

# Prevalence and predictors of smoking and quitting during pregnancy in Serbia: results of a nationally representative survey

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## Abstract

**Objectives** Middle- and low-income countries rarely have national surveillance data on smoking in pregnancy. This nationwide population-representative survey investigated pre- and post-partum smoking and their predictors in Serbia.

**Methods** Using stratified two-stage random cluster sampling, 2,721 women in 66 health care centres were interviewed at 3 and 6 months post-partum.

**Results** 37.2% of women smoked at some point in pregnancy (average 8.8 cigarettes/per day). Smoking at pregnancy onset and during pregnancy was associated with smoking by others in the home and lower education and family socio-economic status. Almost a quarter of women

(23.2%) who quit smoking during pregnancy did not relapse 6 months post-partum. Older women, primiparae, university students and white-collar workers were more likely to successfully quit smoking. More than a half of women were exposed to SHS in their homes (57.6%) and 84.6% allowed smoking in their homes.

**Conclusion** Smoking during pregnancy in Serbia was two- to threefold higher than in the most affluent western countries. Target groups for action are women with lower education and socio-economic status, as well as health professionals and family members who smoke.

**Keywords** Nationwide sample · Pregnancy · Smoking · Smoking cessation · Predictors of smoking and smoking cessation

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## Introduction

In Serbia, almost one-third of women (29.9%), aged 20 or older, are regular or occasional smokers, and 23.7% are daily smokers (Grozdanov et al. 2007). Smoking prevalence is significantly higher than the average for women in Europe (18.2%) and in South-Eastern European countries (16.1%) (WHO, Regional Office for Europe 2007). The harmful effects of smoking to women's and baby's health are well established and include infertility, pathological development of pregnancy and labour, and effects on baby's health (US Department of Health and Human Services 2001).

Population representative estimates of the prevalence of smoking and cessation during pregnancy are obtained through national surveillance studies in relatively few highly developed countries (Al-Sahab et al. 2010; Jaakkola et al. 2001; Jensen et al. 2008; Kvalvik et al. 2008;

Schneider et al. 2008; Tong et al. 2009), but are rare in developing and transitioning countries where smoking in pregnancy is poorly documented (Bloch et al. 2008) and often estimated solely from the prevalence of smoking among women of child-bearing ages (Nichter et al. 2010).

A pilot study conducted in two cities in Serbia in 2003 showed that at some point during the course of pregnancy 45.5% of women smoked (Ukropina et al. 2005), which is a much higher rate than had been observed in high-income countries for which data have been reported, ranging from 9 to 19% (Jaakkola et al. 2001; Jensen et al. 2008; Johnson et al. 2004; Kaneko et al. 2008; Kong et al. 2008; Kvalvik et al. 2008; Schneider et al. 2008; Schneider and Schütz 2008; Tong et al. 2009).

The present study is a nationally representative study of smoking behaviour in relation to pregnancy in Serbia, where smoking among women is socially accepted. We report on the prevalence and heaviness of smoking before, during and after pregnancy, as well as the predictors of smoking during the course of pregnancy and the predictors of successful smoking cessation.

## Methods

### Sampling design

The target population for this study was all women who gave birth in 2008 in Serbia. The sample was designed to provide statistically reliable estimates of a large number of indicators related to smoking in pre- and post-natal women, for the Republic of Serbia, and each of three geographic sub-divisions: Autonomous Province Vojvodina; Belgrade; and all remaining regions of Serbia (West, Central, East and Southeast Serbia—further referred to as Central Serbia). Autonomous Province Kosovo and Metohia was not included.

All Serbian women are entitled to pre-natal care with a Primary Health Care Centre (PHCCs). All newborns are registered with PHCCs and receive routine well baby visits from patronage (primary care) nurses in the first year. For this study, the sampling frame was all women who had already received the first regular post-natal visit by patronage nurses from their PHCCs.

A stratified two-stage random cluster sampling design was applied. Out of the 158 PHCCs, 66 were selected as the primary sampling unit (PSU) by random sampling proportionate to size and stratified by region. The target clustered sample of 2,721 women was determined a priori, using the numbers of newborns registered in PHCC in Serbia in previous years, the results of a previous pilot study (Ukropina et al. 2005) and an assumed 10% non-response rate. Mothers of multiples were counted once.

Within each PHCC, women were sampled according to the order of contact within the applicable time period.

Excluded from the sampling frame were post-natal women whose infant was not discharged alive from hospital, for whom the patronage nursing staff knew, prior to visit, that the infant had died post-discharge, or had become seriously ill, who did not have citizenship of the Republic of Serbia, and thus not entitled to post-partum home care, who had chosen to use private post-natal home care (approximately 4% post-partum women according to patronage service experience) and who refused to participate or chose to withdraw their participation during the study.

### Procedure and study instruments

The Ethical Committee of the Serbian Medical Association approved the study before its start. All post-partum women received a home visit from trained patronage nurses from their PHCC on two occasions: at 3 months after delivery (with interviews conducted from July 1 through September 30, 2008), and 6 months after delivery (from October 1 to December 31, 2008). Each woman was interviewed in-person by patronage nurses. The initial questionnaire obtained basic demographic data on participating women: age, place of residence (region and urban versus rural), education (elementary, high school, and college and university), occupation (blue-collar, white-collar, student and housewife), employment status at the time of interview (employed and unemployed), birth order of newborn child (primipara or not), as well as a self-reported measure of perceived socio-economic status using three levels which translate to poor, average, or good, in English. Also, women were asked if anyone in the same household smoked at home, and if the answer was positive, data were collected on the number of family members who smoked at the time of interview, and whether smoking was permitted in the home. Smoking behaviour of the mother was obtained including whether she smoked at the time she learned of her pregnancy, at each trimester during the pregnancy and at 3 and 6 months after delivery. For each time period, the number of cigarettes smoked per day was obtained, as well as data on smoking cessation attempts and success, and reasons for cessation (concern for the baby's health, both for mother's and the baby's health or for only mother's health, health complaints during the pregnancy and advice of her doctor).

Each participating woman signed the informed consent form. The response rate was 98.1%. Only 49 women refused to participate, and four were excluded because smoking data were missing. Thus, the total number of women participating in the study was 2,668. At the second interview, 6 months after delivery, another 44 women

refused to participate, leaving 2,624 women, and a full participation rate of 96.4%.

### Study indicators

Smoking status indicators were defined as follows:

- Smoking in pregnancy—participants who smoked daily or occasionally in any of the four periods of pregnancy (at the time woman learned of pregnancy as a surrogate measure for smoking prior to pregnancy, and at the first, second and third trimester), and the average number of cigarettes smoked per day for each period of pregnancy;
- Smoking during the entire course of pregnancy—regular (smoked in all four periods of pregnancy), occasional (smoked in up to three time points, but not the whole pregnancy), and ever smoked during the pregnancy, as well as the average number of cigarettes smoked over the different periods of pregnancy;
- Smoking status at 3 and at 6 months after childbirth and average number of cigarettes smoked in these periods;
- Success rates of smoking cessation and maintained non-smoker status at 6 months after delivery for women who smoked at the start or during the pregnancy.
- Success rates of smoking cessation and maintained non-smoker status at 6 months after delivery for women who ceased smoking after the first visit of patronage nurses.

### Statistical methods

Prevalence rates were estimated for core study outcomes, namely: smoking in pregnancy, smoking cessation attempts and successful cessation. Independent effects of women's age, place of residence, education, occupation, self-estimated socio-economic status, the birth order of newborn and smoking of the household members at home on outcome prevalence, were examined for each outcome. Effects are presented as Prevalence Ratios (PR) with 95% confidence intervals (CIs) estimated using multivariable Poisson regression analysis with robust errors. Significance was defined as  $p < 0.05$ . Reported proportions, population totals, means and regression coefficients were estimated using probability sampling weights calculated to reflect an underlying population of 23,382 pregnant women in Serbia by region in 2008. Post-stratification weighting for other socio-demographic characteristics was not used. Variance estimates and confidence intervals reported account for the impact on precision of stratification, cluster-sampling and sampling weights, using Taylor-series linearization techniques for complex samples. Analyses were carried out

using procedures specific to survey data within STATA version 11.1 (StataCorp LP College Station, TX, USA).

### Test–retest reliability assessment

Reliability of self-reported smoking status was assessed by drawing a random sample of one woman per PHCC (66 in total) for re-interview by a study supervisor within 1 week following the second interview to obtain data on smoking status (daily, occasionally and not-at all) at the time of recognition of the pregnancy, in the third trimester of the pregnancy and at 6 months post-partum. Weighted kappa ( $\kappa$ ) coefficients for within person agreement between the original and validation interview were calculated.

## Results

### Reliability assessment

Excellent test–retest reliability (between the first and second interview) was observed for self-reported smoking at recognition of pregnancy ( $\kappa = 0.663$  and  $p < 0.0001$ ), in the third trimester of pregnancy ( $\kappa = 0.693$  and  $p < 0.0001$ ). Excellent test–retest reliability was also observed for self-reported smoking status at 6 months post-delivery, assessed comparing the sixth-month interview with re-interview by a supervisor 1 week later ( $\kappa = 0.812$  and  $p < 0.0001$ ).

### Basic demographic characteristics of participants

The total number of women participating in the study was 2,668. At the second interview 44 women refused to participate, leaving 2,624 women. Roughly half of Serbian women giving birth in 2008 lived in Central Serbia, and more than two-thirds lived in urban areas (Table 1). The mean age at the first interview was just over 28 years. For roughly half of the women in the study, this was their first delivery (50.4%); for one-third (36.1%) it was their second, and for 10.3% it was their third delivery. More than a half of the women had completed high school. With respect to occupation, more than half worked in blue-collar occupations (hair-dressers, florists, shoe shop workers, janitors, cooks, workers in storage, chemical technicians, etc.), one quarter were white-collar workers (bookkeepers, bank employees, journalists, professors, teachers, dentists, managers, economists, preschool teachers, nurses, secretaries, etc.), one-fifth were housewives, and 59 were university students. At the time of this study, more than a half of the women were not employed. Half of the women self-estimated the socio-economic status of their family as “average”, 7.8% as

**Table 1** Demographic characteristics of a nationally representative sample of women who gave birth between April 1 and June 30, 2008, Serbia

Characteristics	Category	Number of women (total = 2,668)	%
Geographical area	Vojvodina	726	27.2
	Belgrade	687	25.7
	Central Serbia	1,255	47.0
Urban/Rural	Urban	1,884	70.6
	Rural	784	29.4
Age intervals	<20	155	5.8
	20–28	1,192	44.7
	≥28	1,321	49.5
Education	Elementary	424	15.9
	High school	1,465	54.9
	College and University	779	29.2
Occupation	Blue-collar	1,414	53.0
	White-collar	656	24.6
	Student	59	2.2
	Housewife	539	20.2
Employment	Unemployed	1,361	51.8
	Employed	1,267	48.2
Self estimated socio-economic status	Poor	208	7.9
	Average	1,330	50.5
	Good	1,096	41.6

“poor” and significant percentage of women (41.6%) as “good”.

#### Exposure to second-hand smoke (SHS)

More than a half of pregnant women in Serbia were exposed to SHS in their homes (57.6%; 95% CI 52–63%) and two-thirds from their husbands (67.4%; 95% CI

62.8–71.6%). The average number of smokers in household of women in Serbia was 1.3, and the largest reported number of smokers in the home was six. More than four in five women allowed smoking in their home (84.6%).

#### Smoking prevalence

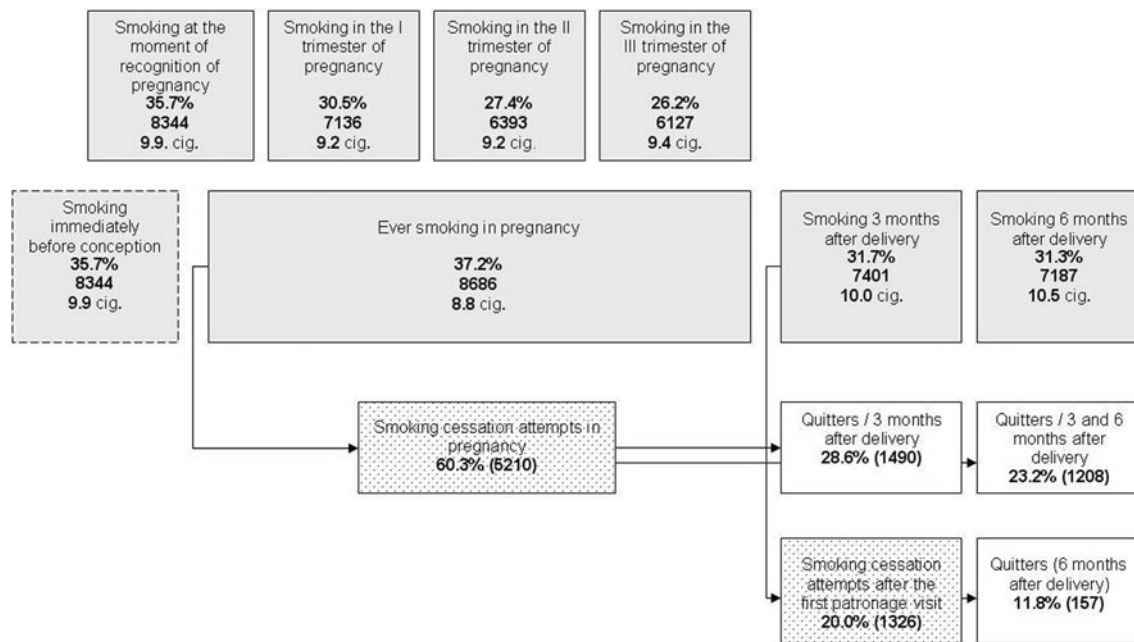
The collective patterns of smoking and quitting behaviours over the course of pregnancy and after childbirth are presented in Table 2 and illustrated in Fig. 1. More than a third of women (37.2%) in Serbia smoked at some point during the pregnancy. Among them, 37% (95% CI 32.7–41.5%) did not smoke for at least some period during the pregnancy. During the course of pregnancy, the number of pregnant women who smoked decreased, from 35.7% at the time of recognition of pregnancy to 26.2% in the last trimester. Estimated average number of cigarettes smoked per day was quite consistent across the various time points over the pregnancy with an overall average of 8.8 cigarettes per day per smoker (Table 2).

At 3 months after delivery, the prevalence of smoking, at 31.7%, was significantly lower than that observed at the beginning of pregnancy (a decrease of 12.8%; 95% CI 6.9–18.9%;  $p < 0.0001$ ) and the prevalence remained similar at 6 months after delivery (31.3%; 95% CI 28.3–34.4%), (decrease of 14.2%; 95% CI 7.7–21.1%;  $p < 0.0001$ ).

Factors significantly associated with smoking before pregnancy and during the entire pregnancy are the same (Table 3). Women with household members who smoked inside their home were twice as likely to smoke themselves (PR = 2.0 at both time points). Women with lower levels of education were more likely to smoke (PR = 1.5 and PR = 1.4, for immediately before and during the pregnancy, respectively), as were women who described their family socio-economic status as “poor” compared with “good” (PR = 1.2, and PR = 1.2, respectively).

**Table 2** Estimates of smoking proportion among pre- and post-natal women in Serbia (percentage and 95% CI) and average number of cigarettes smoked daily in various periods of pregnancy and post-partum (mean and 95% CI), 2008

Periods of pregnancy and after delivery	Daily smoking		Occasional smoking		Total	
	Yes	No. of cigarettes	Yes	No. of cigarettes	Yes	No. of cigarettes
Immediately before conception	26.0 (23.2–29.0)	12.03 (11.51–12.55)	9.7 (8.5–11.2)	4.08 (3.44–4.71)	35.7 (33.0–38.5)	9.88 (9.39–10.37)
I trimester	22.3 (19.8–24.9)	11.27 (10.61–11.94)	8.3 (7.0–9.7)	3.65 (3.08–4.22)	30.5 (28.1–33.1)	9.21 (8.65–9.78)
II trimester	20.4 (18.1–22.7)	11.21 (10.56–11.86)	7.0 (5.9–8.3)	3.46 (2.87–4.04)	27.4 (25.4–29.4)	9.22 (8.65–9.79)
III trimester	19.9 (17.8–22.2)	11.31 (10.55–12.08)	6.3 (5.3–7.6)	3.39 (2.67–4.12)	26.2 (24.3–28.3)	9.42 (8.76–10.07)
Ever	23.4 (21.4–25.5)	11.40 (10.69–12.11)	13.8 (11.8–16.0)	5.09 (4.10–6.08)	37.2 (34.5–39.9)	8.75 (8.11–9.39)
3 months after delivery	24.7 (22.1–27.4)	12.14 (11.58–12.70)	7.0 (6.0–8.2)	2.31 (1.79–2.83)	31.7 (29.0–34.5)	9.97 (9.37–10.58)
6 months after delivery	26.7 (23.7–29.8)	12.02 (11.36–12.67)	4.6 (3.6–5.9)	1.73 (1.34–2.12)	31.3 (28.3–34.4)	10.50 (9.81–11.19)



**Fig. 1** Population estimates of the prevalence (%) of smoking, number of smokers, and average number of cigarettes smoked per day by smokers, among women who gave birth between April 1 and June 30, 2008, Serbia

### Smoking cessation attempts and success

More than a half of pregnant women who smoked during their pregnancy tried to quit smoking (60.3%; 95% CI 55.7–64.8%), as shown in Fig. 1. The most often reported reason for quitting was concern for the baby's health (47.1%), followed by mother's concern both for her own and the baby's health (33.8%); health complaints during the pregnancy (16.2%); and concern for the mother's health (2%). Only a small minority reported that they had decided to quit smoking upon the advice of their doctor (1.4%).

Nearly one quarter of pregnant women (23.2%) who ceased smoking during pregnancy remained non-smokers at 6 months following delivery (Fig. 1). As presented in Table 3, the likelihood that a woman would quit smoking and maintain abstinence at 6 months after delivery was greater for women 28 years or older, versus younger, (PR = 1.6). First-time mothers were 80% more likely to have quit smoking by the post-partum period relative to women who were smoking at the start of a second or subsequent pregnancy (PR = 1.8). Women who were university students, contrasted to all other occupations, were nearly three times more likely to quit smoking (PR = 2.7). Women who worked in white-collar occupations were 45% more likely to be successful in smoking cessation relative to those in other occupational groups. Women living in urban areas were roughly 10% more likely to succeed in quitting relative to those from rural areas.

### Discussion

This large nationwide study among post-partum women provides evidence that smoking during pregnancy is alarmingly common in Serbia. To our knowledge this is the first nationwide study of this kind in the Balkans to provide an overview of smoking behaviour in relation to pregnancy. We observed that one-third of all pregnant women smoked at some point during the pregnancy, more frequently if some of their family members smoked at home, if they have lower educational level and if they self-estimate their family socioeconomic status as "poor". In spite of the pattern of smoking that fluctuated in prevalence during the pregnancy, almost one quarter of women quit smoking during the pregnancy and had not started 6 months after giving birth.

Comparable data, though not nationally representative, on smoking during pregnancy have been reported from Romania and Greece (Meghea et al. 2010; Vardavas et al. 2010). In Crete, 36% of pregnant women smoked at some point during the pregnancy, which is similar to our findings. Results from a study in Romania revealed lower smoking prevalence among pregnant women while approximately 15% of the pregnant women continued to smoke during pregnancy. For other Balkan countries, and for the majority of low- and middle-income countries in other regions, data are simply not available. Bearing in mind that former Yugoslav countries (e.g., Croatia, Bosnia

**Table 3** Predictors of smoking and successful smoking cessation during pregnancy and after delivery in Serbia (PRs and 95% CIs, from adjusted robust Poisson regression), 2008

Smoking	Predictors of smoking	PR	95% CI
Immediately before conception	Education		
	Elementary school	1.17	1.05–1.31
	High school	1.49	1.25–1.76
	College and University	1.00*	
	Self estimated socio-economic status (SES)		
	Poor	1.19	1.07–1.33
	Average	1.02	0.89–1.17
	Good	1.00*	
	Smoking of family members at home		
	Yes	2.00	1.75–2.29
No	1.00*		
During the pregnancy	Education		
	Elementary school	1.15	1.03–1.28
	High school	1.42	1.19–1.69
	College and University	1.00*	
	Self estimated socio-economic status (SES)		
	Poor	1.21	1.09–1.34
	Average	1.03	0.91–1.17
	Good	1.00*	
	Smoking of the household members at home		
	Yes	2.01	1.76–2.28
No	1.00*		
Successful smoking cessation	Predictors of successful smoking cessation	PR	95% CI
No relapse at 3 months and 6 months after delivery	Age of woman		
	≥28 years	1.55	1.17–2.05
	<28 years	1.00*	
	Primipara		
	Yes	1.80	1.32–2.45
	No	1.00*	
	White-collar		
	Yes	1.45	1.01–2.09
	No	1.00*	
	University student		
	Yes	2.69	1.60–4.53
	No	1.00*	
	Self-estimated socioeconomic status (SES)		
Good	1.45	0.96–2.20	
Average	1.51	0.64–3.53	
Poor	1.00*		
Smoking cessation 3 months after delivery—no relapse 6 months after delivery	Place of residence		
	Urban	1.13	1.02–1.24
	Rural	1.00*	

\* Referent value

and Herzegovina, Montenegro, and the Former Yugoslav Republic of Macedonia), as well as some other Balkan countries such as Bulgaria, Romania and Greece have similar smoking patterns, smoking prevalence and social environment in favour of smoking, one may expect similarly high rates of smoking during pregnancy to exist throughout the region.

In many developed countries, the prevalence of smoking before and during the pregnancy has declined substantially in the past two decades to rates as low as 9–14% in the USA, Europe and Canada (Al-Sahab et al. 2010; Moussa et al. 2008; Schneider and Schütz 2008; Tong et al. 2009). Among women in Serbia and other Balkan countries, what appears to exist now is an epidemic of tobacco use with smoking rates among women being as high as those observed in some high-income countries in the 1980s, such as 31% in Sweden and Canada (Moussa et al. 2008; Murin et al. 2011), 32% in the USA (Severson et al. 1995), or 34% in Norway and Denmark (Kvalvik et al. 2008)—putting Serbia almost three decades behind other nations in the battle against tobacco use.

In many low- and middle-income countries, cultural norms severely limit tobacco use by women and this is reflected in low rates of smoking related to pregnancy (Nichter et al. 2010). However, this is not the case in many Balkan countries, where sex-prohibitions on smoking do not exist and smoking is increasingly becoming prevalent among women. Limited data have been presented for nine developing nations in South America, Africa and Asia (Bloch et al. 2008), with the highest smoking prevalence in pregnancy reported in Uruguay (18.3%) and Argentina (10.3%). Again, these rates are much lower than that observed in Serbia.

As has been shown in many studies, in many settings, smoking prior to and during pregnancy was significantly more common among women with lower education and lower socio-economic status (Goedhart et al. 2008; Graham et al. 2010; Jaakkola et al. 2001; Kvalvik et al. 2008; Schneider and Schütz 2008). More than 80% of women in our study permitted smoking in their homes, and more than a half lived in a household with someone who smoked.

Our data showed that smoking prevalence was highest prior to pregnancy (36%) and steadily declined during the course of pregnancy. The lowest prevalence was in the third trimester of pregnancy (26%), followed by rebound to an intermediate, although significantly lower post-partum level than at the beginning of the pregnancy. Almost two-thirds of Serbian women who smoked in pregnancy made at least one attempt to quit smoking. Relapse was common, but post-pregnancy smoking remained significantly lower relative to the beginning of the pregnancy. We also found that smoking of family members inside the homes was closely related to the woman's own smoking behaviour

during pregnancy, as has been observed elsewhere (Charrier et al. 2010; Kaneko et al. 2008; Schneider and Schütz 2008; Vardavas et al. 2010), making the entire family an appropriate focus for efforts to reduce pregnancy-related smoking and second-hand smoke exposure to children. Efforts should be made to educate partners and other family members on the health hazards from the second-hand smoke. Older age, first-time mother, university students and women who worked in white-collar occupation were more likely to quit smoking and not to relapse 6 months post partum, as was reported elsewhere too (Graham et al. 2010; Murin et al. 2011)

In spite of the fact that nearly all women received prenatal care by the primary health care of gynaecologists and obstetrician, and had, on average, ten visits during the course of pregnancy, only 4.4% asked for help with smoking cessation (data not presented) (Krstev et al. 2009). This indicates that there is much to be done to engage Serbian healthcare professionals to inform, advice and help pregnant women to quit smoking. Tobacco cessation campaigns should address and include the health professionals. Good coverage of women with health care services during the pregnancy that exists in Serbia should also be a channel for stronger preventive efforts, including counselling of pregnant women to quit smoking during the pregnancy and to not relapse after delivery, as well as to adopt a smoke-free family life to benefit the newborn.

Several potential limitations of our study should be mentioned. Smoking behaviour was obtained from self-reports without biochemical validation and partially retrospective, i.e., smoking prevalence before and during the pregnancy was reported 3 months after delivery; therefore, recall bias can be introduced. Retrospective self-reports are the predominant method used in truly population-based surveillance studies of maternal behaviours and exposures during pregnancy. This is true even in those affluent countries which have national surveillance systems at all (Al-Sahab et al. 2010; Johnson et al. 2004; Schneider and Schütz 2008; Tong et al. 2009). Sampling from registries of live births (as performed here) is also more common than sampling of women during pregnancy from truly population-based registries of pregnancies, which exist in few countries (Jensen et al. 2008; Kvalvik et al. 2008; Moussa et al. 2008; Schneider et al. 2008).

The reliability of self-report data on smoking has been evaluated extensively and is found to be an acceptable method of gathering information on smoking pattern (Chiu et al. 2008; George et al. 2006; Hensley Alford et al. 2008; Patrick et al. 1994; Pickett et al. 2005; Post et al. 2008; Swamy et al. 2010). Our own reliability analysis showed that recall of smoking history before and during pregnancy was highly reliable. However,

underreporting of smoking during pregnancy has been reported in some studies (Boyd et al. 1998; Dietz et al. 2010; Kendrick et al. 1995; Russell et al. 2004; Webb et al. 2003). Here, data were collected through self-reports and by patronage nurses, as opposed to independent survey personnel, which was essential for feasibility of this national-level study. One of the possible sources of underreporting of smoking could be the provision of socially acceptable response. However, we do not expect this to happen, as data were collected after the successful delivery. Without the possibility of biochemical validation, the extent of under-reporting bias in this setting cannot be known. Significant underreporting may not have occurred, given the very high rates of smoking that were reported in general population and given general acceptance of smoking which still remains in Serbia. It is also possible that the true prevalence rates were even higher than those reported. Similar smoking prevalence before and during the pregnancy was reported in a retrospective study in Serbia among mothers of 2-year-old children which found that 32.4% mothers smoked before the pregnancy and 28.1% during the pregnancy (Stojanovic et al. 2010).

In conclusion, our study illustrates the high burden of smoking experienced in this region, where smoking during pregnancy remains at peak levels in terms of the global smoking epidemic. Our findings also suggest important target groups within the population including women with lower levels of education and lower socio-economic status, as is increasingly recognized in many countries (Bloch et al. 2008; Kvalvik et al. 2008; Najman et al. 1998; Nichter et al. 2010; Phung et al. 2003; Schneider et al. 2008). Although women in Serbia have regular prenatal health care, negligible numbers receive advice and assistance to quit smoking. Health professionals, and particularly those working in women's health, need more education and training as to how to approach smoking pregnant women and help them in smoking cessation. Given high rates of smoking in homes with a newborn and clear association between maternal smoking and smoking of family members, prevention efforts should not just be directed toward women, but also partners and family members.

Bearing in mind that in 2010 the Serbian Government adopted the new Law on Protection from Exposure to Second-Hand Smoke that bans smoking in all public and workplaces and in public transit (the hospitality sector is exempted) and that the compliance with the Law is high, we hypothesize that the behaviour regarding smoking at home will be changed gradually in the future. Therefore, repeated monitoring in the Balkans will be a unique opportunity to study the impact of such population-based policy measures.

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