

## Original Article

## Prevalence and determinants of tobacco consumption among pregnant women of three Central Indian Districts

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## ABSTRACT

**Background:** About 6.8% of Indian women consume tobacco and only 21.0% receive 'full' antenatal care. Thus, there are chances that women who consume tobacco during the non-pregnant state will continue to use tobacco during pregnancy.

**Materials and Methods:** A cross-sectional study was conducted across nine health centres in three districts of Madhya Pradesh, India. A total of 3,839 women admitted in the post-partum ward of selected hospitals were interviewed about tobacco consumption during pregnancy. Adjusted odds ratios were calculated to determine the predictors of tobacco consumption during pregnancy.

**Results:** The prevalence of tobacco consumption during pregnancy was 13.1%. Only 4.4% of women who consumed tobacco and 1.6% of women who did not use tobacco were advised against tobacco consumption by frontline health workers. The strongest predictors of tobacco consumption were tobacco consumption by husband [AOR = 36.16 (CI = 22.89–68.86)], neighbor/female friend consuming tobacco [AOR = 22.29 (CI = 13.11–31.82)], and female family members consuming tobacco [AOR = 5.63 (CI = 4.39–7.53)].

**Conclusion:** Awareness among women about adverse effects of tobacco consumption during pregnancy was low. Health system intervention in the form of health education and advice against tobacco consumption was virtually non-existent.


**Key words:** India; pregnancy; tobacco; women.

## Introduction

Seven decades after independence, India has not been able to provide 'full' antenatal care to every pregnant woman. Overall only, 21.0% (urban = 31.1%, rural = 16.7%) women in India received 'full' antenatal care.<sup>[1]</sup> In the state of Madhya Pradesh, only half (53.1%) of all pregnant women visited health centres during the first trimester, only one-third (35.7%) had four antenatal visits and merely 11.4% received 'full' antenatal care.<sup>[2]</sup> Tobacco use during pregnancy can contribute to maternal and perinatal/infant mortality.<sup>[3-8]</sup> Pregnant women who consume tobacco are at an increased risk of developing life-threatening complications such as placenta praevia,

placental abruption and pre-eclampsia.<sup>[3,4]</sup> However, more severe and permanent are the detrimental effects of tobacco on the fetus, which include low birth weight, premature birth, intrauterine growth restriction and an overall increase in perinatal/infant mortality.<sup>[5-8]</sup> As per the National Family Health Survey (NFHS)-4, the prevalence of tobacco consumption among Indian women was 6.8% (urban = 4.4%, rural = 8.1%).<sup>[1]</sup> As per NFHS-3, about 9.5% of all pregnant women (smokeless

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<b>Website:</b> <a href="http://www.tjogonline.com">www.tjogonline.com</a>	<b>Quick Response Code</b> 
<b>DOI:</b> 10.4103/TJOG.TJOG_32_17	

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**How to cite this article:** Verma P, Pandey P, Thakur A. Prevalence and determinants of tobacco consumption among pregnant women of three Central Indian Districts. *Trop J Obstet Gynaecol* 2017;34:XX-XX.

tobacco = 8.5%, smoking = 1.0%) in India consumed tobacco in one form or another.<sup>[9]</sup>

With such low level of antenatal care coverage, there are good chances that some women might consume inappropriate stuff such as teratogenic medicines, tobacco, alcohol or other harmful substances during pregnancy. There can be multiple reasons for such undesired health behaviour including lack of intervention (s) by the health system.<sup>[10-12]</sup> Many pregnant women, especially those who are less educated might not be aware of the harmful effects of tobacco consumption during pregnancy, thus it is the responsibility of health system to intervene by educating and advising them against tobacco consumption. Guidelines prescribed by the government of India for antenatal care and Indian Public Health Standards (IPHS) clearly mention that auxiliary nurse midwife (ANM) and physician should ask a pregnant woman about tobacco consumption habit/history during antenatal visits and intervene by advising pregnant women to give up tobacco at least during pregnancy and possibly forever.<sup>[13,14]</sup>

In the absence of recent population-based estimates about the tobacco use during pregnancy, we do not know whether there is a need for tobacco cessation program specifically for pregnant women, and for those who are planning to conceive in the near future. Moreover, we do not have any idea about the extent of knowledge a pregnant woman has about harmful effects of tobacco use during pregnancy. Lastly, we do not have any data to support whether the auxiliary nurse midwives (ANMs), ASHA (community health worker) and physicians currently provide any type of health education to pregnant women against tobacco use during pregnancy. Thus, to fill the existing gap in knowledge, we undertook this study with the objective to assess the prevalence, extent and determinants of tobacco use during the pregnancy.

## Materials and Methods

This was a hospital-based cross-sectional study. The total duration of the study was 11 months, from March 2016 to January 2017. The period of data collection was 6 months (June 2016 to December 2016). The study was conducted at multiple government hospitals where women come for antenatal care and childbirth. The present study was conducted in three districts of Madhya Pradesh, India. Indian health system is organised as a three-tier system.<sup>[14]</sup> The primary level is constituted by the primary health centre (PHC) and health sub-centre (HSC). Secondary level is constituted by community health centre (CHC), sub-district hospital and district hospital. Tertiary level is constituted by medical colleges and sub-specialties hospitals. Facilities for antenatal care and child-birth are available at all level of health facilities.

## Sampling technique

The study employed two-stage sampling. In the first stage, one block was selected from each district using simple random sampling technique. In the second stage, 1 community health centre and 2 primary health centres were randomly selected from each pre-selected block. In this manner, we selected 3 community health centres and 6 primary health centres for recruiting study participants. Women of all ages and parity coming for labor at selected hospitals.

Exclusion criteria included (1) any women (pregnant or post-partum) or her newborn that had to be referred out to the higher facility for any complications and (2) women who did not give consent for the study.

Participant's recruitments: As per the Janani Sishu Suraksha Karyakram (JSSK), all women who come for labour at public health facility stay at a health facility for 48 hours after delivery.<sup>[15]</sup> JSSK entitles pregnant women coming for child-birth at public health facilities to absolutely free and no expense delivery including caesarian section. This scheme stipulates free drugs, diagnostics, food, and transport (to either home or higher facility) facility to the mother and her new-born.<sup>[15]</sup> The time of participant recruitment and data collection was the period of post-partum stay at the facility. The data was collected minimum 12 hours after delivery to allow women to breastfeed, recover and rest before the interview. Because of the sensitivity of the study topic, the data was collected when women were alone in the post-partum ward to avoid bias (concealment of information) due to embarrassment in front of relatives/in-laws/spouse. This strategy was finalised after the pilot testing of the questionnaire. During the period of data collection, we enrolled all women coming for child-birth at the selected hospitals who fulfilled selection criteria for the study. The outcome variable was consumption of tobacco in any form for any duration by the women during the antenatal period. For the purpose of the study, we considered antenatal period as the time period between the date of woman's last menstrual period and date of delivery.

There were two sources of collected data. The first source was the participant's interview conducted using a pre-designed questionnaire, and the second source was the medical records relating to present pregnancy. To construct the questionnaire for the study, we conducted a systematic search on PubMed and Internet for the pre-validated questionnaire and relevant studies carried out in past on similar topic.<sup>[16-23]</sup> The study questionnaire had three parts – first part collected information on social demographic variables, second part collected information related to the knowledge of women

about the adverse effects of tobacco and the third part collected data on antenatal history, obstetric care availed and pregnancy outcome. The information related to the obstetric care such as date of last menstrual period, date of urine pregnancy test and dates of all antenatal visits were collected from the medical records. In case a woman did not have any medical records or a woman's medical record was incomplete, in all such cases, the required/missing data was collected from the women herself. The questionnaire was translated from English to native language (Hindi). The questionnaire was pre-tested on 30 women admitted to post-partum ward of the district hospital of one of the selected three districts. The results of pre-test were excluded from the final data analysis. The final version of study questionnaire had a reliability of  $\alpha = 0.94$ . To be included in data analysis a woman needed to answer all the questions in the questionnaire.

The data collectors were nurses/ANM posted in the health facility. We trained three nurses/ANMs from each selected hospital. All data collectors from all facilities of a selected block were simultaneously trained for data collection, conducting an interview and providing health advice against tobacco and alcohol use. Due to the transfer of four data collectors (nurses) during the period of the study, we had to train new nurses for data collection. New data collectors were given onsite training during the routine visit (s) by the authors. Authors cross checked the quality of data collected by visiting health centres in a pre-decided sequence and providing on-site supervision to data collectors. Before collecting data, the consent form was given/read out to participants and data was collected only after obtaining the informed oral consent from the participants. After completion of the interview, all study participants irrespective of their tobacco consumption habit were given information about the hazards of tobacco and alcohol use with particular emphasis on restraining from tobacco and alcohol consumption during pregnancy. Those who consumed tobacco/alcohol during pregnancy were in addition given advice on quitting tobacco/alcohol. The present study was approved by ethical committee of the institute.

### Data analysis

Filled questionnaire were checked for completeness of data and other errors before entering into the SPSS version 20.0 for analysis. Descriptive analyses were conducted to study the distribution of dependent variables among study participants.  $P$  value  $< 0.05$  was considered statistically significant. Multivariate linear regression analysis was conducted to examine the relationship between the outcome and dependent variables. Adjusted odds ratios (AOR) and their 95% confidence intervals (CI) were used as to measure the strength of association.

## Results

Data collectors approached a total of 4,280 women; 63 (1.5%) refused to participate in the study, 268 (6.3%) mother-newborn pair were referred out to higher health facility, questionnaire of 110 (2.6%) women were incomplete thus excluded, and hence, a total of 3,839 (89.7%) women were included in the final data analysis.

Table 1 displays the background characteristics of the study participants according to their tobacco consumption habit. The mean age of the women who did and did not consume tobacco during pregnancy was 26.8 and 24.1 years, respectively. Husbands of most participants (both tobacco consumers and non-consumers) consumed tobacco in one form or the other. A higher proportion (63.4%) of women who consumed tobacco during pregnancy had a female family member who consumed tobacco as compared to women who did not consume tobacco during pregnancy (20.9%).

Perhaps the most significant findings of our study are detailed in Table 2. Most women (both tobacco consumers and non-consumers) were not aware of the harmful effects of tobacco consumption during pregnancy. Also, most women (both tobacco consumers and non-consumers) did not receive health advice in any form from frontline health workers (ANM and ASHA) about the harmful effects of tobacco consumption during pregnancy. Only 3.8% women who consumed tobacco and 3.9% women who did not consume tobacco were asked by physicians about tobacco consumption habit/history during the antenatal visits (all such women visited the same health center for antenatal care).

Table 3 details the tobacco consumption pattern of study participants. The majority of women were consuming tobacco before they conceived, and only 5.6% of women started consuming tobacco (chewing) during present pregnancy. The most cited reason for tobacco initiation during pregnancy was the belief that tobacco helps in suppressing nausea associated with pregnancy (morning sickness). Most women were consuming tobacco for a period of 3–5 years and the majority of multiparous women had consumed tobacco during their previous pregnancy as well. Of all, 36.3% of women thought of quitting tobacco during pregnancy but only 17.9% of women attempted to quit tobacco by abstaining from its use.

Table 4 details the result of multivariate analysis to identify the predictors of tobacco consumption during pregnancy. The strongest predictor of tobacco consumption during pregnancy were having a husband who consumes tobacco [AOR = 36.16 (CI = 22.89–68.86)] followed by having a female neighbor/friend who uses

**Table 1: Distribution of biosocial characteristics of study participants by tobacco consumption habit during pregnancy (n=3,839)**

Study Variable	Consumed tobacco n=503 (%)	Did not consumed tobacco n=3,336 (%)
<b>Age</b>		
<20	78 (15.5)	649 (19.5)
21-<25	198 (39.4)	1143 (34.7)
25-<30	163 (32.4)	861 (25.8)
30 or more	64 (12.7)	683 (20.5)
<b>Number of children***</b>		
1	140 (27.8)	1049 (31.4)
2	254 (50.5)	1437 (43.1)
3 or more	109 (21.7)	850 (25.5)
<b>Resident</b>		
Rural	412 (81.9)	2587 (77.5)
Urban	91 (18.1)	749 (22.5)
<b>Per capita income (in Indian National Rupees)</b>		
<1000	112 (22.3)	1028 (30.8)
1000-3000	134 (26.6)	1143 (34.3)
3000-5000	188 (37.4)	734 (22.0)
>5000	69 (13.7)	431 (12.9)
<b>Family type</b>		
Joint	429 (85.3)	2373 (71.1)
Nuclear	74 (14.7)	963 (28.9)
<b>Educational qualification of participants</b>		
Illiterate	79 (15.7)	331 (9.9)
Literate without formal education	114 (22.7)	1061 (31.8)
School-educated	207 (41.2)	1526 (45.7)
College educated	103 (20.4)	418 (12.6)
<b>Consumed alcohol during present pregnancy</b>		
Yes	49 (9.7)	82 (2.5)
No	454 (90.3)	3254 (97.5)
<b>Husband consume tobacco</b>		
Yes	491 (97.6)	1623 (48.7)
No	12 (2.4)	1713 (51.3)
<b>Predominant form of tobacco consumption by husband</b>		
Smoking	222 (44.1)	1073 (66.1)
Chewing	281 (55.9)	550 (33.9)
<b>Female member in your family uses tobacco</b>		
Yes	319 (63.4)	698 (20.9)
No	184 (36.6)	2638 (79.1)
<b>Women in your neighborhood/friend circle consume tobacco</b>		
Yes	474 (94.2)	1269 (38.0)
No	29 (5.8)	2067 (61.9)
<b>Exposure to second hand tobacco smoke at home</b>		
Yes	299 (59.4)	1542 (46.2)
No	204 (40.6)	1794 (53.8)
<b>Frequency of exposure to second hand smoking</b>		
Daily	216 (72.2)	1328 (86.1)
Multiple times a week but not daily	67 (22.4)	183 (11.9)
Occasionally	16 (5.4)	31 (2.0)
<b>Birth weight of new born</b>		
Normal	351 (69.8)	2962 (88.8)
High birth weight	03 (0.6)	32 (0.9)
Low birth weight	149 (29.6)	342 (10.3)
<b>Timing of delivery</b>		
Term	421 (83.7)	2724 (81.7)
Pre-term	82 (16.3)	612 (18.3)
<b>Still birth</b>		
Yes	12 (2.4)	32 (0.9)
No	491 (97.6)	3304 (99.1)

\*\*\*Including the child born just before data collection

**Table 2: Distribution of study participants by tobacco consumption during pregnancy and antenatal care access (n=3,839)**

Study variable	Consumed tobacco n=503 (%)	Did not consumed tobacco n=3,336 (%)
<b>Time of first antenatal visit</b>		
First trimester (<12 weeks)	342 (68.0)	2387 (71.6)
Second trimester or later (>12 weeks)	161 (32.0)	949 (28.4)
<b>Number of antenatal visits</b>		
<3	189 (37.6)	1107 (33.2)
3 or more	314 (62.4)	2229 (66.8)
<b>Tobacco consumption have any specific ill effects during pregnancy</b>		
Yes	53 (10.5)	418 (12.5)
No	450 (89.5)	2918 (87.5)
<b>Tobacco consumption have any ill effects on pregnant women</b>		
Yes	07 (1.4)	228 (6.8)
No	496 (98.6)	3108 (93.2)
<b>Harmful effects of tobacco consumption on pregnant women (n=7 and 228)</b>		
High BP	04 (57.1)	82 (36.0)
Increased bleeding	03 (42.9)	87 (38.2)
Other	00 (0.0)	59 (25.9)
<b>Tobacco consumption during pregnancy have any ill effects on fetus</b>		
Yes	86 (17.1)	472 (14.1)
No	417 (82.9)	2864 (85.9)
<b>Husband told pregnant women about the ill effects of tobacco consumption during pregnancy</b>		
Yes	29 (5.8)	288 (8.6)
No	474 (94.2)	3048 (91.4)
<b>Health worker (ASHA/ANM) informed pregnant women about adverse effect of tobacco consumption during pregnancy</b>		
Yes	22 (4.4)	56 (1.7)
No	481 (95.6)	3280 (98.3)
<b>Doctor asked pregnant women about tobacco consumption habits during ANC visits</b>		
Yes	19 (3.8)	129 (3.9)
No	484 (96.2)	3207 (96.1)
<b>Prescription slips of ANC visits mentioned women's tobacco consumption status</b>		
Yes	00 (0.0)	00 (0.0)
No	503 (100.0)	3336 (100.0)
<b>ANC prescription slip (s) had written advice against tobacco consumption</b>		
Yes	00 (0.0)	00 (0.0)
No	503 (100.0)	3336 (100.0)
<b>Seen any poster/IEC material at health center/hospital displaying warnings against tobacco use during pregnancy</b>		
Yes	00 (0.0)	00 (0.0)
No	503 (100.0)	3336 (100.0)

tobacco [AOR = 22.29 (CI = 13.11–31.82)], having female family member who consumes tobacco [AOR = 5.63 (CI = 4.39–7.53)]. Other predictors were rural background, living in a joint family and consuming alcohol during pregnancy.

## Discussion

We observed that the prevalence of tobacco use in any form during pregnancy was 13.1%, which was higher than that reported by NFHS-3 survey for Madhya Pradesh (10.0%).<sup>[24]</sup> However, prevalence observed in our study was lower than that reported by other studies conducted at Mumbai (24.7%) and Jharkhand (14.8%).<sup>[16,19]</sup> We observed that among tobacco consumers, only 1.6% smoked tobacco and rest 98.4% used

smokeless tobacco. Our observations are supported by both NFHS-4 and NFHS-3 reports; both surveys reported that most women of Madhya Pradesh consumed tobacco in smokeless tobacco form.<sup>[2,24]</sup> Many individual studies also support our finding that smokeless tobacco is the most popular form of tobacco consumption among Indian women.<sup>[16,19-21]</sup>

Most women in our study were already consuming tobacco before becoming pregnant, and most of them were consuming tobacco for a duration of 3–5 years. A study from Mumbai also reported that most women do not change their tobacco habit even if they become pregnant.<sup>[19]</sup> Only 5.6% of women in our study initiated tobacco used uring pregnancy. The most common reason cited by such woman was that ‘tobacco

**Table 3: Distribution of study participants by tobacco consumption pattern during pregnancy (n=503)**

Variable	n	Percentage
<b>Consuming tobacco before the pregnancy was diagnosed</b>		
Yes	475	94.4
No	28	5.6
<b>Total duration of tobacco consumption before this pregnancy (n=475)</b>		
<1 year	46	9.7
1-<3 year	108	22.7
3-<5 year	193	40.6
>5 year	128	26.9
<b>Consumed tobacco in any form for complete duration of pregnancy</b>		
Yes	446	88.7
No	57	11.3
<b>Reason for starting tobacco consumption during pregnancy (n=28)</b>		
Beneficial in morning sickness/nausea	15	53.6
Beneficial in increasing food intake	03	10.7
To counter growing hunger	10	35.7
<b>Predominant mode of consuming tobacco</b>		
Smoking	8	1.6
Chewing	495	98.4
<b>Predominant form of tobacco consumed</b>		
Gutka/Pan-masala	91	18.1
Jarda + lime	183	36.4
Jarda + pan	158	31.4
Kheni	63	12.5
Bidi	5	1.0
Cigarette	3	0.6
<b>Consumption of tobacco during last thirty days (frequency)</b>		
Daily	448	89.1
Multiple times a week but not daily	41	8.2
Occasionally	14	2.7
<b>Frequency of consumption among consumers (Chewers, n=495)</b>		
Times	29	5.9
3-5 times	365	73.7
>5 times	101	20.4
<b>Thought about quitting tobacco during pregnancy (n=463) ^</b>		
Yes	168	36.3
No	295	63.7
<b>Tried*** to quit tobacco consumption during pregnancy (n=463) ^</b>		
Yes	83	17.9
No	380	82.1
<b>Plan to quit tobacco during postpartum (n=463) ^</b>		
Yes	71	15.3
No	392	84.7
<b>Consumed tobacco during previous pregnancies (n=363)</b>		
Yes	309	85.1
No	54	14.9
<b>Tobacco was arranged/bought most commonly by (n=503)</b>		
Husband	219	43.5
Self	166	33.0
Children	48	9.5
Mother-in-law	26	5.2
Other relatives	44	8.8

Contd...

**Table 3: Continued**

Variable	n	Percentage
<b>Health worker (ASHA/ANM) suggested modalities for stopping tobacco consumption during pregnancy</b>		
Yes	0	0.0
No	503	100.0
<b>Asked doctor about ill effects of tobacco consumption in pregnancy during ANC visits</b>		
Yes	27	(5.4)
No	476	(94.6)

\*\*\*- Abstaining defined as not using tobacco for 3 consecutive days; ^ - Women who were still using tobacco at the time of interview

**Table 4: Predictors of tobacco consumption during pregnancy; results of multivariate analysis**

Variable	Adjusted odds ratio	95% confidence interval	P
<b>Resident</b>			
Urban	1	1.02-2.86	0.0278
Rural	1.98		
<b>Type of family</b>			
Nuclear	1	1.73-2.92	0.018
Joint	1.95		
<b>Alcohol consumption during pregnancy</b>			
No	1	2.68-5.84	<0.001
Yes	3.80		
<b>Husband consume tobacco</b>			
No	1	22.89-68.86	<0.0001
Yes	36.16		
<b>Female family member consumes tobacco</b>			
No	1	4.39-7.53	<0.001
Yes	5.63		
<b>Friends/neighbor (women) consumes tobacco</b>			
No	1	13.11-31.82	<0.0001
Yes	22.29		

helped in countering symptoms of morning sickness' (53.6%). Thereafter, most such women continued using tobacco for the rest of the pregnancy even when symptoms of morning sickness subsided. Our findings are supported by two other studies which also reported that similar misconceptions are prevalent in other parts of India.<sup>[16,19]</sup>

Many women in our study consumed smokeless tobacco in more than one form (poly smokeless tobacco consumer). A study conducted at Mumbai also reported that 'poly-SLT' consumption is not uncommon among women.<sup>[19]</sup> Such poly-SLT consumption probably indicates a high level of dependence among such women; they are probably compelled by their addiction to using any type of tobacco they can get their hands on to satisfy their need (s). It becomes essential to delineate the determinant of poly-SLT consumption because such women might be ingesting the higher amount of tobacco and thus may have a poor pregnancy, reproductive, oral and other health outcome (s)

as compared to women who uses only one type of smokeless tobacco. We observed that pregnant women (both tobacco consumer and non-consumer) had very low level of awareness (12.3%) about the adverse effects caused by the use of tobacco during pregnancy. Three studies conducted in Jharkhand, Assam and Kolkata reported better awareness among pregnant women as compared to our study.<sup>[16,25,26]</sup> This difference can be attributed to variation in the way study questions were framed, the type of tobacco in question and different geographical and socio-demographic (literacy levels) variables of study participants. Equally important was the observation that spouse (husband) of very few study participants (both tobacco consumer and non-consumer) advised pregnant women about adverse effects of tobacco consumption indicating that they (husband) themselves had a low level of awareness about the issue.

The government of India's guidelines for ANM, ASHA and physicians recommend that a pregnant woman should be asked about her tobacco consumption habit/history and should be advised appropriately.<sup>[13,14]</sup> However, we observed that, of all women, only 4.4% women who consumed tobacco and 1.7% women who did not consume tobacco were informed by frontline health worker (ANM or ASHA) about ill effects of tobacco consumption during pregnancy. We observed that none of those women who initiated tobacco consumption during pregnancy (5.6%) received any health advice against tobacco use during pregnancy from either health workers or physicians. A Cochrane systematic review concluded that a variety of psychosocial interventions (including counselling) increases a woman's chance of stopping smoking during pregnancy and such interventions also reduced low birthweight and preterm births among pregnant women.<sup>[27]</sup> Similar psychosocial interventions can also be developed for smokeless tobacco; ANM or primary care physician can be trained to provide such intervention (s) to support pregnant women quit tobacco. In our study, we observed that of all pregnant women; only 3.8% of those who consumed tobacco and 3.9% of those who did not consume tobacco were asked about tobacco consumption habits/history by a doctor during antenatal visits. We also observed that none of the prescription slips of antenatal visits that we collected data from had any mention of the tobacco consumption habit/history. Given the high prevalence of tobacco consumption among pregnant women in India, we need to sensitise the health care workforce to screen pregnant women who consume tobacco so that they can be educated about adverse effects of tobacco consumption.

In our study, we observed that more than one-third of all women thought of quitting tobacco during pregnancy and 17.9% tried unsuccessfully to quit tobacco by simply

abstaining from its use. This shows the high unmet demand for quitting tobacco during pregnancy. Similar observations were also reported from other studies conducted in India and abroad.<sup>[18,22,28]</sup> NFHS-4 also reported that about 29.3% (urban = 33.0%, rural = 28.2%) of all women who consumed tobacco tried quitting tobacco use.<sup>[1]</sup> A Cochrane systematic review concluded that nicotine replacement therapy (NRT) can be safely used in pregnancy and it increases smoking cessation rates by approximately 40%.<sup>[29]</sup> Another Cochrane systematic review concluded that varenicline, nicotine lozenges and behavioural interventions may help smokeless tobacco users to quit.<sup>[30]</sup> But before large scale implementation, we must verify the safety and effectiveness of these interventions among pregnant women. In conclusion, given the high prevalence of smokeless tobacco use among Indian women, we need to develop a set of tobacco cessation interventions (both pharmacological and non-pharmacological) for smokeless tobacco and integrate it with routine antenatal care so that all women, especially those who are motivated to give up tobacco can be helped.

In our study, about half of all pregnant women (irrespective of their tobacco consumption habit) were exposed to second-hand smoke. Similar observations were reported by many other studies conducted in different parts of India.<sup>[16,19]</sup> In our study, most potent predictor of tobacco consumption among pregnant women was; tobacco consumption by closed one (husband, a female friend and family members). Thus, it is essential to involve a woman's husband and family member (s) in any health care intervention meant for preventing her from initiating/continuing tobacco use during pregnancy. It would be a good idea to create self-help group for supporting women to quit tobacco on the lines of groups meant for supporting breastfeeding. We observed that most commonly husband bought tobacco products for pregnant women followed by self-purchase. Similar findings were reported by the studies conducted at Mumbai and Jharkhand.<sup>[16,19]</sup> These facts reiterate our earlier recommendation that any intervention (s) introduced to prevent women from initiating/continuing tobacco use during pregnancy must involve the unborn child's father.

### Limitations

We enrolled only those women who delivered at the hospital (s) and did not cover those women who gave birth at home. We did not verify the amount of tobacco consumed by women during their pregnancy nor did we assess the level of dependence by measuring biochemical parameters.

### Recommendations

- The government of India needs to strengthen the implementation of its own guidelines for antenatal care.

- All pregnant women (regardless of their tobacco consumption habit) should be asked and advised against tobacco consumption during their first (if possible at every) antenatal visit because some women might start consuming tobacco after they become pregnant.
- Any intervention (s) program developed to prevent a woman from consuming tobacco during pregnancy must involve the husband.
- All family members should be sensitised not to expose pregnant women to second-hand smoke.
- The mass media campaign against tobacco should include advice against tobacco consumption during pregnancy.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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