

# Dealing with the burden of hypertension in Nepal: current status, challenges and health system issues

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## Abstract

Hypertension is one of the risk factors for cardiovascular diseases, which form the bulk of noncommunicable diseases (NCDs). Studies done in Nepal have reported a prevalence of hypertension ranging from 18.8% to 41.8%. One study reported a tripling of prevalence from 1981 to 2006 in the same community. Along with hypertension, the prevalence of other cardiovascular risk factors has also increased. Nepal's health-care system is unprepared to deal with these changes in disease burden, from tackling communicable, maternal and child health issues to NCDs. Out-of-pocket spending accounts for 55% of health-care spending in Nepal. Poor people are thus most vulnerable to the burden of hypertension and other NCDs due to their inability to afford the long-term treatment needed. Rapid enactment of an integrated national NCD policy, and effective prevention and control of hypertension is thus urgently required. This demands appropriate training and mobilization of the health workforce, including community-based health volunteers. Other measures include improving access to health care and essential medications, building institutional capacity to care for patients with hypertension, promoting lifestyle changes through community engagement, and introducing innovative policies to ensure the financial sustainability of these changes. Development of an equity-oriented, robust, people-responsive health system is critical in addressing this serious public health challenge.

## Noncommunicable diseases, hypertension and the regional context

Worldwide, noncommunicable diseases (NCDs) surpass communicable diseases as causes of death.<sup>1</sup> NCDs such as cardiovascular diseases (CVDs), cancers, chronic respiratory illnesses and diabetes account for more deaths than communicable illnesses such as diarrhoea, HIV, tuberculosis, childhood infections or malaria, and maternal, perinatal or nutritional conditions. Nearly two thirds of the 57 million deaths globally in 2008 were due to NCDs.<sup>2</sup> Furthermore, nearly 80% of these deaths occurred in low- and middle-income countries, imposing a massive challenge to the already struggling health-care systems in these countries. NCDs also negatively impact the socioeconomic status and progress of these countries, as the population most affected is younger than 60 years of age.<sup>2</sup> While poverty influences vulnerability to NCDs, access to care and outcomes of interventions, NCDs have a strong potential to increase individual and family impoverishment due to the need for long-term treatment and high out-of-pocket spending.

Fortunately, many of the risk factors for NCDs are modifiable. Tobacco use, physical inactivity, unhealthy diet and harmful use of alcohol are risk factors that are strongly associated with the development of NCDs. These behavioural risk factors increase the chances of developing

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hypertension, overweight/obesity, hyperglycaemia and hyperlipidaemia. Of these NCD risk factors, the percentage of deaths attributable to hypertension globally is the highest (13%).<sup>2</sup>

## **Hypertension in Nepal: prevalence estimates and temporal trends**

Nepal is a small, low-income country in the South-East Asia Region. Nearly 25% of its population of 26.6 million earns less than US\$ 1.25 per day.<sup>1</sup> It has an extreme topography, with flat lands in the south and mountains in the north, which pose a challenge to development efforts. Though the annual population growth rate of the country is slowing down, the urban population has increased from 13.9% in 2001 to 17% in 2011.<sup>3</sup> Urbanization is, in turn, increasing the risk for NCDs in the country because of the lifestyle changes that it invariably causes. The high rate of affliction of the young is likely to affect the productivity of the nation because the country's population is young, with a median age of 20.1 years.<sup>3</sup>

The prevalence of NCDs is increasing in Nepal. In 2008, nearly 50% of total deaths in Nepal were estimated to be due to NCDs, and CVD accounted for 25% of these deaths. Hypertension, one of the major risk factors for CVD, was estimated to be present in 27.8% of Nepalese adults aged 25 years and above.<sup>4</sup> Because of the lack of reliable national data, these are World Health Organization (WHO) estimates using data from other countries and country-specific characteristics.<sup>4</sup> Limited prevalence studies from Nepal in the past decade indicate a comparable prevalence and agreement with the general trend of increase in CVD and its risk factors over the years.

The largest of these studies, a community-based screening for CVD risk factors in eastern Nepal, showed a hypertension prevalence of 33.9% among adults 20 years of age and above.<sup>5</sup> Other studies, which were heterogeneous in design, showed variable results, with prevalence estimates ranging from 18.8% to 41.8% (Table 1).<sup>5-13</sup>

A study comparing the prevalence of hypertension in the same community in 1981 and 2006 reported a threefold increase in prevalence, confirming the trend of a dramatic increase in CVD risk factors in Nepal.<sup>11</sup> This high prevalence of a major CVD risk factor poses unique challenges to the current health-care system in Nepal.

## **Current health-care system in Nepal**

At the community level, health care is provided by nearly 50 000 female community health volunteers (FCHVs); about 14 000 primary health-care outreach clinics (PHC/ORCs) and 16 000 Expanded Programme on Immunization (EPI) clinics, according to the Ministry of Health and Population, Nepal.<sup>14</sup> In increasing order of hierarchy from the community level are sub-health posts, health posts, primary health-care centres, and district, zonal, regional and central hospitals under the umbrella of the Department of Health Services, Ministry of Health and Population.<sup>14</sup> While the rapidly expanding private hospitals and academic teaching hospitals are increasingly involved in providing clinical care, various national and international nongovernmental organizations are supplementing the government's efforts in providing primary health care-related activities.

More illuminating, however, is the structure of health financing in Nepal. Out-of-pocket expenditure accounted for 55% of the total health expenditure in 2006, with spending by government and external development partners accounting for the rest.<sup>15</sup> The poorest quintile spent 2.4% of their household budget in 2008 on health care, which amounts to US\$ 0.45 per person

per month.<sup>16</sup> It is apparent that managing long-term illnesses would add a massive financial burden on the poor.

**Table 1. Prevalence studies of hypertension<sup>a</sup> within the past decade done in different regions of Nepal**

Investigators	Year <sup>b</sup>	Location (urban or rural)	Sample size (N)	Age (years)	Prevalence (%)
WHO STEPs surveillance <sup>6</sup>	2003	Kathmandu (urban)	2 030	25–64	18.8
Vaidya et al. <sup>7</sup>	2004–2005	Eastern Nepal (urban and rural)	1 000 (males only)	≥35	34.4 <sup>c</sup>
WHO STEPs surveillance <sup>8</sup>	2004–2005	Lalitpur, Tanahun and Kathmandu districts (urban and rural)	3 254	15–64	41.8
Sharma et al. <sup>9</sup>	2005	Kathmandu (urban)	1 114	≥18	19.7
Shrestha et al. <sup>10</sup>	2006	Urban Nepal	1 012	≥40	22.7
Vaidya et al. <sup>11</sup>	2006	Kathmandu (urban)	1 218	≥21	33.8
WHO STEPs surveillance <sup>12</sup>	2007	Rural and urban Nepal	1 016	15–64	31.3 <sup>d</sup>
Chataut et al. <sup>13</sup>	2011	Central Nepal (urban and rural)	527	≥18	22.4
Sharma et al. <sup>5</sup>	2011	Eastern Nepal (urban and rural)	14 425	≥20	33.9

<sup>a</sup> Hypertension defined by systolic blood pressure (SBP) ≥140 mmHg and/or diastolic blood pressure (DBP) ≥90 mmHg

<sup>b</sup> Year of the study (year of publication mentioned instead if the year of the study has not been mentioned in the publication).

<sup>c</sup> The reported prevalence in the published article was 22.7% based on the fact that persons taking antihypertensive medications were excluded. However, on personal communication, the author agrees that the actual prevalence should have been 34.4%.

<sup>d</sup> Also includes persons taking antihypertensive medications

In the existing health-care system of Nepal, the inadequate response to hypertension is apparent if we look at the WHO STEPs surveillance data from 2008.<sup>12</sup> The self-reported hypertension prevalence of 9% is much lower than the measured hypertension prevalence of about 31%, indicating that a large proportion of those with hypertension remain undiagnosed. Even in those who have been diagnosed, compliance with medication and knowledge of behavioural

changes remain low, highlighting the inadequacy of the current health-care system in preventing and controlling hypertension.

The current overarching government policy on health care is the Second Long-Term Health Plan (1997–2017).<sup>15</sup> Its focus is on improving maternal and child health; improving access to health care for rural populations, the poor, underprivileged and marginalized; and prioritizing resources for low-cost, high-impact essential health services. While there were significant gains with the first phase of the implementation plan called the Nepal Health Sector Programme – Implementation Plan I (NHSP-IP 1) carried out from 2004 to 2010, the second phase NHSP-IP 2 (2010–2015) has set out three major objectives: (a) to increase access to and utilization of quality essential services; (b) to reduce cultural and economic barriers to accessing health-care services and harmful cultural practices, in partnership with non-state actors; and (c) to strengthen the health system to achieve universal coverage of essential health services, including NCDs and injuries. It has identified the main response as expansion of the prevention effort through educational campaigns, and the use of regulatory and taxation measures, for example, to discourage smoking.<sup>15</sup>

## Challenges in dealing with hypertension

Like many other developing countries, Nepal's current health policy and targets are focused on the care of acute illnesses, child and maternal health care, and communicable illnesses.<sup>17–19</sup> Despite pervasive political uncertainties created by a decade-long civil war and recent dissolution of the Constituent Assembly, Nepal's economy has been inching up gradually.<sup>20</sup> With improvement in the economy, people's purchasing power, access to food and transportation, and longevity has increased. Concurrently, risk factors that contribute to CVD such as unhealthy eating habits, obesity and physical inactivity have increased, posing a major public health problem. This change in the dynamics of diseases is highlighted by studies done in Nepal.<sup>10, 21–24</sup>

Nepal's current health-care system is not adequately equipped to deal with the challenges brought on by the increased prevalence of hypertension and CVD. These challenges exist at several levels.

First, health-care facilities that are entrusted with dealing with hypertension should be able to accurately measure blood pressure, screen for CVD risk factors (including behavioural and biochemical abnormalities), and detect early potential complications due to hypertension, for example, renal damage. For this, they need to be equipped with basic essential tools such as a reliable sphygmomanometer, necessary laboratory equipment and reagents. Providing adequate quantities of these to cover the entire community is challenging but essential.

Second, the current health workforce at the community level is not competent enough to assess the risk factors or screen for hypertension, and educate the public on the importance of and available measures for reducing the risk of hypertension. Facilities that are capable of assessing and managing risk factors and measuring blood pressure are limited in number and not easily accessible to all the communities in Nepal. Even if capable of performing these duties, unless there is an effective mechanism in place for ensuring rigorous adherence to pre-defined protocols or standard operating procedures, they are less likely to carry out the task consistently.

Third, as the bulk of the cost of health care is out-of-pocket spending, the general population, especially the poor, will have major difficulties in coping with the cost of managing hypertension. The cost entails diagnostic tests for concomitant CVD risk factors and complications, for example, high blood glucose, dyslipidaemia and proteinuria. Medications need to be taken on a long-term

basis and involve substantial expenditure. The issue of expenditure may have contributed to the low use of antihypertensive medications found in the WHO STEPs survey.<sup>12</sup>

We conducted a small survey on the cost of antihypertensive medications in Kathmandu (Table 2). The annual cost of using the cheapest drug amlodipine 5 mg per day is about US\$ 7. This is alarming if we look at the current health-care spending of the population in the poorest quintile, which is about US\$ 5.4 per person per year.<sup>16</sup> A simple, standard treatment and monitoring regimen for uncomplicated hypertension involving medication and laboratory testing is currently beyond their means.

**Table 2. Average cost of antihypertensive medications (at one tablet per day) in Kathmandu in an informal survey**

Medication	Cost per tablet (US\$)	Cost per month (US\$)	Cost per year (US\$)
Enalapril 5 mg	0.04	1.07	12.99
Losartan 25 mg	0.08	2.32	28.29
Losartan 50 mg	0.10	3.00	36.54
Nifedipine 10 mg	0.03	0.82	9.93
Atenolol 50 mg	0.03	0.95	11.52
Amlodipine 2.5 mg	0.02	0.65	7.96
Amlodipine 5 mg	0.02	0.52	6.29
Amlodipine 10 mg	0.03	0.84	10.27
Hydrochlorothiazide 25 mg	0.03	0.98	11.94

In the current context of Nepal, dealing with chronic medical conditions such as hypertension demands a primary health-care system that can comprehensively manage such conditions. Most of Nepal's government health facilities that currently deal with these kinds of problems are overcrowded, and function without the benefits of a system of outpatient primary care. There is no mechanism for longitudinal follow up, and health professionals do not regularly staff the facility so that patients do not have a consistent, reliable relationship with a provider, which is a critical element in creating lasting behavioural change. While there is an overall shortage of the health workforce, uneven distribution and poor retention in rural areas and public institutions have contributed to health workforce deficits.<sup>25</sup> Furthermore, in the absence of well-delineated job descriptions, formal supervision and monitoring processes, and reliable technical backstopping, these health institutions are not able to provide a consistent quality of care. Therefore, only the most motivated patients, who are very concerned about their health and are also aware of the risks of hypertension, are the ones likely to use and benefit from the existing health-care facilities.

## Needs and the way forward

The foremost challenge for Nepal is to develop a health policy for the future in the current environment of political turmoil. While it is struggling to manage communicable diseases and maternal and child health, the changing epidemiological pattern of NCDs demands a different approach than is used for these current health-care priorities.

However, Nepal has strengths to build on. A largely non-physician, widespread community-based primary health-care infrastructure exists. There are already a large number of FCHVs, PHC/ORCs and EPI volunteers in the community. Despite a decade-long conflict ending in 2006, there was a significant decline in the infant mortality rate and maternal mortality ratio.<sup>4</sup> Female

facilitators working with women's groups in the community have proven to be effective<sup>26</sup> and FCHVs are credited with some of these impressive achievements.<sup>15</sup> In the existing set-up in Nepal, training these volunteers to perform basic community-based NCD prevention and control activities appears an attractive option. The way forward for Nepal will require a multifaceted approach.

**1. Training the health workforce to deal with hypertension and NCD risk factors:** given the magnitude of the NCD problem, providing unimpeded access to health-care services at the community level is of critical importance. Existing community-based primary health-care workers can be trained in the prevention and screening of hypertension and other NCD risk factors. The success story of the Iranian rural primary health-care system, where community members with at least a primary level of education were given two years of training and employed for the management of two major NCDs (hypertension and diabetes), offers evidence to support this proposition.<sup>27</sup> This would also require appropriate curricular changes in health workforce training institutions to include the management of hypertension and other common NCDs. In addition, existing health workers should receive refresher training/reinforcement to deal with the changing disease patterns.

All levels of health workers and physicians should be educated on how to create personal and group-level behavioural change. Since behavioural change lies at the heart of preventive efforts for NCDs, development of a health workforce that is capable of carrying out health educational activities at the community level will be very important. Primary health-care workers can feasibly function as educators and counsellors for effectively modifying the behavioural risk factors for NCDs.

**2. Making referral facilities available for evaluating and managing hypertension and NCD risk factors:** the first level of referral for community health workers could be the sub-health posts or health posts, which are currently staffed by mid-level health workers. Feasibility studies should be done to evaluate if these workers could be trained to do basic evaluation and treatment of NCDs. If pilot studies prove the operational efficacy of this approach, the human resources capacity of the current health system to deal with NCDs would be greatly enhanced. The mid-level health-care personnel working at the sub-/health posts would be expected to provide adequate care to patients with uncomplicated hypertension. However, they would require access to the next level of care for patients with complicated hypertension and those with associated serious co-morbidities. A robust communication mechanism between these referral systems, which also includes FCHVs, will help ensure treatment compliance, regular follow up and risk factor modification. Strengthening the district health system, including effective deployment and retention of an adequate number of physicians, is critical for establishing an efficient referral system.

**3. Financing the cost of laboratory testing and medications:** for effective, holistic CVD and NCD risk management, laboratory testing for additional risk factors besides hypertension will be required, for example, diabetes and dyslipidaemia. As discussed above, cost is a prohibitive issue for many patients. A plan to address hypertension and NCDs must address the cost of laboratory assessment and essential medications. Promotion of generic medications through education, government policies, market competition and efficient management to ensure adequate local supplies is likely to improve access to essential medications.<sup>28</sup>

**4. Promoting lifestyle changes through community engagement:** effective community engagement is critical for a successful public education campaign by primary health-care workers, especially FCHVs, regarding the risks of tobacco consumption, excessive alcohol use, obesity, physical inactivity and unhealthy (including high salt) diet. Launching such campaigns in primary and secondary schools to inform/educate young children so that behaviours that could lead to NCDs are modified early on would pay off well. Likewise, working with/through community-based

Mothers'/Women's Group to spread the message and induce desirable changes in behaviours might prove very effective. The media could be leveraged as a tool for public education. Even in rural areas, access to the local FM radio is widespread and can be utilized for health awareness campaigns. There is also an urgent need to create a pool of professionals with different skills sets, who are capable of training the health workforce, conducting research and helping to raise public awareness on modifying NCD-related behavioural risk factors.

**5. Developing local guidelines for hypertension management, laboratory testing and surveillance for complications:** the value of simple, user-friendly guidelines for the diagnosis and management of hypertension cannot be overemphasized. These guidelines should be based on global and local evidence, resource availability, cost-effectiveness and operational feasibility in the context of Nepal.

**6. Endorsing an integrated NCD prevention and control policy:** a draft policy addressing NCDs has been prepared but has not yet been endorsed by the government. This is but one example of how Nepal's political instability affects health planning. The proposed strategy addresses many of the important issues related to health promotion and NCD management. Urgent endorsement and implementation of this policy is very important.

**7. Performing research that informs an effective response:** generating reliable local data related to NCD prevention and control is indispensable for formulating an effective response. Such data could come from epidemiological, health systems/operational, behavioural and clinical studies. Therefore, adequate investment in developing and/or strengthening the capacity of appropriate research institutions is vital.

In conclusion, the increasing prevalence of hypertension and NCDs poses a serious threat to Nepal's health-care system. Appropriate policy changes based on available global and national evidence, and effective implementation of these policies through a robust, equity-oriented and community-responsive health system offers hope in dealing with the challenge of NCDs in Nepal.

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