organization, 2020). The current study aimed to explore the prevalence of SLT use and factors associated with SLT use in adolescents using GYTS 2019 data.

Samples/Participants
The original survey selected the school based on proportional probability in terms of the sampling method. The class was chosen by random sampling method, and all the eligible students in grades 7-12 could join the survey. This study used the sample who were eligible for this study and met the inclusion and exclusion criteria. The inclusion criteria are a student aged 7 to 12 years old. The exclusion criteria are those who complete the questionnaire. The total sample in the original survey was 8,823 students.

Instruments
This current study used the smokeless tobacco (SLT) use-dependent variable. It was a dummy variable with categories *yes/no.* The independent variables used in this study were the sociodemographic variables, knowledge, and attitude. The question about tobacco use (SLT use) was chosen due to the prevalence of cigarette use decreasing in some communities, but on another side, the SLT use is increasing. The Sociodemographic questions were taken from the original questionnaire. Those independent variables

were chosen to examine the correlation of the predictors to the SLT use. The study about determinants of SLT use is important since the lack of studies discuss SLT use compared to the common cigarette use.

Data Analysis

The statistical analysis used consists of univariate, bivariate, and multivariate. The univariate showed the frequency and percentage (for categorical variable) and minimum number, maximum number, and mean (for continuous variable) of each variable to see the respondents' characteristics. The bivariate analysis with Chi-Square and t-test to see the Crude Odd Ratio (COR) for each independent variable to dependent variables. The binary logistic regression was done to examine all the independent variables to the dependent variables in three models, which were presented by Adjusted Odd Ratio (AOR). STATA version 15 Mahidol University licensed was used to analyze the data.

Results

About 8,823 respondents were eligible for this study. Among them, about 3.25% used smokeless tobacco (SLT), which means cigarettes with low nicotine. In terms of the age of students, most of them were in age 13 to 14 years old. More than half of the respondents were female, and most of the students were in grades 1 to 3. According to the money pocket, more than half of the respondents had more than 20,000 rupiahs per day. Many of their parents do not smoke; as shown by the data, 53% of the parents were not smokers. In the school environment, most of the teachers were smokers, as demonstrated by the data that many teachers smoke during school hours (**Table 1**). In terms of knowledge and attitude, most of the respondents have known that smoke from others is dangerous to their health, and they agree with the policy of banning smoking in any enclosed public place.

The bivariate analysis using the Chi-square test found all independent variables significantly associated with the smokeless tobacco use, except the grade, which showed a low correlation. After adjusted analysis, the binary logistic regression test result found that higher age tends to decrease the tendency to be smokeless tobacco users compared to the young one. Compared with the students having no smoker parents, students having mother

smokers significantly increase the likelihood 2.22 times for using the smokeless tobacco. In the school environment, compared with teachers who smoke every day during school hours, teachers who never smoke during the school hours decreased the probability of students using smokeless tobacco. In terms of the knowledge which showed by the questions of harmful smoke from others, compared to the students who thought the smoke from the other cigarettes is not harmful, those who thought it was harmful decrease the probability of smoking the smokeless tobacco. Compared to students who agree with banning smoking in any enclosed public place, those who did not agree were 1.4 times more likely to use smokeless tobacco. However, the variables of sex, grade, and money pocket did not correlate with smokeless tobacco use after testing the binary logistic regression (**Table 1**).

Discussion

The prevalence of smokeless tobacco (SLT) use in Indonesia remains low. However, the prevalence is going to elevate since there are many policies banning smoke in many places. Another study using IFLS (Indonesia Family Life Survey) 2015 wave five found the prevalence of SLT use was 5.6% (Pengpid & Peltzer, 2019). The SLT may contain harmful ingredients. One study reported that SLT might contain metals such as arsenic (Muthukrishnan & Warnakulasuriya, 2018). Another study in India revealed that consuming the SLT may have the risk of cancer, especially oral cancer (Boffetta et al., 2005). In line with the previous study, one study found SLT use correlated to Head and Neck Cancer (HNC), especially oral cancers (Wyss et al., 2016). Different results were shown from another study that mentioned that SLT use is not correlated to cancer but is mostly correlated to coronary heart disease (Timberlake et al., 2017). SLT products are increasing as the campaign of non-smoking and banning smoke in the enclosed public place (Delnevo et al., 2014). For instance, the moist snuff products increased 65.6% from 2005 to 2011 (Delnevo et al., 2014). SLT products are not the harm reduction method compared to cigarettes, and further research is needed to explore that (Hatsukami et al., 2004). The study examined the determinants of SLT in 140 countries found that the higher prevalence of SLT was in low- and lower-income countries (Sinha et

al., 2011). The number of SLT users in Sri Lanka is increasing since the low economic status community tends to have low awareness about the health risk of using SLT (Somatunga et al., 2012). The recent study revealed the factors influencing the SLT use were gender, educational level, wealth index, place of residence, socioeconomic status, and low tax policy (Thakur & Paika, 2018). Another study found that factors such as former smoking status, low education level, living in rural areas, younger age, white race, and unemployment were associated with SLT use (Chang et al., 2016).

Table 1 Characteristic of the respondents, Chi-square, and binary logistic regression results

Variables (N = 8,823)		Smokeless tobacco use	
	n (%)	Chi-Square	AOR. CI 95%)
Tobacco Use			
Used smokeless tobacco (Yes)	287 (3.25)		
Sociodemographic Factors			
How old are you?		0.000	
11 years old or younger	247 (2.80)		Ref
12 years old	1,156 (13.10)		0.50* (0.28-0.90)
13 years old	1,530 (17.34)		0.33*** (0.18-0.60)
14 years old	1,575 (17.85)		0.50* (0.29-0.88)
15 years old	1,435 (16.26)		0.44** (0.24-0.80)
16 years old	1,418 (16.07)		0.62 (0.32-1.19)
17 years old	1,462 (16.57)		0.68 (0.36-1.28)
Sex		0.000	
Male	3,677 (41.68)		Ref
Female	5,146 (58.32)		1.31 (0.95-1.81)
Grade		0.010	
Grade 1-3	5,074 (57.51)		Ref
Grade 4-6	3,749 (42.49)		0.69 (0.46-1.03)
During an average week, how much money do you have that you can spend on yourself; however you want?		0.000	
Less than Rp. 20,000	4,025 (45.62)		Ref
More than Rp. 20.000	4,798 (54.38)		0.79 (0.61-1.02)
Do your parents smoke tobacco?		0.000	
None	4,651 (52.71)		Ref
Father only	3,422 (38.78)		0.82 (0.62-1.08)
Mother only	84 (0.95)		2.22*(1.11-4.48)
Both	249 (2.82)		1.29 (0.74-2.27)
Don't know	417 (4.73)		1.03 (0.60-1.77)
Teacher smoking during school hours		0.000	
About every day	941 (10.67)		Ref
Sometimes	3,150 (35.70)		1.80 (0.755-1.54)
Never	3,120 (35.36)		0.64* (0.42-0.95)
Do not know	1,612 (18.27)		0.068 (0.43-1.07)
Knowledge and Attitudes			
Do you think the smoke from other people's cigarettes is harmful to you?		0.000	
Definitely not	250 (2.83)		Ref
Probably not	147 (1.67)		1.38 (0.69-2.75)
Probably yes	1,665 (18.87)		0.45** (0.26-0.78)
Definitely yes	6,761 (76.63)		0.49**(0.29-0.82)
Are you in favor of banning smoking inside enclosed public places?		0.000	
Yes	7,936 (89.95)		Ref
No	887 (10.05)		1.40* (1.00-1.96)

*p-value < 0.05, **p-value <0.01, ***p-value <0.001
Number of obs = 8,823 | LR chi2(40) = 251.82 | Prob >chi2 = 0.0000 | Pseudo R2 = 0.0995 | Log likelihood = -1139.53

The limited study examined the smokeless tobacco (SLT) use in Indonesia leads to elaborate the explanation through the general cigarettes. The prevalence of current tobacco use among adolescents in Indonesia remains high compared with the previous survey, 19.2% (35.6% male and 3.5% female) (World Health Organization, 2020). The prevalence of tobacco use in Indonesia was higher than in Cameroon, Myanmar, Botswana, and India, with current adolescent smoking was 11.2%, 13.6%, 10%, and 11.4%, respectively (Lalithambigai et al., 2016; Mbatchou Ngahane et al., 2015; Mbongwe et al., 2017; Tun et al., 2017). Compared to 10 countries in Africa, the current cigarette smoking among students aged 13-15 was in the range of 3.4% to 13.6%, lower than in Indonesia (Zhao et al., 2016). The access and affordability to purchase cigarettes near the school may be due to the kiosk or shop near the school selling tobacco products. The knowledge of cigarettes might come from the family who spends the majority of their time with the adolescent (Maretalinia et al., 2021). This study found that the SLT is determined by age, parents smoking, teacher smoke, knowledge, and attitude.

The regulation from the Minister of Education mentioned that the school environment is a free smoke area that needs to be supported by the headmaster of the school, teachers, students, and other people in the school area (Ministry of Education Republic of Indonesia, 2015). School is prohibited from producing, selling, distributing, sponsoring, and putting a cigarettes logo. The regulation about addictive products also mentioned that smoking cigarettes are prohibited in public areas, including schools. The regulation of the Minister of Finance mentioned the price of cigarette sticks (Ministry of Finance Republic of Indonesia, 2021). The cigarette advertisement is prohibited from demonstrating by using the real cigarette, and there is a time restriction of promotion in television (Barker et al., 2019; Bigwanto & Soerojo, 2020; Blencowe et al., 2016; Lyons et al., 2014; World Health Organization, 2013).

Smokeless tobacco (SLT) use is one solution to reduce the negative effect of tobacco on health. However, that statement is still debated. The determinants of SLT use can give the general characteristics of SLT users among adolescents and the factors that influence them to choose SLT compared to other types of tobacco. In the public health area, the study about SLT is not many, especially the study using the national representative data among adolescents. Therefore, the government, especially the Ministry of Education, needs to collaborate with the Ministry of Health to arrange the program to reduce the prevalence of tobacco use, especially SLT use. Furthermore, the appropriate planning programs may prevent adolescents from smoking. For instance, the communication, information, and education program using the interesting application with adolescent-friendly. That application in the smartphone can provide information about the harmfulness of smoking, the diseases caused by smoking, and tips on how to get great achievement as a student without smoking.

Conclusion

The prevalence of smokeless tobacco (SLT) use among adolescents in Indonesia in 2019 was 3.25%. The associated factors of SLT use were mostly related, such as age, smoking parents, smoking teacher, knowledge, and attitude. Multilevel prevention and control can reduce the prevalence of SLT use among adolescents, starting from a student level, school level, household level, community level, and national level. There is a need the communication, information, and education about the harmfulness of the SLT to change the perspective of risk reduction by using SLT.

Author Contribution
All authors contributed to all phases of the study and concurred with the last version of the article to be issued and accountable in all stages of the work.

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