THE EVIDENCE

www.evidencejournals.com

Review Article | Public Health

Check for updates

Determinants of hypertension and treatment-seeking behavior among reproductive-age women in India: evidence from the national family health survey-5

Neonika Sharma[1], Ananya Thakur[2], Celso Augusto Guimaraes Santos[3], Paramita Sengupta[4], Jagdish Khubchandani[5*]

[1] Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India.

[2] Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India.

[3] Civil and Environmental Engineering, Federal University of Paraiba, Joao Pessoa, Brazil.

[4] Department of Community Medicine Family Medicine, All India Institute of Medical Sciences, Kalyani, West Bengal, India.

[5] Department of Public Health Sciences, New Mexico State University, Las Cruces, USA.

Correspondence:jagdish@nmsu.edu

evidence Journals

Cite this Article

Sharma N, Thakur A, Santos CAG, Sengupta P, Khubchandani J, Determinants of hypertension and treatment-seeking behavior among reproductive-age women in India: evidence from the national family health survey-5. The Evi. 1:1(1):1-. DOI:10.61505/evidence.2023.1.1.1 Available From https://the.evidencejournals.com/index.php/j/article/view/1

Received:	2023-07-20
Accepted:	2023-09-21
Published:	2023-10-12

Evidence in Context

• Hypertension affects 27% of Indians, with a higher risk in the elderly and those aged 35-59. • Many reproductive-age women in India have undiagnosed hypertension, especially in rural areas. • Age, education, residence, and wealth impact hypertension and treatment-seeking behavior. • 74% of hypertensive women sought treatment; 26% did not. • Targeted health campaigns and accessible primary care are needed.

To view Article

Abstract

Background: The burden of non-communicable diseases (e.g., hypertension) has become exceedingly high as a consequence of the epidemiological transition. Further insights into the socio-demographic determinants of hypertension specifically among women are much needed for prevention initiatives. This study examines the effect of sociodemographic determinants on the prevalence of hypertension and treatment-seeking behavior among reproductive-age women in India.

Methods: In this study, we focused on a population of reproductive-age women from India comprising 116,318 participants sourcing information from the National Family Health Survey (NFHS) of India. We examined the relationship between reported hypertension prevalence and several socio-demographic variables using adjusted estimates in regression models.

Results: Out of the 116,318 participants in the study, 6,008 individuals (5.17%) reported having hypertension, with only 74.37% of them seeking treatment. Multivariable model analysis revealed that women in higher age groups had a greater adjusted odds ratio of reporting hypertension [1.45, 1.43-1.47]. Additionally, wealthiest families were associated with higher reporting of hypertension [1.75; 1.57-1.94].

Conclusion: About 5% of women in the reproductive age group were found to be hypertensive, and a considerable number of them did not seek treatment. The findings warrant tailored health promotion campaigns for hypertension prevention among women of reproductive age in India.

Keywords: *hypertension, reproductive-age women, socio-demographic determinants, treatment-seeking behavior, India, nfhs-5 (national family health survey-5), prevalence, non-communicable diseases (NCDs), cardiovascular disease (CVD), logistic regression*

Introduction

Non-communicable diseases (NCDs) accounted for more than 50 million deaths worldwide (equivalent to 70% of all deaths) in 2015 [1]. Since the past few decades, cardiovascular diseases have consistently ranked among the top causes of death worldwide [2]. More specifically, hypertension has been ranked as a leading risk factor for premature mortality and health loss, mostly from ischemic heart disease and stroke [3]. In the 20th century, NCDs such as cardiovascular diseases were mostly a concern in developed countries [4]. However, NCDs are now causing a large number of deaths worldwide, irrespective of whether the country is developed or developing. Cardiovascular disease (CVD) is identified as the predominant factor leading to mortality in women across developed and developing nations, among all NCDs. Several studies have indicated that women exhibit a higher propensity to manifest multiple metabolic risk factors, thereby contributing to a heightened prevalence of Non-Communicable Diseases (NCDs) among them. The presence of hypertension serves as well established, prevalent, and modifiable risk factor associated with cardiovascular diseases [3, 5-7].

In India, the prevalence of hypertension was reported to be close to 27% in both the sexes (which could be higher than some of the neighboring countries) [8, 9]. Furthermore, the risk of developing hypertension in India has been reported to be 6 to 8 times higher in elderly individuals and 2 to 3 times higher amongst those aged 35 to 59 years compared to those in the 20 to 34-year-old age group [9]. Also, hypertension and hemorrhage have been identified as leading causes of death among reproductive-agewomen in India [10]. Less than 10% of Indian men and women are aware of their hypertensive condition, while the majority remain unidentified. Among those with hypertension, more than half have been reported to actively seek treatment [9-11].Studies have also found that in India, almost a fifth of the women of reproductive age have undiagnosed hypertension with profound regional differences (e.g. 17% and 22% in rural andurban areas respectively [11]. Also, the contribution of pregnancy-induced hypertension to maternal mortality is likely underestimated [12].

Much of the research on hypertension prevalence, determinants, and prevention has focused on individuals in developed countries. Also, hypertension control programs predominantly target the elderly population, thus overlooking the early screening of other vulnerable groups like women, especially those of reproductive age [13-16]. In this study, we investigated the factors that affect hypertension-related treatment-seeking behavior among women in India. Also, we explored the variation in hypertension prevalence among women in the reproductive age group and its association with age groups and socioeconomic status. We utilized data from the 2019–2020 National Family Health Survey (NFHS-5), India focusing on women of reproductive age.

Methods

Ethical considerations

The study does not include any identifiable information about the participants involved in the survey since it utilizes secondary data. The dataset used in the study is readily accessible from the public domain for research purposes. Therefore, approval through an institutional review board is not required.

Study Design and Sampling

The study uses the secondary data derived from the NFHS-5 conducted in 2019–2020. The data was synchronized from the latest fifth NFHS survey in the series. It involves a representative sample of households throughout India. The NFHS was conducted first time in 1991. To date, a total of five rounds of NFHS have been conducted by the Government of India.

The survey provides vital data on populations, housing and socio-economic variables. It also shines a light on crucial indicators like infant and child mortality, fertility, family planning, anemia, nutrition, morbidity, women's empowerment, maternal and child health, and domestic violence. This information is provided for both the entire country and discretely for every State/Union Territory in India. In NFHS-4 (2015–2016), it was the first time that information on emerging health issues, and non-communicable diseases like hypertension and diabetes mellitus,

Was gathered. The main benefit with conducting successive rounds of NFHS is to make vital health information data available. It also focuses on emerging health-related issues of the population. Therefore, the information obtained from NFHS assists policymakers in identifying public health needs and introducing programs for specific health issues. Organized questionnaires were administered, and females and males aged from fifteen to forty-nine and fifty-four years respectively in the selected households were considered for interview. A total of 610,000 individuals were interviewed. This study investigated the prevalence of hypertension and its treatment seeking behavior in women of childbearing age (N= 116,318), as well as its correlation with socio-demographic factors such as age, educational attainment, location of residence, employment status, and income level.

Outcome variable

The prevalence of hypertension and its treatment-seeking behavior serve as the outcome variables. These variables were constructed with the help of certain questionnaire items. For instance, the survey included a specific question, "Question 1: Do you presently have hypertension?" This question aimed to assess the prevalence of hypertension among reproductive age women. In addition, the question, "Have you sought treatment for hypertension?" was used to identify treatment-seeking behavior among hypertensive women. The participants were asked if they currently have hypertension, and if they do, whether they have sought treatment for it.

A correct response to the above-mentioned questions falls within the provided options: "yes," coded as "1," and "no," coded as "2." The option "don't know" is also available and is coded as "8." If the participants are recorded as hypertensive, a further question regarding treatment-seeking behavior is asked. The responses are recorded as "1" for "yes" and "2" for "no."

Exposure variables

Socio-demographic factors, such as age, educational attainment, residential location, employment status, and income level, were examined as variables of exposure. These variables were selected for their suspected association. They were further categorized based on age into intervals of five years starting with 15–19 and reaching 45–49. This study analyzed a range of demographic variables, including the type of dwelling (urban or rural), the highest educational (no education, primary, secondary, or tertiary), and the wealth status (classified as poorest, poorer, middle, richer, and richest). These factors were analyzed to assess their influence on the primary outcome. They were derived from the latest NFHS to determine the association between the prevalence of hypertension, its treatment-seeking behavior, and the exposure variables.

Statistical analysis

The study variables were summarized using descriptive statistics. To understand the hypertension status of the women, we first calculated the percentages and frequencies and then presented the data in tabular form. The prevalence of hypertension and its treatment-seeking behavior, as outcome variables, were categorized as "Having hypertension" and "Not having hypertension". In this study, we investigated the relationship between socio-demographic determinants (exposure variables) and the prevalence and of hypertension, and the behavior of seeking treatment for hypertension among women in the reproductive age group (outcome variable). To assess the strength of this association, we conducted a multivariate logistic regression analysis. The results were presented in the form of adjusted odds ratios (aOR), 95% confidence intervals (CI) and p-values ($P \leq 0.05$) to determine statistical significance. Data analysis was conducted with Stata.

Results

115,379 women in the reproductive age group participated in the study and Table 1 presents the frequency distribution of their sociodemographic characteristics The prevalence of hypertension was greatest in the age group of 45–49 years, with 1,756 individuals (29.23%), followed by the age groups of 40–44 years, with 1,292 individuals (21.50%), and 35–39 years, with 1,010 individuals (16.81%). The least prevalence was observed in 15–19 years, with 188 individuals (3.13%). The study reveals that most of the participants resided in rural areas (70.92%) while 29.08% lived in urban areas. The majority of the respondents, 43.39%, had completed secondary-level education, followed by 30.34% with no education. Only a small fraction of respondents,

9.35%, had achieved higher education. The combined wealth index revealed distribution across all economic statuses, with 22.69%, 23.04%, 21.30%, 18.22%, and 14.74% falling into the categories of poorest, poorer, middle, richer, and richest, respectively. Figure 1shows the treatment-seeking behavior of hypertensive women in absolute numbers and percentages. Of the total hypertensive respondents (6008), 4468 (74.37%) had sought treatment for hypertension, whereas 1540 (25.63%) had not.

Table 1. Basic socio-demographic characteristics of study participants based on hypertension status (N= 1,15,379)

Variables	Hypertensive, no (%)	Yes (n=6008) (%)	Total (115379) (%)	P-value
Age in 5-year groups				**0.000**
15-19	19152 (17.51%)	188 (3.13%)	19340 (16.76%)	
20-24	18107 (16.56%)	377 (6.27%)	18484 (16.02%)	
25-29	17377 (15.89%)	629 (10.47%)	18006 (15.61%)	
30-34	14613 (13.36%)	756 (12.58%)	15369 (13.32%)	
35-39	14439 (13.20%)	1010 (16.81%)	15449 (13.39%)	
40-44	12416 (11.35%)	1292 (21.50%)	13708 (11.88%)	
45-49	13267 (12.13%)	1756 (29.23%)	15023 (13.02%)	
Type of place of residence				**0.000**
Urban	28344 (25.92%)	1747 (29.08%)	30091 (26.08%)	
Rural	81027 (74.08%)	4261 (70.92%)	85288 (73.92%)	
Highest educational level				**0.000**
No education	26606 (24.33%)	1823 (30.34%)	28429 (24.64%)	
Primary	12732 (11.64%)	1016 (16.91%)	13748 (11.92%)	
Secondary	54571 (49.90%)	2607 (43.39%)	57178 (49.56%)	
Higher	15462 (14.14%)	562 (9.35%)	16024 (13.89%)	
Wealth index combined				**0.000**
Poorest	25137 (22.98%)	1043 (17.36%)	26180 (22.69%)	
Poorer	25272 (23.11%)	1317 (21.92%)	26589 (23.04%)	
Middle	23310 (21.31%)	1271 (21.16%)	24581 (21.30%)	
Richer	19784 (18.09%)	1234 (20.54%)	21018 (18.22%)	
Richest	15868 (14.51%)	1143 (19.02%)	17011 (14.74%)	

P-values by t-test and Chi2 test for continuous and categorical variables respectively.

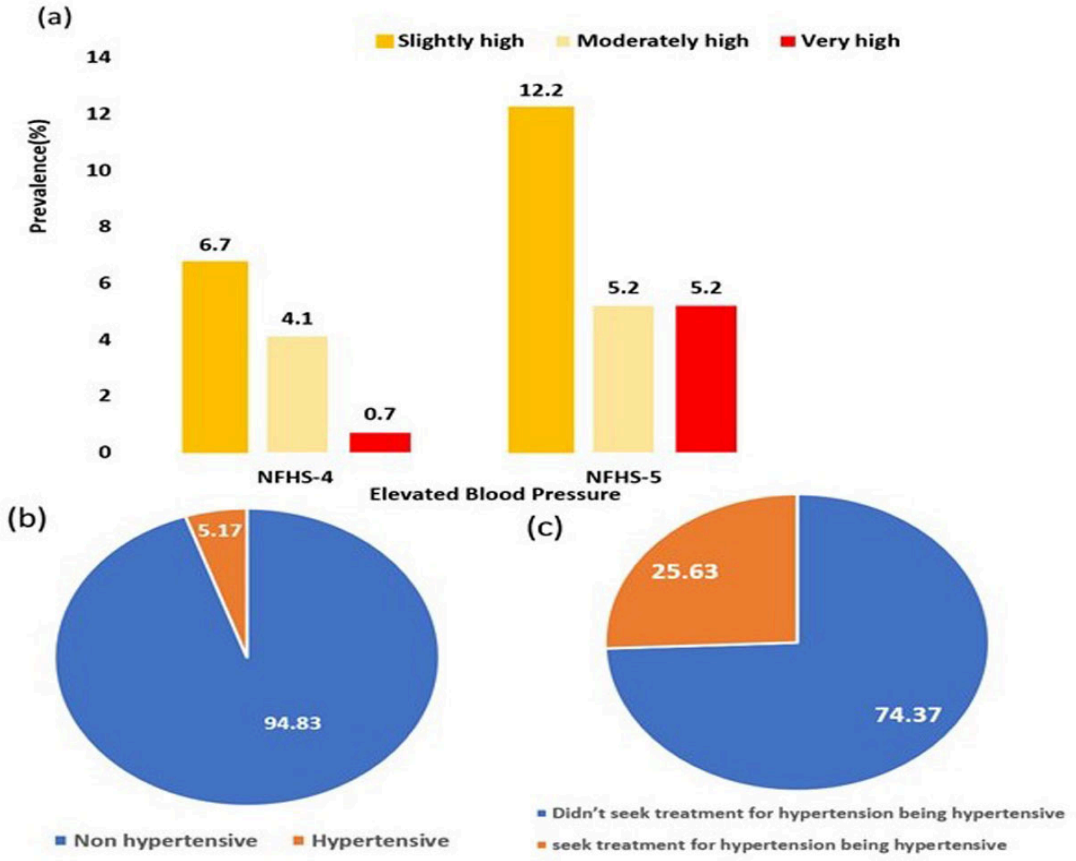

Figure 1: (a) Comparison of hypertension prevalence between NFHS-4 and NFHS-5; (b) prevalence of hypertension among women of reproductive age group (N= 6008); (c) treatment-seeking behavior among women of reproductive age group (N=1540).

Table 2 describes the association between the prevalence of hypertension and the sociodemographic characteristics of the study participants. We found significant associations between the prevalence of hypertension and the following socio-demographic characteristics: respondent's current age [aOR 1.08, 95% CI: 1.06–1.11], type of residence (rural vs. urban) [0.95, 0.89–1.02], highest educational level (no education vs. higher education) [1.18, 1.06–1.33], primary education [1.62, 1.44–1.81], secondary education [1.36, 1.23–1.50], and wealth index (poorest vs. poorer) [1.23, 1.13–1.33], middle [1.25, 1.14–1.36], richer [1.44, 1.31–1.58], and richest [1.72, 1.55–1.91].

Table 3 shows the association between the treatment-seeking behavior of hypertensive women in India and sociodemographic characteristics. The sociodemographic variables significantly associated with treatment-seeking behavior among hypertensive women were current age [1.04, 1.03–1.04], place of residence (rural vs. urban) [0.96, 0.83–1.11], highest educational level (no education vs. higher education) [1.60, 1.27–2.02], primary education [1.89, 1.47–2.42], secondary education [1.54, 1.26–1.89], and wealth index (poorest vs. poorer) [1.05, 0.87–1.26], middle [1.22, 1.00–1.48], richer [1.28, 1.04–1.57], and richest [1.48, 1.18–1.86].

Table 2. Multiple logistic regression for the association between hypertension and socio-demographics of study participants (N= 1,15,379)

Variable	AOR [95% CI]	P-value
Respondent's current age	**1.08 [1.08, 1.08]**	**0.00**
Type of place of residence: base rural		
Urban	0.95 [0.89, 1.02]	0.17

Highest educational level: base higher		
No education	1.18 [1.06, 1.33]	0.00
Primary	1.62 [1.44, 1.81]	0.00
Secondary	1.36 [1.23, 1.50]	0.00
Wealth index combined: base poorest.		
Poorer	1.23 [1.13, 1.33]	0.00
Middle	1.25 [1.14, 1.36]	0.00
Richer	1.44 [1.31, 1.58]	0.00
Richest	1.72 [1.55, 1.91]	0.00

Table 3: Multiple logistic regression analysis for the association between hypertension treatment-seeking behavior and socio-demographic characteristics of study participants (N= 6008)

Variable	AOR [95% CI]	P-value
Respondent's current age	1.04 [1.03, 1.04]	0.00
Type of place of residence: base rural		
Urban	0.96 [0.83, 1.11]	0.58
Highest educational level: base higher		
No Education	1.60 [1.27, 2.02]	0.00
Primary	1.89 [1.47, 2.42]	0.00
Secondary	1.54 [1.26, 1.89]	0.00
Wealth index combined: base poorest		
Poorer	1.05 [0.87, 1.26]	0.63
Middle	1.22 [1.00, 1.48]	0.05
Richer	1.28 [1.04, 1.57]	0.02
Richest	1.48 [1.18, 1.86]	0.00

Discussion

This study sought to investigate the influence of socio-demographic determinants on hypertension and treatment-seeking behavior among women of reproductive age in India. Our findings underscore a significant association between socio-demographic factors, hypertension prevalence, and treatment-seeking behavior. Of the 116,318 study participants, 6008 (5.17%) reported currently having hypertension, with only 74.37% of them having sought treatment. A positive relationship between sociodemographic factors and hypertension indicates the importance of these factors in the prevalence of hypertension and possibly many related diseases. Our study outcomes align with a previous study conducted on hypertension disorders during pregnancy among women in the reproductive age group of 15–49 in India, which utilized data from the recent nationally representative survey, NFHS-4. In a similar study, a sample size of 1,07730

Women participated, and out of these, 6260 women were found to be hypertensive, which concluded that 5.8% of women were hypertensive [17]. Comparable findings were seen in another Indian study, indicating that about every tenth of women of reproductive age have hypertension, with a prevalence of nearly 11% [18].

According to our study, of the 6008 hypertensive respondents, only 4468 have sought treatment for hypertension, leaving 1540 who have not. This shows that 74.37% have sought treatment while 25.63% of hypertensive women have not. Also, our study reveals a higher prevalence of hypertension among participants in the range of 45 to 49 years, followed by those in the range of 40 to 44 years (21.50%), and 35 to 39 years (16.81%). These results align with other studies that demonstrate an increased risk of hypertension with age [19,20]. Studies from other developing countries and in the Southeast Asia region have also highlighted a higher prevalence of hypertension in women over 30 years of age compared to those in the 15–29 age group. Furthermore, we found a higher prevalence of hypertension among rural women, in line with previous studies from developing countries [21]. These findings also highlight the rapid increase in hypertension among the rural population as per NFHS-4 data. Place of residence, therefore, is a significant sociodemographic determinant of hypertension prevalence and treatment-seeking behavior in Southeast Asia. Previous studies have shown that rural populations tend to add more salt to their food compared with urban populations and may have other lifestyle risk behaviors potentially leading to higher hypertension prevalence and lower tendencies to seek treatment [13-16, 22, 23].

Our findings are similar to another Indian study where the prevalence of undiagnosed hypertension was 18.63%. This study reports a similar overall weighted prevalence of undiagnosed hypertension in this age group (15–49) [11]. It also reports that self-reported hypertension was at 8.86% [11]. Furthermore, a study by Ramakrishnan and colleagues [24] estimated an overall hypertension prevalence of 30.7% (30.5, 30.9), with women specifically at 23.7% (95% CI: 23.3, 24), indicating that approximately a third of the Indian adults are affected by hypertension. Other regional studies have also suggested that the prevalence of hypertension among pregnant Indian women could range from 5-15% [25-27].

Previous evidence from the studies has shown that women of reproductive age group suffer the most significant morbidities in endemic areas [13]. Specific and tailored strategies are needed to help women overcome these challenges and develop treatment-seeking behaviors. Patient-centered prevention interventions should be introduced as the control of hypertension is less expensive than treatment [13]. Integration of hypertension care services at the grassroots level of primary health care may prove beneficial for women. Women who seek treatment and those who have developed treatment-seeking behavior often find accessing healthcare services difficult and many of them in turn avoid visiting healthcare centers [14]. Improving the accessibility of services at the primary health care level is essential as it directly impacts the approachability of care provided at the health care center [14]. Therefore, irrespective of socio-demographic factors, women should be enabled to seek treatment. The strategies should be culturally appropriate, applicable, and focused on the self-management of hypertension among women [15]. Considering the disparities in hypertension prevalence among women in India it is also crucial that national-level strategies be developed with a focus on education and awareness [16]. Interventions targeting behavior change through different approaches, such as education, provision of tailored services, training for self-care management, and involvement of the targeted group in policymaking and execution, are needed. This study provides a robust estimate of the overall prevalence of hypertension within a large sample representing women in the reproductive age group (15–49) in India. It sheds light on the impact of sociodemographic factors on hypertension prevalence and treatment-seeking behavior, contributing to a better understanding of the subject matter.

Limitations

The results of this study have a few limitations. First, given the cross-sectional design of the study, one cannot assess causal relationships. Second, this study is confined to the information available in the NFHS-5 dataset and may not reflect population estimates from across India. Third, the NFHS-5 questionnaire asked, "Do you currently have hypertension?" to determine the prevalence of hypertension. The self-reported prevalence of hypertension by the participants may be biased, leading to potential underreporting of hypertension or treatment-seeking behavior. The data should

Ideally be matched or cross-verified with healthcare center records. Also, we could not analyze some important factors, such as perceived severity among women exhibiting poor treatment-seeking behavior, as well as the distance and time required to reach healthcare centers for treatment. In spite of the mentioned limitations, this is one of the biggest studies that indicates the influence of sociodemographic factors on hypertension and treatment-seeking behavior among women of reproductive age group in India. The factors include age group, place of residence, education level, and wealth index.

Conclusion

This national study of hypertension among reproductive-age women in India found that approximately 5.17% of women in this group were diagnosed with hypertension and a significant proportion of these women are not actively seeking treatment. Sociodemographic factors were associated with hypertension prevalence and treatment seeking for hypertension. Tailored health promotion campaigns specifically targeting the prevention of hypertension among women in this age group in India are warranted as such campaigns hold immense potential to increase awareness, facilitate early identification, and promote effective management of hypertension, thereby leading to a reduction in premature mortality and ameliorating health loss. By addressing the gaps in treatment-seeking behavior, these initiatives can also substantially contribute to the overall well-being of women in the reproductive age group.

Supporting information

None

Ethical Considerations

None

Acknowledgments

None

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author contribution statement

Neonika Sharma: Conceptualization (lead); writing – original draft (lead); formal analysis (lead); writing – review and editing (equal). **Ananya Thakur**: conceptualization, Software (lead); writing – review and editing (equal). **Celso Augusto Guimarães Santos**: conceptualization, Software (lead); writing – review and editing (equal). **Paramita Sengupta**: conceptualization, Software (lead); writing – review and editing (equal). **Jagdish Khubchandani**: Conceptualization (lead); writing – original draft (lead); formal analysis (lead); writing – review and editing (equal).

All authors attest they meet the ICMJE criteria for authorship and gave final approvalforsubmission.

Data availability statement

Data included in article/supp. material/referenced in article.

Additional information

No additional information is available for this paper.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. World Health Organization. NCD mortality and morbidity. 2017. *[Crossref][PubMed][Google Scholar]*

2. Badlam JB, Badesch DB, Austin ED, Benza RL, Chung WK, Farber HW, et al. United States pulmonary hypertension scientific registry: baseline characteristics. Chest. *2021;159(1):311-27 [Crossref][PubMed][Google Scholar]*

3. Forouzanfar MH, Liu P, Roth GA, Ng M, Biryukov S, Marczak L, et al. Global burden of hypertension and systolic blood pressure of at least 110 to 115 mm Hg, 1990-2015. [Erratum appears in JAMA. *2017;317(6):648]. JAMA. 2017;317(2):165-82 [Crossref][PubMed][Google Scholar]*

4. World Health Organization. Global action plan for the prevention and control of NCDs 2013–2020. Available from: https://www. *who.int/publications/i/item/9789241506236; 2013. Accessed July 20, 2023 [Crossref][PubMed][Google Scholar]*

5. Khuwaja AK, Kadir MM. Gender differences and clustering pattern of behavioural risk factors for chronic non-communicable diseases: community-based study from a developing country. Chronic Illn. *2010;6(3):163-70 [Crossref][PubMed][Google Scholar]*

6. Ahmad A, Oparil S. Hypertension in women: recent advances and lingering questions. Hypertension. *2017;70(1):19-26 [Crossref][PubMed][Google Scholar]*

7. Prabhakaran D, Jeemon P, Ghosh S, Shivashankar R, Ajay VS, Kondal D, et al. Prevalence and incidence of hypertension: results from a representative cohort of over 16,000 adults in three cities of South Asia. Indian Heart J. *2017;69(4):434-41 [Crossref][PubMed][Google Scholar]*

8. Ministry of Health of Nepal. Nepal Demographic and Health Survey 2016 [FR336]. Available from: https://www. *dhsprogram.com/pubs/pdf/fr336/fr336.pdf; 2016. Accessed July 20, 2023 [Crossref][PubMed][Google Scholar]*

9. Laxmaiah A, Meshram II, Arlappa N, Balakrishna N, Rao KM, Reddy CG, et al. Socio-economic & demographic determinants of hypertension & knowledge, practices & risk behaviour of tribals in India. Indian J Med Res. *2015;141(5):697-708 [Crossref][PubMed][Google Scholar]*

10. Chhabra P, Guleria K, Bhasin SK, Kumari K, Singh S, Lukhmana S. Severe maternal morbidity and maternal near miss in a tertiary hospital of Delhi. Natl Med J India. *2019;32(5):270-6 [Crossref][PubMed][Google Scholar]*

11. Talukdar D, Tripathi M, Tripathi V, Teelucksingh S. Prevalence and associated factors of undiagnosed hypertension among women aged 15–49 years in India: an analysis of National Family Health Survey-4 data. J Hum Hypertens. *2021;35(8)726–740. doi: 10.1038/s41371-020-0384-7 [Crossref][PubMed][Google Scholar]*

12. Von Dadelszen P, Magee LA. Preventing deaths due to the hypertensive disorders of pregnancy. Best Pract Res Clin Obstet Gynaecol. *2016;36:83-102 [Crossref][PubMed][Google Scholar]*

13. Zaman MM, Bhuiyan MR, Karim MN, MoniruzZaman N, Rahman MM, Akanda AW, et al. Clustering of non-communicable diseases risk factors in Bangladeshi adults: An analysis of STEPS survey 2013. BMC Public Health. *2015;15:1-9 [Crossref][PubMed][Google Scholar]*

14. Witter S, Zou G, Diaconu K, Senesi RG, Idriss A, Walley J, et al. Opportunities and challenges for delivering non-communicable disease management and services in fragile and post-conflict settings: perceptions of policy-makers and health providers in Sierra Leone. Confl Health. *2020;14:1-4 [Crossref][PubMed][Google Scholar]*

15. Jones LM, Wright KD, Wallace MK, Veinot T. Take an opportunity whenever you get it: Information sharing among African-American women with hypertension. J Assoc Inf Sci Technol. *2018;69(1):168-71 [Crossref][PubMed][Google Scholar]*

16. Appiah F, Ameyaw EK, Oduro JK, Baatiema L, Sambah F, Seidu AA, et al. Rural-urban variation in hypertension among women in Ghana: Insights from a national survey. BMC Public Health. *2021;21:1-8 [Crossref][PubMed][Google Scholar]*

17. Sharma N, Joshi N, Nazar GP, Arora M, Malhotra S, Bhatt G, et al. 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. J Fam Med Prim Care. *2022;11(9):5799-806 [Crossref] [PubMed][Google Scholar]*

18. Bhimarasetty MD, Pamarthi K, Kandipudi KL, Padmasri Y, Nagaraja SB, Khanna P, et al. Hypertension among women in reproductive age in India: Can we predict the risk? An analysis from National Family Health Survey (2015–2016). J Fam Med Prim Care. *2022;11(9):5857-64 [Crossref] [PubMed][Google Scholar]*

19. Nahla Ibrahim NK, Hijazi NA, Al-Bar AA. Prevalence and determinants of prehypertension and hypertension among preparatory and secondary school teachers in Jeddah. J Egypt public health assoc. *2008;83(3-4):183-203 [Crossref][PubMed][Google Scholar]*

20. Bell K, Twiggs J, Olin BR, Date IR. Hypertension: the silent killer: updated JNC-8 guideline recommendations. Alabama Pharmacy Association. *2015;334:4222 [Crossref][PubMed][Google Scholar]*

21. Virk A, Samdarshi N, Saini P, Mohapatra A, Sahoo S, Goel S. Prevalence and determinants of hypertension and associated comorbidities in non-pregnant women of reproductive age group (15–49 years): Evidence from National Family Health Survey (NFHS-4), India. J Fam Med Prim Care. *2022;11(9):5865-73 [Crossref][PubMed][Google Scholar]*

22. Tripathy JP, Thakur JS, Jeet G, Chawla S, Jain S. Alarmingly high prevalence of hypertension and pre-hypertension in North India-results from a large cross-sectional STEPS survey. PloS one. *2017;12(12):e0188619 [Crossref][PubMed][Google Scholar]*

23. Ghosh S, Prevalence and associated risk factors of hypertension among persons aged 15-49 in India: a cross-sectional study. BMJ Open. 2019;9(12):e029714. *[Crossref][PubMed][Google Scholar]*

24. Ramakrishnan S, Zachariah G, Gupta K, Rao JS, Mohanan PP, Venugopal K, et al. Prevalence of hypertension among Indian adults: Results from the great India blood pressure survey. Indian Heart J. *2019;71(4):309-13 [Crossref][PubMed][Google Scholar]*

25. Mehta B, Kumar V, Chawla S, Sachdeva S, Mahopatra D. Hypertension in pregnancy: a community-based study. Indian J Community Med. *2015;40(4):273-8 [Crossref][PubMed][Google Scholar]*

26. Raj K, Paul A, Bansal K, Devgun P, Passi U. Incidence of gestational hypertension among pregnant women in the rural population of District Amritsar-A community based study. Indian J Public Heal Res Dev. *2018;9(8):42 [Crossref][PubMed][Google Scholar]*

27. Nath A, Sheeba B, Raj S, Metgud CS. Prevalence of hypertension in pregnancy and its associated factors among women attending antenatal clinics in Bengaluru. J Fam Med Prim Care 2021;10(4):1621-7. *[Crossref][PubMed][Google Scholar]*

Disclaimer / Publisher's Note