



Prevalence and epidemiological factors associated with hypertension among post-menopausal women in an urban area of central India

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ABSTRACT

Background: Hypertension is one of the leading cause of global burden of disease. Blood pressure is typically lower in premenopausal women than in their male counterparts. But women lose this advantage after menopause.

Objectives: Objectives of study were to know the prevalence of hypertension among postmenopausal women and to study some of its epidemiological factors.

Methodology: It was a community based cross-sectional study with a sample size of 100 postmenopausal women residing in Kamptee, an urban satellite township of Nagpur district in central India conducted for a period of two months. A written informed consent was taken and a study questionnaire was administered to the participants. Data regarding demographic characteristics, alcohol and tobacco consumption, dietary habits, physical activity, psychological stress and family history was obtained. Physical examination such as waist circumference, hip circumference, weight, height, blood pressure and pulse rate was recorded. Blood pressure was recorded using mercury sphygmomanometer and weight was recorded using standardised electronic weighing machine.

Results: The prevalence of hypertension in postmenopausal women in the urban area was found to be 33%. The prevalence of isolated systolic hypertension was 30% and that of isolated diastolic blood pressure was 44%. There was significant difference in positive family history of hypertension and body mass index (BMI) between hypertensive and non-hypertensive women.

Conclusion: The prevalence of hypertension (33%) among postmenopausal women in Kamptee town was high. There was large burden of risk factors among the study population.

1. Introduction

Hypertension is one of the leading cause of global burden of disease, posing a major public challenge to population in socio-economic and epidemiological transition. This problem is of special concern for developing countries, where studies have projected an increase by 80% in the number of hypertensives by the year 2025¹.

In the INTERHEART and INTERSTROKE study, hypertension accounts for 17.9% and 34.6% population attributable risk for coronary artery diseases and stroke respectively^{2–3}. It is one of the major cause of cardiovascular mortality, which is estimated to be 1.5 million deaths per year in India⁴.

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) defines hypertension as systolic blood pressure (SBP) of 140 mmHg and above and/or diastolic blood pressure (DBP) of 90 mmHg and above⁵. Both systolic and diastolic blood pressure increase with advancing age. It is seen that blood pressure is typically lower in premenopausal

women than in their male counterparts. However, after menopause, the prevalence of hypertension in women is higher than it is in men of same age group, which in turn leads to increased morbidity and mortality in postmenopausal women⁶.

In view of population aging throughout the world, identification of possible risk factors and prevention of hypertension in postmenopausal women are important. An association of hypertension with the menopause and related risk factors need to be given due attention to avoid increased burden of hypertension and related cardiovascular diseases (CVDs) among women. The present cross-sectional study is conceptualized to provide the data on the prevalence of hypertension in postmenopausal women and association of some epidemiological factors with the same.

2. Literature review

There are some studies done in India and abroad which shows high prevalence of hypertension and its risk factors in postmenopausal

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women:

A community based cross-sectional study on hypertension and its risk factors was conducted in an urbanized village of Delhi. The prevalence of hypertension in postmenopausal women was found to be 39.6%⁸. Obesity, smoking, family history and physical activity were significantly higher among hypertensives as compared to non-hypertensives.

A study in North Delhi involved a survey of 245 females of age range 20 to 65 years. Data regarding demographic characteristics, anthropometric measurements, lifestyle and blood pressure pattern was collected. According to the systolic blood pressure 27.2% of postmenopausal women were found to be hypertensive. Similarly, 41.1% of postmenopausal women were found to be hypertensive as per the diastolic blood pressure⁷. BMI and waist circumference showed statistically significant ($p < 0.001$) higher values among hypertensive postmenopausal women as compared to their normal counterparts. The females taking non-vegetarian diet were 3 times more likely to develop hypertension. Also educational level of females was found to be significantly correlated with the chances of them being hypertensive.

A descriptive study conducted among 350 perimenopausal and postmenopausal women at Urban Health Centre, Bandra, Mumbai revealed that the prevalence of hypertension was more among postmenopausal women (36.76%) as compared to perimenopausal women (3.03%)⁹. Statistically, it was found to be significant.

In the Chennai Urban Rural Epidemiology Study, it was found that the prevalence of isolated systolic hypertension increased at a lower pace until the age of 50, after which, it increased dramatically yielding a prevalence of 11.9% (men: 10.9%, women: 13.1) at the age group of 50–59 years and 25.2% (men: 21.4%, women: 30.2%) at the age of 60 years and above¹⁰.

An epidemiological study of hypertension in a rural household community shows 22.6% adult males and 27.4% adult females are suffering from hypertension. Greater prevalence was observed in unemployed and unskilled category of occupation. The prevalence of hypertension was higher 33.3% among those who were in the habit of chewing tobacco for more than 5 years as compared to 31.6% who had this habit for less than 5 years. The lower prevalence rate of hypertension among non-tobacco chewers was 23.5%. Among hypertensives, 29.1% were obese, 13.7% were class 1 and 5.8% were class 2 obese. These differences were highly significant ($p < 0.001$). The prevalence was also higher among those who were taken oral contraceptive pills for more than 3 years (66.6%) and it was 46.3% among those taking the oral contraceptive pills for less than 3 years. Similarly, environmental stress and anxiety were found to have statistically significant higher risk for hypertension¹¹.

The aims of this study were 1) To know the prevalence of hypertension among postmenopausal women in an urban area of central India. 2) To study some epidemiological factors associated with hypertension in postmenopausal women.

3. Material and methods

The present cross-sectional study was conducted in Kamptee, an urban satellite township of Nagpur district in central India from August 1, 2016 to September 30, 2016. A total of 100 postmenopausal women were included in the study. We excluded severely ill or bed-ridden patients. For data collection, a house-to-house survey was carried out in a ward of Kamptee town. The ward was selected by lottery method. The first house in the ward was selected from the last digit of a five rupees currency note then every tenth house was visited.

Postmenopausal women were identified by the criteria of cessation of menstrual period for more than 12 consecutive months¹². After written informed consent, a study questionnaire was administered to the participants. Data regarding demographic characteristics, tobacco and alcohol consumption, dietary habits, physical activity, psychological stress, use of oral contraceptive pills and family history was

obtained. Socioeconomic status was calculated using Modified Kuppuswamy's Socioeconomic Scale. This scale takes account of education, occupation, and income level of an individual with a different score for each of these three parameters summing up to total scores to classify the study groups as upper, upper middle, and lower socioeconomic status¹³. The food habits were broadly classified as vegetarian and non-vegetarian. Information regarding the frequency of meat consumption, daily salt consumption, amount of carbonated soft drinks and servings of fast food consumed in last 7 days was collected. Global physical activity questionnaire (GPAQ) Version 2 was used to assess physical activity¹⁴. The Perceived Stress Scale (PSS) was applied to assess the stress among the subjects¹⁵.

Blood pressure for all the participants was measured by the auscultatory method in sitting position using a mercury sphygmomanometer, in left arm, 2 times, 5 minutes apart and an average of two readings was taken. The primary investigator had been trained in the standardized technique by skilled medical practitioner. In case where the two readings differed by over 10 mm of Hg, a third reading was obtained, and the three measurements were averaged. Normal blood pressure was taken as less than 120 mmHg-systolic and less than 80 mmHg-diastolic. Participants with the blood pressure values of 120 to 139 mmHg (systolic) or 80 to 89 mmHg (diastolic) were classified under pre-hypertension category. Stage-I hypertension was taken as 140 to 159 mmHg-systolic or 90 to 99 mmHg-diastolic, whereas Stage-II hypertension was taken as blood pressure of more than 160 mmHg-systolic or more than 100 mmHg-diastolic, as per US Seventh Joint National Committee on Detection, Evaluation and Treatment of Hypertension (JNC VII) criteria⁵. Pulse rate was counted manually in the radial artery for complete one minute.

Height was measured without slippers to the nearest 0.1 cm and weight was measured using digital weighing machine. Body mass index was calculated. BMI ≥ 23 kg/m² was taken as overweight¹⁶. Waist circumference was measured in standing position mid-way between lowest rib and iliac crest. Hip circumference was measured at the level of maximum posterior extension of buttocks, over light clothing. Waist Hip Ratio was calculated using waist and hip circumference. All measurements were taken by primary investigator according to standard techniques.

3.1. Data Analysis

The data was analysed using Epi Info 7 Version 22.0 statistical software. Mean and standard deviation were calculated. Tests of significance, chi-square test was applied to find out the association. The study was approved by the Institutional Ethics Committee, Government Medical College, Nagpur.

4. Results

4.1. Demographic Characteristics

100 postmenopausal women individuals of Kamptee participated in the study. The age of the study population ranged from 40–85 years with the mean age of 59.5 ± 9.8 years. Majority of respondents were aged between 50–64 years of age (61%).

Majority of women were married (62%), Muslim by religion (72%), literate (93%) and unemployed (67%). Out of 100, 41 study subjects belonged to lower middle followed by 32% belonged to upper lower socio-economic status. Out of total 100 postmenopausal women, 67 unemployed study subjects were housewives and stayed at home [Table 1].

4.2. Prevalence of Hypertension

The prevalence of hypertension in postmenopausal women was 33% while 48% were found to be pre-hypertensive [Table 2]. The mean

Table 1
Socio-Demographic Profile of Postmenopausal Women.

SOCIO-DEMOGRAPHIC FACTOR	NUMBER OF WOMEN (n = 100)	PERCENT
RELIGION		
HINDU	6	6.00%
MUSLIM	72	72.00%
BUDDHIST	21	21.00%
JAIN	1	1.00%
MARITAL STATUS		
SINGLE	3	3.00%
MARRIED	62	62.00%
WIDOWED	35	35.00%
EDUCATION		
PROFESSION OR HONOURS	1	1.00%
GRADUATE OR POST-GRADUATE	12	12.00%
INTERMEDIATE OR POST HIGH SCHOOL DIPLOMA	9	9.00%
HIGH SCHOOL CERTIFICATE	12	12.00%
MIDDLE SCHOOL CERTIFICATE	21	21.00%
PRIMARY SCHOOL CERTIFICATE	38	38.00%
ILLITERATE	7	7.00%
OCCUPATION		
SEMI-PROFESSION	7	7.00%
SHOP-OWNER	1	1.00%
SKILLED WORKER	17	17.00%
SEMI-SKILLED WORKER	2	2.00%
UNSKILLED WORKER	6	6.00%
UNEMPLOYED	67	67.00%
SOCIO-ECONOMIC STATUS		
UPPER	1	1.00%
UPPER MIDDLE	26	26.00%
LOWER MIDDLE	41	41.00%
UPPER LOWER	32	32.00%
TOTAL	100	100.00%

Table 2
Prevalence of Hypertension in Postmenopausal Women.

CATEGORY	BLOOD PRESSURE(SBP/DBP)	NUMBER OF WOMEN (n = 100)	PERCENTAGE
NORMAL	< 120/ < 80	19	19.00%
PRE HYPERTENSION	120–139/80–89	48	48.00%
HYPERTENSION STAGE 1	140–159/90–99	15	15.00%
HYPERTENSION STAGE 2	≥ 160/ ≥ 100	18	18.00%
TOTAL	TOTAL	100	100.00%

Table 3
Distribution of Study Population as per Systolic and Diastolic Blood Pressure.

	NUMBER OF WOMEN (n = 100)	PERCENTAGE
SYSTOLIC BLOOD PRESSURE		
NORMAL	31	31.00%
PRE-HYPERTENSION	39	39.00%
HYPERTENSION STAGE 1	21	21.00%
HYPERTENSION STAGE 2	9	9.00%
DIASTOLIC BLOOD PRESSURE		
NORMAL	26	26.00%
PRE-HYPERTENSION	30	30.00%
HYPERTENSION STAGE 1	25	25.00%
HYPERTENSION STAGE 2	19	19.00%
TOTAL	100	100.00%

systolic blood pressure was 128.5 ± 23.5 with range of 80–190 and mean diastolic pressure was 88.9 ± 15.6 with range of 60–130. As per systolic blood pressure, 30% women were found to be hypertensive.

Similarly, according to diastolic blood pressure, 44% were found to be hypertensive [Table 3].

4.3. Hypertension and Risk factors

Table 4 displays the risk factors of hypertension. 96% women were at risk of hypertension as the reported salt intake was equal or more than 5 grams/day. 64% reported some kind of stress either moderate or severe. Family history of hypertension was found in 48% of women. This risk factor is significantly higher among hypertensive as compared to non-hypertensive (p < 0.05). 39% women gave history of tobacco chewing. 19% women were currently exposed to homemade smoke. Mild physical activity was reported in 47% women as compared to moderate physical activity reported by 53% women. 93% women were taking mixed type of diet that is both vegetarian diet and meat. 68% and 54% postmenopausal women had waist circumference more than or equal to 80 cm and waist hip ratio more than or equal to 0.85, respectively. 16% of women were obese BMI more than or equal to 23¹⁶. There is significant difference in BMI between hypertensive and non-hypertensive women (p < 0.05).

We also considered alcohol consumption, carbonated soft drink, fast food and oral contraceptive pills as one of the risk factors but the data obtained was practically negligible.

5. Discussion

The prevalence of hypertension in postmenopausal women in the urban area was found to be 33%. Moreover, the prevalence of isolated systolic hypertension was 30% and that of isolated diastolic blood pressure was 44%. Our findings were comparable to that reported by the studies in other parts of the country^{7,8,9,17}. It was found that 96% women were at high risk because of salt intake (≥ 5 grams per day). Mean salt intake of the study population was 12.2 ± 1.7, ranging from 3.3–20 grams per day. The results showed that 48% women had family history of hypertension. Hypertensive women had significantly higher percentage for positive family history than rest of the study population. Among the women who ever used smokeless tobacco product (39%), 31% were current chewers and 8% were past chewers. The prevalence of current tobacco chewing in this study was found to be higher than the prevalence reported in another study on hypertension in postmenopausal women⁸. 47% study subjects were reported to have mild physical activity. The prevalence of mild physical activity was higher as compared to data obtained from other similar studies¹⁸. Also, 30% women were spending more than 5 hrs. sitting at home or work place. Waist hip ratio was found to be ≥ 0.85 in 54% of study population. 16% women had body mass index ≥ 23 kg/m². Hypertensive women had significantly higher value of BMI than non-hypertensive women.

Strength of this study is the fact that it was a community based study.

5.1. Limitations to the Study

This study was limited to a single urban area in central India. The findings may not be generalized to similar populations in other areas of India. Other limitation of this study was its small sample size.

6. Conclusion

It was concluded from the study that the prevalence of hypertension (33%) among postmenopausal women in Kamptee town was high. Also there is a large burden of risk factor among the study population. In view of the current scenario we give the following recommendations.

7. Recommendation

The women having positive family history should be screened

Table 4
Risk Factors of Hypertension among Postmenopausal Women

RISK FACTORS		BLOOD PRESSURE					df	p value
		Normal (n = 19)	Pre hypertensive (n = 48)	Stage 1 (n = 15)	Stage 2 (n = 18)	Total		
Salt intake	< 5 g/day	0	2	0	2	4	3	0.285
	≥ 5 g/day	19	46	15	16	96	3	
Stress	Absent	8	15	6	7	36	3	0.814
	Present	11	33	9	11	64	3	
Family history	Absent	10	31	8	3	52	3	0.007
	Present	9	17	7	15	48	3	
Tobacco chewing	No	15	26	9	11	61	3	0.318
	Yes	4	22	6	7	39	3	
Currently exposed to homemade smoke	No	16	40	10	15	81	3	0.501
	Yes	3	8	5	3	19	3	
Physical activity	Mild	6	26	9	6	47	3	0.160
	Moderate	13	22	6	12	53	3	
Diet	Pure vegetarian	1	5	0	1	7	3	0.545
	Mixed	18	43	15	17	93	3	
Waist circumference	< 80 cm	8	16	4	4	32	3	0.590
	≥ 80 cm	11	32	11	14	68	3	
Waist hip ratio	< 0.85	7	22	7	10	46	3	0.728
	≥ 0.85	12	26	8	8	54	3	
Body mass index	< 23 Kg/m ²	19	42	12	11	84	3	0.01
	≥ 23 Kg/m ²	0	6	3	7	16	3	

periodically and the women suffering from obesity should receive proper treatment. Counselling of the population on lifestyle modification and its role in controlling hypertension should also be emphasized to avoid further burden of both the disease and the risk factors. Similar studies should be conducted in postmenopausal women from different parts of the country.

Conflicting of interest

Nil.

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Presentation at a meeting

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