



# Prevalence and social determinants of Tobacco use among health profession students in Southeast Asia

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## Article Info

### Article history:

Received 17 December 2019

Revised 6 February 2020

Accepted 29 February 2020

Available online 30 April 2021

### Keywords:

health profession students,  
prevalence,  
social determinants,  
Southeast Asia,  
Tobacco use

## Abstract

Tobacco use has been the single biggest cause of morbidity, mortality, and health inequality in Southeast Asia countries. This cross-sectional study was conducted to examine tobacco use and its social determinants among health profession students in Thailand, Indonesia, and Malaysia using a multi-stage sampling method. The Global Health Profession Students Survey questionnaire was modified and validated for an online survey. After IRB approval, the eligible health profession students from the selected universities were invited to join an online survey with the response rate which varied from 40 percent in Indonesia to 45 percent in Thailand and 55 percent in Malaysia. Out of 698 health profession students, 33 subjects (4.7%) reported using tobacco in the past 30 days. Public health students reported the highest prevalence of current tobacco use (5.8%), while medical students and nursing students reported 4.3 percent and 1.6 percent, respectively. According to multiple logistic regression analysis, adjusted odds ratios for current tobacco use was higher for females, country (Thailand), and low self-efficacy. These findings demonstrate minor impact of social determinants (sex, country, and self-efficacy) on tobacco use. The findings can be used to advocate tobacco use control and prevention, particularly for female health profession students by strengthening gender-sensitive implementation and monitoring system for smoke free campuses in ASEAN universities.

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## Introduction

With the efforts of WHO and the U.S. Centers for Disease Control and Prevention to overcome tobacco use, a reduction of prevalence of tobacco use was noted in SEA between 2006–2011 (Preechawong, Panpakdee, Pitayangsarit,

Palipudi, & Sinha, 2014). However, the prevalence of tobacco use among the youth smokers has been increasing according to globalization and shifting of tobacco market (U.S. Department of Health and Human Services, 2014). Smokers aged > 15 years old in SEA accounted for 10 percent of world's smokers in 2012 (SEATCA & VINACOSH, 2012) and increased to 17.2 percent in 2015 (World Health Organization[WHO], 2018).

Although smoke free campus has been implemented in SEA since 2009, the prevalence of tobacco use varied among health profession students across SEA countries. A recent study in Thailand reported the highest prevalence in public health students (8.2%) and the lowest in nursing students (1.7%) (Kalampakorn, Kerdmuang, & Sirichotiratana, 2011).

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The prevalence of tobacco use in Myanmar was 49.5 percent in 2009 (WHO, 2015), compared to in Indonesia (50.7%), Thailand (8.9%), and Malaysia (3.9%) (SEATCA & VINACOSH, 2014).

From literature review and document analysis, it was found that each country has implemented MPOWER strategies differently. In addition, evidence on tobacco use and its social determinants among health profession students in low, middle, and high income countries in SEA was limited. The objective of this study was to examine prevalence of tobacco use and its social determinants among health profession students in SEA. Thus, Social Determinants of Health model (Dahlgren & Whitehead, 2007) was applied for this study. The relationships between individual factors (country, sex, age, religion, wealth index, family income, education, place of residence), lifestyle factors (stress, self-efficacy, knowledge on harmful effects of smoking), social and community factors (tobacco use in family, peer influence), and environmental factors (international smoking policy, national smoking policy, smoke free campus policy) and tobacco use were examined among health profession students.

## Literature Review

The prevalence of smoking has been increasing globally. Tobacco use leads to 6 million premature deaths each year and is predicted to increase to 8 million by 2030 (WHO, 2011). Prevalence of tobacco use has been increasing in SEA, particularly among youth (SEATCA & VINACOSH, 2012), (SEATCA & VINACOSH, 2014). Among youth, health profession students are recognized as an important human resource and have a significant role in tobacco prevention and control. In 2006, a study in Indonesia found that 48.4 percent of medical students had smoked cigarettes and 78.2 percent did not receive any formal training (Aditama et al., 2006).

The WHO FCTC has been proven to reduce smoking prevalence. The MPOWER package encourages policy-makers along with the rest of society, including civil society, health-care providers and others, to envision a world free of tobacco use. To implement the MPOWER policy package, countries need to monitor tobacco use, protect people from tobacco smoke, offer help to quit tobacco use, warn about the dangers of tobacco, enforce bans on tobacco advertising and promotion, and raise taxes on tobacco products (WHO, 2008).

Since the MPOWER policy initiatives in 2009, prevalence of 6.1 percent was reported among public health students in the Philippines, with high level of knowledge (97.7%) about tobacco use (Koomah et al., 2012). In 2011, a study in Myanmar about tobacco use, exposure to second smoke, and cessation training among third year medical and dental students in selected members states of SEA found that the prevalence of tobacco use was similar in Bangladesh, India, Nepal, and Thailand during 2005, 2006, 2009, and 2011.

From the Global Health Professional Students (GHPS) survey in University of Malaya (UM) and University Technology Mara (UTM), low prevalence of current smokers (UM = 1.3%, UTM = 1.6%), secondhand smoke at home (UM = 34.9%, UTM = 39.3%) and public places (UM = 60.5%, UTM = 59.0%) were reported (Nor, Ismail, & Ibrahim, 2013). In Thailand, the public health students reported the highest tobacco use

(8.2%) among other health profession students (physical therapy 5.1%, pharmacy 5.0%, dentistry 4.0%, medical technology 3.4%, and nursing 1.7%) (Kalampakorn et al., 2011).

From document analysis of international tobacco control, national tobacco control, smoke free campus policy and cessations of Indonesia, Thailand, and Malaysia, WHO report on the global tobacco epidemic in 2015 showed that Indonesia did not ban tobacco advertising with little compliance of smoke-free environment in Indonesian universities. Malaysia had a national campaign with a moderate tax increase (50%) and a ban on the advertising of tobacco, and showed the lowest prevalence of tobacco use among health profession students (1.3%) (WHO, 2015).

Despite accelerated mortality associated with smoking at an early stage of the epidemic and among smokers in early age, evidence of tobacco use among youth was questionable because of the shifting market of tobacco use. In addition, the implementation of tobacco control in the selected countries has been recognized, but the prevalence of tobacco use and its social determinants among health profession students in SEA were limited.

## Methodology

This cross-sectional study was conducted among health profession students in the selected countries. Using multi-stage sampling method, first Indonesia, Thailand, and Malaysia were selected according to the prevalence of tobacco use and the country's income level (SEATCA & VINACOSH, 2014). Second, 6 faculties from 30 universities under the Asian University Network (AUN) were non-randomly selected. Third, subjects who met the inclusion criteria were invited to join the on-line survey. A total of 698 health profession students, who were (1) third and fourth year undergraduate students enrolled in medical, nursing, and public health program in 2018 academic year, (2) aged 19–24 years old, and (3) willing to participate in the online survey, were selected. The sample size was estimated using the simple formula (Wayne & Chad, 2018) giving a minimum of 673 students required for the study.

Research instrument was an 8-part self-report questionnaire, developed and modified by the researcher. Part 1, demographic data were collected. Part 2, the tobacco use was measured as use of tobacco in the past 30 days, which was adapted from the global health professional student survey (WHO, 2019). Part 3, stress was measured in terms of level of stress using visual analogue scale (0 = no stress, 10 = worst possible stress); stress from effort (5 items including schoolwork and expectations); reward (11 items including academic performance, esteem, and educational prospects), and over commitment (3 items). Each student was asked to rate their stress using 5-point Likert type scale, 1 referred to strongly disagree and 5 referred to strongly agree (Li, Shang, Wang, & Siegrist, 2010). Part 4, health behavior was measured in terms of self-actualization, health responsibility, exercise, nutrition, interpersonal support, and stress management. The 52-items health-promoting lifestyle had 4-rating scale; ranging from never (1 point) to regularly (4 points) (Walker, Sechrist, & Pender, 2011). The higher the score the better the health behavior. Part 5, self-efficacy was measured as a person's ability to stop smoking in difficult situations. The 12 items with 5-rating scale were

modified from the version developed by Scheiding and College (2009) with 1 indicating not sure at all and 5 indicating absolutely sure. Part 6, knowledge of harmful effects of smoking was modified from research of smoking knowledge, attitudes and practices of Iranian health profession students by Romito, Kouchak, Soofi, Fakheri, and Askarian (2013). Knowledge of tobacco use was assessed in terms of harmful effects, harmful substances, and laws relating to tobacco use. The questionnaire had 16 items with dichotomous answer: yes (0) and no/ do not know (1) (Romito et al., 2013). Part 7, a 12-item Likert -type with 5 response; rating from not at all sure (1 point) to absolutely sure (5 points) was used to measure peer influences on adolescents using substances. It was applied from research of family process and peer influences on substance use by adolescents (Loke & Mak, 2013). Part 8 was perception on policies related to tobacco control and prevention, which was applied from tobacco use and cessation counseling global health profession survey pilot study from 10 countries (WHO, 2005). Each subject was asked to rate on the 5-points Likert scale, from strongly disagree (1 point) to strongly agree (5 points). The higher scores indicated the better perception.

The validity of research instrument was assessed by 3 experts with the acceptable Content Validity Index (CVI) of 0.8. Back translation was performed to confirm the similarity of the content between Indonesian, Thai, and Malaysian version. The google form version was modified and tried out with 30 health profession students. The acceptable Cronbach's alpha of 0.7–0.94 were obtained. Ethics approval was obtained from Research Ethics Committee, Mahidol University (protocol number 66/2560) and the University of Malaya Research Ethics Committee (UM.TNC2/UMREC-489).

#### *Data Collection and Data Analysis*

After the study was approved by IRB of the university, personal contacts were made with the key persons, who were assigned by the Dean from the selected university. First, each key person introduced the study, the link and password to the 3rd and 4th year students from the selected program. Second, informed written consent was obtained from all participants after they agreed to participate in the survey. Third, anonymous and confidential self-administered questionnaire was performed using the online questionnaire developed based on a standardized questionnaire (WHO, 2019). Data on sex, age, country, religion, wealth index, family income, education, place of residence, stress, self-efficacy, knowledge on harmful effects of smoking, tobacco use in family, peer influence, international smoking policy, national smoking policy, smoke free campus policy, and tobacco use were completed within 15 to 30 minutes. After each student subject had returned a consent form, they received a small coupon of 100 baht (3 USDs). For the present study, about 1,455 subjects were informed, but only 698 subjects responded, yielding a range from 40 percent in Indonesia to 45 percent and 55 percent in Thailand and Malaysia.

Data from a total of 698 subjects were analyzed using multivariate logistic regression analysis to assess the impacts of social determinants according to adjusted odds ratios for

current tobacco use after controlling other cofactors based on the objectives.

## **Results**

A total of 33 out of 698 subjects (4.7%) reported using tobacco in the past 30 days. Prevalence of tobacco use within 30 days was reported in Malaysian health profession students (2.8%), Indonesian health profession students (2.9%), and Thai health profession students (8.3%) (Table 1).

**Table 1** Prevalence of tobacco use among health profession students in the selected countries

<i>n</i> = 698			
Country	Non-tobacco user (%)	Tobacco user (%)	Total (%)
Indonesia	338 (97.1)	10 (2.9)	348 (100)
Thailand	221 (91.7)	20 (8.3)	241 (100)
Malaysia	106 (97.2)	3 (2.8)	109 (100)

From Table 2, it was found that most tobacco users were 3rd year students (78.8%), aged 19 to 21 years (69.7%), living in urban area (75.8%), and living in Thailand (60.6%). More than a half were female (57.6%), Buddhist (57.6%), and had monthly family income of more than 1,000 USD (57.6%). Wealth index of tobacco users was poor (75.8%) and about 27.3 percent reported having a father who smoked. About 69.7 percent of them reported having fair health behavior; whereas about 60.6 percent reported middle level of stress and peer influence. More than a half reported having high level of self-efficacy (51.5%) and knowledge of tobacco dangers (51.5%). Most of them reported having middle level of perception on policy related smoking.

Table 3 showed minor impacts of social determinants on tobacco use among health profession students from the selected countries. According to multiple logistic regression analysis, sex (female), country (Thailand), and low self-efficacy were significantly associated with current tobacco use after controlling for other co-factors. Female students were 1.4 times more likely than male students to use tobacco. Indonesian students were 1 time more likely than Malaysian students to use tobacco. Thailand was 0.4 times less likely than Malaysia to use tobacco. Low self-efficacy was 1.2 times more likely than high self-efficacy to use tobacco. Middle self-efficacy was 0.7 times less likely than high self-efficacy to use tobacco.

## **Discussion**

### *Prevalence of Tobacco Use Among the Health Profession Students in SEA*

The major findings from this study indicated similar trends in tobacco use prevalence among health profession students in SEA. Comparing with previous studies in 2014 (SEATCA & VINACOSH, 2014), the current study reported that 4.7 percent of health profession students from Indonesia, Thailand, and Malaysia used tobacco in the past 30 days. Thai students reported similar prevalence of tobacco use in 2011 (8.2%, Kalampakorn et al., 2011) compared to 8.3 percent of tobacco

use from this study. Malaysian students reported the lowest prevalence with increasing trend from 1.3 percent in 2013 (Nor et al., 2013) to 2.8 percent from this study. However, Indonesian students reported a sharp decrease from 39.8 percent (WHO, 2012) compared to 2.9 percent from this study. In addition, the differences were observed between prevalence of tobacco use obtained from the current study (30.3%) and the study of

Pingak and Miller (2019) (25.9%), which might be due to the different group of subjects. In Thailand, the prevalence of tobacco use in the current study was lower than that from National Tobacco Control Strategy 2012–2014 (Ministry of Public Health Thailand, 2012) and the study by Praparnorn Nanthakarat (Channuan & Suebsamrarn, 2016), which reported 22.0 percent and 25.5 percent respectively.

**Table 2** Social determinants of tobacco use among health profession students in the selected countries

Variables		Non-tobacco user number (%)	Tobacco user number (%)	<i>p</i>
<i>n</i> = 698				
Country	Indonesia	338 (50.8)	10 (30.3)	0.005**
	Thailand	221 (33.2)	20 (60.6)	
	Malaysia	106 (16)	3 (9.1)	
Sex	Female	537 (80.8)	19 (57.6)	0.001**
	Male	128 (19.2)	14 (42.4)	
Age	19–21	474 (71.3)	23 (69.7)	0.845
	22–24	191 (28.7)	10 (30.3)	
Education	Third year	462 (69.5)	26 (78.8)	0.255
	Fourth year	203 (30.5)	7 (21.2)	
Religion	Islam	258 (38.8)	9 (27.3)	0.013*
	Buddhism	219 (32.9)	19 (57.6)	
	Other	188 (28.3)	5 (15.1)	
Wealth index	Poor	392 (58.9)	25 (75.8)	0.127
	Middle	234 (35.2)	6 (18.2)	
	Rich	39 (5.9)	2 (6)	
Place of residence	Urban	520 (78.2)	25 (75.8)	0.741
	Rural	145 (21.8)	8 (24.2)	
Family income (USD)	1 to 500	255 (38.3)	7 (21.2)	0.003**
	501 to 1000	214 (32.2)	7 (21.2)	
	1000+	196 (29.5)	19 (57.6)	
Tobacco use in family	Father	199 (29.9)	9 (27.3)	0.745
	Mother	4 (0.6)	0 (0)	0.655
	Sibling	111 (16.7)	5 (15.2)	0.817
Stress level	Low	101 (15.2)	7 (21.2)	0.645
	Middle	430 (64.7)	20 (60.6)	
	High	134 (20.1)	6 (18.2)	
Health behavior	Poor	43 (6.5)	5 (15.2)	0.063
	Fair	562 (84.5)	23 (69.7)	
	Good	60 (9)	5 (15.1)	
Self-efficacy	Low	141 (21.2)	11 (33.3)	0.183
	Middle	82 (12.3)	5 (15.2)	
	High	442 (66.5)	17 (51.5)	
Knowledge	Low	14 (2.1)	1 (3)	0.460
	Middle	237 (35.6)	15 (45.5)	
	High	414 (62.3)	17 (51.5)	
Peer influence	Low	103 (15.5)	4 (12.1)	0.864
	Middle	394 (59.2)	20 (60.6)	
	High	168 (25.3)	9 (27.3)	
Perception on policy related tobacco use	International smoking policy	Low	150 (22.6)	0.400
		Middle	303 (45.6)	
		High	212 (31.8)	
	National smoking policy	Low	158 (23.8)	0.581
		Middle	250 (37.6)	
		High	257 (38.6)	
	Smoke free campus policy	Low	143 (21.5)	0.661
		Middle	311 (46.8)	
		High	210 (31.7)	

Note: \*\*  $p < .01$ . \*  $p < .05$ .

**Table 3** Impacts of Social determinants on tobacco use

Variables		Exp(B)	OR	95% CI	p
Sex	Female	3.278	1.405	1.046–1.888	0.006**
	Male (R)		0.450	0.294–0.690	
Country	Indonesia	0.085	1.814	1.089–3.022	0.186
	Thailand	0.010	0.593	0.451–0.779	0.041*
	Malaysia (R)				
Self-efficacy	Low	0.176	1.271	0.475–3.403	0.003**
	Middle	0.757	0.729	0.270–1.970	0.637
	High (R)				

Note: \*\*  $p < .01$ . \*  $p < .05$ .

Concerning types of health profession students, public health students reported the highest prevalence of current tobacco use (8.2%), while medical students and nursing students reported 3.4 percent and 1.7 percent (Kalampakorn et al., 2011). A similar pattern was observed in this study; however, the trend of tobacco use in public health students (5.8%) and nursing students (1.6%) seems to have decreased, a result of efficient strategies and interventions of tobacco control. However, the trend of tobacco use in medical students (4.3%) seems to have increased.

#### *Social Determinants of Tobacco Use among Health Profession Students in the Selected Countries*

Social determinants associated with tobacco use in this study were female, country (Thailand) and low self-efficacy. These findings demonstrated minor impact of social determinants on tobacco use similar to previous study, female (57.6%), country (60.6%), low self-efficacy could contribute to tobacco use (Mandil et al., 2010). However, social determinants of health were different from previous study; male (OR 2.09), single (OR 2.06), do not think that warnings and pictures on cigarette packs can help to stop smoking (OR 6.38), mother smoked in the past (OR 2.25) and brother or sister smoked in the past (OR 5.50) had odd ratio more than 1, which associated negatively with tobacco use (Provenzano et al., 2019). This is different from previous study (Channuan & Suebsamrarn, 2016), which found that about 11.5 percent smoked (95% CI = 8.5–15.0). Age, gender, attitude on health impacts, and family smoking were significantly related to smoking among university students in Thailand ( $p < .001$ ).

Thus, university administrators should focus more on increasing awareness and self-efficacy of female students about tobacco use prevention. This study acknowledges some limitations, such as selection bias, language barriers, and under-report of prevalence of tobacco use in our analyses due to using non-random sampling and low motivation.

#### **Conclusion and Recommendation**

In conclusion, the major findings from this study indicate no significant change in tobacco use prevalence among health profession students in SEA across the past decade. Females had higher risk of tobacco use than males. Country and self-efficacy were associated with tobacco use among health profession students in SEA countries. Tobacco use in Indonesia had greatly decreased unlike in Thailand and Malaysia, where it had not changed much. Further research will be needed to

develop new strategies regarding female students as they were a potential risk group and cultural context of the country. Eliminating tobacco use among health profession should be the eventual goal of tobacco control activities to promote the future health workforce. This warrants efforts to be continued and further strengthened by integrating smoking cessation training in first year health profession curricula. Collaboration and network such as Asian University Network Health Promotion can be a platform to promote innovation of tobacco prevention and to minimize risk of tobacco market shift among health profession students in SEA.

#### **Conflict of Interest**

There is no conflict of interest.

#### **Acknowledgments**

I would like to thank the entire participants in this study. A sincere thanks is extended to those coordinators from the partner universities, who supported the data collection.

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