

## REVIEW ARTICLE

# Prevalence of Hypertension and its optimal management issues in Rural India: An unmet health care need

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## Introduction

Cardiovascular diseases are the number one cause of death globally. They account for approximately 17 million deaths in the world each year (1). Of these deaths, complications of high blood pressure account for more than nine million, including about half of all deaths from heart disease and stroke (2). The number of adults with hypertension in 2025 was predicted to increase by about 60% to a total of 1.56 billion (1.54–1.58 billion) (3). In India too, overall morbidity and mortality from non-communicable diseases (NCDs) is rising rapidly which will have severe impact on the already frail economy (4). Many studies done in different settings in India have shown that the prevalence of hypertension ranges from as high as 20-50 percent in both rural and urban population ([Table 1](#)) (5). Contradictory to the earlier reports that the prevalence of hypertension is low in rural areas, the recent studies have shown that the rural-urban differences have largely disappeared and the hypertension and other risk factors for cardiovascular diseases are only equal or slightly greater in the rural population (6). A recent study done by the authors in a rural population in Tamil Nadu found that 27.2% of adults between 18 to 60 years have hypertension (7). Also the studies show that more than 50% of the men and women above 60 years old are hypertensive in rural South India (8). This observation has major repercussion on India's health system and health

expenditure in the context of improved life expectancy and a significant increase in the proportion of people living in the age group of 60 years and above in India.

There is a social cost to this increasing magnitude of the prevalence of hypertension in India. A significant proportion of people do not seek care at the right time as they do not have the awareness and to make it worse many forgo taking treatment for high blood pressure in the early stages because they cannot afford it (1). The results are devastating for both families and health systems: early death, disability, personal and household disruption, loss of income and diminished workforce. Also the escalating medical care expenditures take a toll on families, communities and national health budgets.

## Aims & Objectives

The aim of this literature review was to understand the prevalence of hypertension in India and its significant determinants and also to identify evidence based methods to address management issues especially in the rural areas.

## Material and Methods

Narrative review of the literature was performed on the PubMed database using the terms prevalence of hypertension, management issues, decision making tools, patient navigator system, health care system. The relevant articles were selected from this search for review.

## Results

### Management Issues

In the early 70's, the finding was that one half of the people with hypertension actually knew that their pressures were elevated, and one half of these people received therapy for the elevated pressure, and out of those treated patients only one-half had their pressures under control. India has come a long way and still the percentage of hypertensive adults with controlled blood pressures (less than 140/90 mm Hg) has only marginally increased to 24% (9).

The major challenge for optimal management of hypertension in the rural communities in India has been limited health literacy to high blood pressure, its risk factors and the associated health risks and as a result they go undiagnosed and this ignorance can last for years (10). Gupta *et al* reported from a study done among a sample of women participants that 42.8% had good awareness regarding hypertension, more in urban (56.8%) than in rural (24.6%) and of those, 38.6% were diagnosed with hypertension and are on treatment (urban 35.7, rural 46.5) and adequate blood pressure control (SBP<140 and DBP<90 mm Hg) was observed in 21.5%(urban 28.3 vs rural 10.2). In contrast, of all the hypertensive subjects in the study, only 18.3% (rural 13.1, urban 22.5) were on treatment and still worse the control was observed only in 3.9% (rural 1.3, urban 5.9). Laws *et al* recently published the findings from a research among HIV patients assessing the relationship between health literacy and treatment adherence. The authors pointed out that the many studies in the past found an inconsistent association between health literacy and adherence to medications because majority of people blindly follow their doctors instructions without any understanding of biomedical basis for treatment. For many an insight into biomedical basis for treatment is less important than their own health beliefs (11). This may be also true for all those who are diagnosed to have hypertension and advised on a lifelong treatment schedule. It raises the question of what should be the content of community education materials, how can the health providers develop decision making tools for the clients in order to promote effective participation in preventive and treatment programmes.

Further the health care delivery system in India is poorly organized (12). A pyramid health care infrastructure is recommended in order to provide

effective care for those with chronic diseases including hypertension in the community (13). In a pyramid structure, there should be a well-established primary level care centre (level of first contact) with easy access, both physically and in terms of affordability, to everyone. This has to be strengthened with good referral pathway, the successive rung equipped to manage more complex conditions and complications.

The socioeconomic factors also are implied to influence the control of hypertension in the communities. However the relationship between the socioeconomic status and prevalence of hypertension and management issues is not clear and often contradictory. The possible explanations for the contradicting association between socioeconomic status and hypertension include the interactions between enabling factors and barriers like awareness, increased prevalence of obesity, poor quality of diet, sedentary lifestyle and but have better access to medications and adherence among those with higher socio-economic status versus low birth weight, job stress, poor access to medications but mostly involved in high level of physical activity in lower socio-economic status population (14).

The other crucial issue was found to be the suboptimal patient-physician interactions in overcrowded outpatient wings in most low resource setting that lead to poor understanding of their disease and the value of taking medications on a regular and long term basis (15).

Furthermore studies show that the general practitioners, a network of both allopathic and Indian System of medicine experts, the first contact level health care providers in India lack knowledge, skill and attitude to gather relevant history, measure blood pressure and administer appropriate treatment(16). India lacks an accountable health care system to address the challenges of increasing non-communicable diseases and escalating health care cost. The accountable care system is defined as a network of health care providers, including informed primary care doctors, specialists, and hospitals that work together collaboratively and accountable for the cost and quality of care delivered to a population of patients.

### Lessons learned

In the current health care scenario in India with a poor accountable health care system compounded by poorly informed clients, there is a need to identify

multiple innovative interventions to reduce the impact of hypertension in the communities.

### **Role of Decision Support Systems (DSS) for communities**

The efforts to impart health information through socially relevant channels are valuable and can affect consumer health care decisions. There are ways to support patients to make informed choices. Several recent studies have shown that a shared model of clinical decision making, incorporating patient informed choices and professional preferences is the preferred approach of determining patients' treatment. However, the scarcity of physicians, overcrowded outpatient departments, variations in the health literacy makes it difficult for providers to offer best of care to their clients. Often the unstandardized health information given by providers and having to see different providers every time patient make visits to health center leads to inconsistent management advice and information sharing with the patient. Glyn Elwyn *et al* at Cardiff University in 2009 developed 'Option Grid' to assist patients to review management options to frequently asked questions and clear evidence based answers (17). Option grid is a one page, easy to read (or to be read to them), comparison of options. The patients are requested to go through the questions and answer in the grid and encouraged to discuss and clarify their doubts with the providers. In low resource settings, this grid can be administered by nurse practitioners or social workers or medical sociologists to save the time of incredibly busy physicians.

A recently published systematic review of impact on management of hypertension owing to decision support systems including clinical decision supports systems or computerized decision support systems showed that information technology assisted hypertension management program had a better impact on significant reduction of blood pressure in communities and reducing the number of cardiovascular re-hospitalizations in patients suffering from heart failure in a short time (Table 2) (18). A number of mobile and tab based health applications have been developed and recommended, both for health workers and for patients in the recent years to support effective management of chronic diseases including hypertension (19). In a recently published article Ovbiagele B proposed that for Sub-Saharan Africa, nurse run clinics assisted by clinical decision support

tools and m-health technology (personalized text messaging and tele-monitoring) will empower the communities to make treatment choices and will motivate them to adhere to antihypertensive medications (20). The author recommended a theory based integrated blood pressure self-management intervention assisted by phone based simple text messages under the guidance of Nurse for optimum management of hypertension. Thus the involvement of nurses and social workers or medical sociologists in providing care and use of evidence-based, consistent, decision making information tools will certainly improve the care of chronic diseases and increase compliance to treatment

### **Patient Navigator system**

The communities with low health literacy and compounding less than desirable socioeconomic factors are often not aware of the services provided by the health care system. There is evidence to show that a socially accepted patient navigator system as part of the outreach services like ASHAs (Accredited Social Health Activist) or community health workers based health monitoring, supported by decision making tools in the Indian health system, if implemented, will address the deficiencies in the literacy and promote early diagnosis, improve compliance to treatment regimens and consistent follow-up and monitoring (21,22). The patient navigators could promote the communities to comply with recommended periodic blood pressure screenings even when no symptoms are present, facilitate diagnosis and treatment of hypertension in its earliest stages in order to prevent damage to critical organs and conditions such as stroke, heart attack and kidney failure.

### **Accountable Health system**

There is an urgent need to put in place health systems that promote early detection of hypertension and management. Although it is the mandate of the public sector in India to implement preventive services, in practice, 80% of the outpatient visits and 60% of the hospital admissions are handled by private health care institutions. Therefore models of public-private partnerships with organized outreach programmes and accountable referral systems have to be put in place to address the NCDs.

### **Power of Public policy**

Further, we cannot underestimate the power of public policies to address the alleviation of hypertension and its risk factors that include dietary

changes through regulatory and consumer education approaches and promotion of physical activity through awareness campaigns, community mobilisation through media and creation of activity encouraging environments. The dietary changes including increased intake of fruits and vegetables should be promoted by affordable agricultural and pricing mechanisms and furthermore a feasible tobacco control programme can have a significant impact on hypertension and its related complications (23).

## Conclusion

A multipronged intervention strategy is the way to go forward to reduce the impact of chronic diseases like hypertension in India. A health system that has already been designed to understand the need of the patients, has built in methods to address the variation in the treatment preferences; allows the clients to express their concerns; and encourage them to make informed choices using culturally relevant decision making tools assisted by technology will be preferred in the future. Furthermore, optimum management of hypertension will largely depend on the existence of an accountable health care system, organised public-private partnerships and an effective patient navigator system.

## Authors Contribution

PHR and AIK have done extensive literature search to make the first draft. RI has reviewed the literature, compiled the data, edited the manuscript and made the final draft.

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## Tables

**TABLE 1 PREVALENCE OF HYPERTENSION IN INDIA [5]**

First author	Place	Age group	Sample size	Prevalence
<b>Urban Population</b>				
Gupta <i>et al</i> 2002	Rajasthan	> 20	1123	33.4
Shanthirani <i>et al</i> 2003	Tamil Nadu	> 20	1262	21.1
Gupta <i>et al</i> 2004	Maharashtra	> 35	88653	47.9
Prabhakaran <i>et al</i> 2005	Delhi	20-59	2935	30.0
Reddy <i>et al</i> 2006	Multi-centric	20-69	19973	27.7
Kaur <i>et al</i> 2007	Tamil Nadu	18-69	2262	27.2
Yadav <i>et al</i> 2008	Uttar Pradesh	> 30	1746	32.2
Gupta 2011	Multi-centric	35-70	926	48.2
Chakraborty <i>et al</i> 2011	West Bengal	18-60	433	17.6
<b>Rural Population</b>				
Kusuma <i>et al</i> 2004	Andhra Pradesh	> 20	1316	21.0
Hazarika <i>et al</i> 2004	Assam	> 30	3180	33.3
Midha <i>et al</i> 2009	Uttar Pradesh	> 20	400	14.5
Bhardwaj <i>et al</i> 2010	Himachal Pradesh	> 18	1092	35.9
Kinra <i>et al</i> 2010	Multi-centric	20-69	1983	20.0
Kadu <i>et al</i> 2012	Maharashtra	> 18	2196	12.8
Bansal <i>et al</i> 2012	Uttarakhand	> 15	968	32.3
Kaur <i>et al</i> 2012	Tamil Nadu	25-64	10463	21.4

**TABLE 2 ROLE OF DECISION MAKING TOOLS IN REDUCING BLOOD PRESSURE [18]**

Author, year of publication	Sample size,	Decision tool	Effect size/p-value
Hayden B. Bosworth <i>et al</i> , 2009	588	Computerized clinical decision support system Reminder control Provider decision support Patient behavioral intervention Combined	Difference in SBP in 24months(SE) -4.9(1.9), 0.01 -2.1(1.9), 0.27 -2.5(2), 0.2 -2.3(2.1), 0.26
Ste'phane Rinfret <i>et al</i> , 2009	223	IT supported management program	SBP=0.001 DBP = 0.007
LeRoi S Hicks <i>et al</i> , 2008	2027	Computerized decision support	Ad. OR=0.96(.78-1.19)
Christianne L. Roumie <i>et al</i> , 2006	1341	Provider education only Provider education and alert Provider education groups	Mean SBP(SD)in mm Hg 157.3 (11.9) 158.0 (12.4) 156.3 (11.4)
Alan A Montgomery <i>et al</i> , 2000	614	Computer based clinical decision support system	Significantly lower SBP