Original Article

Association of Hypertensive Disorders of Pregnancy (HDP) and tobacco use among women of reproductive age group in India: A secondary data analysis from NFHS-4

Nitika Sharma[1], Nishigandha Joshi[1], Gaurang P. Nazar[1], Monika Arora[1,2], Sumit Malhotra[3], Garima Bhatt[4], Sonu Goel[4]

[1]Healthy Related Information Dissemination among Youth (HRIDAY), B5/94, First Floor, Safdurjung Enclave, New Delhi, [2]Public Health Foundation of India (PHFI), Plot No. 47, Sector 44, Institutional Area Gurugram, [3]Health Promotion, Centre for Community Medicine, All India Institute of Medical Sciences, New Delhi, [4]Department of Community Medicine and School of Public Health, PGIMER, Chandigarh, India

Abstract

Introduction: Tobacco use in any form is known to exert several perinatal complications. Through this study, the authors aimed to study the association between tobacco use and Hypertensive Disorders of Pregnancy (HDP) among women (aged 15–49 years) in India. **Methodology:** We used data from the National Family Health Survey (NFHS-4, 2015–2016) to study the association between tobacco use and HDP among women of reproductive age (15–49 years) in India. Since the NFHS follows a complex multi-level sampling, sampling weights were used to study the univariate and multivariate associations between the independent and dependent variables. Adjusted odds ratios (AORs) are reported along with 95% Confidence Intervals. **Results:** A sample of 1,07730 women was included in the analysis. HDP was more likely to be experienced by smokeless and smoking tobacco users (AOR 1.3, 95% CI (1.0-1.6) and AOR 2.7, 95% CI (2.0-3.7), respectively**).** Women with secondary (AOR 0.7, 95% CI (0.7-0.8)) and higher education (AOR 0.7, 95% CI (0.6-0.8)) were less likely to suffer from HDP as compared to those with no education. Women with daily (AOR 0.7, 95% CI (0.5-0.8)), weekly (AOR 0.8, 95% CI (0.6-0.9)) or occasional AOR 0.7, 95% CI (0.6-0.9)) consumption of fruits were less likely to experience HDP as compared to women with no fruit intake. **Conclusion:** Healthy diet and lifestyle factors can contribute to reduce the risk of HDP across women. The antenatal check-ups in India should also comprehensively focus on screening and counseling of women against tobacco use.

Keywords: Hypertension, NFHS4, preeclampsia, pregnancy, tobacco use

Address for correspondence: Dr. Sonu Goel, Professor of Health Management, Department of Community Medicine and School of Public Health Post Graduate Institute of Medical Education and Research, Chandigarh - 160 012, India.
E-mail: sonugoel007@yahoo.co.in

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Introduction

Tobacco is a known toxicant and teratogenic substance. The use of tobacco in any form, smokeless or smoked, by women during pregnancy is known to adversely affect pregnancy-related outcomes, including the health of the mother and child.[1] Global Adults Tobacco Survey (GATs 2016–2017) shows that 12.8%

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of women use tobacco in one or the other form in India. One finding particularly alarming in GATs 2016–2017 was the massive burden of smokeless tobacco use among pregnant women.[2] The nicotine present in tobacco products adversely affects the cardiovascular system[3,4] and, therefore, acts as a modifiable risk factor for hypertension.[5,6] Eclampsia, preeclampsia, and gestational hypertension are the most common hypertensive disorders of pregnancy (HDP) and result in adverse pregnancy outcomes.[7,8] It is the leading cause of maternal and perinatal morbidity and mortality.[9,10] Furthermore, placental abruption, maternal bleeding, premature birth, low birth weight, and neonatal or maternal death are some of the common risks associated with hypertension during pregnancy.[11,12] HDP is also associated with an increased risk of cardiovascular disorders and related complications in women during the later stage of life compared to those who had normotensive pregnancies.[13] Further, children whose mothers had preeclampsia during their pregnancy have higher chances of experiencing hypertension, insulin resistance, diabetes mellitus, neurological and mental health disorders.[14]

Past literature indicates a considerable burden of preeclampsia in pregnant women in India.[15] It also highlights the role of modifiable risk factors and the complex relationship between pre-existing chronic diseases like diabetes and HDP.[7,15] Globally; there is contradictory literature on the impact of tobacco use, HDP, and its complications.[12,16–18] Tobacco use is a complex public health problem in India because of the array of smoked and smokeless tobacco product availability and use in India. Additionally, smokeless tobacco with betel quid makes it culturally acceptable in India.[19] Past literature shows age, educational status, region, socioeconomic status of an individual are determinants of tobacco use in India.[20] Evidence also suggests no difference in the consumption pattern of tobacco use among pregnant women compared to when they were not pregnant. It was due to the reason because tobacco use was being perceived with ease of birth and as an antiemetic in nausea experienced during the pregnancy.[21] However, there is scant recent literature on the association between tobacco use and HDP in the Indian context. Therefore, through this study, we have studied the association between tobacco use and HDP among women of reproductive age in India using nationally representative National Family Health Survey (NFHS) 2015–2016 data. We also studied the correlates of HDP through our study in this group.

Methodology

Data source: We used data from the National Family Health Survey 2015–2016 (NFHS 2015–2016 or NFHS-4) to investigate our study objectives. NFHS is a large-scale, multi-cluster survey that includes data across more than 600 districts from 29 states and 7 union territories in India.[22] The NFHS-4 compiled information from 699,686 women and 112,122 men nationally for several important health indicators, including biomarker components (blood pressure and blood glucose level). To investigate the association between tobacco use and HDP (Pre-eclampsia and Eclampsia [PE & E]), we restricted the sample to the women (aged 15–49 years) who had a live birth in the five years preceding the NFHS-4 survey [Figure 1].[4]

Dependent variable: The NFHS includes data on pregnancy-related outcomes and other bio-markers. However, the physical markers (proteinuria) used in the clinical diagnosis of PE & E are not included in the NFHS-4; hence we used three validated (Q S432, S433, M471) and self-reported questions construct a measure of HDP. According to the World Health Organisation's Integrated Management of Pregnancy and Childbirth guidelines for midwives and doctors on Managing Complications in Pregnancy and Childbirth (2000) and National Institute for Health and Care Excellences' (NICE) guidelines[23] for management of hypertensive disorders during pregnancy (2010), women who reported difficulty with vision during daylight, and swelling of the legs, body, or face, were classified as having symptoms of preeclampsia (PE). Women who also reported having convulsions during their pregnancy not due to fever, along with preeclampsia symptoms, were classified as having Eclampsia (E) symptoms. The women who either experienced PE or E during their pregnancy were classified as women with HDP. In the NFHS schedule, women were asked the following questions: "During pregnancy did you have convulsions, not from fever?"; "During pregnancy did you have swelling of legs, body, or face?"; and "During pregnancy, did you have difficulty with daylight vision?" The answers to each of these questions were either 'yes' and 'no.'

Independent variables: Additionally, NFHS also includes information on the socio-demographic variables (religion, caste, and sector), other behavioral risk factors (alcohol use, tobacco use). Additional health-related information (self-reported diabetes, thyroid, cancer, asthma) is also recorded in the NFHS survey. During the survey, participants' blood pressure (BP) was recorded, and participants with systolic BP ≥140 mm Hg and diastolic BP ≥90 mm Hg were labeled as hypertensive.

Additional details on the variables are provided in the supplementary file [Table S1].

Data Analysis: Data analysis was conducted in Stata v. 13. The total NFHS sample was limited to women who had live

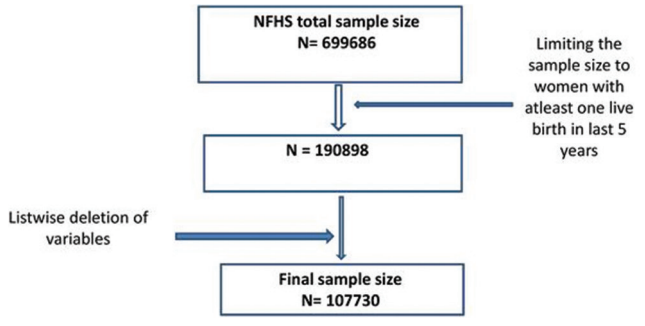

Figure 1: Final sample size calculation for the analysis

births during the past five years.[7] Data analysis was undertaken only on complete cases across all the variables included in the analysis after undertaking listwise deletion in Stata. Since the NFHS follows a complex multi-level sampling, sampling weights were used to study the univariate and multivariate associations. Univariate associations between the independent and dependent variables were tested using a person's Chi-square test. Further, all the independent variables significantly associated with HDP in the univariate analysis were included in the logistic regression (since HDP was treated as a binary variable) model. The NFHS also contains information on the household assets, therefore using inverse probability weighting technique,[24] a wealth quintile variable was derived and was included as an independent variable.

The study was ethically approved by the Institute's Ethics Committee, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh (PGI/IEC/2021/001139).

Results

A sample of 1,07,730 women aged 15–49 years was included in the analysis. The majority of the women in the sample were residing in rural areas (71.6%) and had completed secondary education (46.5%). Around 5.9%, 95% CI (5.8-6.2) women in our sample were found to have HDP. Table 1 presents the univariate associations between sociodemographic variables and HDP in our study population. The women living in rural areas (6.6%) reported higher prevalence of HDP than those living in urban areas (4.5%). Similarly, HDP was highest (7.9%) in the poorest and middle wealth quintile. Women with no primary education (8.4%) reported a higher prevalence of HDP as compared to those with primary (6.8%), secondary (4.7%), and higher education (4.2%).

About 1.1% and 0.4% of participants used smokeless tobacco and smoked tobacco, respectively. Of the total women who consumed tobacco, 9.4% of smokeless tobacco users and 21.6% of smoking tobacco users experienced HDP [Table 2]. Around 12.7% of the women with diabetes and 7.3% of the women with asthma experienced HDP. Women with the occasional intake of fish reported significantly higher (6.9%) prevalence of HDP, as compared to those not consuming fish (6.0%), consuming weekly (5.2%), or daily (3.1%). HDP was highest in women with daily consumption of chicken and meat (7.6%), followed by those with occasional (6.8%), no consumption (6.1%), and weekly (4.8%) consumption of meat.

Table 3 presents the unadjusted and adjusted odds ratio and 95% CI between the independent variables and HDP. HDP was more likely to be experienced by smokeless and smoking tobacco users (AOR 1.3, 95% CI (1.0-1.6) and AOR 2.7, 95% CI (2.0-3.7), respectively**).** Women with secondary (AOR 0.7, 95% CI (0.7-0.8)) and higher education (AOR 0.7, 95% CI (0.6-0.8)) were less likely to suffer from HDP as compared to those with no education. The odds of HDP increased with increasing age among women, with HDP being the highest in the women aged 30 and above (AOR 1.3, 95% CI (1.3-1.6)). Women with self-reported diabetes (AOR 1.5, 95% (1.0-2.3)) and asthma (AOR 2.1, 95% (1.5-2.9)) were significantly more likely to have HDP compared to those who did not report having these conditions. Women with daily (AOR 0.7, 95% CI (0.5-0.8)), weekly (AOR 0.8, 95% CI (0.6-0.9)) or occasional AOR 0.7, 95% CI (0.6-0.9)) consumption of fruits were less likely to suffer from HDP as compared to women with no fruit intake. Women with daily fish intake were less likely to suffer from HDP (AOR 0.6, 95% CI (0.5-0.8). However, women with daily chicken intake were more likely to suffer from HDPs (AOR 1.6, 95% CI (1.1-2.4)) while those with weekly chicken intake were less likely to suffer from HDPs (AOR 0.8, 95% CI (0.7-1.0) as compared to those with no chicken or meat intake.

Table 1: Univariate association with sociodemographic variables and HDP

Variables	HDP (*n*=6260) *n* (%)	*P*
Sector		***P*<0.05**
Urban (26243)	1329 (4.5)	
Rural (81487)	4931 (6.6)	
Religion		***P*<0.05**
Hindu (81326)	4949 (5.8)	
Muslim (13355)	1142 (8.1)	
Christian (8549)	73 (3.6)	
Sikh (4500)	96 (3.1)	
Social Group		***P*<0.05**
Schedule caste (20524)	1454 (6.3)	
Schedule Tribe (22473)	659 (5.7)	
Other backward class (43924)	3049 (6.4)	
Others (20809)	1098 (4.9)	
Age (years)		***P*<0.05**
15-19 (3221)	167 (4.7)	
20-24 (31872)	1779 (5.4)	
25-29 (39945)	2317 (5.8)	
30-34 (20760)	1246 (6.6)	
35 and above (11932)	751 (7.7)	
Education		***P*<0.05**
No formal education (32082)	2525 (8.4)	
Primary (15197)	976 (6.8)	
Secondary (49755)	2278 (4.7)	
Higher (10696)	481 (4.2)	
Wealth Quintiles		***P*<0.05**
Q1 Poorest (39445)	2949 (7.9)	
Q2 Second poorest (20010)	958 (4.8)	
Q3 Middle (6184)	444 (7.9)	
Q4 Second richest (22148)	1060 (4.8)	
Q5 Richest (19943)	849 (4.3)	

*$P<0.05$ using pearson Chi square test

Discussion

We studied the association between tobacco use and HDP across women in the reproductive age group in India, using a recent nationally representative survey (NFHS-4). We also studied other socio-demographic and behavioral risk factors associated with HDP. We found that women who used tobacco either in

Table 2: Univariate association between potential risk factors and HDP

Variables	HDP (*n*=6260) *n* (%)	*P*
Tobacco use		
Smokeless tobacco use		**P<0.05**
Yes (2231)	6152 (9.4)	
No (105499)	107 (5.9)	
Smoking tobacco use		**P<0.05**
Yes (525)	91 (21.6)	
No (107205)	6169 (5.9)	
Alcohol use		0.28
Yes (2391)	6180 (6.8)	
No (105339)	80 (6.0)	
Thyroid issue		0.11
Yes (1080)	94 (7.3)	
No (106650)	6166 (6.0)	
Asthma		**P<0.05**
Yes (872)	145 (14.3)	
No (106858)	6114 (5.9)	
Diabetes		**P<0.05**
Yes (583)	6177 (12.7)	
No (107147)	83 (5.9)	
Heart Disease		**P<0.05**
Yes (780)	114 (17.1)	
No (106950)	6146 (5.9)	
Cancer	7 (4.5)	0.48
Yes (114)	6253 (6.0)	
No (107616)		
Pre-existing Hypertension	96 (8.6)	**P<0.05**
Yes (1457)	6164 (6.0)	
No (106273)		
Freq. of milk intake		
Never (927)	400 (5.6)	**P<0.05**
Daily (41588)	2354 (5.2)	
Weekly (25103)	1548 (6.3)	
Occasion (31822)	1957 (7.1)	
Freq. of pulses intake		
Never (411)	26 (6.9)	**P<0.05**
Daily (46095)	2943 (6.2)	
Weekly (48431)	2651 (5.6)	
Occasion (12793)	640 (6.5)	
Freq. of leafy vegetable intake	19 (7.5)	**P<0.05**
Never (246)	2896 (5.9)	
Daily (51514)	2320 (5.8)	
Weekly (39461)	1025 (6.7)	
Occasion (16509)		
Freq. of fruit intake	268 (9.2)	**P<0.05**
Never (2809)	451 (4.0)	
Daily (10020)	1714 (5.2)	
Weekly (32380)	3826 (6.6)	
Occasion (62521)		
Freq. of egg intake		**P<0.05**
Never (30314)	1800 (6.2)	
Daily (3252)	169 (4.3)	
Weekly (35241)	1875 (4.9)	
Occasion (38923)	2416 (7.2)	
Freq. of fish intake		**P<0.05**
Never (36243)	2083 (6.0)	
Daily (3523)	137 (3.1)	
Weekly (28030)	1557 (5.2)	
Occasion (39934)	2483 (6.9)	
Freq. of meat/chicken intake		**P<0.05**
Never (32699)	1917 (6.1)	
Daily (1204)	70 (7.6)	
Weekly (29910)	1548 (4.8)	
Occasion (43917)	2725 (6.8)	
Freq. of fried food intake		0.31
Never (4609)	276 (5.8)	
Daily (11125)	508 (5.9)	
Weekly (35402)	2284 (6.2)	
Occasion (56594)	3191 (5.8)	

*$P<0.05$ using pearson Chi square test

smokeless or smoked form had a significantly higher risk of developing HDP than the non-users. Although there is scant literature focusing on tobacco consumption and HDP, some studies around the globe have observed a positive association between preeclampsia and tobacco consumption.[25–27] Our findings are consistent with these studies conducted in other parts of the world and highlight the importance of tobacco control in reproductive-aged women, mainly if they were to become pregnant.

Traditionally, all the tobacco control efforts in India have been focused on men. As per the Global Adult Tobacco Survey (GATS) - 2 (2016–2017) survey in India, the percentage of women across all age groups who were advised to quit tobacco by healthcare providers during the health care facility visit was consistently lower than that of men.[28] Additionally, younger women (<45 years of age) were less likely to be advised by the health workers than the older ones.[29] Moreover, the decline in tobacco consumption between GATS-1 (2009–2010) and GATS-2 has been lower in women than men. Therefore, the higher odds for developing HDP in women of reproductive age groups and consuming tobacco brings into focus the relevance of targeted tobacco cessation efforts specifically for this group. Efforts to achieve tobacco control in women can provide a profound opportunity to improve health outcomes in them and has the potential to exert multigenerational impact by improving the health of their offspring.[30]

Our study findings suggest that the risk of HDP increases with increasing maternal age, as observed in previous studies.[31,32] The likelihood of HDP was lower in higher socio-economic groups as compared to the lower socioeconomic groups. This might be attributable to prolonged working hours and inadequate access to medical services in low socioeconomic groups.[33] Although previous literature shows a positive association between alcohol and HDP, the association between HDP and alcohol consumption was not significant in our study.[34]

The positive associations of HDP with comorbidities such as heart disease, diabetes, and asthma, as indicated in the present study, highlights the importance of screening pregnant women for these comorbidities during antenatal check-ups.[35] The past literature shows that irrespective of the place of delivery,

Table 3: Unadjusted and adjusted odds ratios and 95% confidence interval for the risk of HDP during pregnancy in women aged 15-49 years, with live birth five years preceding the NFHS (2015-2016) survey (*n*=107730)

Variables	HDP Unadjusted OR (95% CI)	HDP AOR (95% CI)
Sector		
Urban	Reference	Reference
Rural	1.5 (1.3-1.7)*	1.2 (1.1-1.4)*
Religion		
Hindu	Reference	Reference
Muslim	1.4 (1.3-1.6)*	1.5 (1.4-1.7)*
Christian	0.6 (0.5-0.8)*	0.8 (0.6-1.0)
Sikh	0.5 (0.4-0.7)*	0.6 (0.4-0.8)*
Social Group		
Schedule Caste	Reference	Reference
Schedule Tribe	0.9 (0.8-1.0)	0.8 (0.7-0.9)*
Other backward caste	1.0 (0.9-1.1)	0.9 (0.9-1.0)
Others	0.8 (0.7-0.9)*	0.8 (0.7-0.9)*
Education		
No primary	Reference	Reference
Primary	0.8 (0.7-0.9)*	0.9 (0.8-1.0)
Secondary	0.5 (0.5-0.6)*	0.7 (0.7-0.8)*
Higher	0.5 (0.4-0.5)*	0.7 (0.6-0.8)*
Age		
15-19 years	Reference	Reference
20-24 years	1.1 (0.9-1.4)	1.2 (0.9-1.4)
25-29 years	1.2 (1.0-1.5)*	1.2 (1.0-1.5)*
30-34 years	1.4 (1.2-1.7)*	1.3 (1.1-1.6)*
>35 years	1.7 (1.4-2.1)*	1.3 (1.1-1.6)*
Wealth Quintiles:		
Q1 Poorest	Reference	Reference
Q2 Second poorest	0.6 (0.5-0.6)*	0.7 (0.7-0.8)*
Q3 Middle	1.0 (0.9-1.1)*	1.0 (0.9-1.2)
Q4 Second Richest	0.6 (0.5-0.6)*	0.8 (0.7-0.8)*
Q5 Richest	0.5 (0.5-0.6)*	0.8 (0.7-0.9)*
Smokeless Tobacco use		
No	Reference	Reference
Yes	1.6 (1.3-2.1)*	1.3 (1.0-1.6)*
Smoked Tobacco use		
No	Reference	Reference
Yes	4.4 (3.2-5.9)*	2.7 (2.0-3.7)*
Heart Disease		
No	Reference	Reference
Yes	3.2 (2.6-4.2)*	2.3 (1.8-3.2)*
Diabetes		
No	Reference	Reference
Yes	2.3 (1.7-3.2)*	1.5 (1.0-2.3)*
Pre-existing Hypertension		
No	Reference	Reference
Yes	1.5 (1.1-1.9)*	1.3 (0.9-1.7)
Asthma		
No	Reference	Reference
Yes	2.7 (2.1-3.4)*	2.1 (1.5-2.9)*
Freq. of milk intake		
Never	Reference	Reference
Daily	0.9 (0.8-1.1)	1.1 (0.9-1.3)
Weekly	1.1 (0.9-1.3)	1.2 (1.1-1.4)*
Occasion	1.3 (1.1-1.5)*	1.3 (1.1-1.4)*
Freq. of pulses intake		
Never	Reference	Reference
Daily	0.9 (0.6-1.5)	1.0 (0.6-1.7)
Weekly	0.8 (0.5-1.3)	0.8 (0.5-1.4)
Occasion	0.9 (0.6-1.6)	0.9 (0.5-1.5)
Freq. of leafy vegetable intake		
Never	Reference	Reference
Daily	0.8 (0.4-1.4)	0.9 (0.5-1.7)
Weekly	0.8 (0.4-1.4)	0.9 (0.5-1.6)
Occasion	0.9 (0.5-1.6)	0.9 (0.5-1.7)
Freq. of fruit intake		
Never	Reference	Reference
Daily	0.4 (0.3-0.5)*	0.7 (0.5-0.8)*
Weekly	0.5 (0.5-0.6)*	0.8 (0.6-0.9)*
Occasion	0.7 (0.6-0.8)*	0.7 (0.6-0.9)*
Freq. of egg intake		
Never	Reference	Reference
Daily	0.7 (0.5-0.8)*	0.8 (0.6-1.1)
Weekly	0.8 (0.7-0.9)*	0.8 (0.7-1.0)*
Occasion	1.2 (1.1-1.3)*	1.0 (0.9-1.2)
Freq. of fish intake		
Never	Reference	Reference
Daily	0.5 (0.4-0.7)*	0.6 (0.5-0.8)*
Weekly	0.9 (0.8-0.9)*	1.0 (0.9-1.2)
Occasion	1.2 (1.1-1.3)*	1.0 (0.9-1.2)
Freq. of meat/chicken intake		
Never	Reference	Reference
Daily	1.3 (0.9-1.7)*	1.6 (1.1-2.4)*
Weekly	0.8 (0.7-0.8)*	0.8 (0.7-1.0)*
Occasion	1.1 (1.0-1.2)*	0.9 (0.8-1.1)

*$P<0.05$

receiving inadequate antenatal care is associated with adverse pregnancy outcomes.[36,37] The study findings suggest the positive role of a healthy diet in reducing HDP. Intake of fish and fruits can reduce the likelihood of HDP, highlighting the importance of a well-balanced diet in reducing the risk of HDP consistent with existing literature.[38]

Traditionally, the maternal and child health services personnel are not trained to provide tobacco prevention and cessation services in India. Given the potential ill-effects of tobacco consumption both on the health of the mother and child,[1] comprehensive tobacco prevention and cessation services need to be integrated into existing maternal and child health care services. Health facilities providing antenatal care should include screening for tobacco use and cessation counseling to pregnant women. They should be encouraged to quit the habit and should be provided with the necessary assistance. As most women begin tobacco use during early age, it is essential to include the tobacco control component among the existing adolescent health programme. This paper highlights the need for tobacco control initiatives and better screening and management of other co-morbid conditions to prevent HDP in pregnant women. It emphasizes the importance of a healthy diet and antenatal care among pregnant women for better health outcomes in both mother and the child.

Strengths and Limitations of the Study

The strength of our study lies in the fact that the study's findings can be generalized to pregnant women in India because it is based on a nationally representative NFHS 4 survey. Our prime limitation was that the outcome variable (HDP) in women was self-reported and was not found on any clinical diagnosis; hence, there can be a possibility of recall bias and misclassification. However, we used definitions as set out by previous studies[23] based on participants' self-reported symptoms, and no actual clinical tests were conducted. Additionally, blood pressure was measured on one occasion during data collection in NFHS, so this might have led to incorrect determination of hypertensive status in some of the participants. There are predictive limitations because the NFHS survey is cross-sectional, so causal inferences cannot be drawn. Since the NFHS survey included self-reported responses on tobacco and alcohol use and given the taboo regarding tobacco and alcohol use, these behaviors could be under-reported by the NFHS participants.

Conclusion

Tobacco use is associated with an increased risk of HDP among Indian women in the age group 15–49 years. Tobacco use during pregnancy can result in negative consequences for both mother and her offspring. While many other genetic and environmental factors can increase the risk of HDP, a healthy diet and lifestyle factors can contribute to reducing its risk. Additionally, antenatal check-ups in India should also comprehensively focus on screening and counseling women against tobacco use.

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Conflicts of interest

There are no conflicts of interest.

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Table S1: Variables information

	Dependent variable
Hypertensive disorder of pregnancy (HDP) Bivariate (yes/no)	The NFHS-3 contains a list of studies items related to health problems during pregnancy. The physical markers such as blood pressure, proteinuria) used in the clinical diagnosis of PE&E are not measured in the NFHS-3, we used three self-reported questions to construct a measure of HDP. Q1: 'During this pregnancy, did you have difficulty with your vision during daylight?', Q2: 'During this pregnancy, did you have swelling of the legs, body or face?' and Q3: 'During this pregnancy, did you have convulsions not from fever?' The response options were 'yes', 'no' and 'don't know'. The women who reported both difficulty with vision during daylight and swelling of the legs, body or face were be coded as having symptoms suggestive of pre-eclampsia,[13,14] while those who additionally reported experiencing convulsions (not from fever) were coded as eclamptic.[14] Women belonging either of the pre-eclampsia or eclampsia category were classified as having HDP.
Independent variables[13,14]	
Sociodemographic factors	Education (no education, primary, secondary, higher); religion (Hindu, Muslim, Christian, Sikhs, Others); category (Scheduled Castes, Scheduled Tribes, Other Backward Class, General); employment status (not working, working); wealth index (measured by an index based on household ownership of assets and graded as lowest, second, middle, fourth, and highest), place of residence (urban/rural).
Tobacco use:	Two categories: smoking tobacco, smokeless tobacco, second hand smoking exposure (yes/no)
Other potential covariates	Self reported diabetes (yes/no), cancer, thyroid, asthma, existing heart diseases and pre-hypertension, and dietary variables (frequency in daily, weekly, occasionally, and never)