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ORIGINAL ARTICLE

Prevalence of tobacco smoking in Vietnam: findings from the Global Adult Tobacco Survey 2015

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Abstract
Objectives We report the prevalence of tobacco smoking among adult populations in Vietnam, 2015.
Methods The Vietnam GATS 2015 was a nationally representative survey. 9513 households were selected using two-stage random systematic sampling method. Handheld computers were used for capturing data. Data collection was carried-out by National Statistics Office of Vietnam in 2015. Weight was used in all estimates.
Results The Vietnam GATS 2015 found that the prevalence of smoking in Vietnam was 22.5% overall, 45.3% among men, and 1.1% among women. The overall 2015–2010 reduction in prevalence of any tobacco product was 5.3%. However, the reduction was not statistically significant. The significant reduction in prevalence of tobacco smoking was found for any type of cigarette (−8.4%), and especially for hand-rolled cigarettes (−38.3%). The use of cigarettes significantly decreased in urban areas (−14.7%).
Conclusion The reduction in the prevalence of tobacco smoking in Vietnam during the last 5 years (2010–2015) has not been as high as expected, especially in rural areas. Further efforts are needed to continue to reduce the harms caused by tobacco smoking.

Keywords Tobacco use · Adult · Vietnam · GATS

Introduction

Tobacco use is the number one risk factor for many non-communicable diseases, such as cardiovascular diseases, cancer, chronic respiratory diseases, and diseases of the digestive tract. Tobacco use causes nearly 6 million deaths per year in the world, and current trends show that it will continue to increase. This figure is expected to rise to 10 million deaths a year by 2030, with 70% of these deaths occurring in developing countries (Jha and Chaloupka 2000; World Health Organization 2011).

In Vietnam, smoking is the most important type of tobacco use and it is very prevalent. According to the Global Adult Tobacco Survey (GATS) conducted in Vietnam in 2010, the prevalence of tobacco smoking among adults aged ≥15 was 23.8%, with a much higher percentage among males (47.4%) than females (1.4%) (Vietnam Steering Committee on Smoking and Health et al. 2010). Tobacco control has been identified as a priority public health program in Vietnam. Vietnam signed the Framework Convention on Tobacco Control (FCTC) on August 8, 2003 and ratified it on November 17, 2004. Vietnam became a party of the WHO FCTC on December 17, 2004. In 2000, the Government of Vietnam introduced its National Tobacco Control Policy in Government Resolution No. 12/2000/NQ-CP. This resolution set out policy objectives on numerous aspects of tobacco control, including: public education, prohibition on

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tobacco advertising, promotion and sponsorship, health warnings, tax and price, smoking cessation, and restriction on public smoking, among others. To implement the National Tobacco Control Policy, the government issued a series of government decrees and Prime Ministerial Directives that both provided substantive regulations and elaborated frameworks and plans for implementing the FCTC. Over the years, protections gradually expanded, and in 2012, the National Assembly enacted the comprehensive law on Prevention and Control of Tobacco Harms, which significantly strengthened tobacco control policy in Vietnam. The first ever-comprehensive tobacco control legislation in Vietnam—a public health milestone for the country—took effect on 1st May 2013, after being adopted by the National Assembly on 18th June 2012. The new law established smoke-free places, increased the size of graphic health warning labels, restricted tobacco advertising, promotion and sponsorship, and established a tobacco control fund (Minh et al. 2016).

To examine the current status and trend in tobacco use as well as to evaluate the tobacco control progress in Vietnam, Vietnam has completed the second round of the Global Adult Tobacco Survey in 2015 (Vietnam GATS 2015) with continued support from the Bloomberg Initiative to Reduce Tobacco Use, the US Centers For Disease Control And Prevention (CDC), the CDC Foundation, and the World Health Organization (WHO). The findings from the Vietnam GATS 2015 are expected to be used to further develop effective tobacco control policies and interventions in Vietnam. In this paper, we report the prevalence of tobacco smoking among adult populations in Vietnam, 2015.

Methods

Study population

The Vietnam GATS 2015 was a nationally representative survey of all non-institutionalized men and women aged 15 and older who considered Vietnam as their primary place of residence. Thus, the target population also included individuals who were not Vietnamese citizens but mainly resided in Vietnam. The target population did not include adults aged 15 and older who were visiting the country (e.g., tourists) or whose primary place of residence was a military base or group quarter (e.g., a dormitory), or those who were institutionalized—including people residing in hospitals, prisons, nursing homes, and other such institutions.

Sample size and sampling

To provide reliable estimates for gender and urban/rural areas, and as previously described in the GATS sample design protocol (Asma 2015), 8000 people were selected for the Vietnam GATS 2015. For selection of study subjects, a two-stage random systematic sampling method was used.

In the first stage of sampling, the primary sampling unit (PSU) was identified as follows: the sampling frame for the Vietnam GATS 2015 was developed by the General Statistics Office of Vietnam (GSO) based on the master sampling frame used in the 2009 Population and Housing Census and updated with 2014 data. The sample for the Vietnam GATS 2015 was selected using a probability proportional to size technique. The master sampling frame of GSO was first divided into two strata (1 = urban; 2 = rural) and then separated by three district groups (1 = district/town/city of province; 2 = plain and coastal district; 3 = mountainous, island district). The final sample included 315 enumeration areas (EAs) in the urban stratum and 342 EAs in the rural stratum.

In the second stage of sampling, 10% of the households in each EA were selected to target 4100 subjects for each urban/rural stratum. Thus, 15 households from the selected urban EA and 14 households from the selected rural EA were chosen using simple systematic random sampling. In total, 9513 households (4725 households in the urban and 4788 households in the rural) were included in the GATS 2015. One eligible household member from each selected household was then randomly chosen for interview using Kish methods (Leslie 1949).

Questionnaire

The Vietnam GATS 2015 used the standard GATS questionnaire (Asma 2015), which collected information on: (1) background characteristics: gender, age, ethnicity, education, work status, possession of household items, and health insurance status; (2) tobacco smoking: patterns of use, former/past tobacco consumption, age of initiation of daily smoking, consumption of different tobacco products, nicotine dependence, frequency of quit attempts, use of water pipes, and shisha; (3) electronic cigarette: aware of electronic cigarettes, use of electronic cigarettes, and perceptions about harm of this product; (4) smokeless tobacco: patterns of use, former/past use of smokeless tobacco, age of initiation of daily use of smokeless tobacco, and consumption of different smokeless tobacco products; (5) cessation: advice to quit smoking by a healthcare provider, method(s) used to try to stop smoking; (6) second-hand smoke: smoking allowed in the home, exposure to second-hand smoke at home, indoor smoking policy at work place,

and exposure in last 30 days in the work place, government buildings/offices, healthcare facilities, restaurants, or public transportation; (7) economics: type of tobacco product and quantity bought, cost of tobacco product(s), brand and type of product purchased, and source of tobacco products; (8) media: exposure to tobacco advertisements from television, radio, billboards, posters, newspapers/magazines, cinema, Internet, public transportation, public walls, and other venues; exposure to sporting events connected with tobacco; exposure to music, theatre, art or fashion events connected with tobacco; exposure to tobacco promotion activities; reaction to health warning labels on cigarette packs; and exposure to anti-tobacco advertising and information; (9) knowledge, attitudes, and perceptions: knowledge about health effects of both smoking and smokeless tobacco; (10) cigarette packs: pictoral graphic health warning and tax stamp on cigarette packs. The GATS questionnaire was adapted for the Vietnamese context and approved by the GATS Questionnaire Review Committee. For estimating the current prevalence of tobacco smoking, respondents were asked the question "Do you currently smoke tobacco on a daily basis, less than daily, or not at all?". Those who answered "not at all" were administered a follow-up question "In the past, have you smoked tobacco on a daily basis, less than daily, or not at all?"

Data collection

Data collection was done by the General Statistics Office, under the co-supervision of the World Health Organization in Vietnam, Vinacosh, and Hanoi Medical University. There were 20 data collection teams involved in Vietnam GATS 2015. Each data collection team consisted of one leader and four interviewers to ensure close supervision and collection of high quality data. The data collection teams took part in a 6-day training workshop, including classroom lectures, discussions, role plays, mock interviews, and field practices. Handheld computers (Samsung Galaxy Tabs 3 7.0) were used for capturing data.

Data processing and analysis

Collected data were sent to the GSO every week via the Internet. IT personnel received and checked data to make sure result codes were completed and conditions were valid. After the data collection process was completed, IT personnel aggregated, processed, and converted data to SPSS formats. Descriptive and analytical statistics were completed using SPSS version 22 software. Weight was used in all estimates. The levels of significance $p < 0.05$, $p < 0.01$ and $p < 0.001$ were applied.

Results

The number and percentage of households and persons interviewed, as well as response rates by residence are presented in Table 1. Of the 9514 sampled households, 9206 were completely screened, for a household response rate of 98.0%. The household response rate was slightly higher in rural areas compared to urban areas (98.5 and 97.4%, respectively). Only 0.3% of the selected households refused to respond to the survey. Among 9206 individuals selected from the completely screened households, 8996 were completely interviewed for a person-level response rate of 97.8%.

Table 2 presents the unweighted sample size and weighted distribution of the sample using population estimates, by selected demographic characteristics. The 8996 completed interviews represented an estimated population of 69,259.7 million adults aged 15 and over in Vietnam. Of the study population, 48.5% were men and 51.5% were women. By age group, people aged 25–44 made up the largest proportion (41.9%) and those 65 and above accounted for the smallest share (9.3%). Two-thirds of the people aged 15 and over in Vietnam lived in rural areas. The majority of the study population reported having lower secondary school education (48.3%) or primary or lower education (20.4%). People with a college degree or higher made up 16.6% of the study population. The main occupation of the study population was elementary occupation (59.5%). Professionals and senior officials accounted for only 4.2 and 1.2% of the study population, respectively.

Tobacco smoking status among the study population was categorized as "current tobacco smoker" or "non-smoker". Current tobacco smokers included "daily smokers" and "occasional smokers". Non-smokers included "former daily smokers" and "never daily smokers". Table 3 presents the percentage of adults 15 years and over, by detailed smoking status and gender. The overall prevalence rate of current smokers was 22.5%. That prevalence was higher among men than women (45.3 vs. 1.1%, respectively). Overall, 19.2% of adults ≥15 years were daily smokers (38.7% among males and 0.9% among females) and 3.3% were occasional smokers (6.6% among males and 0.2% among females). Non-smokers accounted for 77.5% of the surveyed population. Overall, 6.7% of adults were former daily smokers and 70.8% were never daily smokers. The survey found that 68.3% of adults had never smoked in their lifetime and 2.5% were former occasional smokers. The estimated number of current adult smokers in Vietnam was about 15.6 million (15.2 million current smokers were male and 388,900 were female). The number of daily smokers was estimated to be about 13.3 million (12.99 million males and 309,600 females). The estimated number

Table 1 Number and percent of households and persons interviewed and response rates by residence (unweighted)—Global Adult Tobacco Survey (GATS) Vietnam, 2015

	Residence				Total	
	Urban		Rural			
	Number	Percent	Number	Percent	Number	Percent
Selected household						
Households completed (HC)	4543	95.8	4663	97.7	9206	96.8
Households completed—no one eligible (HCNE)	4	0.1	2	0.0	6	0.1
Households incompleted (HI)	0	0.0	0	0.0	0	0.0
Households with no screening respondents (HNS)	3	0.1	4	0.1	7	0.1
Households with nobody at home (HNH)	77	1.6	51	1.1	128	1.3
Households refused (HR)	25	0.5	2	0.0	27	0.3
Households unoccupied (HUO)	61	1.3	39	0.8	100	1.1
Household address not a dwelling (HAND)	13	0.3	3	0.1	16	0.2
Households of other type (HO)[a]	14	0.3	10	0.2	24	0.3
Total households selected	4740	100.0	4774	100.0	9514	100.0
Household response rate (HRR) (%)[b]	97.4		98.5		98.0	
Selected person						
Persons completed (PC)	4421	97.3	4575	98.1	8996	97.7
Persons incompleted (PI)	3	0.1	0	0.0	3	0.0
Persons not eligible (PNE)	1	0.0	2	0.0	3	0.0
Persons not at home (PNH)	32	0.7	20	0.4	52	0.6
Persons refused (PR)	24	0.5	13	0.3	37	0.4
Persons incapacitated (PI)	54	1.2	49	1.1	103	1.1
Persons of other type (PO)[a]	8	0.2	4	0.1	12	0.1
Total number of sampled persons	4543	100.0	4663	100.0	9206	100.0
Person-level response rate (PRR) (%)[c]	97.3		98.2		97.8	
Total response rate (TRR) (%)[d]	94.8		96.7		95.8	

An incomplete household interview (i.e., roster could not be finished) was considered a nonrespondent to the GATS. Thus, these cases (HI) were not included in the numerator of the household response rate

The total number of sampled persons should be equal to the number of completed [HC] household interviews

A completed person interview [PC] includes respondents who had completed at least question E01 and who provided valid answers to questions B01/B02/B03. Respondents who did not meet these criteria were considered as nonrespondents to GATS and thus were not included in the numerator of the person-level response rate

[a]Other includes any other result not listed

[b]The household response rate (HRR) is calculated as: $\frac{HC \times 100}{HC + HI + HNS + HNH + HR + HO}$

[c]The person-level response rate (PRR) is calculated as: $\frac{PC \times 100}{PC + PI + PNH + PR + PI + PO}$

[d]The total response rate (TRR) is calculated as: (HRR X PRR)/100

of occasional smokers was about 2.3 million [more than 2.2 million were male and 79,300 were female (Table 4)].

Table 5 reports current smoking prevalence of various tobacco products, by gender and selected demographic characteristics. The overall prevalence of current smoking was highest among people aged 45–64 (26.9%) and 25–44 (27%), and was lowest among those aged 15–24 (12.6%) and those aged 65 years and above (14.9%). Among males, the prevalence of current smoking was highest among people aged 45–64 (55%) and 25–44 (53.3%) and lowest among those aged 15–24 (24.3%). Among females, the prevalence of current smoking was highest among those 45 years and older (1.9%) and lowest among those aged 15–24 (0.5%). The prevalence rates of current smokers were slightly higher in the rural areas, but no statistical significance was found (overall: 23.5 vs. 20.6%, respectively; males: 46.7 vs. 42.7%, respectively; females: 1.3 vs. 0.7%, respectively). By education, the prevalence rate of current smoking was highest among people with primary education or lower (males: 60.7%; females: 3.7%) and lowest among those with college degrees or higher (males: 34.9%; females: 0%). By occupation, the prevalence of smoking was highest among those with elementary occupations (overall: 28.3%, males: 54.1% females: 1.7%) and was

Table 2 Distribution of adults ≥15 years by selected demographic characteristics—Global Adult Tobacco Survey (GATS) Vietnam, 2010

Demographic characteristics	Weighted		Unweighted number of adults
	Percentage (95% CI[a])	Number of adults (in thousands)	
Overall	100	69259.7	8996
Gender			
Male	48.5 (47.1, 49.9)	33562.7	3983
Female	51.5 (50.1, 52.9)	35697.0	5013
Age (years)			
15–24	23.0 (21.6, 24.5)	15932.7	1147
25–44	41.9 (40.6, 43.2)	29016.1	3498
45–64	25.8 (24.7, 26.9)	17884.6	3153
65+	9.3 (8.6, 10.0)	6426.4	1198
Residence			
Urban	33.8 (32.8, 34.8)	23395.4	4421
Rural	66.2 (65.2, 67.2)	45864.3	4575
Education level[b,c]			
Primary or lower	20.4 (18.8, 22.1)	10873.5	1607
Lower secondary	48.4 (46.7, 50.0)	25751.1	3765
Upper secondary	14.6 (13.5, 15.8)	7776.9	1122
College or above	16.6 (15.5, 17.9)	8862.1	1346
Occupation[d]			
Senior officials	1.2 (1.0, 1.5)	620.9	106
Professionals	4.2 (3.6, 4.9)	2138.9	307
Associate professionals	4.8 (4.2, 5.5)	2465.5	350
Elementary occupations	59.5 (57.4, 61.5)	30303.4	3781
Other occupations	30.3 (28.4, 32.2)	15412.8	1921

The following observations were missing: [X] for age, [X] for gender, [X] for residence, and [X] for education

[a]95% confidence interval

[b]Primary or lower includes "No formal education" and "Not having completed primary education"; Lower secondary includes "Having completed primary education" and "Having completed basic secondary school"; Upper secondary includes "Having completed secondary school"; College or above includes "Graduated university/college/specialized secondary education" and "Having been post-graduated"

[c]Education level is reported only among respondents 25+ years old

[d]Senior officials include "Legislators, senior officials, and managers"; Professionals includes "High-qualified professionals"; Associate professionals includes "Technicians and associate professionals"; Elementary occupations include "Elementary occupations"; Other occupations includes "Armed forces", "Clerks", "Service workers and shop and market sales workers", "Skilled agricultural and fishery workers", "Craft and related trade workers", "Plant and machine operators and assemblers", and "Other occupation"

Table 3 Percentage of adults ≥15 years, by detailed smoking status and gender—Global Adult Tobacco Survey (GATS) Vietnam, 2015

Smoking status	Overall	Male	Female
Percentage (95% CI)			
Current tobacco smoker	22.5 (21.3, 23.8)	45.3 (43.1, 47.5)	1.1 (0.7, 1.6)
Daily smoker	19.2 (18.0, 20.5)	38.7 (36.6, 40.9)	0.9 (0.6, 1.3)
Occasional smoker	3.3 (2.9, 3.8)	6.6 (5.7, 7.7)	0.2 (0.1, 0.4)
Occasional smoker, formerly daily	1.2 (0.9, 1.5)	2.3 (1.8, 3.0)	0.1 (0.0, 0.2)
Occasional smoker, never daily	2.1 (1.8, 2.6)	4.3 (3.5, 5.2)	0.1 (0.1, 0.3)
Non-smoker	77.5 (76.2, 78.7)	54.7 (52.5, 56.9)	98.9 (98.4, 99.3)
Former daily smoker	6.7 (6.1, 7.3)	13.1 (11.9, 14.4)	0.6 (0.4, 0.9)
Never daily smoker	70.8 (69.5, 72.1)	41.6 (39.4, 43.8)	98.3 (97.7, 98.7)
Former occasional smoker	2.5 (2.2, 3.0)	5.0 (4.2, 5.9)	0.3 (0.1, 0.5)
Never smoker	68.3 (66.9, 69.6)	36.6 (34.5, 38.8)	98.0 (97.4, 98.5)

Current use includes both daily and occasional (less than daily) use

Table 4 Number of adults ≥15 years, by detailed smoking status and gender—Global Adult Tobacco Survey (GATS) Vietnam, 2015

Smoking status	Overall	Male	Female
Number in thousands			
Current tobacco smoker	15602.4	15213.5	388.9
Daily smoker	13307.8	12998.2	309.6
Occasional smoker	2294.7	2215.3	79.3
Occasional smoker, formerly daily	815.4	788.1	27.3
Occasional smoker, never daily	1479.2	1427.2	52.0
Non-smoker	53657.3	18349.2	35308.1
Former daily smoker	4616.6	4394.2	222.4
Never daily smoker	49040.6	13954.9	35085.7
Former occasional smoker	1760.7	1666.4	94.2
Never smoker	47280.0	12288.5	34991.5

Current use includes both daily and occasional (less than daily) use

lowest among those who in professional occupations (overall: 15.6%, males: 30.5% females: 0%). The use of manufactured cigarettes was dominant compared to other types of tobacco (17.5% of a total 22.5%). With regard to the use of manufactured cigarettes across socioeconomic groups, the use pattern was quite similar to the use of other types of smoked tobacco. The prevalence of smoking traditional bamboo water pipe was 6.7%. Prevalence of shisha use was 0.1%. The use of water pipe was significantly more common among those aged 45–64 (8.9 vs. 3.6–7.5%) and living in the rural areas (8.3 vs. 3.5%).

Discussion

Monitoring tobacco use is an important component of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) and the MPOWER (a package of selected demand reduction measures contained in the WHO FCTC). Article 20 of the WHO FCTC strongly recommends that countries develop surveillance programs: "The Parties shall establish, as appropriate, programs for national, regional and global surveillance of the magnitude, patterns, determinants and consequences of tobacco consumption and exposure to tobacco smoke" (World Health Organization 2003). The WHO MPOWER states that "Good monitoring provides information about the extent of the tobacco use epidemic in a country, as well as how to tailor policies to specific country needs" (World Health Organization 2008).

The Vietnam GATS 2015 found that the prevalences of smoking in Vietnam were 22.5% overall, 45.3% among men, and 1.1% among women. These are quite similar to the figures found in Thailand in 2011 (24.0% overall, 46.6% among men, and 2.6% among women) (Ministry of Health of Thailand 2012a) and in Malaysia in 2011 (23.1% overall, 43.9% among men, and 1.0% among women) (Ministry of Health of Malaysia 2012). The prevalence of current smokers in Vietnam was lower than that of China in 2010 (28.1% overall, 52.9% among men, and 2.4% among women) (Ministry of Health of China 2011) and in Indonesia in 2011 (34.8% overall, 67.0% among men, and 2.7% among women) (Ministry of Health of Indonesia 2012).

The Vietnam GATS 2015 not only provides national estimates of the prevalence of tobacco smoking but also describes its trend over time in Vietnam while comparing to findings from previous estimates, especially the Vietnam GATS 2010. The Vietnam GATS 2015 showed a decreasing trend in the prevalence of tobacco smoking in Vietnam over the last 15 years. The prevalence of tobacco smoking in 2001 reported by the Vietnam National Health Survey was 29.0% overall, 56.1% among men, and 1.8% among women (Ministry of Health 2003). The tobacco smoking estimates of 2006 reported by the Vietnam Living Standard Survey 2006 were 25.4% overall, 49.2% among men, and 1.5% among women (General Statistics Office 2007). However, we have to note that the methods used in both the Vietnam National Health Survey 2001 and the Vietnam Living Standard Survey 2006 are different from that of the GATS.

Table 6 shows the relative changes in the percentage of adults aged 15 and over in Vietnam who were current smokers of various tobacco products between The Vietnam GATS 2010 and 2015 (used the same method). The overall reduction in prevalence of any tobacco product was 5.3% [The Vietnam GATS 2010 (used the same method as the GATS 2015) found the figures of 23.8% overall, 47.4% among men, and 1.4% among women (Vietnam Steering Committee on Smoking and Health et al. 2010)]. However, the reduction was not statistically significant. A significant reduction in prevalence of tobacco smoking was found for any type of cigarettes (−8.4%), and especially for hand-rolled cigarettes (−38.3%). The use of cigarettes significantly decreased in urban areas (−14.7%).

The non-significant reduction in the prevalence of tobacco smoking during the last 5 years (2010–2015) implies some limitations in tobacco control actions in Vietnam. It may be that these tobacco control measures, especially raising tobacco tax, enforcement of smoke-free environment regulations, etc., have not been strong enough. However, it is important to consider that the Tobacco Control Law in Vietnam has only been in effect for 2 years. The current tobacco excise tax in Vietnam is only 65% of tobacco price before VAT, about 41% of retailed price (Vietnam National Assembly 2008). This is lower than the level of excise tax at 70% of retail price recommended by the World Health Organization (World Health Organization 2010). Even though tobacco smoking in indoor public

Table 5 Percentage of adults ≥15 years who are current smokers of various tobacco products, by selected demographic characteristics—Global Adult Tobacco Survey (GATS) Vietnam, 2015

Demographic characteristics	Any tobacco product	Any cigarette[a]	Type of cigarette		Traditional bamboo water pipe	Shisha water pipe	Other tobacco[b]
			Manufactured	Hand-rolled			
Percentage (95% CI)							
Overall	22.5 (21.3, 23.8)	18.2 (17.0, 19.5)	17.9(16.6, 19.1)	0.7 (0.5, 0.9)	6.7 (5.8, 7.7)	0.1 (0.0, 0.2)	0.4 (0.2, 0.6)
Age (years)							
15–24	12.6 (10.4, 15.2)	10.8 (8.8, 13.2)	10.8 (8.8, 13.2)	0.1 (0.0, 0.5)	3.6 (2.4, 5.4)	0.1 (0.0, 0.5)	0.2 (0.1, 0.7)
25–44	27.0 (25.0, 29.0)	22.4 (20.5, 24.4)	22.1 (20.2, 24.1)	0.7 (0.4, 1.2)	7.5 (6.4, 8.9)	0.1 (0.0, 0.4)	0.5 (0.3, 0.8)
45–64	26.9 (25.0, 28.8)	20.5 (18.8, 22.4)	20.1 (18.3, 21.9)	0.9 (0.5, 1.4)	8.9 (7.6, 10.4)	0.0	0.5 (0.2, 1.0)
65+	14.9 (12.7, 17.5)	11.2 (9.3, 13.5)	10.1 (8.3, 12.2)	1.6 (0.9, 2.6)	4.6 (3.2, 6.5)	0.1 (0.0, 0.8)	0.2 (0.1, 0.5)
Residence							
Urban	20.6 (19.1, 22.3)	18.8 (17.2, 20.5)	18.6 (17.1, 20.4)	0.4 (0.2, 0.7)	3.5 (2.8, 4.4)	0.2 (0.0, 0.5)	0.4 (0.2, 0.8)
Rural	23.5 (21.8, 25.3)	17.9 (16.3, 19.7)	17.4 (15.8, 19.2)	0.8 (0.6, 1.2)	8.3 (7.1, 9.8)	0.1 (0.0, 0.2)	0.4 (0.2, 0.7)
Education level[c]							
Primary or lower	24.7 (21.8, 27.7)	20.1 (17.4, 23.1)	18.7(16.1, 21.6)	2.7(1.8, 3.9)	5.5 (4.1, 7.5)	0.2 (0.1, 0.9)	1.2 (0.6, 2.3)
Lower secondary	27.9 (26.0, 29.9)	21.5 (19.6, 23.5)	21.1(19.3, 23.1)	0.5(0.3, 0.8)	9.3 (8.0, 10.8)	0.0 (0.0, 0.2)	0.3 (0.1, 0.6)
Upper secondary	26.7 (23.3, 30.4)	21.9 (18.9, 25.3)	21.8(18.8, 25.2)	0.6(0.2, 1.6)	8.8 (6.6, 11.5)	0.2 (0.0, 1.4)	0.2 (0.0, 1.4)
College or above	18.4 (15.9, 21.3)	16.6 (14.2, 19.3)	16.6(14.2, 19.3)	0.1(0.0, 0.5)	4.4 (3.1, 6.1)	0.0 –	0.2 (0.1, 0.4)
Occupation							
Senior officials	25.9 (17.6, 36.5)	20.6 (13.3, 30.5)	20.6 (13.3, 30.5)	0.0 –	8.7 (4.2, 17.3)	0.0 –	0.3 (0.0, 2.0)
Professionals	15.6 (11.5, 20.9)	14.2 (10.3, 19.3)	14.2 (10.3, 19.3)	0.2 (0.0, 1.3)	3.0 (1.3, 6.7)	0.0 –	0.2 (0.0, 1.3)
Associate professionals	17.3 (13.0, 22.6)	16.8 (12.6, 22.1)	16.8 (12.6, 22.1)	0.3 (0.0, 1.8)	1.8 (0.7, 4.2)	0.0 –	0.0 –
Elementary occupations	28.3 (26.2, 30.5)	22.1 (20.1, 24.3)	21.5 (19.5, 23.6)	1.0 (0.7, 1.5)	9.2 (7.8, 10.8)	0.0 (0.0, 0.3)	0.6 (0.3, 1.1)
Other occupations	29.1 (26.6, 31.9)	24.4 (21.9, 27.0)	24.2 (21.7, 26.8)	0.7 (0.3, 1.4)	8.4 (6.8, 10.4)	0.3 (0.1, 0.8)	0.4 (0.2, 0.9)

Current use includes both daily and occasional (less than daily) use

[a]Includes manufactured and hand-rolled cigarettes

[b]Includes pipes, cigars/cheroots/cigarillos, and any other reported smoking tobacco products

[c]Education level is reported only among respondents 25+ years old

places is banned and there has been significant reduction of second-hand tobacco smoke exposure in all settings (as can be seen in the general GATS report Vietnam 2015), the prevalence of second-hand smoke among adults aged 15 and above in Vietnam remained high (89.1% in Bars/Cafes/Tea shops and 80.7% in restaurants, 37.9% in government offices, and 30.9% in universities). In Thailand, the repeat GATS (conducted in 2011) also found that overall tobacco use remained unchanged from 27.2% in 2009 to 26.9% in 2011 (Ministry of Health of Thailand 2012b). Similarly, the second round of GATS in Mexico (implemented in 2015) showed that the smoking prevalence remained unchanged from 24.8% in 2009 to 25.2% in 2015 (Ministry of Health of Mexico 2015).

The Vietnam GATS 2015 also confirms the fact that smoking prevalence is higher among disadvantaged groups, such as people with lower education level, rural dwellers, and those with less professional occupations. A similar pattern was observed in the Vietnam GATS 2010 (Vietnam Steering Committee on Smoking and Health et al. 2010). Such trends are in line with international literature, which consistently show individuals with lower socioeconomic tend to smoke more and are less likely to quit smoking (Hiscock et al. 2012). To reduce smoking prevalence among disadvantaged groups, comprehensive tobacco control measures should be applied in combination with a social-determinant-of-health approach. A recent review reports that increases in tobacco price have a pro-equity

Table 6 Relative change in percentage of adults ≥15 years old who are current smokers of various tobacco products between 2010 and 2015, by selected demographic characteristics—Global Adult Tobacco Survey (GATS) Vietnam

	Any smoked tobacco product	Any cigarette[a]	Type of cigarette		Waterpipes[b]	Other smoked tobacco[c]
			Manufactured	Hand-rolled		
Percentage						
Overall	−5.3	−8.4*	−8.4*	−38.3*	5.1	170.0
Gender						
Male	−4.4	−7.5	−7.6	−35.2*	5.4	256.4
Female	−24.5	−30.1	−30.0	−51.4	5.2	46.1
Age (years)						
15–24	−5.3	−9.7	−9.7	−77.7**	23.5	
25–44	−6.3	−10.6*	−11.1*	−32.3	4.9	166.5
45–64	−9.4*	−9.8	−8.7	−50.7***	−5.9	107.1
65+	−0.8	1.8	4.6	−19.0	−0.9	4.2
Residence						
Urban	−11.4*	−14.9**	−14.7**	−1.7	40.7	322.7
Rural	−2.1	−5.3	−5.5	−41.7*	2.9	123.6
Education level[d]						
Primary or lower	1.5	0.0	0.0	−19.9	9.5	203.7
Lower secondary	−6.3	−10.3	−10.6*	−53.2**	−4.7	245.1
Upper secondary	−2.4	−8.8	−9.3		31.1	−23.8
College or above	−14.5	−17.0	−17.0	142.3	60.9	25.1

Current use includes both daily and occasional (less than daily) use

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

[a]Includes manufactured cigarettes and hand-rolled cigarettes

[b]Includes traditional bamboo water pipes and shisha water pipes

[c]Includes pipes, cigars/cheroots/cigarillos, and other

[d]Education level is reported only among respondents 25+ years old

effect on socioeconomic disparities in smoking (Hill et al. 2014).

In summary, the Vietnam GATS 2015 has shown a decreasing trend in the prevalence of tobacco smoking in Vietnam over the last 15 years, indicating good initial progress of the tobacco control program in Vietnam. However, it has also revealed that the reduction in the prevalence of tobacco smoking in Vietnam during the last 5 years (2010–2015) has not been as high as expected, especially in rural areas. Further efforts are needed to continue to reduce the harms caused by tobacco smoking. An action plan should be developed to effectively implement WHO MPOWER, with special consideration on raising tobacco tax and enforcing smoke-free policies. More attention should be paid to tobacco control in rural areas, as the reduction in prevalence of smoking has not been statistically significant.

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Compliance with ethical standards

Ethical statement The survey was approved by the Ministry of Health. The objectives of the survey were clearly explained to the respondents and verbal consents were obtained.

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