

RESEARCH ARTICLE

Trends in Second-Hand Tobacco Smoke Exposure Levels at Home among Viet Nam School Children Aged 13-15 and Associated Factors

Nguyen Tuan Lam¹, Pham Thi Quynh Nga^{1*}, Hoang Van Minh², Kim Bao Giang³, Phan Thi Hai⁴, Doan Thu Huyen⁴, Nguyen Thuy Linh⁴, Duong Khanh Van⁵, Luong Ngoc Khue⁴

Abstract

Second-hand tobacco smoke (SHS) exposure at home, especially among children, is a serious issue in Viet Nam. During the past decade, much effort has been taken for tobacco control in the country, including various programmes aiming to reduce SHS exposure among adults and children. This article analysed trends and factors associated with SHS exposure at home among school children aged 13-15 in Viet Nam, using the Global Youth Tobacco Surveys conducted in 2007 and 2014. Descriptive and inferential statistical methods with logistic regression were applied. Overall, there was a significant reduction in the level of exposure, from 58.5% (95% CI: 57.6-59.3) in 2007 to 47.1% (95% CI: 45.4-48.8) in 2014. Of the associated factors, having one or both parents smoking was significantly associated with the highest odds of SHS exposure at home (OR=5.0; 95% CI: 4.2-6.1). Conversely, having a mother with a college or higher education level was found to be a protective factor (OR=0.5; 95% CI: 0.3-0.8).

Keywords: Global Youth Tobacco Use survey- secondhand tobacco smoke - parental smoking - Viet Nam

Asian Pac J Cancer Prev, 17 Tobacco Prevention and Control in Vietnam Suppl, 43-47

Introduction

Second-hand tobacco smoke (SHS) exposure can cause a long list of diseases; reducing SHS exposure is one of the 6 key measures to control tobacco-related harm, as recommended by the World Health Organization (WHO, 2008).

SHS exposure can happen in both public places and at home. A recent published factsheet (CDC, 2016) based on the Global Youth Tobacco Survey (GYTS) 2007 showed a very high level (58.5%) of SHS exposure at home in Viet Nam. Since then, significant progress has been made in Viet Nam in tobacco control, including the approval of the National Tobacco Control law in 2012, which is in line with the WHO FCTC.

This article examines levels of SHS exposure at home among school children aged 13-15 between 2007 and 2014, with Asia-Pacific countries, and socio-demographic factors associated with the level of SHS exposure at home.

Materials and Methods

The GYTS survey was conducted using a standardized

questionnaire, with data cleaning and weighting support from CDC. The description of these surveys can be found (Giang et al., 2016) in the same special issue of this journal. The age eligibility for inclusion in this study is 13-15 years old.

The dependent variable is the level of SHS exposure at home, which is defined as "any student who witnessed a person smoking inside the home in his/her presence, in the past 7 days before the survey." Independent variables included: current smoker, defined as respondents who smoked at least one cigarette, or another tobacco-smoking product, during the last 30 days; parental smoking, defined as having a parent or both currently smoking; weekly money, the allowance given by parent, was coded into 4 groups-no weekly money, less than 20000 VND, 20000 to 50000, and more than 50000. For the 2007 survey, the unit was monthly money, which we have transformed into weekly money; father and mother education is recorded into 4 groups: less than primary, primary and secondary school, high school, and college and higher; father and mother occupation is recoded into three groups: farmers (including farmers, fishing and forestry), government employees, and others; region of Viet Nam is classified

¹World Health Organization Office in Viet Nam, Hanoi, ²Hanoi School of Public Health, Hanoi, ³Hanoi Medical University, Hanoi, ⁴Vietnam Steering Committee on Smoking and Health (VINACOSH), Hanoi, Viet Nam, ⁵The International Union Against Tuberculosis and Lung Diseases *For correspondence: ngap@who.int

under the three major regions, the north, central, and south.

Some variables available in the 2014 survey, but missing from the 2007 survey include region, parent education level and parent occupation. Therefore, no comparisons could be made for these categories between the two surveys.

The data analysis was conducted using Stata 10 statistical software. Chi-square was used to test for differences in the prevalence of SHS exposure between 2007 and 2014. Statistical analyses were conducted using both descriptive and inferential methods. Univariate and Multiple logistic regressions were used to explore the effects of different socio-demographic factors that impacted on level risk of SHS exposure at home.

Ethical considerations: The study was presented for review by the Ministry of Health. In addition provincial authorities granted legal permission to proceed with the research. Furthermore, prior to conducting the survey, teachers, parental representatives, and students provided consent.

Results

The GYTS survey 2007 had a total of 15,610 respondents from 134 schools located in 9 provinces of Viet Nam. After excluding those outside the age range of 13-15, the number eligible for analysis was 14,637 students. Of these, boys and girls accounted for 45.5% and 54.5%, respectively.

The GYTS 2014 had a smaller respondent of 3553 respondents from 50 schools, located in 13 provinces of Viet Nam. The number of students eligible for analysis, aged 13 to 15, was 3430, of which 49.1% were boys and 50.9% were girls.

The results on trend of SHS exposure are summarized in table 1. There was a significant reduction in the level of overall SHS exposure at home from 58.5% in 2007 to 47.1% in 2014 ($p < 0.01$). The reduction was evenly distributed in all socioeconomic groups between the two iterations of the surveys, all at a level of high statistical significance ($p < 0.01$).

Table 1. Pattern of SHS at Home by Socio-Demographic Characteristics-GYTS Vietnam, 2007 and 2014

Characteristic	2007 SHS at home (95% CI)	2014 SHS at home (95% CI)	P Value (Chi-square)
Overall	58.5 (57.6-59.3)	47.1 (45.4-48.8)*	<0.0001
Gender			
Male	59.0 (57.8-60.2)	45.5 (43.5-47.9)*	<0.0001
Female	58.0 (57.0-59.1)	49.9 (47.6-52.2)*	<0.0001
Current smoking status			
Non-current smokers	57.6 (56.8-58.4)	47.1 (45.4-48.8)*	<0.0001
Current smokers	79.6 (75.8-85.5)	61.1 (51.8-70.3)*	<0.0001
Weekly money			
No	46.1 (44.6-47.5)	36.0 (32.2-39.8)*	<0.0001
Less than VND20,000	62.1 (61.0-63.2)	48.7 (45.8-51.5)*	<0.0001
VND 20,000-50,000	67.2 (64.5-69.9)	51.5 (48.3-54.7)*	<0.0001
>VND 50,000	64.0 (61.1-66.9)	49.6 (45.8-53.4)*	<0.0001
Parental smoking status			
No one smokes	33.6 (32.4-34.8)	30.4 (28.4-32.5)*	<0.0001
Mother and/or father smoke	75.8 (74.9-76.8)	69.2 (68.8-71.6)*	<0.0001
Region			
North		40.4 (37.9-42.8)	
Central		63.2 (40.0-66.3)	
South		45.6 (42.4-48.8)	
Father's occupation			
Farmers		51.2 (48.6-53.7)	
Government official		37.8 (32.6-42.9)	
Others		47.3 (44.8-49.7)	
Mother's occupation			
Farmers		50.9 (48.3-53.6)	
Government official		39.8 (34.4-45.1)	
Others		47.2 (44.8-49.5)	
Father's education			
Less than primary		52.7 (47.9-57.4)	
Primary and Secondary		52.5 (49.8-55.1)	
High school		42.0 (38.9-45.0)	
College and higher		45.2 (41.3-49.0)	
Mother's education			
Less than primary		54.4 (49.8-59.0)	
Primary and Secondary		50.4 (47.7-53.0)	
High school		42.4 (39.3-45.5)	
College and higher		47.0 (43.0-51.0)	

* Significant at 0.05 level

Table 2. Logistic Regression Analysis of the Association between SHS Exposure at Home and Selected Socio-Demographic Factors -Vietnam GYTS, 2014

Characteristics	Uni-variable logistic regression OR (95% CI)	Multiple logistic regression OR (95% CI)
Gender		
Male	1	1
Female	1.1 (0.9-1.3)	1.1 (0.9-1.4)
Current smoking status		
Current non-smokers	1	1
Current smokers	1.6 (0.98-2.6)	1.7(1.1-2.8)*
Father's occupation		
Farmers	1	1
Government official	0.6 (0.4-0.8)*	0.8 (0.5-1.3)
Others	0.9 (0.7-1.0)	1.00 (0.8-1.4)
Mother's occupation		
Farmers	1	1
Government official	0.7 (0.5-0.9)*	1.4 (0.8-2.2)
Others	0.9 (0.7-1.0)	1.0 (0.7-1.3)
Father's education		
Less than primary	1	1
Primary and Secondary	0.9 (0.7-1.2)	1.0 (0.8-1.5)
High school	0.8 (0.6-1.0)	1.0 (0.7-1.6)
College and higher	0.5 (0.4-0.7)*	1.0 (0.6-1.6)
Mother's education		
Less than primary	1	1
Primary and Secondary	0.8 (0.6-1.0)	0.8 (0.6-1.0)
High school	0.7 (0.5-0.9)	0.7 (0.5-1.0)
College and higher	0.5 (0.4-0.6)*	0.5 (0.3-0.8)*
Weekly spending money		
No	1	1
Less than VND20,000	1.6 (1.3-2.1)*	1.5 (1.1-1.9)*
VND 20,000-50,000	2.0 (1.5-2.6)*	1.8 (1.3-2.3)*
>VND 50,000	1.7 (1.3-2.3)*	1.6 (1.2-2.2)*
Parental smoking status		
No one smokes	1	1
One or Both smoke	5.2 (4.3-6.2)*	5.0 (4.2-6.1)*

* Significant at 0.05 level

Table 3. SHS Exposure in Selected Countries in the Region

Country	SHS at home in 7 days before survey (%)	Year of survey
Cambodia	31.5	2010
Indonesia	68.8	2009
Laos	36.5	2011
Malaysia	48.7	2009
Myanmar	32.2	2011
Philippines	42.9	2011
Thailand	45.7	2009
New-Zealand	33.6	2010
South Korea	37.6	2008
Viet Nam-2007	58.5	2007
Viet Nam-2014	47.1	2014

Among various groups, those with at least one current smoking parent had the highest level of exposure in both surveys, 75.8% and 69.2% for 2007 and 2014 respectively ($p < 0.01$). On the other hand, the groups with neither parent smoking had the lowest level of exposure, at 33.6% and 30.4% ($p < 0.01$) for the 2007 and 2014 surveys, respectively.

Socio-economic factors associated with higher odd

of SHS exposure are presented in table 2. There were significantly higher odds of SHS exposure for some subgroups, while for other subgroups there were no significant differences.

There were some differences in univariate and multiple logistic regression results. For example, the current smoker group is not significantly different in univariate regression, OR=1.6 (95%CI: 0.98-2.6), but does yield a statistically significant variability in the multiple regression model, OR=1.7 (95%CI: 1.1-2.8). On the other hand, some variables, such as father having college or university education is significantly different from the reference group in univariate analysis with OR=0.5 (95%CI: 0.4-0.7), but becomes statistically insignificant in multiple regression model, OR=1.0 (95%CI: 0.6-1.6). Similar patterns are noticed for groups with father or mother holding governmental positions. Lastly, the group with a mother having a college or higher education had significantly higher odd in both univariate and multiple regression analyses, with OR=0.5 (95%CI: 0.3-0.8) respectively.

For the final results, we will use the results of the multiple logistic regression models for its superiority over the univariate model. The group having the highest

risk were those having a parent smoking currently, with 5 time greater odd of exposure (OR=5.0; 95%CI: 4.2-6.1). A similar trend, though to a lesser degree, were found those respondents who were current smokers, which was associated with a 1.7 higher odd of exposure (OR=1.7; 95%CI: 1.1-2.8).

Conversely, respondents with a mother having a college education or higher had a significantly lower odd of SHS exposure at home; it was half compared to other groups (OR=0.5; 95%CI: 0.3-0.8). It is interesting to note that a father's higher education did not have any protective impact on reducing odd of exposure to their children (OR=1; 95%CI: 0.6-1.6).

Lastly, it is noted that those who had pocket money had significantly higher odd of SHS exposure at home, ranging from 1.5 times (OR=1.5; 95%CI: 1.1-1.9) to 1.8 times (OR=1.8; 95%CI: 1.3-2.3).

Discussion

From the results of the 2014 GYTS survey, there is evidence of significant reductions in the SHS exposure levels at home among school children, from 58.5% in 2007 to 47.1% in 2014. This reduction is expected given significant investment, effort, and progress made in tobacco control in Viet Nam in the past few years, especially the adoption of a strong tobacco control law in line with the FCTC and several mass media communication campaigns with funding and technical support from the World Lung Foundation, WHO, Bloomberg Initiative partners, and others (WLF, 2015).

Besides the GYTS 2007, there was a National Global School Health Survey conducted in Viet Nam in 2013 that also asked about SHS exposure. The survey, however, did not distinguish between exposures at home or at public places. In addition, the age groups were also different. There was no other national survey covering SHS exposure among this group of school aged children.

As seen in table 3, when comparing SHS exposure levels among selected countries in the Asian region using GYTS data from the CDC Global Tobacco Surveillance System Data (CDC, 2016), Vietnam's exposure levels in the 2007 survey (58.5%) was the second highest. The level of exposure in the 2014 survey (47.1%) was significantly reduced when compared to 2007, but still significantly higher than most other countries, with the exception of 2009 data from Malaysia and Indonesia (which is data that is now 8 years out-dated).

Among the sub-groups, those who have one or both parents currently smoking suffered the highest odd of SHS exposure at home (OR=5.0). This is logical and also in agreement with evidence from GYTS studies elsewhere (Peltzer, 2011; Raute, 2012).

The level of a mother's education, especially a mother having college or higher education clearly had a positive impact in reducing SHS exposure levels. However, a father's education level seemed to have no effect. This may be explained by two suppositions: 1) the rate of adult women who smoke (according to the GATS 2010) is only 1.5%, suggesting most mothers aren't smokers and 2) culturally, mothers in Viet Nam have a higher tendency

to be proactive about protecting their children's health. Conversely, males are more likely to smoke (almost one in two adult males are smokers according to GATS 2010), so they may be less proactive about taking specific steps to reduce SHS exposure to their children.

The positive association between higher levels of SHS exposure and having pocket money to spare, a proxy for higher income families, seemed to be counter-intuitive. When cross-referenced with the 2007 survey, there was a similar trend: those who have no pocket money have less SHS exposure. When compared with other countries, this finding is unusual and surprising. A review by (Orton, 2014) found that most studies (10 out of 11) showed significantly higher risk of SHS exposure among those with lower socio-economic classes. One potential explanation is that children with no pocket money tend to reside in rural areas, where there is an open court-yard in nearly all households and children spend more time outdoors. These varying conditions may explain the lower level of SHS exposure inside the home. It is unfortunate that we do not have a variable for rural versus urban groups, and therefore could not test this hypothesis.

It is noted that this study is not without limitations. Although, both surveys in 2007 and 2014 were considered nationally representative surveys, there were notable differences in the sampling methods and sample size of the two surveys. Therefore, comparison of the results with those of the earlier study should be interpreted with suitable level of caution.

In conclusion, there has been significant progress in reducing SHS exposure to school children aged 13-15 in Viet Nam, when comparing results from 2007 to 2014, suggesting that tobacco control efforts are in the right direction. Still, the level of exposure, even after a sizable reduction, is still much higher when compared with other countries in the region. Therefore, greater effort is needed to increase awareness among smokers, typically adult males, to encourage smoking outside of homes as well as smoking cessation efforts in order to reduce the effects of SHS exposure.

It is recommended that future GYTS studies also collect information for the variable of urban vs. rural locality and the sampling method should be kept stable in the future rounds.

Acknowledgements

We thank the VINACOSH (Vietnam Steering Committee on Smoking and Health) and the GATS/GYTS team of Vietnam for making these data available. We also thank WHO Tobacco Free Initiative (TFI) and CDC's Office on Smoking and Health for providing technical assistance. We acknowledge the financial support and coordination of the Hanoi School of Public Health, World Health Organization and the Tobacco Control Research group of Vietnam Tobacco Control Fund. We also would like to express our sincere appreciation to Dr. Malcolm Moore, the Editor-in-Chief of the Asian Pacific Journal of Cancer prevention for his great input to this paper. We would like to thank Viet Nguyen from Harvard Medical School for editing the English of this paper.

References

- CDC (2016). Global tobacco surveillance system data.
- Giang KB, Minh HV, Hai PT and et al (2016). Methodology of global youth tobacco use survey (GYTS) in Viet Nam, 2014. *Asian Pac J Cancer Prev*, **17 Tobacco Prevention and Control in Viet Nam Suppl**, 11-15.
- Orton S JL, Cooper S, et al (2014). Predictors of children's secondhand smoke exposure at home: a systematic review and narrative synthesis of the evidence. *PLoS ONE*, **vol 9**, 112690.
- Peltzer K (2011). Determinants of exposure to second-hand tobacco smoke (SHS) among current non-smoking in-school adolescents (aged 11–18 years) in South Africa: Results from the 2008 GYTS Study. *Int J Environ Res Public Health*, **8**, 3553–61.
- Raute LJ, Pednekar MS, Mistry R, et al (2012). Determinants of exposure to second-hand smoke at home and outside the home among students aged 11-17 years: Results from the Mumbai Student Tobacco Survey 2010. *Indian J Cancer*, **49**, 419-24.
- WHO (2008). Report on the global tobacco epidemic, 2008 - The MPOWER package.
- WLF (2015). Vietnam health communications campaigns. .