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## Original Article

# Prevalence of hypertension and prehypertension in a community-based primary health care program villages at central India



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## ABSTRACT

**Objective:** The objective of this study is to evaluate the effects of a community-based effort in a rural area of central India to decrease the prevalence of hypertension among the middle-aged and older population by using multiple blood pressure measurements.

**Methods:** With a prevalence of 16.8% (error of 3.36, and 95% confidence interval) from a recent study in a nearby district, the sample size required for this study was 495 subjects. A proportionally stratified random sample design was used. With maps of ten villages, where in a community-based health project had been in place for many years, 20 households and 20 backups were randomly selected from a list of all households. Multiple BP measurements were obtained and categorized and one-month period prevalence was calculated. Statistical analyses of frequency and percentage were performed.

**Results:** Approximately one-fifth of the population above 40 years of age in central India where a community-based approach is in place was hypertensive. This is significantly lower than the previously documented prevalence rate of one-third or even more prevalence rate in India. The attribute of caste and religion, a specific rural Indian characteristic did not have any significant bearing on the above results. The prevalence tended to increase progressively with age until 70 years, after which it declined. Multiple blood pressure measurements may yield an accurate prevalence of hypertension.

**Conclusion:** With the documented evidences from India, the current reduced prevalence of hypertension could have been influenced by the community-based interventions in this population.

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## 1. Introduction

The first hypertension (HTN) prevalence study in India was reported by Chopra in 1942.<sup>1</sup> Since then at least 50 such studies have been published using data from both urban and rural settings. A careful review of this literature shows a steady increase in the prevalence of hypertension. The prevalence of HTN has increased in urban communities as well as in rural people.<sup>2</sup> The latest 2012 figures on the prevalence of HTN among the rural Indian population is available for only the women and the elderly (31.5%<sup>3</sup> and 32.6%<sup>4</sup>, respectively). The most up-to-date estimate in 2007-08 for Maharashtra found 29% were hypertensive in the age group 45-54, and 43.8% among 55-64 years.<sup>5</sup> Hypertension is responsible for 57% of stroke deaths and 24% of coronary heart disease deaths in India.<sup>6</sup> Cardiovascular disease will be the largest cause of death and disability in India by 2020 and HTN is emerging as a major health problem.<sup>2</sup>

Interestingly, most of the earlier studies on elevated blood pressure (BP) have concentrated only on clinical HTN, which is defined by the JNC 7 guidelines as systolic blood pressure (SBP)  $\geq 140$  mmHg and/or diastolic blood pressure (DBP)  $\geq 90$  mmHg.<sup>7</sup> The recent creation of the 'prehypertension' (pre-HTN) classification by the JNC 7 guidelines in 2004,<sup>7</sup> defined as SBP of 120-139 mmHg or DBP of 80-89 mmHg invites additional efforts on the part of researchers to study this group separately both because it is considered to be a starting point for cardiovascular disease and also because it is estimated to decrease average life expectancy by as much as five years.<sup>6,8,9</sup> Ever since the creation of the pre-HTN category, a number of studies have examined the prevalence of prehypertension in India. Two major studies in India were: (i) WHO - ICMR: NCD risk factor surveillance that used JNC 6 guidelines<sup>10</sup> and it did not have the category of pre-HTN. (ii) Integrated Disease Surveillance Project (IDSP) of ICMR, which used pre-HTN category in its analyses.<sup>5</sup>

Most surveys were based on a casual reading taken only on one occasion. It is well recognized that the predictive power of multiple BP determinations is much greater than a single reading.<sup>11</sup> This study aims to investigate the prospects of multiple BP readings in rural setups with a community based primary health care (CB PHC) approach. CB PHC is an accepted approach to manage various health-related issues and has been used mainly in developing countries. A bulletin published by the WHO in 2010 reported the first impact study of a long running CB PHC program on under-5 mortality.<sup>12</sup> As far as we know, there are no such studies to document CB PHC's impact on lifestyle diseases like HTN.

### 1.1. Rural setups with CB PHC approach

In the rural areas under investigation, CB PHC is provided by community residents, commonly known as Community/Village Health Workers trained in different health-related issues, historically maternal and child health. Today, they also attend to communicable and life style-diseases including mental health. Social issues, such as caste discrimination, the empowerment of women, and substance abuse, are addressed and supported by community/village organizations such as

women's and farmers' clubs. This approach is described in detail in other literatures.<sup>13,14</sup>

The CB PHC program comprehensively approaches HTN, through a three-tier system. The first tier is at community level by voluntary female village Health Workers (VHWs), trained in measuring BPs and providing regular follow-up for individuals with known cases of HTN for drug and altered lifestyle compliances. Active village organizations, such as women's and farmers' clubs, are also equipped with the knowledge of HTN and educate community members on the prevention of HTN. The second tier consists of the Mobile Health Team, which is made up of a physician, nurse, and social worker. They visit CB PHC villages at regular intervals to conduct additional monitoring and treatment to HTN patients suspected or referred by the community health worker. They also support the community efforts by providing expert advice and replenishing their resources for HTN care. The third tier consists of a secondary care medical facility, mostly for patients referred by the Mobile Health Team for further investigation, treatment, and hospitalization if required.

To reduce the overall burden of hypertension in the community, a population-based approach is used in these CB PHC programs at individual and group levels. In the participating rural areas, CB PHC addresses HTN by targeting two groups: (1) older persons who have a higher risk of developing HTN and (2) younger people who attend adolescent girls and boys programs (in batches) from the CB PHC project villages. Prevention strategies applied early in life are taught to the adolescent girls and boys groups. This provides the greatest long-term potential for avoiding the precursors that lead to hypertension. In both of these groups, the specific HTN/pre-HTN related prevention activities are (i) reduce salt consumption, (ii) opportunities for exercise, (iii) education related to healthier food with fruits and vegetables and at the same time reduction in intake of saturated and total fat food items, (iv) limited or no alcohol consumption, and (v) long-term weight reduction counseling for obese adults. Preventive measures with adult and older persons are carried out through community/village organizations and by the VHWs.

### 1.2. Objectives

The specific objective of this study is therefore to (i) obtain a statistically significant 2012 estimate of the prevalence of hypertension and prehypertension among adults over the age of 40 in a rural area of central India where CB PHC and development efforts have been in place for a number of years; (ii) study the association between HTN and five repeatedly tested social determinants along with a less frequent social determinant, 'caste/religion'; and (iii) investigate the prospects of multiple BP readings in rural set-ups.

## 2. Methods

### 2.1. Survey methodology

London School of Economics (LSE) methodology for such an Indian rural project survey was adopted after carrying out

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