Original Research Article

Prevalence and determinants of hypertension among men and women in Maharashtra: an analysis of NFHS-5 data 2019-2021

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ABSTRACT

Background: Hypertension is a major underlying factor in India's rising non-communicable disease burden and poses a significant public health challenge. This study investigated the prevalence and identifies key determinants among men and women in Maharashtra.
Methods: This cross-sectional study used data from the National Family Health Survey (NFHS-5, 2019-2021). Statistical analysis was conducted using SPSS for descriptive statistics and logistic regression, we explored associations between hypertension and comprehensive set of factors including demographic attributes (age, gender, marital status, education), socioeconomic status (wealth index quintiles, religion, caste/tribe), geographic (urban/rural residence, region), health (diabetes status), and lifestyle (tobacco use, alcohol consumption).
Results: Our results showed that hypertension occurs significantly more often with age and is generally higher in women. Wealthier individuals in urban settings exhibit a higher prevalence, with some regional differences across the state. A strong correlation was found between diabetes and hypertension, and lifestyle habits such as tobacco and alcohol use were significantly associated with elevated blood pressure.
Conclusions: Hypertension in Maharashtra is influenced by complex mix of factors, such as age, socioeconomic status, geography, and modifiable risk behaviours, to a significant extent. High prevalence, especially in women and wealthier populations, coupled with the diabetes link and far-reaching lifestyle impacts, underscores an urgent public health priority. These findings highlight focused public health initiatives and awareness programs, lifestyle intervention, and better healthcare access in Maharashtra to manage and prevent hypertension, a growing non-communicable disease burden.

Keywords: Hypertension, Maharashtra, Men, NFHS-5, Non-communicable disease, Women

INTRODUCTION

Globally, hypertension is becoming a serious public health threat. About 1.28 billion people between the ages of 30-79 globally suffer from hypertension, with the majority (about two-thirds) living in low-and middle-income countries. Approximately 46% of adults who have hypertension are not aware of their condition. Less than half of adults (42%) diagnosed with hypertension receive proper diagnosis and treatment. To combat non-communicable diseases, one global goal is to reduce the prevalence of hypertension by 33% between 2010 and 2030.[1] The prevalence of hypertension varies within geographical regions and between nations' economic sectors. The WHO region of the Americas shows the lowest prevalence of hypertension (18%), while the WHO African region reports the highest incidence (27%). Adults with hypertension increased from 594 million in 1975 to 1.13 billion in 2015, with a large portion of this increase being seen in low-and middle-income countries.[1] Hypertension is crucially preventable. It can lead to serious effects like myocardial infarction, stroke, renal

failure, and even death if undiagnosed and poorly treated. Hypertension is a significant risk factor for 51% of global deaths from stroke and 45% of deaths from coronary heart disease.[2]

Globally, the burden of hypertension is steadily increasing, with India contributing to a substantial share.[3] Approximately 20-40% of persons in urban areas and 12-17% of adults in rural areas experience hypertension. With an almost equal distribution of men and women, it is predicted that the number of people with hypertension will increase from 118 million in 2000 to roughly 214 million in 2025. A study including 26,000 individuals in South India found that 20% of the population had hypertension (23% of males and 17% of women). Surprisingly, nearly 67% of people who had hypertension were unaware of it. The majority of hypertensive patients are still undiagnosed, and the condition is not adequately controlled.[4] By 2025, India aims to achieve a 25% decrease in the relative occurrence of hypertension (elevated blood pressure). To accomplish this goal, the Indian government initiated the Indian Hypertension Control Initiative (IHCI). The main objective of this project is to speed up the availability of treatment options for India's more than 220 million hypertensive people.[5] The Indian Hypertension Control Initiative, which has many partners, was launched in November 2017 by the Ministry of Health and Family Welfare, Indian Council of Medical Research, WHO Country Office for India, and resolve to save lives.[6]

Maharashtra, as a highly populous state, faces unique challenges in the problem of hypertension and its consequences. The National Family Health Survey (NFHS) provides a rich and nationally representative source of information about hypertension prevalence and its correlates. Age and gender are the important non-modifiable risk factor associated with hypertension, but also, factors such as educational and economic status, place of residence, religious status, community connectedness, and hypertension management are such factors that may predict the risk for hypertension. Other risk factors for hypertension include diseases such as obesity, high cholesterol, and diabetes. Further, greater BMI, alcohol consumption, poor dietary behaviour, and sedentary lifestyle significantly contribute to the higher prevalence of hypertension in India.[2]

The incidence of hypertension has risen gradually across India, including in Maharashtra. Hypertension will have a significant impact on people living in Maharashtra, one of India's most populous and economically influential states. A recent study in Maharashtra estimated overall hypertension prevalence at around 25%. Significant variation exists in the prevalence of hypertension across various districts of Maharashtra.[2] This systematic review sought to conduct a comprehensive examination of the prevalence, patterns, and factors associated with hypertension in Maharashtra. It was achieved by analyzing data from the fifth edition of National Family

Health Survey (NFHS-5). The aim was to gain deep insight of how hypertension is distributed and its connected factors at state level becomes crucial for devising impactful strategies to prevent and manage hypertension, a significant public health challenge.

Objectives

To examine patterns of hypertension occurrence across various demographic characteristics, such as age, gender, socioeconomic status, urban/rural residence, and educational attainment. To measure the prevalence of hypertension in different regions of Maharashtra using NFHS-5 data. To determine factors associated with hypertension in Maharashtra, including lifestyle factors, dietary habits, physical activity, tobacco, and alcohol consumption

METHODS

Data

Data were obtained from the fifth National Family Health Survey (NFHS-5), which was conducted in 2019-20. For India and each state/union territory (UT), it provides information regarding nutrition, health, and population. Ministry of Health and Family Welfare under Government of India picks International Institute for Population Sciences Mumbai as nodal agency for conducting NFHS-5. Like NFHS-4, NFHS-5 also offers district-level estimates for several significant indicators. To allow comparisons across time, the contents of NFHS-5 are like the contents of NFHS-4.[18] According to the International Institute for Population Sciences (2021), "NFHS-5 covers several new issues, such as preschool education, disability, access to a toilet facility, death registration, bathing habits during menstruation, and abortion methods and reasons." To provide estimates of several survey indicators at the national, state/union territory (UT), and district levels, the NFHS-5 sample was developed.[18]

However, estimates of indicators of sexual behaviour, husband's background and woman's employment, knowledge, attitudes, and behaviour related to HIV/AIDS, as well as domestic violence, are only available at the state/UT and federal levels. NFHS-5 sample size decisions were influenced by several factors, the most important of which was the requirement to develop indicators at the district, state, and/or union territory (UT) levels. As a result, NFHS-

5 includes data for 707 districts, 28 states, and 8 union territories.[18] Every round of the survey used the same sample design, which was chosen because it is representative at the national, state/union territorial, and district levels. Urban and rural regions are differentiated within each district.

Each rural stratum is divided into a smaller substrate based on the village population and the proportion of the population that belongs to a scheduled caste or scheduled tribe (SC/ST). A sample of villages was chosen as primary sampling units (PSUs) within each specific rural sampling stratum; prior to PSU selection, PSUs were classified based on the literacy rate of women aged 6+ years. The household list was generated as an outcome of the mapping and household listing operations performed in each selected PSU before the household selection in the second stage. As of March 31, 2017, 30,456 primary sampling units (PSUs) were chosen across the country in NFHS-5 from 707 districts, with fieldwork completed in 30,198 PSUs. The NFHS-5 samples are split into two stages. The 2011 census was used as the sampling frame for the selection of PSUs. Primary sampling units (PSUs) were villages in rural regions and census enumeration blocks (CEBs) in urban areas.

Survey schedules/questionnaires

Computer-assisted personal interviewing (CAPI) was used to survey households, women, men, and biomarkers in 18 native languages. The household questionnaire collected information on all regular members of the family as well as guests who slept in the household the night before the interview.

Basic demographic information was gathered on the characteristics of each person mentioned, such as age, gender, marital status, and education, as well as possessing an Aadhaar card, tobacco usage, alcohol usage, disability, and relationship to the head of the home are all factors to consider.

The woman's questionnaire gathered data from all eligible women aged 15 to 49, who were given questions about a wide range of issues, including the following:

Background characteristics- Age, literacy, schooling, religion, caste/tribe, and media exposure are examples of background characteristics.

Other health issues- Other health concerns include cigarettes and alcohol, tuberculosis knowledge, chronic morbidity (diabetes, hypertension, asthma, goiter and other thyroid disorders, heart disease, cancer), and household decision-making (state module subsample only).

Data processing

The International Institute for Population Sciences received electronic data from the 2019-2021 National Family Health Survey (NFHS) daily through the Sync Cloud system. This data was securely stored on a password-protected computer. For the 2019 NFHS, a total of 636,699 households were chosen for the sample.

Within the interviewed households, there were 747,176 eligible women aged 15-49 for individual interviews. Interviews were conducted with 724,115 women, yielding a response rate of 97 per cent. Furthermore, there were 11,179 eligible men aged 15-54 in households selected for the state module. Interviews were carried out with 101,839 of these men, resulting in a response rate of 92 per cent.[18]

Variables description

Outcome variable

The presence of hypertension was the outcome variable, which was obtained by asking the question, "do you currently have hypertension?" Yes or no was entered as the response.

Explanatory variables

The information related to socio-demographic variables includes participant age, marital status, place of residence (urban and rural), education status, religion, caste, wealth index, administrative divisions, and other explanatory variables such as obesity, diabetes, smoking, chewing tobacco, and alcohol consumption. These data were obtained from the NFHS-5 survey.

Individual characteristics

Age was grouped into 15-19 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years, 40-44 years, 45-49 years, and 50-54 years. Marital status was coded as unmarried and married, which includes married and those who were divorced, separated, or widowed. Educational status was categorised as illiterate, primary, secondary, and higher.

Household characteristics

The wealth status variable was formulated using data provided by the NFHS-5 survey conducted from 2019 to 2021. Households were assessed by assigning a score, which took into consideration their possession of various consumer goods, including items like televisions, cars, or bicycles. Additionally, it considered housing characteristics such as toilet facilities, the source of drinking water, and the materials used for flooring, along with their access to services such as electricity, cooking fuel, and healthcare facilities.

For analysis, the variable of religion was divided into three groups: Hindus, Muslims, and a combined category for minority communities such as Christians, Buddhists, Sikhs, Jains, and Parsis. Caste was grouped into scheduled tribes, scheduled castes, OBCs, and a higher social class category. The location of residence was marked as either rural or urban, and participants were also categorized based on the six administrative divisions of Maharashtra.

Behavioural characteristics

In India, a range of tobacco products are consumed, including cigarettes, bidis, cigars, hookah, gutkha, paan masala, paan, and khaini. To construct the 'tobacco smoking' variable, respondents were asked the questions, 'Do you currently smoke cigarettes?' 'Do you currently use a tobacco pipe?', 'Do you currently snuff via your nose?' and 'Do you currently use a hookah?' All replies were divided into two categories: 'no' and 'yes'. Chew Tobacco was created by answering the questions: 'Do you currently chew tobacco?', 'Do you currently use gutkha/paan masala along with tobacco?' 'Do you currently consume paan along with tobacco?', and 'Do you currently consume khaini?'. Every response was coded as 'no' and 'yes'. The variable 'alcohol consumption' was created by asking the question,' Do you currently drink alcohol?' and the response was coded as 'yes' and 'no.'

Statistical analysis

Statistical analyses were performed using SPSS. The preliminary phase involved descriptive and bivariate analysis to understand data patterns, followed by binary logistic regression to evaluate the relationship between hypertension and multiple explanatory variables at the individual, behavioural, and household levels.

RESULTS

Socio-demographic characteristics of the study population

The distribution of the study population by background characteristics is depicted in Table 1. Most of the women respondents, nearly 16.2% belonged to the 25-29 age group, and 15.2% belonged to the age group 30-34. While the majority of the male respondents, 15.12%, belonged to the 15-19 age group, 14.12% of males belonged to the 25-29 age group. Under the "current marital status" category, it was evident that a higher percentage of females (79.86%) were married compared to males (63.16%). In contrast, a significantly higher percentage of males (36.84%) were unmarried compared to females (20.14%). Table 1 also breaks down the population by place of residence. In both urban and rural areas, females outnumber males, with 33.17% of females living in urban areas compared to 31.47% of males. In rural areas, 66.83% of the female population resides compared to 68.53% of males. The educational status of the population was categorized into four groups: illiterate, primary, secondary, and higher education. Notably, a higher percentage of males (62.16%) had secondary education compared to females (59.92%). While 15.74% of females and 21.41% of males had higher education. Most of the females (81.42%) and males (80.61%) in this dataset were Hindu. There was a smaller Muslim population among both genders, with females at 10.37% and males at 10.68%. The category "others" included individuals of

various religions like Christians, Buddhists, Sikhs, Jains, and Parsis, with similar percentages for both genders. It was found that ethnicity was categorized into scheduled tribe, scheduled caste, OBC (other backward classes), and others. OBC was the largest category for both females (32.2%) and males (34.7%). Scheduled caste was the second-largest category, followed by scheduled tribe and others. The data shows that a higher percentage of males (27.31%) fall into the "richer" category compared to females (26.57%). Conversely, a slightly higher percentage of females (10.00%) are in the "poorest" category compared to males (10.51%). The table presents data by administrative division within Maharashtra. It shows the population distribution across six divisions: Kokan division, Pune division, Nashik division, Aurangabad division, Amravati division and Nagpur division. The "Aurangabad division" has the highest study population for both genders, with females at 23.02% and males at 22.56%.

Prevalence of hypertension by demographic characteristics

Table 2 provides data on the prevalence of hypertension among women and men in the state of Maharashtra for the year 2019-20. The prevalence of hypertension generally increases with age for both genders. Notably, in every age group, a higher percentage of females have hypertension compared to males. Among those aged 45-49, 9.5% of females have hypertension compared to 5.9% of males. The data reveal that married individuals, both females (5%) and males (3.5%), have a higher prevalence of hypertension compared to unmarried individuals in Maharashtra. This difference might be attributed to lifestyle factors associated with married life. In terms of place of residence, individuals in urban areas tend to have a higher prevalence of hypertension compared to those in rural areas for females (4.6% versus 3.9%) and males (2.3% versus 2.6%). The data indicate that individuals with higher levels of education tend to have a lower prevalence of hypertension. For instance, among females, those with higher education (2.8%) had a significantly lower prevalence compared to illiterate individuals (5.3%). A similar trend was observed among males. The prevalence of hypertension varies by religion. In females, Muslims (5.5%) had a higher prevalence compared to Hindus and others. And in males, Hindus (2.8%) had a higher prevalence compared to Muslims and others. This suggests that there may be lifestyle or dietary factors associated with religion that influence hypertension rates. The data shows variations in hypertension prevalence by ethnicity. Scheduled tribe individuals had the lowest prevalence of hypertension (2.8% in females and 2.3% in males), while OBC individuals had a higher prevalence among both females (4.5%) and males (2.8%). There was a clear trend in the wealth index data. Individuals in wealthier categories (4.8% among women and 3.3% among men) tend to have a higher prevalence of hypertension compared to those in poorer categories (2.9% among females and 2.6% among males). This

could be linked to dietary choices and lifestyle factors associated with higher socioeconomic status. The prevalence of hypertension by administrative division within Maharashtra shows variations across divisions; with Kokan division (3.6%) and Nashik division (4.7%) having the highest prevalence in males and females, respectively, and Nagpur division was having the lowest among both females and males.

Table 1: Socio-demographic profile of the woman and men in Maharashtra, India, 2019-21.

Background characteristics		Gender			
		Female		Male	
		N	%	N	%
Age Group	15-19	4929	14.60	831	15.12
	20-24	4977	14.71	768	13.97
	25-29	5460	16.22	776	14.12
	30-34	5121	15.20	766	13.93
	35-39	4717	14.00	680	12.37
	40-44	4181	12.41	613	11.15
	45-49	4370	12.90	558	10.15
	50-54	NA	NA	505	09.19
Current marital status	Unmarried	6798	20.14	2025	36.84
	Married	26957	79.86	3472	63.16
Place of Residence	Urban	11197	33.17	1730	31.47
	Rural	22558	66.83	3767	68.53
Educational Status	Illiterate	4470	13.24	358	06.51
	Primary	3747	11.10	545	09.91
	Secondary	20226	59.92	3417	62.16
	Higher	5312	15.74	1177	21.41
Religion	Hindu	27485	81.42	4431	80.61
	Muslim	3502	10.37	587	10.68
	Others	2768	08.20	479	08.71
Ethnicity	Scheduled tribe	4870	14.40	732	13.30
	Scheduled caste	5783	17.10	904	16.40
	OBC	10859	32.20	1905	34.70
	Others	12243	36.30	1956	35.60
Wealth index	Poorest	3374	10.00	578	10.51
	Poorer	6357	18.83	1016	18.48
	Middle	8370	24.80	1403	25.52
	Richer	8969	26.57	1501	27.31
	Richest	6685	19.80	999	18.17
Administrative division	Kokan division	5475	16.22	827	15.04
	Pune division	4765	14.12	744	13.53
	Nashik division	4820	14.28	757	13.77
	Aurangabad division	7769	23.02	1240	22.56
	Amravati division	5200	15.41	944	17.17
	Nagpur division	5726	16.96	985	17.92
Total		33755	100.00	5497	100.00

Prevalence of hypertension by health and lifestyle practices

Table 3 presents the prevalence of hypertension in relation to health and lifestyle practices among women and men in Maharashtra for the year 2019-2020. Diabetes was one of the health indicators that showed individuals with diabetes had a significantly higher prevalence of hypertension. Among females, 35.8% of those with diabetes have hypertension compared to 3.6% of those without diabetes. Among males, the pattern was similar, with 30.3% of those with diabetes having hypertension compared to 1.8% of those without diabetes. This indicates a strong correlation between diabetes and hypertension in both genders.

Table 2: Prevalence of hypertension among women and men in Maharashtra, India 2019-21.

Background characteristics		Hypertension (%)	
		Female	**Male**
Age group	15-19	0.7	0.1
	20-24	1.6	0.8
	25-29	2.5	0.8
	30-34	4.2	1.3
	35-39	4.9	2.8
	40-44	6.7	4.7
	45-49	9.5	5.9
	50-54		6.5
Current marital status	Unmarried	0.7	0.7
	Married	5.0	3.5
Place of residence	Urban	4.6	2.3
	Rural	3.9	2.6
Educational status	Illiterate	5.3	1.4
	Primary	5.5	3.1
	Secondary	3.9	2.5
	Higher	2.8	2.5
Religion	Hindu	3.9	2.8
	Muslim	5.5	0.9
	Other	4.4	2.1
Ethnicity	Scheduled tribe	2.8	2.3
	Scheduled caste	4.3	1.8
	OBC	4.5	2.8
	Others	4.2	2.6
Wealth index	Poorest	2.9	2.6
	Poorer	3.4	2.3
	Middle	4	2.2
	Richer	4.6	2.3
	Richest	4.8	3.3
Administrative division	Kokan division	4.3	3.6
	Pune division	4.1	3.4
	Nashik division	4.7	2.4
	Aurangabad division	3.9	2
	Amravati division	4.5	2.1
	Nagpur division	3.3	1.9
	Total	4.1	2.5

Table 3: Prevalence of hypertension by health and lifestyle practices among women and men, Maharashtra, India, 2019-2021.

Health and lifestyle practices		Currently hypertension (%)	
		Female	**Male**
Health indicators			
Diabetes	No	03.6	01.8
	Yes	35.8	30.3
Lifestyle practices			
Chew tobacco	No	04.0	02.5
	Yes	07.8	02.2
Smoke tobacco	No	04.1	02.5
	Yes	02.1	02.6
Alcohol consumption	No	04.1	02.1
	Yes	02.4	04.3

Table 4: Determinant of hypertension among women and men in Maharashtra, India, 2019-21.

| Background characteristics		Female Exp (β)	95% CI for lower	Exp (β) upper	P value	Male Exp (β)	95% CI for lower	Exp (β) upper	P value
Age group (years)	15-19®	1.000				1.000			
	20-24	0.144	0.093	0.222	0.000	0.013	0.002	0.113	0.000
	25-29	0.191	0.147	0.249	0.000	0.090	0.030	0.276	0.000
	30-34	0.246	0.200	0.304	0.000	0.093	0.035	0.244	0.000
	35-39	0.410	0.343	0.490	0.000	0.166	0.079	0.346	0.000
	40-44	0.480	0.405	0.570	0.000	0.367	0.204	0.659	0.001
	45-49	0.673	0.574	0.790	0.000	0.655	0.389	1.103	0.111
	50-54					0.824	0.497	1.365	0.451
Current marital status	Unmarried®	1.000				1.000			
	Married	0.360	0.249	0.521	0.000	1.087	0.491	2.403	0.837
Place of residence	Urban®	1.000				1.000			
	Rural	1.011	0.881	1.161	0.872	0.809	0.508	1.288	0.373
Educational status	Illiterate®	1.000				1.000			
	Primary	1.039	0.807	1.336	0.768	0.298	0.107	0.827	0.020
	Secondary	1.144	0.895	1.463	0.281	0.730	0.366	1.454	0.370
	Higher	1.205	0.992	1.464	0.060	1.008	0.626	1.624	0.972
Religion	Hindu®	1.000				1.000			
	Muslim	0.935	0.747	1.170	0.555	1.049	0.493	2.235	0.901
	Other	1.421	1.076	1.876	0.013	0.410	0.126	1.330	0.137
Ethnicity	Scheduled tribe®	1.000				1.000			
	Scheduled caste	0.876	0.706	1.087	0.229	1.137	0.598	2.165	0.695
	OBC	1.181	0.983	1.418	0.076	0.715	0.374	1.366	0.309
	Others	1.154	1.004	1.327	0.044	1.072	0.702	1.638	0.747
Wealth index	Poorest®	1.000				1.000			
	Poorer	0.662	0.502	0.873	0.003	0.986	0.453	2.145	0.972
	Middle	0.751	0.606	0.929	0.008	0.796	0.411	1.540	0.498
	Richer	0.824	0.685	0.991	0.040	0.679	0.376	1.228	0.201
	Richest	0.963	0.816	1.136	0.655	0.757	0.440	1.303	0.315
Administrative division	Kokan division®	1.000				1.000			
	Pune division	1.309	1.070	1.601	0.009	2.062	1.113	3.820	0.022
	Nashik division	1.270	1.026	1.572	0.028	1.990	1.042	3.800	0.037
	Aurangabad division	1.630	1.330	1.999	0.000	1.434	0.734	2.800	0.291
	Amravati division	1.286	1.057	1.565	0.012	1.406	0.744	2.655	0.294
	Nagpur division	1.380	1.130	1.684	0.002	1.290	0.674	2.469	0.443

®: Reference group

In lifestyle practices, the variable chew tobacco highlights the prevalence of hypertension among individuals who chew tobacco versus those who do not. Among females, 7.8% of tobacco chewers had hypertension compared to 4% of non-chewers. Among males, the percentages were 2.2% and 2.5%, respectively. Among males, 2.6% of smokers have hypertension. 4.3% of drinkers have hypertension (Figure 1).

Determinant of hypertension

Table 4 presents the results of a logistic regression analysis aimed at understanding the factors associated with the prevalence of hypertension among women and men in Maharashtra for the years 2019-2021. It was observed that as individual's age, they are more likely to have hypertension. For both females and males, the odds of having hypertension increase significantly with each successive age group. In the 20-24 age group, the odds of hypertension (Exp (β)=0.144, 95% CI-0.093-0.222) are much lower compared to the reference group. However, as individuals move into older age groups, the odds of hypertension rise considerably. Among females, being married was associated with a significantly lower odds ratio (OR=0.360, 95% CI- 0.249-0.521) compared to being unmarried, indicating that married females have a lower likelihood of having hypertension. Among males, those with primary education had a lower odds ratio of hypertension (Exp (β)=0.298), and this difference was statistically significant (p value=0.020). Among females,

individuals belonging to the "other" category have higher odds of hypertension compared to Hindus (Exp (β)=1.421), and this difference was statistically significant (p value=0.013). In females, those who did not know their caste/tribe had higher odds of hypertension (Exp (β)=1.154), and this difference was statistically significant (p value=0.044). Among females, individuals in the "poorer" category have significantly lower odds of hypertension (Exp (β)=0.662, 95% CI- 0.502-0.873) compared to the "poorest" category. This suggests that higher wealth is associated with a higher likelihood of hypertension. In the Pune division, females (Exp (β)=1.309, 95% CI=1.070-1.601) and males (Exp (β)=2.062, 95% CI=1.113-3.820) had significantly higher odds of hypertension compared to the Kokan division, and these differences were statistically significant (p<0.05). This indicates that regional variation plays a role in hypertension prevalence.
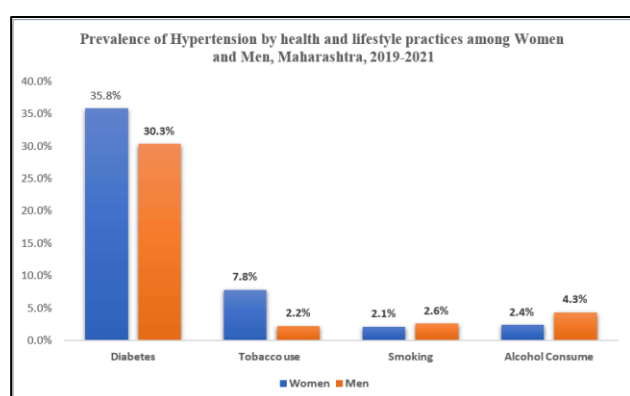
Figure 1: Prevalence of hypertension by health and lifestyle practices among women and men, Maharashtra, India, 2019-2021.

DISCUSSION

According to the human development index (HDI), Maharashtra is one of the top five states in India.[3] The data reported in this research paper sheds light on hypertension as a considerable public health concern in Maharashtra, India. It is anticipated that 17.6% of hypertensive patients worldwide live in India, indicating a significant increase in cardiovascular disease burden in the future. This requires early identification and treatment, as proper blood pressure control can prevent about one-third of all cardiovascular-related deaths.[15] The study found that the prevalence of hypertension varied by demographic group in Maharashtra. Age is a key non-modifiable risk factor, with older people being more likely to develop hypertension. Unexpectedly, there is a gender gap, with females continuously having a greater incidence of hypertension than males across all age groups. This highlights the significance of gender-specific healthcare interventions in addressing health disparities. Marital status is also a significant determinant, with married people, both men and women, having a greater frequency of hypertension. This discovery may reflect

lifestyle and stress associated with married life, underlining the need for focused health promotion interventions for this population. Individuals in urban regions have a greater incidence of hypertension than those who live in rural areas, suggesting that urbanisation is related to a higher prevalence of hypertension. This shows that the urban environment, with its increased stress, sedentary lifestyle, and dietary changes, may contribute to the increased prevalence of hypertension.

Education level is important, with higher education levels related to a lowered frequency of hypertension. This conclusion highlights the significance of education as a predictor of health outcomes and points out the need for health literacy programmes aimed at people with lower educational levels. Religion and ethnicity also exhibit variations in hypertension prevalence. Individuals in richer groups have a greater prevalence of hypertension, according to the wealth index statistics. This surprising discovery may be related to lifestyle and nutritional patterns linked with a greater socioeconomic level. There are disparities among regions within Maharashtra, with certain administrative divisions having a greater rate of hypertension. This shows that geographical variables, such as healthcare availability and environmental impacts, may play a role in hypertension rate variations. A recent systematic analysis suggested that India had a high prevalence of hypertension with poor awareness, treatment, and control.[12,16] Trends from the non-communicable disease risk factor collaboration (NCD-risk) show that the mean systolic and diastolic blood pressure, as well as the prevalence of hypertension in the Indian population, remained steady from 1975 to 2015. The methodology and demographic selection of the studies included in this analysis vary. The NFHS is collecting data on non-communicable illnesses such as obesity and hypertension for the first time. This information will be useful in understanding epidemiological trends in the coming years.[17]

Limitations of this study are: the study's findings, drawn from the cross-sectional NFHS-5 data, cannot be interpreted as evidence of causal relationships. Hypertension was measured once, and information on tobacco use, alcohol consumption, and diabetes status was self-reported, which may have led to reporting bias. Significant factors such as diet, exercise, stress, and treatment- related details were not accessible, and residual confounding may exist. Thus, the results may not be applicable outside Maharashtra.

CONCLUSION

In conclusion, this comprehensive study on hypertension prevalence and related determinants in Maharashtra highlights the complicated interaction of demographic, daily lifestyle, and health markers in creating the burden of this crucial health condition. Age, as a non-modifiable risk factor, shows a continuous connection with hypertension, highlighting the necessity for age-specific

therapies. The unanticipated gender gap, with females continuously having a greater prevalence of hypertension across all age groups, requires gender-specific healthcare strategies to address this imbalance. Marital status, urbanisation, educational attainment, religion, ethnicity, and wealth status all appear as significant determinants of hypertension prevalence, providing essential insights into the varied character of this condition. Notably, diabetes is strongly correlated with hypertension, highlighting the importance of holistic management approaches. Additionally, there is a strong correlation between lifestyle choices like drinking alcohol and using cigarettes, underscoring the need for broad, effective health programs. These findings have significant implications for public health interventions and policies that aim at reducing the prevalence of hypertension in Maharashtra, which contributes to the larger global mission of preventing non-communicable diseases and improving population health.

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