Research Brief

Prevalence, awareness, treatment and control of hypertension among adults aged 30 years and above in Barmer district, Rajasthan, India

Ramesh Godara a, Elezebeth Mathews a,1, G.K. Mini b, K.R. Thankappan a,∗

a Department of Public Health and Community Medicine, Central University of Kerala, Kasaragod, Periye, Pin 671320, India
b Global Institute of Public Health, Ananthapuri Hospital and Research Centre, Thiruvananthapuram, Kerala, 695029, India

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A B S T R A C T

We studied awareness, treatment and control of hypertension and factors associated with hypertension prevalence in Barmer district, Rajasthan. A cross-sectional study was conducted among 300 adults aged ≥ 30 years. Data were collected using a modified World Health Organization STEPS tool. Bivariate and multivariate analyses were done to find the factors associated with hypertension prevalence. Hypertension and pre-hypertension prevalence were 22.0% and 50.7% respectively. A quarter (27%) was aware, 25% were on treatment and 9% achieved adequate control of hypertension. Hypertension prevalence was significantly higher among men, older adults, overweight adults and those reported higher income compared to their counterparts.

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1. Introduction

The number of people with hypertension increased from 594 million in 1975 to 1.13 billion in 2015.1 Globally, high systolic blood pressure (SBP) accounted for 10.2 million deaths and 208 million disability-adjusted life years (DALYs) in the year 2017.2 In India, a recent study estimated that there were 207 million persons with hypertension.3 Hypertension was attributed to 1.63 million deaths in India in 2016.4 Overall prevalence of high SBP in India was 21.1% ranging from 18.8% in the low epidemiological transition level (ETL, the ratio of DALYs from communicable diseases to non-communicable disease and injuries combined) states to 26.0% in the high ETL states.5 In a nationally representative study of 1.3 million adults aged ≥ 18 years, hypertension prevalence in rural areas ranged from 14.6% in Chhattisgarh to 38.8% in Kerala and in urban areas from 17.7% in Chhattisgarh to 62.7% in Daman and Diu.6

Rajasthan State belongs to the low ETL group of states.5 Hypertension prevalence in Rajasthan was 18.3% in rural areas and 26.1% in urban areas.6 Since the national program for prevention and control of cancer, cardiovascular diseases, diabetes and stroke (NPCCDS) focuses on hypertension among adults aged ≥ 30 years, it is important to know the community-based prevalence, awareness, treatment and control of hypertension in this age group. We conducted this study in Barmer district of Rajasthan to find out the prevalence, awareness, treatment and control of hypertension and the factors associated with hypertension prevalence.

2. Methods

In this community-based cross-sectional study, 20 villages of Barmer district of Rajasthan were selected by multistage cluster sampling. The total sample size of 300 was estimated based on the hypertension prevalence of Rajasthan (20%).7 The population which was registered in the recently updated voters list constituted the sample frame in the selected Panchayath Samithis, local self-government body for about 200,000 population.8 Out of the 17 Panchayath Samithis in the district, two were selected randomly for the study. From each Panchayath Samithi, 10 villages were selected randomly. From each village, we selected 15 adults aged ≥ 30 years, making a total sample size of 300. The first household in the district was selected randomly from the list of households. The households were then visited continuously until we recruited 15 adults in that village. From each household, one adult aged ≥ 30 years was selected using the KISH method.9 We used the World Health Organization (WHO) STEPS tool for data collection.10 Blood pressure was measured at least three times and the average of the last two readings was taken as the blood pressure value of the individual. If there was a difference of more than 10 mm of Hg in systolic BP and
more than 6 mm of Hg in diastolic blood pressure between the second and the third readings the readings were repeated up to five times.

Hypertension was defined as SBP $\geq$140 mmHg and or diastolic blood pressure (DBP) $\geq$90 mmHg or on medication for high blood pressure. Body mass index of $\geq$ 25 kg/m² was considered as overweight.

Data analysis was done using SPSS version 20. Bivariate and multivariate analyses were done to find out the factors associated with hypertension prevalence.

The Ethical clearance for the study was obtained from the Institutional Human Ethics Committee of the Central University of Kerala. Written informed consent was obtained from all the participants before the survey.

3. Results

The baseline characteristics of the study participants are given in Table 1. Mean age was 45 years (SD: 14.3), women 49%. Mean SBP was 125 and mean DBP was 81 mm of Hg.

Hypertension and pre-hypertension prevalence were 22% and 50.7% respectively. A quarter (27%) was aware, 25% were on treatment and 9% achieved adequate control of hypertension. Control rates were higher among women (15.8%) compared to men (6.4%). Control rate among treated hypertensives was 35.3%.

Factors associated with hypertension prevalence are given in Table 2.

4. Discussion

The prevalence of hypertension in this study was 22% which was lower than the national prevalence. Since our sample consisted of adults aged $\geq$ 30 years the prevalence should have been higher compared to studies on adults sample aged $\geq$ 18 years. Unlike several other studies, the large majority of our sample had a body mass index below 25 which could be one of the reasons for the low prevalence of hypertension in this population.

Awareness level of hypertension was lower than that was reported in earlier studies. Among those who were aware, most of them were on treatment. However, the control rate of 9% was less than that of Kerala. Significant hypertension control rate of 69% has been reported recently if programs are effectively implemented. In spite of the national program (NPCCDS), the awareness, treatment and control rates of hypertension in this population was inadequate and lower than several studies on hypertension in India indicating the need to strengthen this program at the community level.

The large proportion of pre-hypertension in our sample is a concern since most of them are likely to progress to hypertension unless appropriate plans addressing them are implemented.

Men in our sample had significantly higher hypertension prevalence after adjusting for smoking, alcohol consumption and other behaviors which was similar to earlier reports from India.

One important finding of this study was a large proportion of the population belonged to the normal weight category. Since we did not measure the body fat, we are unable to say what proportion of these adults with normal BMI are normal weight obese, an important cardiovascular risk factor in Asian population.

5. Conclusions

This study among a representative sample of 300 rural adults aged $\geq$ 30 years in the Rajasthan district of Barmer found a hypertension prevalence of 22% and a pre-hypertension prevalence of 50.7%. Over a quarter of them (27%) were aware, 25% were on treatment and 9% achieved adequate control of hypertension. Hypertension prevalence was significantly higher among men, older adults, overweight adults and those reported higher income compared to their counterparts. More than half of this population had pre-hypertension. Efforts should be taken to improve the

Table 1

Baseline characteristics of the study participants (N = 300).

| Variables                              | N  | %   |
|----------------------------------------|----|-----|
| Age group                              |    |     |
| <45                                    | 172| 57.3|
| $\geq$45                               | 128| 42.7|
| Sex                                    |    |     |
| Men                                    | 154| 51.3|
| Women                                  | 146| 48.7|
| Education                              |    |     |
| No Schooling                           | 155| 51.7|
| Others                                 | 145| 48.3|
| Occupation                             |    |     |
| Home-maker                             | 9  | 3.0 |
| Manual laborer                         | 148| 49.3|
| Private sector employee                | 40 | 13.3|
| Self-employee                          | 33 | 11.0|
| Government sector employee             | 15 | 5.0 |
| Retired and others                     | 55 | 18.3|
| Monthly income (in Indian Rupees)      |    |     |
| $<7835$                                | 173| 57.7|
| $\geq$7835                             | 127| 42.3|
| Marital Status                         |    |     |
| Currently Married                      | 280| 93.3|
| Others                                 | 20 | 6.7 |
| Religion                               |    |     |
| Hindu                                  | 226| 75.3|
| Muslim                                 | 72 | 24.0|
| Jain                                   | 2  | 0.7 |
| Family history of HPTN                 | 13 | 4.3 |
| Current Smoking                        |    |     |
| All                                    | 88 | 29.3|
| Men only                               | 88 | 57.1|
| Current Alcohol consumption            |    |     |
| All                                    | 19 | 6.3 |
| Men only                               | 19 | 12.3|
| Smoking or alcohol consumption         |    |     |
| All                                    | 93 | 31.0|
| Men only                               | 93 | 60.4|
| Physical Activity*                     |    |     |
| Inactive                               | 91 | 30.3|
| Active                                 | 209| 69.7|
| Overweight                             | 23 | 7.7 |

Mean income was 7836 rupees (range: 1429–28,333).

Table 2

Factors associated with hypertension (HPTN) prevalence: Results of bivariate and multivariate analyses.

| Characteristics | N  | Prevalence of HPTN (%) | Adjusted OR (95% CI) |
|-----------------|----|------------------------|---------------------|
| Age in years    |    |                        |                     |
| $<45$           | 172| 15(8.7)                | Reference           |
| $\geq$45       | 128| 51(39.8)               | 5.91(2.77–12.60)    |
| Sex             |    |                        |                     |
| Women           | 146| 19(13.0)               | Reference           |
| Men             | 154| 47(30.5)               | 3.12(1.26–7.68)     |
| Overweight      |    |                        |                     |
| No              | 277| 50(18.1)               | Reference           |
| Yes             | 23 | 69(69.6)               | 4.68(1.62–13.5)     |
| Monthly Income (INR) |    |                        |                     |
| $<7835$         | 173| 33(19.1)               | Reference           |
| $\geq$7835     | 127| 33(26.0)               | 2.20(1.13–4.25)     |

Other factors included in the model were education, tobacco use and alcohol use.
control rates of hypertension focusing on men, obese adults, older adults and people reporting high income. Those who are in the pre-hypertensive stage should be given special attention so that they don't progress to hypertension. The national program (NPCCDS) may address this issue of pre-hypertension in its future action plans.

**Key message**

Among the 22% hypertensives 27% were aware, 25% were on treatment and 9% achieved adequate control.

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