Original Research Article

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A study on risk factors of hypertension among females residing in a rural block of West Bengal

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ABSTRACT

Background: A systematic review on the prevalence of HTN in India, for studies published between 1969 and July 2011, reported a range between 13.9 to 46.3% and 4.5 to 58.8% in urban and rural areas of India, respectively. Females are more negligent as far as health seeking behaviour is concerned. No study was found to report the status of risk factors of hypertension solely among the female population in this rural community of West Bengal. Thus, this study was undertaken with the purpose to highlight the status of known risk factors of hypertension among adults female population of a rural community of West Bengal.

Methods: A community based cross-sectional study with systematic random sampling was conducted among 174 adult women residing in a rural area of West Bengal. Informed consent was obtained from the study participants. A structured questionnaire was used to collect data on various risk factors of hypertension. Analysis was done using SPSS (v 16).

Results: Among 174 study participants, 54% were found to be hypertensive at the time of examination. Score according to number of risk factors was calculated and found to range from 2-10, the attainable score being 0-14. Median Systolic and diastolic Blood pressure was found to be more in group of individuals with more score.

Conclusions: Modifiable risk factors were found to be present in considerable proportion of the study participants.

Keywords: Hypertension, Female, SBP, DBP

INTRODUCTION

In the 2030 Agenda adopted by United Nations (UN) General Assembly which is basically a plan of action for people, planet and prosperity, reduction of noncommunicable diseases has been prioritized for sustainable development worldwide. In the view of this call to reduce burden by the UN, World Health Organization (WHO) came up with the 25×25 target and has committed to reduce premature mortality from NCDs by 25% by the year 2025. The leading cause of this premature mortality is cardiovascular diseases (CVD) which also accounts for over half of all correlate deaths.

Under the NCD Global Monitoring Framework (NCD-GMF) by WHO, plans to reduce smoking and tobacco use, harmful alcohol use, salt intake, physical inactivity, and elevated blood pressure and glucose levels to reduce the risk of premature mortality from NCDs have been proposed. The framework targets to bring down tobacco use by 30%, harmful alcohol intake by 10%, salt consumption by 30%, prevalence of hypertension by 25%, control of CVD risk factors in at least 50% and stem the rising tide of obesity and diabetes.² The sustainable development goals (SDGs) laid down by the UN, under Goal 3 and Target 4 aims for a 33% reduction of NCD mortality by 2030, achievement of which will

require significant reductions in CVD.³ Among other important strategies for reducing CVD mortality are smoking cessation and blood pressure (BP) control.⁴ Prospective urban rural epidemiology (PURE) study evaluated hypertension awareness, treatment and control in 17 countries (including India) at various stages of economic development and reported that control was about 50% in high income countries and less than 10% in lower middle income and low income countries.⁵

The inception of studies on hypertension (HTN) in India dates back to 1942, when Chopra et al tried to set the standards for BP for Indian population. Since then, many studies have been published using data from both urban and rural settings. A systematic review on the prevalence of HTN in India, for studies published between 1969 and July 2011, reported a range between 13.9 to 46.3% and 4.5 to 58.8% in urban and rural areas of India, respectively. The pooled prevalence of HTN for the rural and urban east Indian population was 31.7% (30.2–33.3) and 34.5% (32.6–36.5), respectively. More et al in the year 2016 reported this prevalence to be 29.99% in rural Maharashtra. In the year 2015, in a rural community of West Bengal, prevalence of hypertension and prehypertension was reported to be as high as 52.53%.

Age and male gender being established risk factors for hypertension, most of the studies done are focused on elderly population. Females are more negligent as far as health seeking behaviour is concerned. They are more bothered with the health of their children and household activities. Moreover, no study was found to report the status of risk factors of hypertension solely among the female population in this rural community of West Bengal. Thus, this study was undertaken with the purpose to highlight the status of known risk factors of hypertension among adults female population of a rural community of West Bengal.

METHODS

A community based observational study with cross sectional design was done over a period of three months (October 2017-December 2017) in Singur block of the West Bengal, India. Among the 64 villages served by the Rural Health Unit and Training Center, Singur (RHUTC), which is the rural field practice area of All India Institute of Hygiene and Public Health (AIIHPH), Kolkata. Two villages were selected randomly. All the adult non pregnant females (aged 18 years or more) residing permanently in the area comprised the study population. Those who did not give consent to participate in the study and those who were mentally or critically ill were excluded from the study population.

A study on prevalence of cardiovascular disease risk factors in rural West Bengal reported that 52.53% of the population have high BP. ¹⁰ Thus, taking p as 52.53% and relative error of 15%, minimum sample size was calculated that came to 161. Data on total number of

households in each village was obtained from registers maintained at the health centre. Systematic random sampling technique was used to obtain the sample. Every 6th house was approached. Keeping the inclusion and the exclusion criteria in the mind, women in the house were explained about the purpose of the study and ensured anonymity of the data, informed consent was obtained. If the exclusion criteria met, then the next house in line was approached. Data was collected using a pre-designed, pre-tested schedule containing both open and closed ended question. Following standard operating procedure (SOPs):

- Anthropometric measurements (height, weight and waist circumference) were recorded. Height was measured in a standing position against a hard wall with occiput, shoulder blades, buttocks, and heel touching the wall without any footwear and headwear with non-stretchable measuring tape with the precision of 0.1 cm. Weight was measured with properly calibrated digital weighing scale with a precision of 0.1 kg with participants standing in straight position with minimum respectable clothing.
- Blood pressure measurement- WHO guidelines were used in order to obtain accurate and precise readings of BP. Minimum of two measurements of BP on each study participant, in sitting position, in the right arm using the ausculatory method with the help of aneroid apparatus were made at intervals of at least 5 min and the mean of both readings was used to represent the patient's BP. In cases, where the two readings differed by over 10 mm of Hg, a third reading was obtained, and the three measurements were averaged.

The schedule comprised of details of age, religion, marital status, education, occupation and socioeconomic status as well as dietary habits, physical activity, tobacco use, stress and family history of hypertension. In this way a total of 174 such women were interviewed during the stipulated time.

Ethical issues

Each selected subject was given explanation about the procedure and objectives of the study. Informed written consent was obtained and referral services were provided if required at the rural health center. The prior ethical clearance for the study was obtained from the Institutional Ethics Committee.

Statistical analysis

Data input was done in SPSS (version 16). Descriptive statistics were performed and depicted using frequency distribution tables. Distribution of study participants (number %) with respect to various risk factors is shown with the help of tables.

Operational definition

- Physical activity- International physical activity questionnaire was used. METS (min/week) was calculated and study participants were divided in 3 categories viz. Low, moderate and vigorous physical activity.
- Dietary habits- Per capita daily consumption of salt and added oil was calculated and compared with the recommended daily allowance (RDA). Frequency of consumption of red meat, sweets, junk food and fast food during week was taken and categorized as often >5 days a week, sometimes- 3-5 days a week, rarely- once or twice a week, and never.
- Stress- Perceived stress score (PSS 4) was used.
 Median was computed. Those having score more than the median were classified to be more stressed.
- *Tobacco use* Currently using tobacco (smoking/smokeless) in any form.
- Family history of hypertension- Obtained for mother, father or any of the siblings.
- *Hypertension* According to Government of India, individuals' BP [12] were categorized as following:

Table 1: Table showing various categories of SBP and DBP.

Category	SBP and DBP (mm of Hg)
a) Optimal	<120 and <80
b) Normal	120-129 and/or 80-84
c) High Normal	130-139 and/or 85-89
d) Grade 1 hypertension	140-159 and/or 90-99
e) Grade 2 hypertension	160-179 and/or 100-109
f) Grade 3 hypertension	\geq 180 and/or \geq 110

- Body mass index- Calculated using formula kg/m² and categorized as underweight (<18.5), normal (18.5-24.99), overweight (25-29.99) or obese (≥30).
- Waist circumference- Using WHO criteria, participants with >80 cm was considered to have higher risk of developing cardiovascular diseases.
- Risk score- Score for each individual was computed for risk factors of hypertension. A total of 14 risk factors were used to compute the risk score namely Stress score (more than the median), salt consumption (>5 g/capita/day), oil consumption (>20 g/capita/day), consumption of fast food (daily), consumption of sweets (daily), consumption of red meat (daily), consumption of junk food (daily), family history (positive for father and/or mother and/or any of the siblings), waist circumference (≥ 80 cm), BMI (>22.9 kg/m²), education(illiterate), occupation(those who were found to be working for pay), physical activity (low) and tobacco (consuming in any form). It was computed such that the score corresponds to the number of the risk factors found to be present in the case of those particular study participants. Total attainable score was 0-14.

RESULTS

Among 174 study participants, 54% were found to be hypertensive at the time of examination. Distribution of study participants according to category is shown in Figure 1. Mean age was $50~(\pm 1.4)$ years, ranging from 18 to 80 years. 79.3% followed Hinduism. Majority (75.9%) were currently married and living with their spouse. 74.1% were living in a joint family. About one-fourth were illiterate. Socio-economic status (SES) was assessed using Modified B G Prasad scale (January 2017).

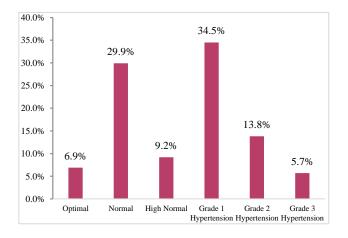


Figure 1: Bar diagram showing distribution of study participants according to BP.

Table 2: Distribution of study participants according to family history, BMI and waist circumference.

Risk factor	Number of participants (%)				
Family history					
None of the family member	12 (6.9)				
Either of father/mother/any sibling	46 (26.4)				
Any two of family member	82 (47.1)				
All three	34 (19.5)				
BMI (kg/m ²)					
Underweight (<18.5)	22 (12.6)				
Normal (18.5-25.9)	102 (58.6)				
Overweight (25-29.9)	42 (24.1)				
Obesity (≥30)	8 (4.8)				
Waist circumference (cm)					
<80	32 (18.4)				
≥80	142 (81.6)				

48.3% had low physical activity, 39.7% had moderate and only 12.1% falls in the category of vigorous physical activity. 89.7% of the study participants were found to have habit of consuming extra salt in diet and daily consumption was ≥5g/day. Mean consumption was 8.2g with a SD of 2.8g. Mean oil consumption was 21.2g with a SD of 7.6g. 54.6% of the participants were found to consume more than RDA. 68.4% reported to consume tobacco in any form. Mean stress score came to be 7.6

with a SD of 1.1. Frequency distribution of other risk factors is shown in Table 2. Status of the risk factors among the participants along with their present status of BP was separately assessed for each of them. It was found that 67.5% of those belonging to lower-middle class had high BP. Those in the age group of more than 50 years were found to have higher BP than the younger participants. Moreover, 65.8% of the illiterate females were hypertensive. It was clearly evident that those having positive family history, low level of physical activity and higher BMI had higher BP (Table 3).

Similarly, BP was compared with respect to behavioral and lifestyle characteristics of the individual. It was found that those consuming salt more than RDA (5 g/day) had higher BP. Individuals with waist circumference more than 80 cm were also found to have high BP (Figure 2).

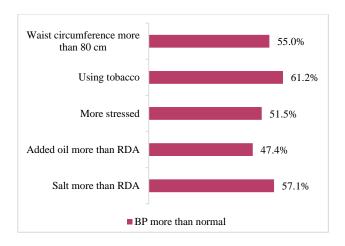


Figure 2: % of individuals diagnosed with hypertension with some of the risk factors.

Table 3: Distribution of study participants according to some risk factors and number of hypertensives in each category.

Risk factor	Number of study participants (%)	Number of hypertensives (%)
Age (in years)		
≥50	84 (48.3)	60 (71.4)
Education		
Illiterate	46 (26.4)	30 (65.2)
Below primary	45 (25.9)	21 (46.7)
SES		
Lower middle or lower	44 (25.3)	29 (65.9)
Family history		
Any one	46 (26.4)	22 (47.8)
Any two	82 (47.1)	50 (61)
All three	34 (19.6)	17 (50)
Level of physical activity		
Low	84 (48.3)	59 (70.2)
Body mass index		
Overweight or obese	50 (28.8)	32 (64)

Table 4: Distribution of study participants with risk score and median SBP and DBP in each category of risk score.

Risk score	Number of individuals (%)	Median SBP (mm of Hg)	Median DBP (mm of Hg)	Number of hypertensives (%)
2	4 (2.3)	125	80	2 (50)
3	9 (5.2)	120	80	4 (44.4)
4	29 (16.7)	130	80	14 (48.3)
5	37 (21.3)	130	80	17 (45.9)
6	50 (28.7)	130	80	27 (54)
7	24 (13.8)	140	80	16 (66.7)
8	18 (10.3)	140	85	11 (61.1)
9	2 (1.1)	135	90	2 (100)
10	1 (0.6)	140	100	3 (100)

The risk score was found to range from 2-10 with a mean (SD) of 5.6 (1.5) and median score of 6. This score was further explored by estimating number of individuals and their median SBP and DBP (Table 4).

Co-relation was found to be significant between risk score and the SBP (spearman's coefficient - 0.16 and p=0.03). Co-relation between risk score and DBP came to 0.13 with a p value of 0.08.

DISCUSSION

India is a developing country and is going through a rapid demographic and epidemiological transition. This community based study identified the presence of high proportion of factors known to predispose hypertension. This highlights the escalating burden of this silent killer. With increasing age, the aorta and arteries walls get stiffened and this contributes to the high prevalence of hypertension in older age groups. 13 Vasan et al in their study conducted among 1298 subjects found significant association of hypertension with age in the current study almost half of the study population comprised of females aged more than 50 years, out of whom 71.4% have high BP. 14 Lifestyle changes like harmful dietary practices, consumption of tobacco and sedentary habits have contributed to the growing epidemic of hypertension in India. In the current study, almost 50% of the population fall under the category of low physical activity according to IPAQ and 70% of them have high BP. A study in similar setup showed 6.2% considered their physical activity to be light, 33.8% thought their physical activity to be moderate and 30.5% considered themselves to be heavily active physically. 15 The differences may be attributed to the fact that the this previous study had both male and female participants. Tobacco use was found among 34% of all the male and female study participants in urban population¹⁶ also which is similar to this rural population. Of the 31.6% of the females with the habit tobacco consumption, 61.2% have high BP. As far as dietary habits are considered, this study focused on consumption of food groups known to predispose to HTN like junk food, fast food and red meat. WHO has given cutoff value for per day salt consumption as 5 g. This population showed a habit of more than the optimum intake i.e. mean consumption was 8.2 g and it ranged as high as 16.1 g. Similarly mean added oil consumption was 21.2 g per capita per day that is near to the WHO cutoff of 20 g. But 54.6% still consumed more than 20 g per day. 58.6% had BMI in the normal range and 28.7% were found to have BMI more than normal. Central obesity predisposes to cardiovascular diseases and here in this population 81.6% had waist circumference more than 80cms.

In case of HTN, primary prevention holds more importance. Thus education plays a vital role in monitoring modifiable factors. As far as females of this area are considered, half of them could not attain education till primary level. Only 7.5% were fortunate enough to complete higher secondary or go beyond. A study in the year 2016 in the slums of Kolkata similarly concluded that only 30% of total 9088 study participants completed class X and 17% were illiterate. 16 Evidently those with higher education tends less towards high BP. Occupation leads to stressful conditions but here only 21% were working females rest were housewives. But when stress was assessed by PSS scale, 100% were found to have a score pertaining to some level of stress. Those belonging to group having score more than the median have high BP. Family history is an established nonmodifiable risk factors. In this study, more than half of the participants gave a positive history in any of the first degree relatives.

CONCLUSION

It is quite evident from the result of the study that this community carries a Hugh burden of the risk factors that are known to predispose an individual to develop hypertension sooner or later. A community where the socioeconomic status is already compromised. development of a disease will only add to the misery. Most of them would eventually find it difficult to adhere to the treatment due to the economic crisis faced by many because of associated out of pocket expenditure for buying medicines, thus increasing the uncontrolled disease pool.

Recommendations

Intensive behaviour change communication activities regarding modifiable age factors like physical activity, stress, and dietary pattern should be done. Knowledge and practices regarding stress management, salt or oil in diet, going for early screening, should be inculcated in the community by regular time to time motivational sessions by the local health workers.

Limitations

Data on many of the factors like family history, diet, physical activity may have been over/under-reported due to recall bias.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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