Impoverishing effect of tobacco use in Vietnam

Minh Ngoc Nguyen, Anh Ngoc Nguyen ![ORCID], Ha Thu Bui ![ORCID], Linh Hoang Vu

Economics, Development and Policies Research Center, Hanoi, Vietnam

Correspondence to
Ha Thu Bui, Research, Development and Policies Research Center, Hanoi, Vietnam;
thuha2806@gmail.com

ABSTRACT

Background Tobacco consumption places a significant economic burden on households, which is particularly severe in developing countries like Vietnam. In a country where the social insurance system is weak and healthcare is often expensive, tobacco-consuming households may face a higher risk of living in poverty. Some evidence on the social consequences of tobacco consumption suggests that it might aggravate poverty and inequality in Vietnam; however, to the best of our knowledge, no research provides a reliable estimate of the impoverishing effect of tobacco use in the country thus far.

Objectives This study quantifies the direct impact of tobacco use on poverty, measured by a poverty head count and the total size of the poverty gap in Vietnam in 2018.

Methods By deducting tobacco-related expenditure from the total household income, the authors recalculate the actual household disposable income and examine whether the households suffer from the state of secondary poverty. Data from the 2018 Vietnam Household Living Standards Survey were used for calculation.

Results (1) Total tobacco-related expenditure increased the number of poor people by 305 090 (0.31% of the country's population) in 2018. More than one-third of those impoverished people are children, who should be considered victims of adults' tobacco use. (2) Tobacco use increased the poverty gap by 0.08 percentage points from 2.20% to 2.28%. (3) The impoverishment effects of tobacco consumption vary across groups in society and appear to be more intense in rural areas, among ethnic minorities and in the two lowest quintiles of consumption.

Conclusion This study confirms the impoverishing effect of tobacco use in Vietnam (305 090 people) and that the effects are heterogeneous across population groups. Therefore, controlling tobacco use should be a part of the broader poverty reduction strategy in Vietnam and should be wisely targeted so as to reduce poverty effectively.

INTRODUCTION

Tobacco products in all forms and at any level of exposure are proven to be harmful and are widely recognised as a leading cause of death, illnesses and impoverishment.[1] The WHO[2] presented three main channels through which tobacco use may have an impact on poverty, including the reduction in disposable income for essential products due to tobacco purchases, the increase in healthcare expenses to treat tobacco-related illnesses and the income lost due to tobacco-related mortality. These effects are expected to be more obvious and serious in low-income and middle-income populations.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ While literature quantifying the impoverishing effect of tobacco spending, in terms of its impact on quantifiable measures of poverty, is still limited, this study will provide a first estimation of the impoverishing effect of tobacco use in Vietnam.

WHAT THIS STUDY ADDS

⇒ It is estimated that in 2018 tobacco use pushed 305 090 people into living in poverty and expanded the poverty gap by 0.08 percentage points. Families in rural areas and from ethnic minorities suffer more severe impoverishing impacts of tobacco use than other groups.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Since tobacco use clearly increases the risk of living in poverty, reducing tobacco use is necessary for public health improvement and poverty reduction in Vietnam and allows households to direct disposable resources to basic needs. Additionally, national targeted programmes aimed at marginalised populations should be implemented together with tobacco taxation to limit tobacco use and help those vulnerable groups climb out of poverty.

The share of tobacco-related spending in the budget of low and middle-income households is always larger than that of high-income households.[3–5] Small consumption of tobacco by some (but not all) household members may create a substantial trade-off on essential goods such as food, education and housing for the entire family. Nguyen and Nguyen[6] measured the crowding-out effects of tobacco consumption on household expenditures in Vietnam and found that expenditure on tobacco significantly reduces spending on education. In the long run, a shortage of investment in education will hinder the nation's progress towards poverty alleviation.

Smoking increases the probability of incurring cancers, cardiovascular diseases, chronic respiratory diseases and other tobacco-related illnesses.[7] Annually, there have been approximately 40 000 deaths caused by tobacco-related diseases in Vietnam, and tobacco use has been responsible for six of the eight leading causes of death.[8] Tobacco-related diseases substantially raise the healthcare cost which is a fundamental part of the Vietnamese household budget. If these diseases resulted in premature death, the entire household would have to deal with the resulting heavy economic burden, particularly in the case of poor and near-poor households. In the

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Vietnamese context, where the social insurance system is weak and healthcare is often expensive, tobacco-consuming households potentially face an even higher risk of living in poverty.

As tobacco use might slow the progress of poverty reduction, it is of critical importance to quantify the impoverishing effect of households' tobacco spending to inform the debates on poverty alleviation policies and social programmes, and on tobacco control measures. However, literature quantifying the impoverishing effect of tobacco spending in terms of its impact on quantifiable measures of poverty is limited. One of the first studies was conducted by Liu et al[9] using the 1998 China National Health Service Survey. The authors found that 30.5 million urban residents and 23.7 million rural residents were impoverished as a result of tobacco-related expenditure. A more recent study conducted by John et al[10] showed that roughly 15 million people in India were pushed below the national poverty line (NPL) as the result of tobacco-related expenditure. In the UK, it is estimated that 500 000 households, comprising nearly 400 000 children and 850 000 adults, actually lived below the NPL if the tobacco-related expenditures were removed from their total consumption.[11] These studies all concluded that a significant proportion of the population above the poverty line was impoverished by tobacco consumption.

The scale of impact might in reality be larger because the income forgone from tobacco-related premature deaths and the productivity loss from tobacco-related illnesses were not fully incorporated in the calculation. Additionally, all those studies used head count ratio (HCR)—the share of the population living below the NPL (ie, the quantity of resources needed to achieve a minimum acceptable welfare level)—as a measure of poverty. However, a shortage of the HCR method is that it does not consider the depth of poverty. In other words, the HCR counts the number of people who have insufficient resources to satisfy their basic needs, but it cannot measure the insufficient level. If a poor household becomes poorer due to tobacco-related expenditures, the value of the HCR does not change. The poverty gap, which is defined as the relative difference between the average living standard of the poor and the NPL, will capture that effect. Nevertheless, this measurement has not been used in previous literature quantifying the effect of tobacco usage on poverty.

In Vietnam, a systematic literature review on the link between tobacco and poverty was conducted by Efroymson et al.[4] In fact, previous studies suggested that tobacco use might be related to poverty and inequality in Vietnam,[12 13] but, to the best of our knowledge, no research has provided a reliable estimate of the impoverishing effect of tobacco use in the country thus far. This study aims to fill the gap by *examining the impact of tobacco spending on poverty in Vietnam in 2018*. Households that fall below the NPL are categorised as those experiencing primary poverty. In this study, the impoverishing impact of tobacco use will be estimated by the number of people who have sufficient resources to live above the NPL but fall below the NPL after subtracting tobacco-related expenditures. These households are classified to suffer from secondary poverty. It should be noted that, in practice, people in the state of secondary poverty may have living conditions similar to (or even worse than) those suffering from primary poverty.

Additionally, our study also aims to estimate the impact of tobacco use by measuring the changes in the poverty gap. We also analyse the heterogeneous impacts of tobacco use on different population groups, based on economic region, ethnicity and consumption quantiles. Since ethnic minorities and the population in the lowest consumption groups in Vietnam are more likely to suffer from chronic poverty and/or remain vulnerable to

falling back into poverty because of any social-economic uncertainty, it is important to understand the impact of tobacco use on those groups in order to design appropriate policies and help them escape from poverty.

Our study finds that, in 2018, tobacco-related expenditures, including tobacco purchases and tobacco-related medical expenses, pushed a significant amount of the Vietnamese population into poverty. Total tobacco-related expenditures increased the number of poor people by 305 090 (corresponding to an increase of 3.77% in comparison to the General Statistics Office of Vietnam's official estimate). Of these, tobacco purchases exclusively increased the number of poor people by 287 095 (3.55%). Additionally, populations in rural areas and ethnic minorities suffer more severely than other groups from the impoverishing impacts of tobacco use.

METHODOLOGY AND DATA
Methodology
In practice, data on expenditure are usually collected through household surveys that treat households as a single unit, thus expenditure statistics are only available at the household level. Since the individual expenditure distribution is unknown, it is a common practice to assume a uniform distribution within households to estimate the number of poor people in developing countries. Behind the per-capita conversion lies an assumption that all household members have equal consumption levels or derive equal welfare from the total household income because there is little scope for economies of size in consumption for poor people. One may argue, however, that the needs of children are different from those of adults, or that gender inequality may reduce the welfare of female members. In line with this reasoning, the validity of our assumption would be questioned, and equivalence scales might be preferred in measuring poverty. Nevertheless, Abanokova et al[14] showed that the use of the equivalence scales results in a lower estimate of the NPL and the World Bank has not been using any equivalence scale to officially estimate the national poverty rate.[15] At the same time, the General Statistics Office of Vietnam officially calculates the number of people living in (primary) poverty by comparing per-capita consumption and the NPL. The individual expenditure adjusted by an equivalence scale will not, therefore, be comparable to the official estimates. The population-level statistics for individuals are generated by using the weight obtained from the product of the household size and the survey weights, which are provided to produce household-level statistics.

To estimate the impoverishing impact of tobacco, we calculated the differences in HCR and the poverty gap between the official estimates and the estimates after subtracting income forgone through tobacco-related expenditure. Let NPL represent the national poverty line, which is a scalar from statistical agencies or other government sources. The official estimate of poverty using the HCR measurement is provided by the following equation:

$$HCR_0 = \frac{1}{N} \sum_{i=1}^{N} I\left(e_i \leq NPL\right), \tag{1}$$

where N is the total population; e_i is the per-capita consumption expenditures of an individual i; $I(.)$ is an indicator function that takes value 1 if the argument is true and 0 otherwise. $(HCR_0 \times N)$ gives the number of poor people in the country.

To calculate the number of individuals who are in the state of poverty due to tobacco-related expenditures, we need to measure individual tobacco-related expenditures, which consist of two components: the expenditure on tobacco products and

the healthcare expenditure due to tobacco consumption. The first component was directly extracted from the survey data. The second component was calculated by multiplying the smoking-attributable fraction (SAF) by the total healthcare expenditure of the individual. The SAF index is defined as the share of an individual's healthcare expenditure attributable to tobacco use. Let H_i be the per-capita healthcare expenditure and h_i be the per-capita healthcare expenditure due to tobacco consumption of individual i. Then:

$$h_i = SAF \times H_i. \tag{2}$$

There are two methods to estimate the SAF index, the inclusive method and the disease-specific method.[16] The former method considers the share of total healthcare expenditure which is attributable to current and former smokers, whereas the latter method focuses only on the cost of certain diseases that are directly linked to smoking. To the best of our knowledge, there were only two studies, conducted by Ross et al[17] in 2005 and Hoang Anh et al[8] in 2011, that calculated the SAF index for Vietnam, and both of them used the disease-specific method. In this study, we attempted to estimate an inclusive SAF for Vietnamese tobacco-consuming households in 2018 using an epidemiological approach. The SAF was calculated as follows:

$$SAF = \frac{P_e * (RR - 1)}{P_n + P_e * RR} * 100\%$$

where P_e is the percentage of ever smokers (ie, the smoking prevalence) and P_n is the percentage of never smokers, which equals $(1 - P_e)$. RR denotes the all-cause relative risk of mortality for ever smokers compared with never smokers. In other words, RR is defined as the ratio of the mortality rate for smokers to that for people who never consumed tobacco.

Let t_i be the per-capita expenditure on tobacco products and h_i be the per-capita healthcare expenditure due to tobacco consumption of the individual i. We then have:

$$HCR_1 = \frac{1}{N} \sum_{i=1}^{N} I(e_i - t_i \le NPL) \tag{3}$$

$$HCR_2 = \frac{1}{N} \sum_{i=1}^{N} I(e_i - t_i - h_i \le NPL). \tag{4}$$

In equation (3), $(e_i - t_i)$ is the per-capita disposable income after deducting the expenditure on tobacco products. $(HCR_1\ HCR_0) \times N$ is the number of people impoverished as a result of tobacco purchases. Similarly, in equation (4), $(e_i - t_i - h_i)$ is the per-capita disposable income after deducting the expenditure on tobacco products and the attributable healthcare expenditure due to tobacco consumption. $(HCR_2\ HCR_0) \times N$ is the number of people impoverished through tobacco-related expenditure.

Note that although the tobacco-purchasing decision is made by certain adult members in a household, it affects the disposable income of the entire household, including the fraction for children and women. Therefore, the impoverishing effect should be equally endured by all household members regardless of the uniform distribution assumption being invalid in the case of tobacco consumption.

Deaton[18] provides the formula for the poverty gap as follows:

$$PG = \frac{1}{N} \sum_{i=1}^{N} \left(1 - \frac{e_i}{NPL}\right) I(e_i \le NPL), \tag{5}$$

in which PG is considered to be a per-capita measure of the total resource shortage below the NPL. $(PG \times N \times NPL)$ gives the total amount by which the poor are below the NPL. The difference between the poverty gap before and after deducting

tobacco-related expenditures should be considered as the depth of the impoverishing effect of tobacco.

Data

Data on household expenditures, including total expenditure, expenditure on tobacco consumption and healthcare expenditure, were taken from the data of Vietnam Household Living Standards Survey (VHLSS) in 2018. VHLSS is an ongoing longitudinal survey of the Vietnamese population that has been conducted every 2 years by the government from 2002 to 2018. The survey collects information on sampled households to evaluate the living standards, including an assessment of the poverty situation of the country. The household questionnaire for the survey includes detailed information related to income, classified by sources, and expenditure, classified by purposes and items.

Summary statistics are presented in table 1. The sample size is 9396 households across all 63 provinces of the country. In general, the tobacco-consuming households are younger than the non-consuming households. The average age of household members in the former households is roughly 37, whereas the average age of household members in the latter ones is approximately 42. Meanwhile, the average number of children in tobacco-consuming households is larger than in non-consuming households (1.21 and 0.94, respectively). Together, these statistics imply a greater effect of tobacco use on younger people in Vietnam. In terms of expenditure, the expenditure per capita of tobacco-consuming households is VND3.20 million, which is significantly lower than that of tobacco-non-consuming households (VND3.68 million). That is, tobacco-consuming households have a higher probability of experiencing a state of poverty.

For the SAF calculation, we need two measures: the smoking prevalence P_e and the all-cause relative risk of mortality RR. Whereas the smoking prevalence came from the Global Adult Tobacco Survey in 2015, the all-cause relative risk of mortality RR is not available in Vietnam. Instead, we borrowed the RR estimates for China from Liu et al[19] to calculate the SAF for Vietnam. The RR estimates for China are the most suitable ones to apply to Vietnam due to the similarities between the two countries in smoking prevalence and socioeconomic conditions. Additionally, the RR estimate has often been stable over years and has been used in several recent studies.[20 21] Since both RR and P_e are classified by gender and region (ie, urban/rural area), we could generate SAF for each gender by region, as presented in table 2. The average SAF index for each region is determined by the proportions of males and females in the regions.

In Vietnam, two NPLs coexist: the first one is provided by the General Statistics Office of Vietnam and the World Bank (ie, GSO-WB NPL), and the second is determined by the Ministry of Labor–Invalids and Social Affairs (ie, MOLISA NPL).[22] In line with previous studies on poverty in Vietnam, we use the GSO-WB NPL, which was VND 997 500 in 2018, to quantify the impoverishing effect of tobacco use for several reasons. First, the GSO-WB NPL is estimated using the same VHLSS database from which we obtain our data. Second, the GSO-WB NPL primarily aims at a long-term analysis of poverty and thus, unlike the MOLISA NPL, it is independent of political considerations. Third, due to the adjustment for annual inflation and spatial price differences across regions, the GSO-WB NPL avoids the 'sawtooth' pattern of the MOLISA one, 'whereby it falls each year as its value is eroded by inflation until it jumps up when a new NPL is determined

Table 1 Summary statistics of household monthly expenditures and some demographic information in Vietnam

	All population	Tobacco-consuming households	Tobacco-non-consuming households	Differences
1. Expenditures per capita				
Value (thousand VND)				
Total	3411.26	3201.91	3682.69	−480.77***
Tobacco consumption	19.26	34.12	0.00	34.12***
Total healthcare expenditure	175.78	159.94	196.32	−36.39***
Proportion (%)				
Total	100.00	100.00	100.00	0
Tobacco consumption	0.56	1.07	0.00	1.07
Total healthcare expenditure	5.15	5.00	5.33	−0.33
2. Household characteristics				
Average household size	3.71	4.01	3.31	0.71***
Average age	38.99	36.78	41.87	−5.10***
Average number of children	1.10	1.21	0.94	0.27***
3. Survey characteristics				
Number of provinces	63	63	63	
Number of districts	704	694	658	
Number of households	9396	5438	3958	
4. Other statistics				
NPL (thousand VND)	997.50			

***p<0.001.
Source: Authors' calculation using VHLSS 2018 and GSO-WB.
GSO-WB, General Statistics Office of Vietnam and the World Bank; NPL, national poverty line; VHLSS, Vietnam Household Living Standards Survey; VND, Vietnamese dong.

at the beginning of the social-economic development strategy period'.[22] Finally, the consumption-based estimate is able to reflect accurately the real purchasing power over time, and therefore it is considered to be more reliable than the income-based measurement. It is also argued that the questionnaire and the estimation procedure of MOLISA may not accurately capture the households' true income. Although having advantages over the MOLISA NPL, the GSO-WB NPL still has its own limitations. The NPL is unique for the entire country each year, ignoring the regional differences in living standards, particularly the difference between rural and urban areas.

Details on the prevalence of tobacco-consuming households are given in table 3. In general, 56.46% of Vietnamese households consumed tobacco products in 2018. The rural areas and ethnic minority groups have a consistently higher prevalence of tobacco consumption. The prevalence of tobacco consumption in rural areas is roughly 10 percentage points higher than that of urban areas. The prevalence of tobacco consumption among ethnic minorities is 64.57%, 9.39 percentage points higher than that of the Kinh and Hoa populations. In addition, the gap between the prevalence of tobacco use for the first and fifth quintiles of consumption is 12.22 percentage

points. We divided our sample into five equal groups from the lowest consumption to the highest consumption levels and found that a lower household total consumption is associated with a higher prevalence of tobacco use. These results suggest a possible inequality between different groups in Vietnam due to tobacco consumption.

RESULTS
In this section, we first analyse the impact of tobacco use on poverty in the whole country and then study its heterogeneous impacts by region, ethnicity and consumption quantiles.

Impact of tobacco use on poverty
Table 4 shows the estimated impoverishing effects of tobacco purchases, tobacco-related healthcare spending and the total effect of the two expenditures. It is clear from the results that tobacco use pushes more people into poverty and deepens the level of poverty they experience. Expenditure on tobacco purchases made 287 095 people live in poverty, whereas tobacco-related healthcare expenditure made 30 256 people live in poverty. Note that the impoverishing effect attributable

Table 2 Tobacco-related indicators in Vietnam

	Urban		Rural		
	Male	**Female**	**Male**	**Female**	**Source**
Relative risk	1.29	1.4	1.22	1.14	Liu *et al*[19]
	1.90	1.90	1.60	1.20	Jha *et al*[25]
Smoking prevalence (%)	42.70	0.70	46.70	1.30	GATS 2015
SAF (%)	11.02	0.28	9.32	0.18	Calculated by authors using RR from Liu *et al*[19]
	27.76	0.63	21.89	0.26	Calculated by authors using RR from Jha *et al* (2008)

Source: Authors' calculation using VHLSS 2018, GSO-WB and Liu *et al*.[19]
GATS 2015, Global Adult Tobacco Survey Viet Nam 2015; GSO-WB, General Statistics Office of Vietnam and the World Bank; RR, relative risk; SAF, smoking-attributable fraction; VHLSS, Vietnam Household Living Standards Survey.

Table 3 Prevalence of tobacco-consuming households* (%)

	Population	% of population	Smoking prevalence (%)
1. Total			56.46
2. Regions			
Urban	32 356 428	33.39	50.06
Rural	64 538 904	66.61	59.75
Difference			9.70***
3. Ethnic groups			
Kinh and Hoa	81 782 268	84.40	55.18
Ethnic minorities	15 113 064	15.60	64.57
Difference			−9.39***
4. Consumption quantiles			
1st quantile (0%–20%)	19 385 316	20	59.44
2nd quantile (20%–40%)	19 377 577	20	59.52
3rd quantile (40%–60%)	19 376 897	20	58.10
4th quantile (60%–80%)	19 380 182	20	60.16
5th quantile (80%–100%)	19 375 360	20	47.22
Difference between the 1st and 5th quantiles			12.22***

***p<0.001.
Source: Authors' calculation using VHLSS 2018 and GSO-WB.
*There is at least one smoker in the household.
GSO-WB, General Statistics Office of Vietnam and the World Bank; VHLSS, Vietnam Household Living Standards Survey.

to tobacco purchases and tobacco-related healthcare expenditure overlapped in certain tobacco-consuming households; they live in a poverty situation due to either one, or both, of the two expenses. Together, the expenditure on tobacco products and the tobacco-related healthcare expenditure in 2018 pushed 305 090 people into poverty, even though their total resources were higher than the NPL. In other words, the impoverishing effect of tobacco use increased the poverty rate by 0.31 percentage points.

Considering the changes in the poverty gap, these findings demonstrate that tobacco use increased the poverty gap from 2.20% to 2.28% in 2018. Another noteworthy point is the high proportion of children (38.60%) in the impoverished population; approximately one in three impoverished people are children. The finding confirms the effect of smoking on the younger generation and raises a serious concern about the long-term impact of smoking on the social and economic development of Vietnam.

Heterogeneity in the impact of tobacco use across regions and ethnic groups

Table 5 presents the impoverishment caused by tobacco use according to three classifications: rural and urban areas; Kinh and Hoa compared with ethnic minorities; and consumption quintiles. First, tobacco use seems to have a greater impact on poverty in rural areas, where both the smoking prevalence and the proportion of low-income people are significantly higher. Whereas the impoverishing effect in urban areas is modest, the effect in rural areas is considerably higher (corresponding to 0.06% and 0.44%, respectively). The differences in the poverty gap caused attributable to the use of tobacco are 0.11% for urban areas and 0.02% for rural ones, again reflecting the more severe impact of tobacco use in rural areas.

Similarly, the impact on ethnic minorities appears to be more substantial in comparison to that on the Kinh and Hoa groups. In 2018, tobacco use had an impoverishing effect on 0.76% of the ethnic minority population and deepened the poverty gap by 0.30%, whereas for the Kinh and Hoa groups, the impoverishing effect was 0.23% and the poverty gap increased 0.04%. The calculations also show that tobacco use only has an impoverishing effect on populations from the lowest consumption quintiles.

DISCUSSION AND CONCLUSION
This study quantifies the direct impact of tobacco use on poverty measured by poverty head count and the total size of the poverty gap in Vietnam. Generally, the tobacco-related expenditures of households include two components: spending on tobacco products and tobacco-related healthcare spending. Together, these two components of tobacco spending pushed 305 000 people into poverty in 2018—approximately 0.31% of the country's population. Smoking also has a powerful effect on children when a third of the impoverished population are children. Additionally, the impoverishing effects differ across groups in society. The effects are mostly concentrated among populations in rural areas, ethnic minorities and the lowest socioeconomic quintiles of consumption. The lower average age of tobacco-consuming household heads also implies a greater effect on younger people.

Table 4 Changes in HCR and number of poor after deducting tobacco-related expenditures in Vietnam

	Official estimates	Accounting for tobacco purchases	Accounting for tobacco-related medical expenses	Combined effect of tobacco purchases and tobacco-related medical expenses
Total population	96 895 332			
HCR—population BPL (%)	8.35	8.65	8.38	8.67
Population BPL	8 091 801	8 378 896	8 122 057	8 396 891
Of which: children	3 457 064	3 567 651	3 460 434	3 574 849
Proportion of children (%)	42.72	42.58	42.60	42.57
Poverty gap (%)	2.20	2.27	2.21	2.28
Impoverishing effect (%)		0.30	0.03	0.31
Impoverishing effect (number of people)		287 095	30 256	305 090
Of which: children		110 587	3370	117 785
Proportion of children (%)		38.52	11.14	38.60
Changes in poverty gap (%)		0.07	0.01	0.08

Source: Authors' calculation using VHLSS 2018, GSO-WB and Liu et al.[19]
BPL, Below Poverty Line; GSO-WB, General Statistics Office of Vietnam and the World Bank; HCR, head count ratio; VHLSS, Vietnam Household Living Standards Survey.

Table 5 Impovering effect of tobacco-related expenditures by population groups in Vietnam

	Region		Ethnic group		Consumption quintiles	
	Urban	Rural	Kinh and Hoa	Ethnic minorities	First consumption quintile	Other consumption quintile
Population	32 356 428	64 538 904	81 782 268	15 113 064	19 385 316	77 510 016
Impoverishing effect (%)	0.06	0.44	0.23	0.76	1.57	0.00
Impoverishing effect (number of people)	17 995	287 095	189 948	115 142	305 090	0
Changes in poverty gap (%)	0.02	0.11	0.04	0.30	0.39	0.00

Source: Authors' calculation using VHLSS 2018, GSO-WB and Liu *et al*.[19]
GSO-WB, General Statistics Office of Vietnam and the World Bank; VHLSS, Vietnam Household Living Standards Survey.

The main limitation of this study concerns the SAF estimate for Vietnam. Due to the lack of available data, the estimation of the SAF for Vietnam used the RR from China and a separated SAF for smokers and non-smokers could not be calculated. The impact of tobacco use on the two groups will never be the same, and therefore the accuracy of the estimated impoverishing effect for the two groups would potentially be impacted. This problem raises a clear need for future study on the relative risk of tobacco use and the smoking-attributable factor in health costs for different population groups in Vietnam.

As smoking rates tend to be highest among the poorest and most marginalised populations,[23] they will be the ones who bear the highest burdens of tobacco use. Tobacco users and their family members in these groups are at a higher risk of facing short-term poverty and are at a higher risk of suffering from prolonged poverty. Their limited budget for daily food and basic needs might be traded off for tobacco purchases. Furthermore, all family members of a tobacco-consuming household are more susceptible to tobacco-related illnesses, which impose additional healthcare costs. If a household's primary income earner dies prematurely, this could place a heavy economic burden on the remaining family. People in the most marginalised groups usually have the lowest tobacco quitting rate[13] and face the greatest number of difficulties in escaping from poverty.[24] Smoking serves to perpetuate and exacerbate cycles of poverty, especially in the most marginalised groups. Therefore, an efficient tobacco control policy would significantly contribute to the improvement of public health in Vietnam and to poverty reduction.

ORCID iDs
Anh Ngoc Nguyen http://orcid.org/0000-0003-2753-2667
Ha Thu Bui http://orcid.org/0000-0002-6011-0821

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