Original Article

Hypertension among women in reproductive age in India: Can we predict the risk? An analysis from National Family Health Survey (2015–2016)

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Abstract

Background: Hypertension in women of reproductive age group is of special concern because of the vulnerability of women to pregnancy-induced hypertension apart from socio-cultural vulnerability. **Aim:** The objective of the study was to identify the predictors for hypertension among Indian women and to develop a risk score which would provide an opportunity for early detection and appropriate action. **Material and Methods:** This study was based on the data collected in National Family Health Survey in 2015–2016. Women in India of 15–49 years were the study population. Data were analysed using SPSS v17. Logistic regression analysis was carried and expressed as odds ratio with 95% confidence intervals to identify predictors of hypertension. The risk score for hypertension was developed after shrinkage of variables and by using regression coefficients obtained by standard Logistic Regression Model. **Results:** Among 6,87,230 women between 15 and 49 years, 77,788 (11.3%) were hypertensive. The study results revealed that there was an increasing trend in the prevalence of hypertension (26.5%) with increasing age, and with increasing weight (23.4%). Urban areas (12.3% vs 10.9%), alcoholics (19.2%) and various forms of tobacco users (14.8%) had more prevalence of hypertension. **Conclusion:** Age, residing in urban area, consuming tobacco products, consumption of alcohol, non-vegetarian diet and overweight, were found to be the significant predictor variables, and were used to develop the Risk Prediction score using logistic regression model.

Keywords: Hypertension, hypertension among women, nfhs-4

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Introduction

According to the WHO, there are five important risk factors for non-communicable diseases (NCDs) and hypertension is one of them.[1] Hypertension contributes to higher disability-adjusted life years (DALYs) due to cardiovascular disease as compared to other metabolic risk factors such as High Total Cholesterol, High Fasting Blood Sugar, and High body mass index (BMI).[1] Globally, it has been reported that hypertensive heart disease accounts

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for 1.16 million deaths and 21.5 million DALYs per year with an annual prevalence of 18.6 million cases.[2] The prevalence of hypertension is increasing in India from 24% in 1980 to 26% in 2015 in comparison to developed nations like the United States which has shown a decline from 23% in 1980s to 12% in 2015.[1-3]

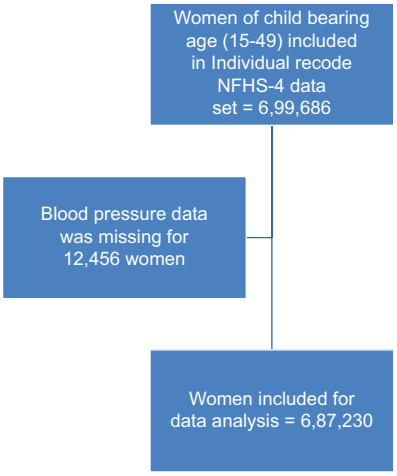
NCDs and mental health conditions are leading causes of mortality and morbidity for women globally.[4] The Global Burden of Diseases study has revealed that the leading causes of death for women are ischaemic heart disease (IHD) and stroke, both of them are associated with hypertension. Also, NCDs accounted for seven out of the ten leading causes of death and included hypertensive heart disease, stroke, chronic obstructive pulmonary disease, Alzheimer's disease, diabetes, kidney disease and lung cancer.[5] Hypertension in women of reproductive age group is of special interest because of the vulnerability of women to pregnancy-induced hypertension, which is associated with poor maternal and foetal outcomes.[6-8] Women apart from their biological vulnerability are also socially and culturally vulnerable to hypertension – be it in poor health seeking behaviour, or suboptimal health system responsiveness. Conventionally, reproductive health needs have been prioritised among women, but with the epidemiological transition and the globalization of NCDs, attention needs to be drawn to addressing NCDs and their risk factors among women in reproductive age group.[9]

Several studies globally had documented risk factors for hypertension, including increasing age, family history, obesity, physical inactivity, smoking and poor dietary practices.[10-13] However very few risk prediction models for hypertension have been developed which are mostly from the United States and Europe, and a few from Asian countries.[14] Risk prediction models would be critical for risk communication and shared decision making for the intensity of prevention measures. They would also help us to project the burden of hypertension and resource allocation at population level. Development of a composite risk score and its validation for major NCDs is being attempted by Nangia R *et al.*[15] through their protocol paper which describes the methodology for development and validation of the composite risk score. However, the score development is based on data from the WHO-STEPS survey of only one State of India. The external validation is also attempted through local population which limits its generalizability. Another risk score for hypertension was developed by Sathish T *et al.*[16] for rural population in India which cannot be generalised to urban population. The available risk scores have been developed for general population, while disaggregated data for specific groups or sub populations are not being analysed. The National Family Health Survey conducted in India provides us an opportunity to study data of a large representative sample of population of women and develops a risk score by identifying the predictors for hypertension among them.

Materials and Methods

Data source: The current study is based on the data collected from women belonging to the reproductive age group (aged 15–49 years) from a nationally representative health survey namely the National Family Health Survey – 4. The survey was conducted in all 29 states and 6 union territories in India during the years 2015–2016.[17] [Individual Recode: IAIR74SV.ZIP file accessed from Demography and Health Survey (DHS)].

Inclusion and exclusion criteria: Among the selected households, those women who belong to the households and women who have come as visitors to the particular household and have stayed overnight were included. Women for whom all the readings of blood pressure data were not available were excluded.



Sampling Technique: Multistage sampling covers 640 districts in India. Primary sampling unit was a village in rural areas and census enumeration block in urban areas. Data were collected using Computer-Assisted Personal Interviewing on mini laptops.

Operational definitions

Dependent variable

Hypertension: For the purpose of the study, the dependent (outcome) variable was hypertension. Out of the three recordings of the blood pressure which were recorded with a gap of 5 min, the first reading was eliminated and average of the second and third reading was considered. Hypertension was defined as systolic blood pressure of at least 140 mm Hg or diastolic blood pressure of at least 90 mm Hg.[18] In addition, women currently on antihypertensive medication were also included as having hypertension.[17]

Independent variables

Use of Tobacco (Current use of tobacco in any form – either in smoke form or non-smoke form such as smoking cigarettes/bidis/cigars, a pipe, hookah or chewing of paan masala or other tobacco forms such as gutkha/khaini/paan with tobacco/other chewing tobaccos), **Use of alcohol** (Alcohol taken in any form currently**), Age** (In completed years), **Education** (Classification was based on years of completed schooling. Primary: Up to five years of completed schooling**,** Secondary: 6–12 years of completed schooling**,** Higher: More than 12 years of completed

schooling), **Region** (The country has a wide geographical distribution and for the purpose of the study it is divided into six regions – Northern, Southern, Western, Eastern, North Eastern, and Central regions), **Wealth Index (**It is used as a proxy indicator for socioeconomic scale. The wealth index is, based on scores on ownership of consumer goods and household characteristics, such as availability of basic facilities like clean drinking water, owning of televisions and non-motor two-wheeler, type of housing, drinking water access and facilities for sanitation. All households are classified into wealth quintiles ranging from Richest to Poorest with in between classes as Richer, Middle and Poorer), **Body Mass Index** (A value of <18.5 was considered as underweight, 18.5–24.9 was considered as normal and >25 was considered as overweight and obese), **Assessment of dietary intake (**The frequency of foods consumed was categorised as daily, weekly, occasionally or never in relation to intake of milk or curd, pulses or beans, dark green leafy vegetables, fruits, eggs, fish, chicken or meat. Non-vegetarian were those who reported consuming fruits, vegetables, pulses or beans, animal products (chicken or meat, fish, eggs, milk or curd) either daily, weekly or occasionally).[19]

Statistical analysis

Descriptive analysis was initially run to understand the baseline characteristics of data and reported in frequencies and percentages. Continuous values were expressed using mean ± standard deviation (SD). Bivariate analysis was conducted using Pearson's $\chi 2$ test. Later Logistic regression model (enter and forward likelihood ratio method) was adapted, model significance was measured by omnibus Chi-square (52252.39), -2 log likelihood (431967.20) with pseudo-R square value of 0.14. Odds ratio with corresponding 95% confidence intervals were calculated to derive the significant predictors for hypertension. Predictors with *P* value < 0.05 were considered as statistically significant. The risk score for developing hypertension was developed after shrinkage of variables by adopting above techniques and by using regression coefficients obtained by standard logistic regression model as.[20]

Individual risk for developing Hypertension = exp (Individual risk score) ÷ [1 + exp (Individual risk score)]

Six predictors were chosen for fitting the risk model based on likelihood ratios using standard and stepwise logistic regression model.

$$\textit{Individual risk score} = \textit{intercept} + (b_{age} \times \textit{age}) + (b_{BMI} \times \textit{BMI}) + (b_{residence} \times \textit{residence}) + (b_{tobacco} \times \textit{tobacco}) + (b_{alcohol} \times \textit{alcohol}) + (b_{food\ habits} \times \textit{food habits}).$$

b = *Regression coefficients*

The statistical package for data analysis was Statistical Package for Social Sciences for windows, version 17.0 (IBM SPSS Inc., Chicago, IL).

Ethical considerations

Institutional Ethics Committee, Post Graduate Institute of Medical Education and Research, Chandigarh (PGI/IEC/2021/001139) has approved the study.

Results

Out of a total sample of 6,99,686 of women of childbearing age (15–49 years), blood pressure data was incomplete for 12,456 (1.8%) women. Hence, data were analyzed for 6,87,230 women (98.2%). Among them, 11.3% were hypertensive. There was a significantly increasing trend in the prevalence of hypertension as age increased from 15 to 49 years. Among the women who had no education, prevalence of hypertension was 14.4% which decreased gradually to 8.5% as the educational status increased ($p < 0.001$). Among the States, Arunachal Pradesh (19.1%) had reported the highest prevalence followed by Sikkim (18.5%) and Assam (18.1%). Least prevalence was observed in Bihar (7.9%) and Rajasthan (8.1%). A significantly ($p < 0.001$) higher prevalence was observed in urban women (12.3%), Sikhs (16.2%), widowed (20.8%) and richest quintile (13.1%). Hypertension was reported in 13.9% of women who smoke cigarettes, 21% among those who smoke pipes, 14.5% among those who chew tobacco, 16% among those who use snuff, 15.6% among those who smokes cigars, 13.1% among those who use gutkha/paan masala with tobacco, 16.3% among those who use paan with tobacco and 14% among those who smokes other products. Overall prevalence of hypertension was 14.8% among women who use tobacco which was significantly higher ($p < 0.001$) than non-tobacco users (11%). A significantly higher prevalence of hypertension was observed among women who were alcoholics (19.2%) as compared to non-alcoholics (11.1%). Also, it was observed that among alcoholics, those who consume almost every day had more prevalence (21.8%) as compared to those who consume once a week (20.2%) and less than once a week (17.6%). Prevalence of hypertension was significantly higher among non-vegetarians' diet (11.6%) as compared to vegetarians (10.5%) and among those who never consumed fried food (13.8%) as compared to those who consume it daily (13%). Also, it was significantly higher in those who never take aerated drinks (12.9%) as compared to who take it daily (12.2%). Prevalence of hypertension also had a significantly increasing trend with change in body mass index from underweight to overweight [Table 1].

Logistic regression analysis reveals that independent variables like increasing age, residing in urban area, people belonging to richest wealth index, education up to primary level, consuming tobacco products and alcohol, eating non-vegetarian diet, belonging to Muslim community, residing in Northeastern states, overweight BMI, widowed/divorced were significant predictors of hypertension [Table 2].

Prediction score was calculated by using logistic regression model. To predict risk individually, the fitted risk model can be used to calculate the risk score [Table 3]. For example, the risk score for a

Table 1: Sociodemographic characteristics of hypertensive and non-hypertensive woman in the age group of 15-49 years, NFHS-4 (2015-2016)

Variable	Hypertensive *n* (%)	Non-Hypertensive *n* (%)	Chi Square	*P*
Age group			40748.49	<0.001
15-19	3767 (3.1)	118344 (96.9)		
20-24	5837 (4.8)	114880 (95.2)		
25-29	8293 (7.3)	104830 (92.7)		
30-34	10768 (11.3)	84667 (88.7)		
35-39	14220 (16.0)	74775 (84.0)		
40-44	15950 (21.2)	59451 (78.8)		
45-49	18953 (26.5)	52495 (73.5)		
State (regions)			3065.966	<0.001
Northern	16590 (12.0)	121145 (88.0)		
Southern	10549 (11.7)	79280 (88.3)		
Western	6158 (11.2)	48722 (88.8)		
Eastern	11960 (9.6)	112371 (90.4)		
Northeastern	15300 (15.8)	81552 (84.2)		
Central	17231 (9.4)	166372 (90.6)		
Residence			291.776	<0.001
Urban	24557 (12.3)	174419 (87.7)		
Rural	53231 (10.9)	435023 (89.1)		
Religion			1297.145	<0.001
Hindu	54002 (10.6)	456363 (89.4)		
Muslim	11741 (12.7)	80810 (87.3)		
Christian	6892 (13.5)	44238 (86.5)		
Sikh	2454 (16.2)	12674 (83.8)		
Buddhist	1299 (14.7)	7517 (85.3)		
Jain	146 (14.7)	845 (85.3)		
Jewish	1 (14.3)	6 (85.7)		
Parsi/Zoroastrian	0 (0.0)	7 (100.0)		
Other	1176 (15.0)	6670 (85.0)		
No religion	77 (19.8)	312 (80.2)		
Caste			720.427	<0.001
Schedule Caste	12634 (10.3)	110207 (89.7)		
Schedule Tribe	15335 (12.3)	109687 (87.7)		
OBC	27785 (10.3)	241583 (89.7)		
None of them	17273 (12.5)	120891 (87.5)		
Don't know	447 (14.0)	2743 (86.0)		
Wealth index			1152.76	<0.001
Poorest	12451 (9.5)	118987 (90.5)		
Poorer	15459 (10.5)	132086 (89.5)		
Middle	16191 (11.2)	128811 (88.8)		
Richer	16975 (12.5)	118930 (87.5)		
Richest	16712 (13.1)	110628 (86.9)		
Education level			3785.442	<0.001
No education	27879 (14.4)	165828 (85.6)		
Primary	11708 (13.4)	75390 (86.6)		
Secondary	31623 (9.6)	297300 (90.4)		
Higher	6578 (8.5)	70924 (91.5)		
Current marital status			11754.71	<0.001
Never in union	7318 (4.4)	160218 (95.6)		
Married	65266 (13.3)	426700 (86.7)		
Widowed	4164 (20.8)	15875 (79.2)		
Divorced	450 (14.8)	2595 (85.2)		
Separated	590 (12.7)	4054 (87.3)		
BMI			23685.103	<0.001
Underweight	9000 (6.0)	141313 (94.0)		
Normal	39202 (9.6)	370430 (90.4)		
Overweight	29392 (23.4)	96432 (76.6)		
Tobacco user			795.164	<0.001
Yes	8704 (14.8)	49916 (85.2)		
No	69084 (11.0)	559526 (89.0)		

Contd...

Table 1: Contd...

Variable	Hypertensive *n* (%)	Non-Hypertensive *n* (%)	Chi Square	*P*
Drinks alcohol			1070.964	<0.001
Yes	3267 (19.2)	13784 (80.8)		
No	74521 (11.1)	595658 (88.9)		
Frequency of alcohol intake			27.028	<0.001
Almost every day	473 (21.8)	1697 (78.2)		
About once a week	1348 (20.2)	5325 (79.8)		
Less than once a week	1446 (17.6)	6762 (82.4)		
Non-vegetarian			159.852	<0.001
Yes	58128 (11.6)	442362 (88.4)		
No	19660 (10.5)	167080 (89.5)		

44-year-old female patient with a BMI of 24 kg/m2 who belongs to rural area who doesn't smoke, drinks alcohol and consumes non vegetarian then the risk score would be calculated as: $-5.968 + 0.074 \times 44 + (0.059 \times 24) + (0.012 \times 0) + (0.027 \times 0) + (0.424 \times 1) + (0.144 \times 1) = -5.968 + 5.24 = -0.728$. Therefore, her predicted risk for developing hypertension would be: Exp (-0.728) ÷ {1 + exp (-0.728)} = 32.4%, when compared to a woman without these risk factors.

Discussion

The current study indicates that about 1 in 10 women in the age group of 15–49 years suffer from hypertension; the overall prevalence was found to be 11.3%. This would amount to an estimated number of around 282.5 million of hypertensive women in reproductive age requiring healthcare services.

Our study finding of 11.3% is consistent with the study done by Ghosh S *et al.*[18] However, the reported prevalence was lower when compared to the prevalence from other studies: Agrawal V *et al.*[21] (systolic, 17.0% and diastolic, 14.4%), Bhansali A *et al* (22.6%),[22] Talukdar *et al.* (18.69%).[23] A significant positive trend in prevalence of HTN was observed among females ranging from 6.9% to 13.1% in urban and from 3.5% to 8.8% in rural areas by *P* Devi *et al.*[24] in a systematic review of studies published from 1969 to July 2011. The reason for the lower prevalence in the present study could be due to the inclusion of different age groups and settings along with different criteria for defining hypertension.

There was an increase in the prevalence of hypertension from 3.1% in the 15–19 years age group to 26.5% in the 45–49 years age group. In addition to the biological changes, the changes in the lifestyle leading to increasing prevalence of risk factors as well could have contributed to these findings. Similar finding of a linear dose-response relationship of increased prevalence as age advances has been reported from earlier studies. The crude hypertension prevalence was found to be 23.6% among women ranging from 9.2% among women aged 18 to 25 years to 48.6% among women older than 65 years.[25] The relatively small percentages of prevalence of hypertensive subjects as compared to percentages of non-hypertensive subjects in the 15–19 years should not be ignored as India has a large population of young adults which is 236 million with a sex ratio of 908 meaning that the number of subjects that do have hypertension is alarmingly high.[26]

Interstate variations with higher prevalence than the national average from the Northeastern states (15.8%) and lower prevalence from central states (9.4%) were observed. Other studies have shown that in addition to the Northeastern states, Punjab, Himachal Pradesh and Kerala have also reported higher rates of hypertensive population which is around 35%.[25] The regional differences either in the dietary patterns or the prevalence of other risk factors like substance use could once again have contributed to higher prevalence which needs further exploration. The present study reported higher prevalence of hypertension among urban women than among rural women as was found in the previous studies in the National Capital Region (42.2% urban and 28.9% rural NCR).[27,28] The pressure for double income among the lower-income group and middle-income groups as well as the prioritisation of the health of the other members in the family in terms of health expenditure in the urban areas is well known.

The prevalence of hypertension was highest among Sikhs (16.2%) as compared to other religions among which Hindus (10.6%), Muslims (12.7%), Christian (13.5%), Buddhist (14.7%) while the previous studies showed highest prevalence among Muslims (68.7%) followed by Hindus (21%) and Christians (10.3%).[29] The religious and cultural practices and the influence of gender on healthcare seeking behaviours could have contributed to these differences. Women belonging to scheduled tribes reported to have the highest prevalence (12.3%) while the women from scheduled caste and other backward classes reported equal prevalence (10.3%) in this study. This may be due to the limited access of healthcare facilities in tribal areas.

The poorest of the sections reported a prevalence of hypertension of 9.5% as compared to the richest in whom the prevalence is reported as 13.5% which is consistent from previous studies from Bengaluru which showed a prevalence of 52% in above poverty line and 10% in below poverty line.[30] The higher prevalence of hypertension among the richest may be due high prevalence of obesity and sedentary lifestyle among them. The study reported a higher prevalence of 14.4% among illiterates as compared to prevalence among highly educated which is 8.5% as

Table 2: A logistic regression analysis to identify predictors for hypertensive among women in the age group of 15-49 years, NFHS 2015-2016

Variable	OR	*P*	95% CI	
			Lower	Upper
Age				
15-19				
20-24	1.52*	0.001	1.45	1.58
25-29	2.13*	0.001	2.04	2.23
30-34	3.19*	0.001	3.05	3.33
35-39	4.60*	0.001	4.41	4.81
40-44	6.42*	0.001	6.15	6.71
45-49	8.55*	0.001	8.19	8.93
Place of residence				
Rural				
Urban	1.04*	0.001	1.02	1.07
Wealth index				
Poorest				
Poorer	1.00	0.727	0.97	1.02
Middle	0.99	0.725	0.97	1.02
Richer	1.04*	0.001	1.01	1.08
Richest	1.03*	0.001	1.01	1.07
Tobacco consumption				
No				
Yes	1.05*	0.07	1.01	1.10
Alcohol consumption				
No				
Yes	1.39*	0.001	1.33	1.45
Dietary (Non-vegetarian)				
No				
Non-vegetarian	1.06*	0.001	1.03	1.08
Religion				
Hindu				
Muslim	1.22*	0.001	1.19	1.25
Others	1.00	0.767	0.97	1.02
Caste				
Others				
SC	0.97*	0.009	0.94	0.99
ST	0.98	0.163	0.95	1.01
OBC	0.92*	0.001	0.90	0.93
State zones				
Northern				
Southern	0.85*	0.001	0.83	0.88
Western	0.93*	0.001	0.90	0.97
Eastern	0.88*	0.001	0.85	0.91
North-eastern	1.43*	0.001	1.39	1.48
Central	0.86*	0.001	0.84	0.89
BMI				
Underweight				
Normal	1.30*	0.001	1.27	1.33
Overweight	2.84*	0.001	2.77	2.92
Marital status				
Married				
Unmarried/divorced/widowed/separated	1.03*	0.014	1.01	1.06
Highest educational level				
No education				
Primary	1.06*	0.001	1.03	1.08
Secondary	0.97*	0.003	0.95	0.99
Higher	0.80*	0.001	0.77	0.83

Table 3: Results of Logistic Regression model (Exp B)

Covariates	Beta coefficients	Value to be substituted
Respondent's current age	0.074	Actual age
BMI	0.059	Actual BMI
Uses tobacco	0.027	1 - Smoker; 0 - Non smoker
Place of residence	0.012	1 - Urban; 0 - Rural
Drinks alcohol	0.424	1 - Alcoholic; 0 - Non alcoholic
Non-veg	0.144	1 - Non vegetarian; 0 - Vegetarian
Constant	-5.968	

compared to a previous study from North India which showed a prevalence of 23% among illiterates and 27% among highly educated.[29] The high prevalence among the illiterates may be a reflection of the poor health seeking behaviour among them due to lack of awareness.

Among those women who consume fried food daily, prevalence of hypertension was 13% and women who consume aerated drinks daily had prevalence of 12.2%. However, 13.8% of those who never consume fried food and 12.9% of those who never take aerated drinks had hypertension. The variation in the dietary patterns across age groups could have confounded the effect which needs to be explored further. The study showed a prevalence of hypertension of 23.4% among overweight individuals which is far higher than the 6% prevalence among underweight which is in line with the findings from previous studies from Mumbai which showed a prevalence of 72.4% in obese individuals and 33.8% in people with low BMI.[31] This confirms the contribution of obesity, an established modifiable risk factor for hypertension.

A prevalence of 14.8% was reported among women who use tobacco while a prevalence of 11.0% is reported among non-tobacco users in the present study as compared to an overall prevalence of 18.8% among people using tobacco from previous studies. Datta and Husain *et al.*[32] further observed an association between tobacco use and uncontrolled hypertension (OR 1.10) among women aged 20–35 years. This emphasises the need for eliciting the history of tobacco use among women and counselling them towards better lifestyle. The prevalence of hypertension was found to be 19.2% among those who consume alcohol when compared to the non-drinkers (11.1%). The ICMR–INDIAB study by Bhansali A *et al.*[22] reported hypertensive subjects had a significantly higher prevalence of alcohol consumption, than normotensive subjects across four states. The changing lifestyles include increase in alcohol consumption among women even in developing countries. Restriction of alcohol consumption may be an important driving factor for prevention of hypertension.

This study had shown that the major predictors of hypertension among women of reproductive age to be increasing age, increase in body mass index, tobacco usage, residing in urban area, alcoholism, and non-vegetarian diet. This is similar to a study by Talukdar D *et al.*[23] who found age more than 35 years, current smoking, prehypertension, and central obesity to be

significantly associated with incident hypertension. A systematic review of studies on risk prediction models for hypertension[14] showed that the most included predictors in the final prediction models were age, sex, body mass index, systolic blood pressure, and diastolic blood pressure, parental history of hypertension, and cigarette smoking. Similarly, a prospective cohort study by Paynter NP *et al.*[33] which included only women; had shown that a model based on clinical information including age, blood pressure, ethnicity, and body mass index predicted incident hypertension better than a model based on blood pressure alone. One interesting finding in this study was that the use of tobacco in any form increased the risk for hypertension among women.

Strengths and limitations

The study is done using NFHS data which is a nationally representative sample with robust estimates and is first of its kind with desegregated data for women in India which fills in a critical gap about hypertension and its determinants among them. The prediction score developed can be applied by individuals and clinicians for shared decision-making.

The limitation of the study is that the inclusion of pregnant women in the sample may perhaps lead to overestimate of the proportion with high blood pressure among females in the reproductive age group.

Future research

The use of "prediction scores" can be validated by further community-based studies. Longitudinal studies to identify the regional differences among the risk factors and their strength of association could lead to tailor-made solutions for the specific populations. The incremental increase in hypertension among the study population indicates the need for exploring innovative health promotion strategies and early screening approaches to prevent the need for pharmacological intervention in the future.

Conclusion

Hypertension is found to be a significant public health problem among women in the age group of 15–49 years with more than 1 in 10 women suffering from the disease. The major predictor variables for hypertension are age, body mass index, tobacco usage, residents of urban area, alcoholics, and non-vegetarians.

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Conflicts of interest

There are no conflicts of interest.

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