

Secondhand smoke among pregnant women in developing countries: comparative analysis using Demographic and Health Surveys in 28 countries

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Background

Tobacco use is a major risk factor for non-communicable diseases, the leading preventable cause of death worldwide. Epidemiologic studies have been conducted extensively to study prevalence of tobacco use and causal associations between tobacco use and selected non-communicable diseases. The negative health effects of smoking, however, are not restricted to smokers. Globally 600,000 deaths are attributable to secondhand smoke in each year (Oberg et al. 2011). Secondhand smoke during pregnancy is also associated with low birthweight (Jaddoe et al. 2008), a risk factor for mortality and morbidity among infants. Nevertheless, few studies examined secondhand smoke among pregnant women in developing countries. The purpose of this study is to assess levels and patterns of secondhand smoking among women – overall as well as by current pregnancy status, using nationally representative surveys from 28 countries.

Data

Data come from Demographic and Health Survey (DHS), a nationally representative household survey collecting population, health, and nutrition data in developing countries. Since 1984, over 260 surveys have been conducted in 90 countries. Standardized methods, questionnaires, and implementation facilitate comparative analyses across time and countries. All women between 15 to 49 years of age in sampled households are eligible for an interview using a women’s questionnaire. In selected surveys, a sub-set of households are randomly selected, and all men between 15 to 59 years of age in those households are interviewed using a men’s questionnaire. More information on the core scope of DHS and the methods is available at www.measuredhs.com.

During the last decade, a limited number of questions on current use of tobacco products have been included in both women’s and men’s questionnaires. In spite of some variation in types of tobacco products across countries, the questionnaires generally collect data on: whether or not she/he uses any tobacco products currently; if yes, what kind of tobacco products she/he uses; and, if commercial cigarettes are used, the number of cigarettes smoked within the last 24 hours.

For the purpose of this study, data will come from 28 countries where the tobacco questions were included in both women’s and men’s questionnaires. If there are multiple eligible surveys in a country, the most recent survey will be analyzed. A complete list of the 28 countries, survey year, and sample sizes are presented in Table 1.

Measurement and Analysis Plan

Main research questions are the following:

1. What is the level of secondhand smoking among women in developing countries?
2. Are pregnant women less exposed to secondhand smoking compared to non-pregnant women?

A binary variable will be created to measure exposure to secondhand smoking at home – i.e., living in a household where one or more adult men (15-59 years of age) smoke commercial cigarettes, cigars, and other country-specific smoking products^{*†}. Another binary variable will be created to measure women’s own smoking status – i.e., currently smoking commercial cigarettes, cigars, and other country-specific smoking products.

A dichotomous variable will be created for self-reported current pregnancy status among women (pregnant vs. not pregnant). Additional variables will be created to control for background demographic and socioeconomic characteristics such as age, residence (rural vs. urban), household wealth quintiles based on housing condition as well as asset ownership, and educational attainment[‡].

Analysis will be limited to women living in the sub-sample of households where both eligible women and men were interviewed (Table 1). Among women 15-49 years of age, proportions of those who are exposed to secondhand smoke at home will be estimated – over all as well as by pregnancy status. Logistic regression analyses will be conducted to measure relative odds of being exposed by pregnancy status. Multivariate models will be used to control for background characteristics. All analyses will be conducted by country, and summary measures across 28 countries will be calculated. All analyses will be adjusted for sampling weights.

Preliminary Results

On average across the study countries, 26% of pregnant women were exposed to secondhand smoke. While women’s own smoking prevalence is lower among pregnant women than non-pregnant women, there is no differential in exposure to secondhand smoke at home by pregnancy status in most countries (Table 2). Only in Zambia, Zimbabwe, and Madagascar, secondhand smoke exposure is lower among pregnant women. In Ghana, Malawi, and Sierra Leone, exposure appears to be higher among pregnant women. This is possibly confounded by background characteristics associated with fertility and men’s smoking status and warrants further analyses using multivariate logistics regression models.

* Such as *bidis*, *kreteks*, and water pipes. Use of chewing tobacco was excluded as the study focuses on secondhand smoke.

†† Limitations of this definition include: (1) Exposure is likely to be underestimated since male respondents were restricted to 15-59, excluding potential older male smokers in the household, (2) The male smokers may not smoke inside the house, and (3) Exposure to secondhand smoke elsewhere is not measured.

‡ Educational attainment of adult women and men.

Study Implications

This study will contribute to fill knowledge gap in secondhand smoking exposure by pregnancy status in developing countries. The results will provide programmatic implications in terms of integrating smoking cessation counseling during antenatal care, in order to improve both pregnancy outcomes and infant survival.

References

- Jaddoe, V. W. V., E. Troe, et al. (2008). "Active and passive maternal smoking during pregnancy and the risks of low birthweight and preterm birth: the Generation R Study." Paediatric and Perinatal Epidemiology 22(2): 162-171.
- Oberg, M., M. S. Jaakkola, et al. (2011). "Worldwide burden of disease from exposure to second-hand smoke: a retrospective analysis of data from 192 countries." Lancet 377(9760): 139-146.

Table 1. Number of women analyzed by country: 23 Demographic and Health Surveys*

Country	Survey year	Number of women		
		Total	Not pregnant	Pregnant
Armenia	2005	1,447	1,407	40
Azerbaijan	2006	2,558	2,464	94
Bangladesh	2007	3,771	3,512	259
Dominican Republic	2007	27,195	25,916	1,279
Ethiopia	2005	6,033	5,554	479
Ghana	2008	4,568	4,225	343
Kenya	2008	3,465	3,212	253
Lesotho	2009	3,317	3,194	123
Liberia	2007	6,009	5,380	629
Madagascar	2008	8,586	7,979	607
Malawi	2004	3,261	2,861	400
Mozambique	2003	2,900	2,604	296
Namibia	2006	3,915	3,691	224
Nepal	2006	4,397	4,167	230
Nigeria	2008	15,486	13,559	1,927
Rwanda	2005	4,820	4,437	383
Sierra Leone	2008	3,280	3,017	263
Swaziland	2006	4,156	3,930	226
Tanzania	2010	2,527	2,341	186
Uganda	2006	2,503	2,280	223
Ukraine	2007	3,178	3,102	76
Zambia	2007	6,500	5,803	697
Zimbabwe	2005	7,175	6,701	474
AVERAGE	2007	5,698	5,275	422

*Five countries will be added: Albania, India, Maldives, Moldova, and Timor-Leste.

Table 2. Prevalence of smoking and exposure to secondhand smoking among adult women 15 to 49 years of age: by current pregnancy status, 23 Demographic and Health Surveys*

Year	Survey year	Current pregnancy status	Number of women	Smoking, self (%)	p-value	Secondhand smoking (%)	p-value
Armenia	2005	not pregnant	1,407	3.9		60.7	
		pregnant	40	0.0	0.250	64.4	0.689
Azerbaijan	2006	not pregnant	2,464	-		48.5	
		pregnant	94	-		48.6	0.980
Bangladesh	2007	not pregnant	3512	-		60.4	
		pregnant	259	-		58.4	0.550
Dominican Republic	2007	not pregnant	25916	6.6		11.4	
		pregnant	1279	2.7	0.000 **	12.1	0.622
Ethiopia	2005	not pregnant	5554	0.1		11.9	
		pregnant	479	0.1	0.869	10.8	0.575
Ghana	2008	not pregnant	4225	0.2		7.8	
		pregnant	343	0.3	0.803	10.2	0.134 *
Kenya	2008	not pregnant	3212	0.3		17.8	
		pregnant	253	0.3	0.957	17.7	0.975
Lesotho	2009	not pregnant	3194	0.3		33.7	
		pregnant	123	0.0	0.645	37.9	0.325
Liberia	2007	not pregnant	5380	0.9		16.6	
		pregnant	629	1.8	0.107 *	14.3	0.282
Madagascar	2008	not pregnant	7979	0.9		25.7	
		pregnant	607	0.2	0.045 **	22.9	0.198 *
Malawi	2004	not pregnant	2861	0.4		16.3	
		pregnant	400	0.3	0.660	22.0	0.019 **
Mozambique	2003	not pregnant	2604	2.3		13.2	
		pregnant	296	1.6	0.535	16.2	0.216
Namibia	2006	not pregnant	3691	9.0		22.6	
		pregnant	224	8.9	0.984	24.2	0.675
Nepal	2006	not pregnant	4167	14.7		30.7	
		pregnant	230	4.9	0.002 **	33.1	0.492
Nigeria	2008	not pregnant	13559	0.4		8.7	
		pregnant	1927	0.2	0.219	8.3	0.605
Rwanda	2005	not pregnant	4437	0.3		14.1	
		pregnant	383	0.4	0.791	16.4	0.265
Sierra Leone	2008	not pregnant	3017	6.9		34.7	
		pregnant	263	4.1	0.086 *	39.5	0.143 *
Swaziland	2006	not pregnant	3930	1.1		14.1	
		pregnant	226	1.3	0.841	15.1	0.721

Tanzania	2010	not pregnant	2341	0.2			17.7	
		pregnant	186	0.0	0.541		19.1	0.671
Uganda	2006	not pregnant	2280	0.4			18.1	
		pregnant	223	0.5	0.828		16.9	0.679
Ukraine	2007	not pregnant	3102	19.5			53.0	
		pregnant	76	7.1	0.063	*	50.0	0.661
Zambia	2007	not pregnant	5803	0.9			24.0	
		pregnant	697	0.4	0.187	*	18.5	0.002 **
Zimbabwe	2005	not pregnant	6,701	0.4			22.4	
		pregnant	474	0.1	0.240		19.1	0.126 *

*Five countries will be added: Albania, India, Maldives, Moldova, and Timor-Leste.

† P-value for Chi-square test of differential distribution by pregnancy status