ORIGINAL ARTICLE

Hypertension and its risk factors among postmenopausal women in Delhi

Nidhi Gupta[1], Vibha[2], Jyoti Khandekar[3], Anju Jain[4], Sachin Gupta[5]

[1]Assistant Professor, [2]Director Professor, [3]Professor, Department of Community Medicine, [4]Director Professor, Department of Biochemistry, Lady Hardinge Medical College, New Delhi, [5]Assistant Professor, Department of Community Medicine, Karpagam Faculty of Medical Sciences and Research, Coimbatore, Tamil Nadu, India.

Abstract | Introduction | Methodology | Results | Conclusion | References | Citation | Tables / Figures

Corresponding Author

Address for Correspondence: Dr Nidhi Gupta, L-2/10, Shastri Nagar, Near Inderlok Metro Station, Delhi-110052, India
E Mail ID: nidlhmc@yahoo.co.in, nidhi.g.11@gmail.com

Citation

Gupta N, Vibha, Khandekar J, Jain A, Gupta S. Hypertension and its risk factors among postmenopausal women in Delhi. Ind J Comm Health. 2014;26(4):412–416.

Source of Funding : Nil **Conflict of Interest:** None declared

Article Cycle

Submission: 19/09/2014; **Revision:** 12/10/2014; **Acceptance:** 25/10/2014; **Publication:** 15/12/2014

Abstract

Background: Hypertension is the commonest cardiovascular disorder, posing a major public health challenge to population in epidemiological transition. The prevalence of hypertension increases with age and is more common in men as compared to women. But women loose this advantage after menopause due to estrogen deficiency. **Objectives:** 1. To assess the prevalence of hypertension and risk factors for hypertension among postmenopausal women in an urban community in Delhi. 2. To study association of risk factors with hypertension. **Methodology:** A community based cross-sectional study was conducted at Palam, an urbanized village in Delhi. A total 416 postmenopausal women were interviewed, examined and investigated. **Results:** Majority (78%) of postmenopausal women were in the age group of 45-65 years. More than three fourth 342 (82.4%) of women belonged to lower middle and upper lower socio-economic status. The prevalence of hypertension in these women was 39.6%, another one third (37%) were pre-hypertensive. All women had one or more than one risk factor for hypertension. The most common risk factors were high salt intake (82.7%), low vegetable and fruit intake (64.2%), stress (53.2%) and truncal obesity (36.1%). Risk factors like diabetes, obesity, smoking and physical inactivity were significantly more common in hypertensive as compared to non-hypertensive. **Conclusion:** Burden of hypertension among postmenopausal women in the present study was found to be high. Interventions integrating promotive, preventive and curative care for postmenopausal women should be provided to them.

Key Words

Hypertension; Risk Factors; Postmenopausal Women; Non Communicable Disease

Introduction

Hypertension is quickly becoming a public health challenge worldwide, especially in developing countries, where studies have projected an increase by 80% in the number of hypertensives by the year 2025 [1].Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease death in India [2].This is due to the demographic and socio economic transformation that has occurred in recent decades and resulted in lifestyle changes including unhealthy dietary patterns, tobacco use, alcohol abuse and sedentary habits without adequate physical activity. With the identification of risk factors, health promotion activities can be aimed at primary prevention for the control of hypertension (for example, elimination or reduction of risk factors, modifications of life-style patterns).

The prevalence of hypertension increases with age and is more common in men as compared to women [3].Women loose this advantage after menopause. A common interpretation is that, compared with men, women are biologically protected against many diseases until they are middle aged, but after

menopause, females are equally prone as are males. After menopause the risk of cardiovascular disease (commonest non-communicable disease) doubles for postmenopausal women due to withdrawal of estrogen [4]. Age at menopause also influence the disease process. Women with an earlier menopause are at an increased risk of cardiovascular disease.

The life expectancy of women is longer than those of men. As a result very soon in most countries the elderly women outnumber elderly men. Life expectancy of women in India is 64 years with mean age of menopause being 50 years. It means Indian women are now expected to live more than one fifth of their lives beyond menopause and are at risk of developing hypertension. It is need of the hour to assess current level of risk factors of hypertension among postmenopausal women to develop a strategy for its prevention.

Aims & Objectives

To find the prevalence of hypertension and its risk factors among postmenopausal women.

Material and Methods

The study was community based cross-sectional study conducted at Palam, an urbanized village located in South-West Delhi with a population of 19,000.

The study population comprised of all postmenopausal women residing in the study area. Postmenopausal women were identified by the criteria of cessation of menstrual period for more than 12 consecutive months [4]. For studying the prevalence of hypertension the sample size required is 349 (Calculated by the formula, sample size= $4pq/l^2$, using p=32.2%, prevalence of hypertension in 45-65 years age group women in Delhi, q=100-p and l is allowable error, 5%). All women fulfilling the criteria for post menopause were identified by door to door enlisting. Women from alternate households (systematic random) were enrolled for the study. A total 438 women were enlisted in 1917 households. Out of these 416 women gave consented (written and informed consent) to participate and were interviewed, examined and investigated. Three follow up visits were made to convince them and all efforts were made to keep non response to a minimum.

A pretested, semi-structured interview schedule was used to elicit information on socio-demographic characteristics and risk factors for hypertension. The behavioral risk factors included: Dietary factors (oil, fat and salt consumption/day/person, vegetable and fruit consumption), personal history including use of tobacco and alcohol and family history of hypertension. Global physical activity questionnaire (GPAQ) [5] Version 2 was used to assess physical activity. General Health Questionnaire (GHQ-12) [6] was applied to assess the stress among the subjects. Blood pressure was measured in the right arm of the study subject in sitting position (who was seated for 5 minutes before the measurement) using OMRON Digital Blood Pressure Monitor. A second reading was taken after an interval of 5 minutes. If the difference between the first and second reading is 10 mmHg or more, then a third reading was taken [7]. JNC-7 (Joint National Committee) classification was used for grading of hypertension. Women with Systolic blood pressure 140 mmHg or more and Diastolic blood pressure 90 mmHg or more are labeled as hypertensive [7]. Height was measured without slippers to the nearest 0.1 cm and weight was measured in light clothing to the nearest 0.1 kg. BMI (body mass index) was calculated [5]. Waist circumference was measured in standing position, mid-way between the lowest rib and iliac crest, directly on to the skin. Hip circumference was measured at the level of maximum posterior extension of buttocks, over the light clothing. Waist Hip Ratio was calculated using waist and hip circumference. All measurements were taken according to standard techniques. For blood investigation, overnight fasting blood sample was collected by venipuncture in anticoagulant (oxalate and sodium fluoride) vial for sugar. Serum was used for measurement of cholesterol and triglyceride.

The data was analyzed using SPSS version 12 software. Averages and measures of dispersion (standard deviation) were calculated for analyzing quantitative data. Proportions and chi square test were applied for qualitative data.

The study was approved by the Institutional Ethics Committee of Lady Hardinge Medical College, Delhi University.

Results

Out of 438 women, a total of 416 postmenopausal women were interviewed and examined (non-response rate of 5.0%). Haematological investigations were performed in 378 women out of 416 women with a refusal rate of 11.3%. The age of study subjects ranged from 38-83 years with mean age of 56.6±7.8 yrs. Majority (78%) of them were in

the age group of 45-64 yrs. Majority of women were currently married (76%), hindu by religion (97.6%), living in joint families (64.7%) and housewives (94%). Approximately half (47.4%) of the women were illiterate and only 20% were educated upto high school and above. More than half (57%) of the study subjects belonged to middle socio-economic status. 42% to lower class and only 1% belonged to upper class (as per Modified Kuppuswamy Scale). [Table 1]

The prevalence of hypertension in postmenopausal women was 39.6% (including already diagnosed cases; 2.8%), another one third (37%) were pre-hypertensives. One forth (25.5%) of women were in grade 1 hypertension. The mean systolic blood pressure (SBP) was 135.7 ± 20.2 mmHg with range of 95- 201mmHg and mean diastolic blood pressure (DBP) was 82.1± 9.7 mmHg, range 58 – 132 mmHg. [Table 2]

One or more than one risk factors were found in all women for hypertension. The risk factors for hypertension are enlisted in Table 3. Majority (82.7%) of women were at risk of hypertension as reported salt intake was more than 5 grams/day. In approximately two thirds (64.9%) of women consumption of vegetable and fruit was less than recommended. More than half (53.2%) had reported stress. Nearly half women (45.2%) consumed oil and fat ≥ 25 gm/day. More than one third women (36.1%) had waist hip ratio more than recommended (≥ 0.85). One fifth (20.9%) women had family history of hypertension. 20.9% of women gave positive history of smoking. 13.9% of women were diabetic and 12.7% were obese (BMI ≥30 kg/m^2). Only 11.5% women reported low physical activity.

All risk factors except for oil and fat intake were high among hypertensive women. Obesity, smoking, diabetes, family history of hypertension, physical inactivity and raised serum cholesterol were significantly higher among hypertensive as compared to non-hypertensive women.

Discussion

The present study was conducted to measure the prevalence of hypertension and its risk factors and to study the association of risk factors with hypertension in postmenopausal women. The prevalence of hypertension among urban post-menopausal women was found to be 39.6%. Our findings were similar to that reported by several other studies, [8,9] and [10]. In the present study majority (82.7%) of women were at risk because of high salt intake. Mean dietary salt intake of the study group was 6.8±1.4 gram/day (range 4-11 gram/day).The salt intake was high among pre hypertensives and hypertensives as compared to normotensives. Various studies reported varied mean salt intake ranging from 6.1 gram/day to 8.5 gram/day [11,12]. The difference may be due to different patterns of dietary intake as well as climatic variations between different regions of the country. Nearly two-third (64.2%) of women consumed vegetables and fruits less than recommended although 93% of them were vegetarian. The mean vegetable and fruit intake was 292±14 gram/day. Stress was high among pre hypertensives and hypertensives as compared to normotensives.

The study revealed that one fifth (20.9%) of women had family history of hypertension. Pre hypertensive and hypertensive women had higher percentage for positive family history of hypertension in comparison of normotensive women. In a study in urban Delhi, [13] also family history of hypertension was found in 20.4% study subjects. Among the women who ever smoked, 17.8% were current smokers and 2.6% were ex-smokers. Women smoked either beedi (75.7%) or hukka (24.3%). The prevalence of smoking in this study was found to be higher than the prevalence reported in most of the other studies which ranged from 1.2% to 12.1%. This difference may be due to the reason that women belonged to rural background. It was also noted that few women indulged in smoking with the belief that smoking has protective effect on gastric acidity.

Majority (88.7%) of women were engaged in high or moderate physical activity. Most women were engaged in household work. These findings were in conformity with those of Silva RB *et al* [14] who observed in their study that 83.3% of postmenopausal women were physically active. Approximately one tenth (11.3%) women were at risk of hypertension because of low physical activity

Three forth (74.8%) of women had waist circumference ≥ 80 cm. The waist circumference was higher in hypertensive women as compared to non hypertensives. Similarly waist hip ratio and BMI were high among hypertensive as compared to non-hypertensive women.

Smaller proportion of women was at risk of hypertension due to raised lipid levels; 4.4% had high serum cholesterol and 3% had high serum triglyceride [Table 3]. Mean serum cholesterol was 154.7±64.0 mg/dl and mean serum triglyceride was

101±61.6 mg/dl. Similar findings were reported by Pradeepa R *et al* [15] mean serum cholesterol being 169±46 mg/dl and mean serum triglyceride of 106±62 mg/dl in females.

Conclusion

It may be concluded from the study that the prevalence of hypertension (39.6%) among the urban postmenopausal women is high. Also the burden of risk factors for hypertension is high. It is recommended that the postmenopausal women need to be made more aware of the modifiable risk factors and change their lifestyle. The women suffering from hypertension, diabetes and obesity should undergo regular treatment to reduce the risk of other non-communicable diseases. Postmenopausal women particularly those with family history of hypertension should undergo periodic screening. Interventions required for this can be achieved through behavior change communication as well as providing medical care services.

Recommendation

Similar studies should be conducted in postmenopausal women from different communities across the country to know the variation in magnitude of the risk factors for hypertension. Further in depth studies may be carried out to understand the complex inter-relationship of behavioral and lifestyle factor in occurrence of hypertension. Inputs from such studies may be used to plan locally viable strategies for prevention and control of hypertension among postmenopausal women.

Authors Contribution

NG: Study Design, Data Collection, V&JK: Concept Designing, Analysis the data, Final Approval of Manuscript, AJ: Interpretation of results and critical inputs in manuscript, SG: Manuscript Drafting.

Acknowledgement

The authors wish to express their sincere thanks to all the study participants for their support and co-operation.

References

1. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. Lancet. 2005 Jan 15-21;365(9455):217-23. PubMed PMID: 15652604. [PubMed].
2. Rodgers A, Lawes C, MacMahon S. Reducing the global burden of blood pressure-related cardiovascular disease. J Hypertens Suppl. 2000 May;18(1):S3-6. PubMed PMID: 10939783. [PubMed]
3. World Health Organization, Non-communicable diseases in South-East Asian Region-A Profile. 1998; WHO.
4. World Health Organization, Research on the menopause in the 1990s: report of a WHO Scientific Group. 1996; WHO, Geneva (WHO Technical Report Series, No. 866)
5. World Health Organization, WHO STEPS Surveillance Manual: The WHO STEP wise approach to chronic diseases risk factors surveillance 2005; WHO, Geneva.
6. Goldberg DP, William P. A user's guide to the GHQ (1988) Windsor, UK: NFER-Nelson Publications.
7. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ; Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension. 2003 Dec;42(6):1206-52. Epub 2003 Dec 1. PubMed PMID: 14656957. [PubMed]
8. Beegom R, Beegom R, Niaz MA, Singh RB. Diet, central obesity and prevalence of hypertension in the urban population of south India. Int J Cardiol. 1995 Sep;51(2):183-91. PubMed PMID: 8522415. [PubMed]
9. Azizi F, Ainy E. Coronary heart diseas0e risk factors and menopause: a study in 1980 tehranian women, the Tehran Lipid and Glucose study. Climacteric 2003 Dec; 6(4): 330-6.
10. Zanchetti A, Facchetti R, Cesana GC, Modena MG, Pirrelli A, Sega R; SIMONA participants. Menopause-related blood pressure increase and its relationship to age and body mass index: the SIMONA epidemiological study. J Hypertens. 2005 Dec;23(12):2269-76. PubMed PMID: 16269969. [PubMed]
11. Singh RB, Beegom R, Ghosh S, Niaz MA, Rastogi V, Rastogi SS, Singh NK, Nangia S. Epidemiological study of hypertension and its determinants in an urban population of North India. J Hum Hypertens. 1997 Oct;11(10):679-85. PubMed PMID: 9400911. [PubMed]
12. Radhika G, Sathya RM, Sudha V, Ganesan A, Mohan V. Dietary salt intake and hypertension in an urban south Indian population--[CURES - 53]. J Assoc Physicians India. 2007 Jun;55:405-11. PubMed PMID: 17879493. [PubMed]
13. Reddy KS. Cardiovascular diseases in India. World Health Stat Q. 1993;46(2):101-7. PubMed PMID: 8303903. [PubMed]
14. Silva RB, Costa-Paiva L, Pinto Neto AM, Braga Ade A, Morais SS. [Habitual physical activity and cardiovascular risk in post menopause]. Rev Assoc Med Bras. 2006 Jul-Aug;52(4):242-6. Portuguese. PubMed PMID: 16967142. [PubMed]
15. Pradeepa R, Deepa R, Rani SS, Premalatha G, Saroja R, Mohan V. Socioeconomic status and dyslipidaemia in a South Indian population: the Chennai Urban Population Study (CUPS 11). Natl Med J India. 2003 Mar-Apr;16(2):73-8. PubMed PMID: 12816185. [PubMed].

Tables

TABLE 1 SOCIO-DEMOGRAPHIC PROFILE OF POSTMENOPAUSAL WOMEN

Socio-demographic factors	Number of women (n=416)	Percentage
Age in completed years		
<44	12	2.8
45-49	69	16.6
50-54	86	20.7
55-59	96	23.2
60-64	73	17.5
65-69	47	11.3
≥70	33	7.9
Socio-Economic Status*		
Upper	4	1.0
Upper middle	51	12.0
Lower middle	187	45.0
Upper lower	155	37.4
Lower	19	4.6

*Modified Kuppuswamy Scale

TABLE 2 HYPERTENSION IN POSTMENOPAUSAL WOMEN

Category	Blood Pressure (SBP/DBP)	Number of women	Percentage
Normal	<120/<80	109	26.2
Pre hypertension	120-139/80-89	154	37.0
Grade1 Hypertension	140-159/90-99	106	25.5
Grade2 Hypertension	≥160/≥100	47	11.3
Total	Total	416	100.0

* Grading of blood pressure according to JNC-7 classification

TABLE 3 RISK FACTORS OF HYPERTENSION AMONG POSTMENOPAUSAL WOMEN

RISK FACTORS	Blood pressure				Total	df	value
	Normal (n=109)	Pre hypertensive (n=154)	Grade one (n=106)	Grade two (n=47)			
Salt intake5 (>=5 gm/day)	68 (62.3)	127(82.5)	86(81.1)	43(91.5)	324(82.7)	3	0.389
Vegetable and fruit intake 5 (<400 gm/day)	74(67.8)	86(55.8)	71(67.0)	37(78.7)	267(64.2)	3	0.13
Stress (present)	56(51.4)	88(57.1)	50(47.2)	27(57.4)	221(53.1)	3	0.393
Fat and oil intake5 (>=25 gm/day)	55(50.5)	82(53.2)	33(31.1)	18(38.3)	188(45.2)	3	0.002
Family history							
Family history of hypertension (present)	18(16.5)	45(29.2)	11(10.4)	13(27.7)	87(20.9)	3	0.001
Lifestyle factors							
Smoker (Ever smoker)	13(11.9)	35(22.7)	17(16.0)	20(42.6)	85(20.4)	3	0.000
Tobacco chewing (Current chewer)	5(4.6)	3(1.9)	5(4.7)	5(10.6)	18(4.3)	3	0.083
Physical activity (low)	10(9.2)	10(6.5)	17(17.0)	10(21.3)	47(11.5)	3	0.008
Anthropometric measurements							
Waist circumference5 (≥80 cm)	72(66.1)	122(79.2)	83(78.3)	34(72.3)	311(74.8)	3	0.077
Waist hip ratio 5 (≥.85)	35(32.1)	61(39.6)	44(41.5)	10(21.3)	150(36.1)	3	0.06
Obesity 5 (BMI ≥30 kg/m2)	6(5.5)	21(13.6)	21(19.8)	5(10.6)	53(12.7)	3	0.017
Clinical and biochemical parameters	8(7.3)	22(14.3)	15(14.2)	13(27.7)	58(13.9)	3	0.010
Serum cholesterol (>=250 mg/dl)	0(0.0)	9(5.8)	7(6.6)	0(0.0)	16(4.4)	3	0.008
Serum triglyceride (>=200 mg/dl)	3(2.8)	5(3.2)	1(0.9)	2(4.3)	11(3.0)	3	0.114