Regional Health Forum
WHO South-East Asia Region

Special issue on
Blood pressure – take control
REGIONAL HEALTH FORUM

WHO South-East Asia Region

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Blood pressure – take control
## Contents

Hypertension: a silent contributor to the global cardiovascular epidemic  
Shanthi Mendis  

Hypertension in the South-East Asia Region: an overview  
Anand Krishnan, Renu Garg and Athula Kahandaliyanage  

Prevalence of hypertension among the Bangladeshi adult population: a meta-analysis  
Moniruzzaman, Abu Taleb, Shahadur Rahman, Amitava Acharyya, Ferdous Ara Islam, MSA Mansur Ahmed and M Mostafa Zaman  

Burden, determinants and control of hypertension: a Bhutanese perspective  
Tashi Wangdi  

Community health workers can be trained to measure blood pressure: experience from India  
Ritvik Amarchand, Hanspria Sharma and Anand Krishnan  

Empowering the community to fight against hypertension: the Indonesian experience  
Bambang Hartono  

Assessment of cardiovascular risk in Myanmar  
Nwe Nwe  

Dealing with the burden of hypertension in Nepal: current status, challenges and health system issues  
Subarna M Dhital and Arjun Karki  

Empowering communities to reduce the burden of diabetes and cardiovascular disease risk: lessons from the NIROGI Lanka project in Sri Lanka  
Diyanath Samarasinghe, Sarath Amunugama, Carukshi Arambepola, Manoj Fernando and Chandrika Wijeyaratne
Evolution of salt reduction initiatives in Thailand: lessons for other countries in the South-East Asia Region
Chaisri Supornsilaphachai

Promoting populationwide salt reduction in the South-East Asia Region: current status and future directions
Sailesh Mohan, D Prabhakaran and Anand Krishnan

Guidelines for contributors
Hypertension: a silent contributor to the global cardiovascular epidemic

Shanthi Mendis

Abstract

Globally, cardiovascular disease accounts for nearly one third of the total global deaths. Hypertension is responsible for at least 45% of deaths due to heart disease, and 51% of deaths due to stroke. Currently, 80% of deaths due to cardiovascular disease occur in low- and middle-income countries, where the burden of hypertension has increased over the past decade due to population growth, ageing and increase in behavioural risk factors. If appropriate action is not taken, deaths due to cardiovascular disease are projected to rise further. The cost of inaction may be very high. In low- and middle-income countries, many people do not seek treatment for early stage hypertension because it is unaffordable. Households then spend a substantial share of their income on hospitalization and care of complications of hypertension, and may be driven to poverty. The annual loss of approximately US$ 500 billion due to major noncommunicable diseases amounts to approximately 4% of gross domestic product for low- and middle-income countries. Cardiovascular disease accounts for nearly half this cost. On the other hand, there are significant health and economic gains attached to early detection, adequate treatment and good control of hypertension. These approaches can significantly reduce the need for costly interventions such as cardiac bypass surgery and dialysis. The estimated cost of scaling up highly cost-effective interventions that address major noncommunicable diseases in all low- and middle-income countries is less than US$ 1 per head in low-income countries, less than US$ 1.50 per head in lower-middle-income countries and US$ 2.50 in upper-middle-income countries. Although such cost-effective interventions are available, there are major gaps in implementation, particularly in resource-constrained settings. Public health policy must address hypertension because it is a major cause of disease burden. A combination of affordable, sustainable and effective interventions targeted at the whole population through multisectoral actions and partnerships is needed to address the implementation gap. Salt reduction initiatives can also make a major contribution to the prevention and control of high blood pressure by shifting the blood pressure distribution of the whole population to a healthy level. Health systems need to be strengthened to deliver cost-effective integrated programmes, particularly at the primary care level, and use hypertension and diabetes as entry points. The prevention and control of hypertension requires political will on the part of governments and policy-makers. The World Health Organization is coordinating the development of a global action plan for the prevention and control of noncommunicable diseases for the period 2013–2020 and a global monitoring framework. Together, they will provide a road map to operationalize the commitments of the United Nations Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases.

Prevention of heart attack and stroke; hypertension as an entry point

Globally, cardiovascular disease accounts for approximately 17 million deaths a year, nearly one third of the total global deaths.1 Of these, complications of hypertension account for 9.4 million deaths worldwide every year.2 Hypertension is responsible for at least 45% of deaths due to heart disease, and 51% of deaths due to stroke. Recognizing the public health importance of reducing the

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1 Director a.i., Department of Management of Noncommunicable Diseases, World Health Organization, Geneva, Switzerland
global burden of heart disease and stroke, the World Health Organization (WHO) has decided that hypertension will be the focus of the World Health Day on 7 April 2013. The theme will be “Prevention and control of heart attacks and strokes through a focus on hypertension”.

Hypertension and cardiovascular disease disproportionately affect populations in low- and middle-income countries where health systems are weak. Currently, 80% of deaths due to cardiovascular disease occur in low- and middle-income countries, which can least afford the social and economic consequences of ill health.1,2,3 The probability of dying from a noncommunicable disease such as cardiovascular disease between the ages of 30 and 70 years is highest in sub-Saharan Africa, eastern Europe and parts of Asia.

In 2008, worldwide, approximately 40% of adults aged 25 years and above had been diagnosed with hypertension. The number of people with the condition rose from 600 million in 1980 to 1 billion in 2008.2 In high-income countries, the prevalence of hypertension has declined due to strong public health policies and widely available diagnosis and treatment. However, in low- and middle-income countries, the disease burden of hypertension has increased over the past decade.

**Causes and consequences of hypertension**

The increase in the number of people affected by hypertension is attributed to population growth, ageing and the presence of behavioural risk factors such as unhealthy diet, harmful use of alcohol, lack of physical activity, excess weight and exposure to persistent stress. A small percentage of people with hypertension have a secondary cause such as kidney or endocrine disease.

The adverse health consequences of hypertension are compounded because many people affected also have other health risk factors that increase the odds of heart attack, stroke and kidney failure. These risk factors include tobacco use, obesity, high serum cholesterol and diabetes mellitus. Tobacco use worsens the risk of complications among those with hypertension. In 2008, 1 billion people were smokers and the global prevalence of obesity had nearly doubled since 1980. The global prevalence of high cholesterol was 40% and that of diabetes was 10% in adults above 25 years of age.4 Tobacco use, unhealthy diet, harmful use of alcohol and physical inactivity are also the main behavioural risk factors of all major noncommunicable diseases, i.e. cardiovascular disease, diabetes, chronic respiratory disease and cancer.5–9

If appropriate action is not taken, deaths due to cardiovascular disease are projected to rise further. The increasing incidence of noncommunicable diseases including cardiovascular disease will lead to mounting costs of care for patients and their families, unless public health efforts to prevent these conditions are intensified. The Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases, adopted by the United Nations General Assembly in September 2011, acknowledges the rapidly growing burden of noncommunicable diseases and its devastating impact on health, socioeconomic development and poverty alleviation. The Political Declaration commits governments to a series of concrete actions.7

**Cost of inaction**

Premature death, disability, personal and family disruption, loss of income and health-care expenditure due to hypertension take a toll on families, communities and national finances. In low- and middle-income countries, many people do not seek treatment for early stage hypertension because it is prohibitively expensive. Households often then spend a substantial share of their
income on hospitalization and care of complications of hypertension, including heart attack, stroke and kidney failure. Families face catastrophic health expenditure when heart attack, stroke and dialysis require hospital care, entrenching people in poverty. Over the period 2011–2025, the cumulative lost output in low- and middle-income countries associated with noncommunicable diseases is projected to be US$ 7.28 trillion. The annual loss of approximately US$ 500 billion due to major noncommunicable diseases amounts to approximately 4% of gross domestic product for low- and middle-income countries. Cardiovascular disease including hypertension accounts for nearly half the cost.

**Cost of action**

There are significant health and economic gains attached to early detection, adequate treatment and good control of hypertension. These approaches can significantly reduce the need for costly interventions such as cardiac bypass surgery and dialysis, which are currently draining individual and government budgets.

The cumulative cost of scaling up highly cost-effective interventions that address major noncommunicable diseases including cardiovascular disease in all low- and middle-income countries is estimated to be US$ 9.4 billion a year. The estimated individual cost is less than US$ 1 per head in low-income countries, less than US$ 1.50 per head in lower-middle-income countries and US$ 2.50 in upper-middle-income countries. Expressed as a proportion of current health spending, the cost of implementing such a package amounts to 4% in low-income countries, 2% in lower-middle-income countries and less than 1% in upper-middle-income countries.

**Addressing implementation gaps through cost-effective approaches**

Hypertension rarely causes symptoms until the blood pressure levels are very high; this is why many people go undiagnosed. Those who are diagnosed may not have access to treatment and may not be able to successfully control their illness over the long term. Although cost-effective interventions are available for addressing hypertension, there are major gaps in implementation, particularly in resource-constrained settings.

A combination of interventions targeted at the whole population and specifically at high-risk groups is needed to address the implementation gap. Strengthening population-wide approaches to reduce behavioural risk factors, e.g. unhealthy diet, harmful use of alcohol and physical inactivity, can prevent hypertension. Reducing tobacco use would decrease the risk of complications of hypertension. Salt reduction initiatives can also make a major contribution to the prevention and control of high blood pressure.

Vertical programmes focusing on the treatment of hypertension or diabetes alone are not cost effective. Strengthening health systems to deliver cost-effective integrated programmes, particularly at the primary care level, will facilitate treatment of people at high risk for complications in an affordable manner. Such programmes need to use hypertension and diabetes as entry points so that the total cardiovascular risk can be assessed and addressed.

Tools such as the WHO/International Society of Hypertension (ISH) risk prediction charts have been designed to aid cardiovascular risk assessment. Evidence-based guidance is also available on the management of patients with hypertension through integrated programmes, even in resource-constrained settings. WHO tools provide evidence-based guidance on the appropriate use of medicines, so that unnecessary costs related to drug therapy can be avoided and the sustainability
of programmes ensured. Not all patients diagnosed with hypertension require medication, but those at medium-to-high risk will need one or more of eight essential medicines to lower their cardiovascular risk (a thiazide diuretic, an angiotensin-converting enzyme inhibitor, a long-acting calcium-channel blocker, a beta-blocker, metformin, insulin, a statin and aspirin). At least 30 low- and middle-income countries are now using these tools to address hypertension in an affordable and sustainable manner.

**Coherent public health policies, multisectoral and multistakeholder efforts**

The prevention and control of hypertension requires political will on the part of governments and policy-makers. Health workers, the academic research community, civil society, the private sector, and families and individuals all have a role to play. Only concerted effort can harness the technologies and treatment options available to prevent and control hypertension and thereby delay or prevent its life-threatening complications.

Public health policy must address hypertension because it is a major cause of disease burden. Interventions must be affordable, sustainable and effective. As such, vertical programmes that focus solely on hypertension are not recommended. Hypertension should be tackled through a programme that addresses total cardiovascular risk and should be an integral part of the national strategy for prevention and control of noncommunicable diseases.

There are six important components that need attention in planning country initiatives to address hypertension. They include:

- an integrated primary care programme
- the cost of implementing the programme
- availability and affordability of basic diagnostics and medicines
- reduction of risk factors in the population
- workplace-based wellness programmes
- monitoring of progress.

Integrated programmes must be established at the primary care level to address hypertension while advancing the universal health coverage agenda. Drug treatment should be targeted particularly at people who are at medium or high risk of developing heart attack, stroke and kidney damage. For this to happen, patients presenting with hypertension should have a cardiovascular risk assessment, including tests for diabetes mellitus and other risk factors. Hypertension and diabetes are closely linked risk factors, and one cannot be properly managed without attention to the other. The objective of an integrated programme is to reduce total cardiovascular risk to prevent heart attack, stroke, kidney failure and other complications of diabetes and hypertension. Adopting a total cardiovascular risk approach ensures that drug treatment is provided to those at medium and high risk. It also prevents unnecessary drug treatment of people with borderline hypertension and low cardiovascular risk. Unnecessary drug treatment exposes people to unwarranted risks and increases the costs of health care. Both need to be avoided.

A cost-effective programme must also include populationwide approaches to shift the blood pressure distribution of the whole population to a healthy level. Populationwide approaches to reduce high blood pressure are similar to those that address other major noncommunicable diseases. These require public policies to reduce the exposure of the whole population to risk factors.
such as unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol and include school health and workplace-based wellness programmes.8,9

Reducing population salt intake requires multisectoral collaboration between the government, the food industry, nongovernmental organizations (NGOs), health professionals and the public.8,9 A modest reduction in salt intake can be achieved by voluntary reduction or by regulating the salt content of prepackaged foods and condiments. The food industry can make a major contribution to population health if a gradual and sustained decrease is achieved in the amount of salt that is added to prepackaged foods. In addition, sustained mass media campaigns are required to encourage reduction in salt consumption in households and communities.

Skilled and trained health workers at all levels of care are essential for the success of hypertension control programmes. Training of health workers should be institutionalized within medical, nursing and allied health worker curricula. The majority of cases of hypertension can be managed effectively at the primary health-care level. Primary health-care physicians as well as trained non-physician health workers can play a very important role in detecting and managing hypertension.17

Civil society institutions, in particular NGOs, academia and professional associations, have a major part to play in addressing hypertension and in the overall prevention and control of noncommunicable diseases at both country and global levels. At present, WHO, in consultation with Member States and other partners, is coordinating the development of a global action plan for the prevention and control of noncommunicable diseases for the period 2013–20208 and a global monitoring framework. Together, they will provide a road map to operationalize the commitments of the UN Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases7 and to continue the work of the Global strategy for prevention and control of noncommunicable diseases, including hypertension.9

References


Abstract

Raised blood pressure or hypertension is the single most important risk factor for mortality worldwide as well as in the South-East Asia (SEA) Region. In the globally agreed list of indicators and targets for noncommunicable diseases, three are directly relevant to hypertension. These include age-adjusted prevalence of hypertension among adults, salt intake levels, and availability of diagnosis and medicines for hypertension at public and private health facilities. We reviewed the burden of hypertension, status of response to this burden in countries of the Region, and the barriers to effective blood pressure prevention and control. In the South-East Asia Region, approximately 35% of the adult population has hypertension, which accounts for nearly 1.5 million deaths annually; 9.4% of the total deaths are attributable to hypertension. National data from some countries indicate an increasing trend in the prevalence of hypertension. In four of the eight countries where information was available, less than 50% of the subjects were aware that they had hypertension and in four other countries, awareness ranged from 56% to 70%. Among those who were aware that they had hypertension, about half were on treatment, except in the Maldives and Thailand, where higher rates of treatment were reported. However, less than half of those who were on treatment had their blood pressure levels controlled to below 140/90 mmHg. Ten countries in the Region have strengthened their surveillance systems to measure risk factors including hypertension, though more needs to be done to establish a regular, sustainable national-level surveillance system for risk factors. Equipment and drugs for the diagnosis and management of hypertension were widely available in all Member States of the Region. However, in 2010, only eight countries had standard national guidelines for the management of hypertension. Only three countries in the Region have initiated efforts at population-level reduction of salt intake. Lack of an enabling environment for healthier lifestyles, cultural norms that promote unhealthy behaviours, lack of access to health services for early detection and treatment, including counselling, are among the major barriers to prevention and control of hypertension in the Region. Despite these barriers, the potential for health benefits makes continued efforts to prevent hypertension an important public health goal for these countries.

Introduction

Noncommunicable diseases (NCDs) accounted for 63% of global deaths in 2008 (36 million of 57 million), principally from cardiovascular diseases, diabetes, cancer and chronic respiratory diseases. Nearly 80% (28 million) of these deaths occurred in low- and middle-income countries. Addressing this burden is one of the major public health challenges facing all countries, regardless of their economic status. The general strategy to address NCDs using a public health approach is to focus on the risk factors of NCDs.

In terms of attributable deaths, the leading NCD risk factor globally is raised blood pressure (to which 13% of global deaths are attributed), followed by tobacco use (9%), raised blood glucose

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1 Additional Professor, Centre for Community Medicine, All India Institute of Medical Sciences
2 Regional Adviser, Noncommunicable diseases, World Health Organization, South-East Asia Regional Office
3 Director, Sustainable Development and Environment, World Health Organization, South-East Asia Regional Office
(6%), physical inactivity (6%), and overweight and obesity (5%).\textsuperscript{1} Raised blood pressure or hypertension is a major risk factor for coronary heart disease and ischaemic as well as haemorrhagic stroke. Blood pressure levels have been shown to be positively and progressively related to the risk of stroke and coronary heart disease.\textsuperscript{2} In some age groups, the risk of cardiovascular disease doubles with each incremental increase in blood pressure of 20/10 mmHg, starting from as low as 115/75 mmHg.\textsuperscript{3} In addition to coronary heart disease and stroke, the complications of raised blood pressure include heart failure, peripheral vascular disease, renal impairment, retinal haemorrhage and visual impairment. Bringing the systolic and diastolic blood pressure to below 140/90 mmHg with treatment is associated with a reduction in cardiovascular complications.\textsuperscript{4}

As a follow up to the UN High-level meeting in September 2011, the World Health Organization (WHO) initiated a process of consultation to decide on a list of global indicators and voluntary targets for noncommunicable diseases. Based on extensive consultations, 25 indicators and nine targets have been agreed upon, which will be submitted to the Sixty-sixth World Health Assembly for approval in May 2013. Three of these indicators and targets are directly relevant to hypertension (Table 1). These are the age-adjusted prevalence of hypertension among adults, salt intake levels, and availability of diagnosis and medicines for hypertension at public and private health facilities.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age-standardized prevalence of raised blood pressure among persons aged 18+ years (defined as systolic blood pressure ( \geq 140 \text{ mmHg} ) and/or diastolic blood pressure ( \geq 90 \text{ mmHg} ))</td>
<td>25% relative reduction in the prevalence of raised blood pressure or containment of the prevalence of raised blood pressure according to national circumstances</td>
</tr>
<tr>
<td>Availability and affordability of quality, safe and efficacious essential NCD medicines, including generics, and basic technologies in both public and private facilities</td>
<td>80% availability of affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities</td>
</tr>
<tr>
<td>Age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years</td>
<td>30% relative reduction in mean population intake of salt/sodium intake (WHO recommendation is less than 5 g of salt or 2 g of sodium per person per day)</td>
</tr>
</tbody>
</table>

In this paper, we review the burden of hypertension, status of response to this burden and the barriers to effective prevention and control of hypertension in countries of the South-East Asia (SEA) Region.

**Regional burden**

Of the estimated 14.5 million total deaths in 2008 in the SEA Region, 7.9 million (55%) were due to NCDs. Of these 7.9 million deaths, 34% occurred before the age of 60 years, compared to 23% in the rest of the world. Cardiovascular diseases alone accounted for 25% of all deaths (3.6 million), while chronic respiratory diseases, cancers and diabetes accounted for 9.6%, 7.8% and 2.1% of all deaths, respectively. Of the deaths due to cardiovascular disease, ischaemic heart disease and stroke accounted for the majority. One of the risk factors for developing cardiovascular disease is hypertension, which is present in approximately 35% of the adult population in the Region.
and accounts for nearly 1.5 million deaths (9.4%) annually.\textsuperscript{5} What is even more worrying than tackling this huge disease burden is that deaths due to NCDs are expected to increase by 21% over the next decade.

Table 2 shows the WHO age-standardized estimates of the prevalence of hypertension (systolic blood pressure ≥ 140 mmHg OR diastolic blood pressure ≥ 90 mmHg OR on medication) in countries of the SEA Region in 2008. All countries uniformly show a high prevalence of hypertension in their populations and males have, in general, higher blood pressure levels in these countries. The figures shown in Table 2 are estimates and, for countries such as Bangladesh, Democratic People’s Republic of Korea, Maldives, Nepal and Timor-Leste where no national information was available, data from other sources have been used. Myanmar and Indonesia seem to have the highest prevalence of hypertension in the Region.\textsuperscript{5}

Table 2: Estimates of age-standardized prevalence (%) of raised blood pressure\textsuperscript{a} in adults aged 25+ years in countries of the SEA Region, 2008

<table>
<thead>
<tr>
<th>Country</th>
<th>Men</th>
<th>Women</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>39 (28.1–49.8)\textsuperscript{b}</td>
<td>38.1 (26.6–49.7)</td>
<td>38.6 (30.8–46.5)</td>
</tr>
<tr>
<td>Bhutan</td>
<td>40.4 (31.1–49.3)</td>
<td>37.4 (28.7–46.7)</td>
<td>39.1 (32.7–45.5)</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>38.5 (27.0–49.8)</td>
<td>34.3 (22.3–46.2)</td>
<td>36.5 (27.9–44.8)</td>
</tr>
<tr>
<td>India</td>
<td>36 (29.7–41.8)</td>
<td>34.2 (28.6–39.9)</td>
<td>35.2 (30.9–35.2)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>42.7 (35.3–49.9)</td>
<td>39.2 (32.5–46.0)</td>
<td>41.0 (35.9–45.8)</td>
</tr>
<tr>
<td>Maldives</td>
<td>41.5 (30.3–52.7)</td>
<td>35.1 (23.0–47.1)</td>
<td>38.4 (30.1–46.6)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>44.3 (37.7–50.5)</td>
<td>39.8 (33.1–46.5)</td>
<td>42.0 (37.2–46.8)</td>
</tr>
<tr>
<td>Nepal</td>
<td>38.4 (27.0–49.2)</td>
<td>38.7 (26.9–50.4)</td>
<td>38.6 (30.2–46.7)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>41.9 (34.0–38.2)</td>
<td>37.0 (29.4–44.6)</td>
<td>39.4 (33.8–44.6)</td>
</tr>
<tr>
<td>Thailand</td>
<td>37.0 (31.3–42.5)</td>
<td>31.6 (26.0–37.1)</td>
<td>34.2 (30.0–38.1)</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>39.7 (28.9–50.0)</td>
<td>35.2 (23.8–46.9)</td>
<td>37.5 (29.5–45.4)</td>
</tr>
<tr>
<td>SEAR</td>
<td>37.6 (32.6–42.4)</td>
<td>35.4 (30.9–39.8)</td>
<td>36.6 (33.1–39.8)</td>
</tr>
<tr>
<td>Global</td>
<td>40.8 (37.7–43.7)</td>
<td>36.0 (33.3–38.6)</td>
<td>38.4 (36.3–40.5)</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Raised blood pressure defined as SBP ≥ 140 mmHg OR DBP ≥ 90 mmHg OR on medication
\textsuperscript{b} Figures in parentheses are 95% confidence intervals of the estimates
However, since 2008, better information on blood pressure is available from all countries in the Region except Timor-Leste (Table 3). However, these data are for different years, for different age groups and at different levels (national/subnational, rural/urban), precluding any direct comparison between them, though they more closely reflect the status in these countries for the studied populations. These figures confirm the higher mean levels of blood pressure in countries of the SEA Region and support efforts to shift the population distribution of hypertension rather than focus on high-risk individuals. Table 3 also shows that many countries have strengthened their surveillance systems to measure risk factors including hypertension, though more needs to be done to establish regular, sustainable, national-level surveillance systems for risk factors.

### Table 3. Details of the NCD risk factor surveys in Member States that have data on blood pressure levels

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of study</th>
<th>Age group</th>
<th>Sampling frame</th>
<th>Sample size</th>
<th>Mean (95% CI) Systolic blood pressure (mmHg)</th>
<th>Mean (95% CI) Diastolic blood pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>2009-2010</td>
<td>25+</td>
<td>National</td>
<td>M 4312 F 4963</td>
<td>121 (120.7–121.5)</td>
<td>119 (118–119)</td>
</tr>
<tr>
<td>Bhutan</td>
<td>2007</td>
<td>25-74</td>
<td>Thimphu</td>
<td>M 1138 F 1346</td>
<td>127.0 (125.9–128.1)</td>
<td>121.7 (120.7–122.7)</td>
</tr>
<tr>
<td>Democratic People’s Republic of Korea</td>
<td>2008</td>
<td>25-64</td>
<td>7 provinces</td>
<td>M 2818 F 2924</td>
<td>126.1 (125.5–126.8)</td>
<td>122.3 (121.7–123.0)</td>
</tr>
<tr>
<td>India</td>
<td>2007-2008</td>
<td>15-64</td>
<td>7 states*</td>
<td>M variable F variable</td>
<td>(124.4–129.2)</td>
<td>(120.0–124.1)</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2007</td>
<td>18+</td>
<td>National</td>
<td>M NR F NR</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Maldives</td>
<td>2004</td>
<td>25-64</td>
<td>Malé city</td>
<td>M 934 F 1092</td>
<td>128.1 (126.8–129.4)</td>
<td>125.4 (124.2–126.6)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>2009</td>
<td>15-64</td>
<td>National</td>
<td>M 2842 F 4567</td>
<td>130.9 (129.5–132.3)</td>
<td>126.0 (124.5–127.6)</td>
</tr>
<tr>
<td>Nepal</td>
<td>2007</td>
<td>15-64</td>
<td>National</td>
<td>M 1907 F 2421</td>
<td>128.3 (124.6–132.0)</td>
<td>122.8 (118.6–127.0)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2007-2008</td>
<td>15-64</td>
<td>National</td>
<td>M 6140 F 6261</td>
<td>125.4</td>
<td>120.2</td>
</tr>
<tr>
<td>Thailand</td>
<td>2009</td>
<td>15+</td>
<td>National</td>
<td>M 8803 F 9826</td>
<td>123.9</td>
<td>119.9</td>
</tr>
</tbody>
</table>

*Sampling was done to be representative at state level but report did not provide combined estimate. This report therefore, presents the range of results between states.

Note: Except Bhutan and Sri Lanka, which excluded those on treatment for estimation of mean blood pressure, these values are for all respondents.

NR not reported

National data from some countries indicate an increasing trend in the prevalence of hypertension. In India, the prevalence of hypertension increased from 5% in the 1960s to nearly 12% in the 1990s, to more than 30% in 2008. In Indonesia, the percentage of the adult population with hypertension increased from 8% in 1995 to 32% in 2008. In Myanmar, the NCD risk factor surveys by the Ministry of Health reported an increase in hypertension prevalence, from 18% to 31% in men, and from 16% to 29% in women during 2004–2009. This increase in the prevalence of hypertension among adults is being driven by an ageing population and adverse changes in risk factors such as tobacco use, decreased physical activity, and inappropriate diet, especially an increase in salt consumption.
The surveys mentioned above, which were done using the WHO STEPs approach, also had questions on awareness, treatment and control of blood pressure. In four of the eight countries that reported this information, less than 50% of subjects were aware that they had hypertension, and in four other countries, this figure ranged from 56% to 70% (Table 4). Among those who were aware that they had hypertension, about half were on treatment, except in the Maldives and Thailand, where higher rates of treatment were reported. However, less than half of those who were on treatment had blood pressure levels below 140/90 mmHg. These data indicate that the proportion of people with hypertension whose blood pressure is under control is very small, highlighting the need for major efforts at control by health systems of Member States. At present, coverage with drug treatment is poor, and advice on healthy lifestyles is not being given adequately to patients with hypertension. All subjects with hypertension should be mandatorily advised on the need to reduce salt in the diet and increase their physical activity. Yet, only about two third of cases were advised to reduce salt intake and about half were advised to exercise. Thailand performed relatively better on these indicators (Table 5).

**Table 4. Awareness, treatment and control of hypertension in Member States of the SEA Region (both sexes)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Aware of their hypertensive status (%)</th>
<th>On treatment for hypertension among those aware (%)</th>
<th>Blood pressure controlled$^a$ among those on treatment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>69.8</td>
<td>48.4</td>
<td>42.2</td>
</tr>
<tr>
<td>Bhutan</td>
<td>65.8</td>
<td>56.2</td>
<td>NR</td>
</tr>
<tr>
<td>India$^b$</td>
<td>11.4–51.8</td>
<td>46.2–76.8</td>
<td>NR</td>
</tr>
<tr>
<td>Indonesia</td>
<td>24.0</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Maldives</td>
<td>33.3</td>
<td>69</td>
<td>41.4</td>
</tr>
<tr>
<td>Myanmar</td>
<td>67.3</td>
<td>25.6</td>
<td>6.4</td>
</tr>
<tr>
<td>Nepal</td>
<td>29.7</td>
<td>41.2</td>
<td>22.3</td>
</tr>
<tr>
<td>Thailand</td>
<td>56.6</td>
<td>85.8</td>
<td>43.1</td>
</tr>
</tbody>
</table>

$^a$ Defined as blood pressure below 140/90 mmHg

$^b$ Range reported from the seven states of India which were surveyed

NR not reported

**Table 5. Frequency of advice on various lifestyle-related behaviours given to subjects with pre-diagnosed hypertension**

<table>
<thead>
<tr>
<th>Country</th>
<th>Salt reduction/ dietary intake (%)</th>
<th>Exercise (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>67.5</td>
<td>56.6</td>
</tr>
<tr>
<td>Bhutan</td>
<td>73.5</td>
<td>37.7</td>
</tr>
<tr>
<td>India</td>
<td>39.7–71.2</td>
<td>28.2–51.5</td>
</tr>
<tr>
<td>Myanmar</td>
<td>90.3</td>
<td>48.0</td>
</tr>
<tr>
<td>Nepal</td>
<td>77.9</td>
<td>51.6</td>
</tr>
<tr>
<td>Thailand</td>
<td>81.6</td>
<td>74.2</td>
</tr>
</tbody>
</table>
Assessment of the systemic response to hypertension

Population or public health strategies to control hypertension broadly fall into three categories: improving access to diagnosis and treatment of hypertension; conducting activities to encourage and assist individuals in taking health-promoting actions; and implementing strategies for social and environmental change. A small decrease in the population distribution of systolic blood pressure is likely to result in a substantial reduction in the burden of blood pressure-related illness.

Countries need to respond to the problem of hypertension by adopting prevention strategies and strengthening health systems to improve access to good-quality treatment. Equipment and drugs for the diagnosis and management of hypertension were generally available in the primary health-care facilities of all Member States (Box 1). However, in 2010, a WHO survey that assessed the capacity of Member States to prevent and control NCDs found that only eight countries had standard national guidelines for the management of hypertension. As many countries have embarked on NCD-related initiatives in the recent past, the status could have changed since 2010. A similar survey to be done later in 2013 will update these findings. A more recent review showed that only three countries in the Region have initiated efforts at population-level reduction of salt intake (Indonesia, Sri Lanka and Thailand).

Box 1. Results of capacity assessment for prevention and control of hypertension in Member States of the SEA Region (2010)

<table>
<thead>
<tr>
<th>Health system</th>
</tr>
</thead>
<tbody>
<tr>
<td>• National guidelines for management of hypertension were available in eight countries.</td>
</tr>
<tr>
<td>• Equipment at primary health-care (PHC) level for diagnosis of hypertension were available in 11 countries.</td>
</tr>
<tr>
<td>• Availability of drugs in general at PHC level:</td>
</tr>
<tr>
<td>o thiazide diuretics – 10 countries</td>
</tr>
<tr>
<td>o angiotensin-converting enzyme inhibitors – 11 countries</td>
</tr>
<tr>
<td>o calcium-channel blockers – 10 countries</td>
</tr>
<tr>
<td>o beta-blockers – 11 countries.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Policies and programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Population-level salt reduction strategies – three countries (Indonesia, Sri Lanka and Thailand).</td>
</tr>
</tbody>
</table>

Hypertension, along with other NCDs, requires an integrated multisectoral response by governments to create an enabling environment for people to make healthier choices. The measures include encouraging physical activity, and implementing fiscal and regulatory measures to promote healthy eating, and discourage tobacco and alcohol use. A healthy settings approach can also foster healthy lifestyles, in which industries, schools, workplaces and communities implement guidelines for healthy living within their environments. These initiatives have been launched in many countries of the Region, some of which have been shared in this issue of the journal.

Barriers and the way forward

Some of the major barriers to prevention and control of hypertension in the Region include the lack of an enabling environment for healthy lifestyles due to the absence of healthy public policies and cultural norms that promote unhealthy lifestyles. Other barriers are weak health services
characterized by an unregulated private sector, and lack of access to health services for early
detection and treatment including counselling. To overcome these barriers, professional associations
and policy-makers should work with the private sector, foster partnerships and collaboration with
other relevant sectors such as agriculture, urban planning and education, among others. Increased
allocation of resources for NCD prevention and control activities is a must.

Despite these barriers, the potential for health benefits makes continued efforts to prevent
hypertension an important public health goal. Public health leadership that emphasizes population-
based integrated approaches, particularly those that target the risk factors of hypertension, would
ultimately lead to significant improvement in public health – a reduction in the prevalence of
hypertension, improvement in the quality of care provided to individuals with hypertension, a
reduction in health disparities and, ultimately, reduced mortality and morbidity due to heart disease
and stroke.

In conclusion, raised blood pressure or hypertension affects one in three adults in the SEA Region. Although countries are strengthening their health systems to address hypertension, much
more needs to be done, as reflected by the high diagnostic gap, poor coverage with treatment and
resultant poor control. Existing surveillance systems in the Region need to be strengthened to collect
information on globally agreed upon indicators of hypertension, which would enable monitoring of
progress in future. Population-level strategies, including that of salt reduction, are at a very early
stage of introduction and need to be considerably scaled up.

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(2) Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. Seventh report of the joint
national committee on prevention, detection, evaluation, and treatment of high blood pressure.

Clinical and public health advisory from the national high blood pressure education program. JAMA.

(4) Cook NR, Cohen J, Hebert PR, Taylor JO, Hennekens CH. Implications of small reductions in diastolic

March 2013.


(9) National Institute of Medical Statistics, Indian Council of Medical Research. IDSP non-communicable
disease risk factors survey, phase-I: states of India, 2007–08. New Delhi: National Institute of Medical
Statistics and Division of Non-Communicable Diseases, Indian Council of Medical Research, 2009.


Prevalence of hypertension among the Bangladeshi adult population: a meta-analysis

Moniruzzaman1, Abu Taleb1, Shahadur Rahman1, Amitava Acharyya1, Ferdous Ara Islam1, MSA Mansur Ahmed1 and M Mostafa Zaman2

Abstract
Hypertension has become a significant problem in many developing countries undergoing epidemiological transition. A meta-analysis covering studies up to 1994 reported a prevalence of 11.3% in the adult population of Bangladesh. We conducted a meta-analysis to estimate the current prevalence of hypertension among the adult Bangladeshi population. We searched MEDLINE and included studies published in professional journals between 1995 and 2009 on the prevalence of hypertension among the adult Bangladeshi population. We included population-based studies that had a clear definition of hypertension, and were conducted in adults (≥15 years). We located twelve articles, of which six articles were excluded from the current analysis as they were conducted in specific population subgroups. To obtain the prevalence of hypertension, we conducted a meta-analysis of these studies and recalculated their 95% confidence intervals, if required, to obtain a pooled estimate. Five of the six studies were from rural areas and were heterogeneous in terms of age groups studied and definition of hypertension used. The pooled estimate for the prevalence of hypertension in 6430 adults was 13.5% (12.7%–14.3%). Our meta-analysis clearly demonstrates the high burden of hypertension among the adult population of rural Bangladesh and underscores the importance of instituting screening for asymptomatic individuals, especially in primary health-care settings.

Introduction
Hypertension is recognized as a major contributor to the disease burden globally. Hypertension and its complications account for an estimated 9.4 million deaths every year.1 It has become a significant problem in many developing countries undergoing epidemiological transition.2 The higher the blood pressure, the greater the chances of heart attack, heart failure, stroke and kidney disease.3 The World Health Organization (WHO) attributes hypertension, or high blood pressure, to be the leading cause of cardiovascular mortality.

Bangladesh is passing through a phase of epidemiological transition from communicable diseases to noncommunicable disease (NCDs) and currently has a double burden of disease.4 This means that the prevalence of hypertension is modest now but will show a rising trend.

There is a lack of representative data on the prevalence of hypertension in the Bangladeshi population. One meta-analysis conducted by Zaman and Rouf in 1999 on the prevalence of

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1Bangladesh Institute of Health Sciences (BIHS), the sister organization of BIRDEM, 125/1 Darussalam, Mirpur, Dhaka-1216
2World Health Organization (WHO), Bangladesh
hypertension in the Bangladeshi adult population included studies from 1976 to 1994, and estimated the prevalence to be 11.3%. Between 1995 and 2009, some more studies with small sample sizes were conducted, which showed varying prevalence rates. Individually, these studies cannot provide sufficient information about the prevalence in the country due to the non-representativeness of the study populations as well as the small sample sizes. In order to efficiently utilize the information available from these surveys, we decided to conduct another meta-analysis of all previous population-based studies in Bangladesh for a more accurate estimation of the prevalence of hypertension. We present the results of this exercise in this paper.

Methods

For this meta-analysis, we identified articles published from 1995 to 2009 on the prevalence of hypertension among the Bangladeshi adult population by conducting a MEDLINE search. We included those population-based studies that had a clear diagnostic definition of hypertension and were conducted in the age group ≥15 years. We located 12 articles, among which 5 were excluded from the current analysis because they did not fulfill our selection criteria. These were studies done in clinical settings, on diabetic subjects, pregnant women, subjects with arsenicosis, and among the elderly population (>60 years). If there was more than one publication from the same survey, we included only one of the publications and so we did not include the data of one study. We then calculated the prevalence of hypertension in these studies and the 95% confidence intervals (CI) for the individual studies using the data presented. Finally, we added the denominators (total number of subjects studied) and numerators (total number of subjects identified with hypertension) from each study to get the pooled prevalence estimate with its 95% CI. This meant that the weight given to each study was proportional to its sample size.

Results

Table 1 summarizes the studies on the prevalence of hypertension in the Bangladeshi adult population from 1995 to 2009, and the calculated prevalence rates and their 95% confidence intervals. Except for one study, which was done in both urban and rural areas, the remaining five studies were done in rural Bangladesh and thus the results can be used as an estimate only for rural Bangladesh. Five studies included adults ≥18 years of age and the sixth one included persons ≥15 years. The prevalence of hypertension in these studies ranged from 7.8% to 18.6%.

All the studies did not use the definition of hypertension proposed by WHO in 1993, which defines hypertension as systolic and/or diastolic blood pressure (≥140/90 mmHg) with or without a history of taking antihypertensive medication.

Table 1 provides the pooled estimate of the prevalence of hypertension as measured from the studies that met the eligibility criteria for this meta-analysis. From a total of 6430 adults included in these studies, we arrived at an estimate of 13.5% (with 95% CIs ranging from 12.7% to 14.2%).

Discussion

Through this meta-analysis, we attempt to provide information on the prevalence of hypertension in the Bangladeshi adult population. For this purpose, we searched articles published in MEDLINE during the years 1995–2009 on the prevalence of hypertension in Bangladeshi adults.
<table>
<thead>
<tr>
<th>First author</th>
<th>Year of publication (ref)</th>
<th>Place of study</th>
<th>Year of study</th>
<th>Subjects</th>
<th>Sampling procedure</th>
<th>Response rate (%)</th>
<th>Number of readings taken</th>
<th>Criteria for diagnosis of hypertension</th>
<th>Age group (years)</th>
<th>Sample size (N)</th>
<th>Prevalence (%)</th>
<th>Meta-analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sayeed A</td>
<td>1995</td>
<td>Dhaka, Not mentioned</td>
<td>2000</td>
<td>Rural community of Dhaka</td>
<td>Cluster sampling</td>
<td>70</td>
<td>Mean of three readings</td>
<td>SBP ≥ 140 mmHg or DBP ≥ 90 mmHg</td>
<td>≥ 15</td>
<td>1005</td>
<td>13.40</td>
<td>8.6-12.4</td>
</tr>
<tr>
<td>Sayeed MA</td>
<td>1998</td>
<td>Bangladesh, Not mentioned</td>
<td>1999</td>
<td>MHDUM and IG T subjects</td>
<td>Random sampling</td>
<td>Not reported</td>
<td>Not reported</td>
<td>SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg</td>
<td>30-60</td>
<td>673</td>
<td>13.4</td>
<td>Not included</td>
</tr>
<tr>
<td>Rahman M</td>
<td>1999</td>
<td>4 villages: Santo, Tippalkola, Rajapur and Suroshand, Not-mentioned</td>
<td>2001</td>
<td>Rural inhabitants</td>
<td>Multistage cluster sampling</td>
<td>100</td>
<td>Three readings taken</td>
<td>SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg</td>
<td>≥ 30</td>
<td>114</td>
<td>7.80</td>
<td>2.9-12.7</td>
</tr>
<tr>
<td>Zaman MM</td>
<td>2001</td>
<td>Rural area, Savar, Dighi, 1998</td>
<td>2000</td>
<td>Rural population of Bangladesh</td>
<td>Simple random sampling</td>
<td>60</td>
<td>Mean of two readings</td>
<td>SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg</td>
<td>≥ 18</td>
<td>510</td>
<td>12.8</td>
<td>9.9-15.7</td>
</tr>
<tr>
<td>Quoosset I</td>
<td>2001</td>
<td>Mymensingh, municipal and Muktiganda Thana, Mymensingh, 1999-2000</td>
<td>2000</td>
<td>Elderly population</td>
<td>Multistage cluster sampling</td>
<td>Not reported</td>
<td>Mean of two readings</td>
<td>WHO International Society for Hypertension criteria</td>
<td>≥ 60</td>
<td>480</td>
<td>Urban 7.5 and Rural 53</td>
<td>Not included</td>
</tr>
<tr>
<td>Sayeed MA</td>
<td>2002</td>
<td>Rural and urban community, Not mentioned</td>
<td>2000</td>
<td>Rural and urban community</td>
<td>Simple random sampling in rural and urban sampling in village</td>
<td>Rural 83.6 and Urban 77.8</td>
<td>Mean of two readings</td>
<td>Not mentioned</td>
<td>≥ 20</td>
<td>2361</td>
<td>14.4</td>
<td>8.4-20.4</td>
</tr>
<tr>
<td>Zaman MM</td>
<td>2004</td>
<td>Rural community, Matlab, Chhapra, district, Not mentioned</td>
<td>2001</td>
<td>All</td>
<td>One reading</td>
<td>SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg</td>
<td>≥ 20</td>
<td>1271</td>
<td>17.80</td>
<td>Not included</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sayeed MA</td>
<td>2005</td>
<td>Randomly selected 10 villages of Nandail sub-district, Mymensingh, 2001-2002</td>
<td>2002</td>
<td>Pregnant women</td>
<td>Not reported</td>
<td>Not reported</td>
<td>WHO criteria was used</td>
<td>18-44</td>
<td>147</td>
<td>SBP ≥ 140 mmHg</td>
<td>Not included</td>
<td></td>
</tr>
<tr>
<td>Chen Y</td>
<td>2006</td>
<td>Arakashar, 2000-2002</td>
<td>2001</td>
<td>Rural Bangladesh with exposure to arsenic</td>
<td>Not mentioned</td>
<td>97.50</td>
<td>Three readings, the lowest one was taken</td>
<td>SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg</td>
<td>≥ 18</td>
<td>1111</td>
<td>13.30</td>
<td>Not included</td>
</tr>
<tr>
<td>Zaman MM</td>
<td>2007</td>
<td>Ekushe village, Chandpur district, 2001</td>
<td>2001</td>
<td>Rural Bangladesh</td>
<td>Simple random sampling</td>
<td>64</td>
<td>One reading</td>
<td>Blood pressure: SBP ≥ 140/90 mmHg or DBP ≥ 90 mmHg</td>
<td>≥ 20, mean age 40</td>
<td>705, actual age 44</td>
<td>18.65</td>
<td>20.4, 440</td>
</tr>
<tr>
<td>Van Minh PT</td>
<td>2009</td>
<td>Matlab, Minara, Alibaugan and WATCH area, 2003</td>
<td>2003</td>
<td>Rural Bangladesh</td>
<td>Multistage cluster sampling</td>
<td>98</td>
<td>Mean of three readings</td>
<td>WHO criteria were used</td>
<td>25-64</td>
<td>2000</td>
<td>13.40</td>
<td>11.9-14.9</td>
</tr>
</tbody>
</table>

**Table 1.** Articles on hypertension published from 1995 to 2009 identified by MEDLINE search

NIDDM non-insulin dependent diabetes mellitus  
IGT impaired glucose tolerance  
SBP systolic blood pressure  
DBP diastolic blood pressure

Pooled estimate of hypertension 6430 13.5 12.7-14.2
On analysis, we found a prevalence of hypertension of 13.5% in the adult population of Bangladesh, which was higher than the 11.3% prevalence reported by Zaman and Rouf in 1999. The meta-analysis by Zaman and Rouf included studies conducted from 1976 to 1994 and the higher estimate reported in our study could represent a temporal trend. However, the previous meta-analysis included studies conducted in Dhaka only and mostly urban areas, where the prevalence of hypertension has been found to be higher, while our meta-analysis included studies conducted mainly among the rural community, which report a lower prevalence and would, therefore, probably have underestimated the increase in the prevalence of hypertension.

In the NCD risk factor survey conducted in Bangladesh in 2010, the overall prevalence of hypertension was estimated to be 17.9% for the whole country (19.9% in urban and 15.9% in rural areas) among the population aged 25 years and above. This compares well with the estimate derived from our meta-analysis. With the conduct of such large nationally representative surveys, the role and relevance of meta-analyses of this nature would diminish.

This meta-analysis has certain limitations. The studies included were heterogeneous in terms of the age groups studied and classification of hypertension. Interestingly, the maximum number of studies was conducted among rural populations and thus we were unable to generate an estimate for urban Bangladesh. With increasing urbanization, this segment of the population is of great relevance to NCD prevention and control.

Our meta-analysis demonstrated that 13.5% of the adult rural population suffers from hypertension and is at risk for developing cardiovascular and kidney diseases. The study thus underscores the importance of screening asymptomatic individuals. Every adult’s blood pressure should be checked. Primary health-care centres, community clinics and all health-care facilities should implement this strategy for the prevention and control of hypertension.

References


Burden, determinants and control of hypertension: a Bhutanese perspective

Tashi Wangdi

Abstract
In its 60 years of pursuing modern developmental goals, Bhutan has done remarkably well. However, the country now faces a triple burden of diseases – communicable diseases, noncommunicable diseases, and accidents and injuries. Among the risk factors for noncommunicable diseases, hypertension is perhaps the most important cause of an increasing number of strokes, heart attacks and chronic kidney diseases in Bhutanese adults. Unfortunately, the proportion of those with hypertension on treatment is small and the proportion of those with both diabetes and hypertension is large. Another unhealthy sign is the large proportion of overweight adults, which is the main driver of noncommunicable diseases, symbolized by a moderately high prevalence of diabetes mellitus. A diet that is high in carbohydrates, fats and salt, in addition to the unhealthy but socially acceptable custom of alcohol use, are responsible for this alarming trend. Increasing consumerism in society has led to a rise in sedentary lifestyles and further increase in salt and fat intake from imported food items. All this does not bode well for the health of the Bhutanese. Comprehensive policies and strategies at both the population and individual levels are needed to meet the challenge posed by the triple burden of diseases. In resource-poor Bhutan, implementation of the World Health Organization (WHO) “best buys” and effective scaling up of the WHO Package of Essential NCD Interventions to all districts holds promise. A robust combined response from both the government and all of society would be needed to overcome these challenges.

Introduction
The Kingdom of Bhutan and its people are experiencing a “pentad of transitions” – demographic, epidemiological, nutritional, economic and political. The country now faces major health challenges in the form of a triple burden of diseases – communicable diseases, noncommunicable diseases (NCDs), and accidents and injuries. Among the NCDs, the silent killer called hypertension is one of the most dangerous risk factors for developing stroke, heart attack and chronic kidney disease. This article discusses the burden, prevention and control of hypertension in Bhutan.

Burden of hypertension in Bhutan
There is a paucity of accurate data on the prevalence of hypertension in Bhutan. Evidence of the burden of hypertension and its costs and consequences to Bhutanese society comes from indirect and, more recently, direct sources. The indirect sources are hospital data based on inpatient admissions in the tertiary hospital in Thimphu, as well as information on the increasing expenditure over the past few years on antihypertensive drugs, both nationally and at the apex hospital. The first

1 Head of Department, Department of Internal Medicine, JDW National Referral Hospital, Thimphu
direct evidence is based on the 2007 NCD risk factor survey using the World Health Organization (WHO) STEPs approach, which was carried out in urban Thimphu, the capital of Bhutan.

**Bhutan WHO STEPs Survey 2007**: The survey revealed a 26% prevalence of hypertension (defined as a blood pressure [BP] of 140/90 mmHg or current use of BP-lowering medications) among adults (25–74 years). This is not far from the US prevalence rate of 31%. The prevalence in rural areas is not known at present.

**Hospital-based data**: These show rapidly increasing usage and expenditure on antihypertensive drugs, plus an increasing number of referrals for cardiovascular disease (CVD), stroke in particular, from the periphery to the centre. The burden of hypertension is increasing fast in both rural and urban Bhutan. Between 2010 and 2012, in the National Referral Hospital in Thimphu, there was a twofold increase in the number of tablets prescribed and issued of certain popular antihypertensive drugs such as losartan and atenolol, from 1.1 million to 2.2 million, and from 0.18 million to 0.3 million, respectively (Figure 1). In 2011, the nation faced acute shortages of various medicines due to lapses in procurement.

**Figure 1. Increasing trend in the use of antihypertensive drugs (tablets) at the pharmacy of National Referral Hospital, Thimphu**

Hypertension is responsible for a large number of strokes, heart attacks and chronic kidney diseases in Bhutan. The data from the National Referral Hospital clearly show an overwhelming preponderance of strokes compared with acute myocardial infarction. In 2012, the National Referral Hospital admitted 89 patients with stroke as compared with only 12 with acute myocardial infarction. This is typical of the phase of epidemiological transition that Bhutan is undergoing at present. The relatively low number of heart attacks despite all the major risk factors being present in urban Bhutanese society may be due to the relatively low prevalence (6.8%) of smoking in the adult population.

**Coexistence with diabetes**: An alarming finding of the WHO STEPs survey was the 8.2% prevalence of type 2 diabetes in the same urban population. Because of a set of shared risk factors such as body mass, diet and activity level, hypertension and diabetes mellitus commonly coexist. Among those with type 2 diabetes mellitus, 40%–75% also have hypertension. A survey of the first 100 diabetic patients presenting to the Diabetic Clinic of the National Referral Hospital in January
showed that more than 70% of patients had coexisting hypertension and in 60% of them, the BP was not controlled to the target of <130/80 mmHg (unpublished information). The very high prevalence of hypertension among those with diabetes needs further investigation. What is clear is that an increasing prevalence of diabetes would contribute to the already high burden of hypertension in the non-diabetic population. Added to that is the 52% prevalence of overweight and 12% of obesity. Put together, this is a potent recipe for an NCD epidemic unfolding in the near future. This is definitely not good at this juncture, when the ideals of Gross National Happiness and economic self-sufficiency after 2020 are inspiring the Bhutanese people.

Determinants of hypertension in Bhutan

Some health conditions, as well as lifestyle and genetic factors, can put people at a higher risk for developing hypertension. The most important risk factors for developing this modifiable cardiovascular risk factor are described below.

**Excessive salt intake:** Even though exact amounts have not been measured, salt intake is probably high among the Bhutanese and may be a major contributor to the burden of hypertension. The traditional national dishes of Bhutan are red rice, ema datse (chilli pepper and cheese stew) and suja (salted butter tea). Chilli pickles called ezay are frequently served as appetizers and are consumed in large quantities. Generally, large amounts of salt are added to both the curry and the pickle or paste. Due to the proven association of high salt intake with both hypertension and gastric carcinoma, it would be helpful and timely to generate data on the levels and patterns of salt intake at the earliest. However, preventive actions should not be withheld for want of data because of the obvious nature of the problem.

**Overweight:** In addition to the classical rice–ema datse–suja–ezay combination, the Bhutanese diet is rich in meat and poultry, dairy products and grain, and is generally fat-rich and very spicy. In addition, the majority of the population (58.6%) does not fulfil the minimum requirement for health-enhancing physical activity. The number of motor vehicles in Bhutan has risen rapidly in recent years due to a macroeconomic shift in policy of the government towards economic liberalization, privatization and globalization, resulting in a rise of consumerism and easier access to credit. As of June 2012, the number of vehicles stood at 66 430, with Thimphu accounting for 35 490 and Phuentsholing 23 981⁴. The combination of a high carbohydrate intake in the form of thrice-daily rice, salty butter tea and cheese curry, fat-rich meat and poultry dishes, together with an increasingly sedentary lifestyle, especially among urban dwellers, contributes to the high prevalence of overweight in adults. This problem of overweight is likely to be the main driver of the NCD epidemic in Bhutan as well as a major contributor to the burden of hypertension.

**Alcohol use:** Locally brewed alcohol such as chang, a local beer, and arra, a spirit distilled from rice, maize, wheat or barley, have been used by the Bhutanese throughout history. It is used in everyday life as well as an effective potion to appease mountain and valley spirits. The prevalence of daily alcohol consumption is the highest in the eastern districts of Bhutan. However, there is a nationwide increase in the prevalence of alcohol use, which is threatening to become a major public health problem by itself. In urban Bhutan, nearly one third of adults drank alcohol in the past 30 days and one third of them drank on four or more days in the past week. Alcohol is the most important “gateway drug” for the youth in Bhutan, who go on to experiment with other, more dangerous substances. Unlike other countries in the Region, tobacco use is much less in Bhutan due to strong regulatory measures.

**Rural–urban migration:** In Bhutan, the urban migration rate is one of the highest in South Asia, as many people move from rural to urban areas. The report Overcoming barriers: human mobility and development⁵ argues that migration within and across borders brings many benefits. Economic
benefits aside, there is also the possibility of stress due to adjustment problems related to urban migration, which could result in health problems such as hypertension. These issues have not been well studied in Bhutan. The increasing prevalence of obesity and diabetes in India and in other low- and middle-income countries has been attributed to increased consumption of saturated fats, sugars and sedentary behaviour associated with urbanization and Westernization.\textsuperscript{6}

**Status of treatment for hypertension in Bhutan**

Treating hypertension has been associated with about a 40% reduction in the risk of stroke and about a 15% reduction in the risk of myocardial infarction.\textsuperscript{7} Already one in four adults in urban Thimphu (estimated population 100 000) are hypertensive. The proportion of cases on antihypertensive medications is extremely low at 11.6%, which means that only about 3000 cases from an estimated 26 000 are taking antihypertensive medications. Among those taking drugs, the proportion whose BP levels are not controlled is not known. The prevalence of hypertension in rural areas is also not known. Assuming that the prevalence in the remaining 600 000 population of Bhutan is half (13%) that in Thimphu, there would be about 78 000 undiagnosed and untreated cases. The unhappy combination of high prevalence, shockingly low proportion on medications and low-resource setting that exists in Bhutan poses an enormous problem for the health system.

**What can be done to reduce and address the problem of hypertension in Bhutan?**

In view of the dismal scenario of hypertension in Bhutan, a combination of population- and health facility-based strategies to reduce BP must be implemented on a campaign footing. Evidence-based recommendations of the WHO/International Society of Hypertension (ISH), American Heart Association; the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; and the U.S. Preventive Services Task Force should be incorporated in the local strategies to reduce BP.\textsuperscript{8,9} These non-pharmacological recommendations include: (i) achieving and maintaining a healthy body weight; (ii) participating in regular leisure-time physical activity; (iii) adopting of a healthy diet, including reduced salt intake and increased potassium intake; (iv) stopping smoking; and (v) managing stress. A review of clinical trials and longitudinal studies showed that even small reductions in salt intake lower the BP and might prevent the development of hypertension or improve BP control among adults with hypertension.\textsuperscript{10}

Screening for and control of BP is one of the most effective ways to prevent heart disease and stroke. In Bhutan, to ensure cost effectiveness, generic and least expensive formulations should be used. The decision to initiate drug therapy for hypertension should be based on the cardiovascular risk (WHO/ISH risk chart). From a provider’s perspective, there is an urgent need to have a national hypertension guideline, and prescribers at all levels, from the basic health unit (BHU) level upwards, must be trained in its use. The availability of antihypertensives is adequate, according to the national essential drugs list of Bhutan. However, the inclusion of hydrochlorothiazide, methyldopa and hydralazine at the BHU level in the current list needs to be reviewed. The WHO Package of Essential NCD (PEN) Interventions has been successfully pilot-tested and is envisioned to be scaled up to all the districts in 2013. This package contains provision for the inclusion of more classes of antihypertensive drugs at the BHU level. From a health unit and provider point of view, Bhutan must ensure that its equitably distributed units are strengthened with better equipment, trained personnel and drugs. The success or failure of implementing the WHO PEN will determine to a large extent the outcome of hypertension prevention and control in Bhutan.
Progress in controlling hypertension cannot be achieved without improvement in the quality of health care. Countries with good coverage talk about efforts to improve the measurement of successes and shortfalls, such as the Physician Quality Reporting System, which is designed to improve provider performance. They also discuss system improvements, including adoption of electronic health records with registry- and clinical decision-support functions. This would facilitate better patient management and the generation of patient and physician reminders to improve patient–physician interaction and patient follow up. Other promising system improvements are also suggested, such as nurse- or pharmacist-led care, which can improve preventive care delivery and reduce time pressures on physicians.

While taking note of such ideas, Bhutan must not lose sight of initially concentrating on building a strong foundation for the prevention and control of hypertension. In 2009, the National Policy and Strategic Framework for prevention and control of NCDs was launched. This incorporates all of the above, but now needs to be implemented effectively.

A national response to this major health problem has thus been initiated. We have to work diligently on a robust population strategy by roping in multiple stakeholders and building cooperation between them to ensure a high degree of awareness, legislative actions on tobacco, alcohol and import of high salt-processed foods, and persistent diet and exercise campaigns through the mass media. The task is enormous, with major implications for the burden of cardiovascular diseases and their associated costs in Bhutan. Last but not least, it is important to track this epidemic through surveillance. A second STEPs survey in both urban and rural Bhutan in 2013 will provide a firm foundation for this activity.

References


Community health workers can be trained to measure blood pressure: experience from India

Ritvik Amarchand, Hanspria Sharma and Anand Krishnan

Abstract
Hypertension afflicts an estimated one third of the adult population in Member countries of South-East Asia. Its effective control and treatment depends on a proper diagnosis, for which measurement of the blood pressure is a critical factor. However, a large number of those with hypertension go untreated as they are not diagnosed. To bring down the large diagnostic gap, it is imperative that we improve access to blood pressure measurement for the general population. One of the ways to do this is to empower community-based health workers (CHWs) to undertake this task. To test the feasibility and validity of using CHWs to measure blood pressure, we trained 169 CHWs to take blood pressure using digital devices. This training was a part of the noncommunicable disease (NCD) risk scoring that they were to carry out in the 200–250 households allocated to them. The workers were trained at four different urban and rural sites in and around Delhi, and consisted of accredited social health activists, peer educators and lay volunteers residing in these areas. The workers were supervised by a team of experienced supervisors using a standard observation checklist, which included the steps for blood pressure measurement as taught during the training. These supervisors also measured the blood pressure of the subjects themselves, taking care to follow all the steps. Assessment showed that asking the person to rest for 10 minutes before taking the measurement was the least followed step at three of the four sites; other steps were more scrupulously followed in more than 90% of the measurements observed. Comparison of the blood pressure readings between workers and supervisors showed that the workers consistently had a slightly higher reading (mean difference <4 mmHg). However, the correlation coefficient between their readings was consistently high (>0.8). Using 140/90 mmHg and 160/100 mmHg as cut-offs for grade I and grade II hypertension, respectively, the agreement ranged between 79% and 90%, and kappa coefficient was rated as moderate or good. Our results show that CHWs can contribute to NCD prevention and control by successfully undertaking blood pressure measurement as part of their job responsibilities. This skill would help them in fulfilling other routine tasks, such as blood pressure monitoring of antenatal women.

Introduction
Hypertension is the leading cause of mortality in the world. An estimated one third of the adult population in Member countries of South-East Asia suffers from hypertension. Its effective control and treatment depends on a proper diagnosis, for which measurement of the blood pressure (BP) is a critical step. However, data show that there is a big diagnostic gap in these countries. If this gap is to be bridged, it is important that we improve access to BP measurement for the general population.

One of the ways that access to health services has been improved in many areas, such as infectious diseases and reproductive health, is to empower community-based health workers
(CHWs) to undertake some tasks. In the area of noncommunicable diseases (NCDs), the ability of CHWs to undertake these tasks has not been properly evaluated, except perhaps for the diagnosis of cervical cancer by visual inspection by grass-roots workers. BP measurement is one of the tasks that could be considered for inclusion in the job responsibilities of CHWs. In many countries, auxiliary nurse midwives (ANMs) measure the BP as a part of the antenatal care package they provide. Thus, the concept of an allied health professional measuring BP is well established and one could consider delegating this task to CHWs, though their level of competence is lower than that of ANMs.

Previously, proper measurement of BP was considered a highly technical and difficult task, as it involved auscultation with a stethoscope. It also invited resistance from the medical fraternity. However, with improvement in technology and the availability of digital BP devices, it is now possible to consider delegating this job to CHWs. However, before actually recommending this, it is important to implement this strategy and evaluate their performance in a controlled setting. We undertook this exercise as a part of the research to address NCDs in India by strengthening primary health care. The study was funded by the Indian Council of Medical Research.

Methods

The study was conducted at four sites in the National Capital Region of Delhi. The four sites were rural and urban Ballabgarh (by the All India Institute of Medical Sciences), urban Delhi in Nandnagari (by St Stephen’s Hospital) and slums of Sangam Vihar (by the Association for Health Environment and Development). A total of 169 CHWs were trained across these four sites. In rural Ballabgarh and Nandnagari, we worked with accredited social health activists (ASHAs), who are part of the cadres of the National Urban and Rural Health Missions. In the other sites, the trainees were mainly volunteers. In Sangam Vihar, the volunteers were peer educators who had earlier been involved in HIV/AIDS counselling.

Their training on NCDs was comprehensive and included different tasks such as assessment of risk, assessment and interventions at the community level, and referring suspected disease cases and bringing them to the health facility. The workers were trained for two days in batches of about 20 each. BP measurement was part of the risk assessment module and was taught on day one of the training. The workers were first told the steps of BP measurement and why each of the steps was important. Next, measurement of BP was demonstrated to them more than once. Then the workers were paired and asked to take each others’ BP readings twice. Their technique of BP measurement was closely observed and they were corrected by the trainers if they went wrong. On day two of the training, the BP measurement exercise was repeated, this time in groups of four workers. This was done to familiarize them with the element of variability among subjects. Next, some steps of BP measurement were deliberately demonstrated incorrectly and the workers were asked to identify where the trainers were making mistakes.

The project was cleared by the Institute’s Ethics Committee. Once the training was over, they were asked to work in the houses assigned to them (200–250 houses per worker). Supervisors who visited them had considerable experience in risk assessment and measurement, and had earlier been involved in the NCD risk factor surveys. They used a checklist to observe these workers and identified how many of the steps told during the training were being followed by the workers. The results are expressed as mode (most frequently reported observation). The supervisors also measured the BP of the subject themselves, taking care to follow all the steps correctly and compared their measurement with that of trained research workers using a correlation coefficient and the standard definition of grade I hypertension (systolic BP >140 mmHg or diastolic BP >90 mmHg)
mmHg) and grade II hypertension (systolic BP ≥160 mmHg or diastolic BP ≥100 mmHg). We tested for significance of agreement using the kappa coefficient.

**Results**

The background characteristics of the workers are given in Table 1. In rural Ballabgarh, all the CHWs were women, most of them were married and only about a quarter of them were educated till class 12 or more. In the three other areas, about a quarter of CHWs were men and less than 50% were married. In urban Delhi, among the peer educators, youth volunteers/ASHAs, about 40% were educated till class 12 or beyond; this figure was much higher for volunteers in urban Ballabgarh (70%). The annual family income of the CHWs across the four sites was comparable, with only about 25% of workers reporting family incomes beyond INR 125 000 per annum.

**Table 1. Background characteristics of the community health workers**

<table>
<thead>
<tr>
<th></th>
<th>Rural Ballabgarh (N=70)</th>
<th>Urban Ballabgarh (N=40)</th>
<th>Sangam Vihar (N=29)</th>
<th>Nandnagari (N=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>0</td>
<td>25.0</td>
<td>17.2</td>
<td>30.0</td>
</tr>
<tr>
<td>Married</td>
<td>92.9</td>
<td>40.0</td>
<td>48.3</td>
<td>40.0</td>
</tr>
<tr>
<td>Education ≥12th grade</td>
<td>21.4</td>
<td>70.0</td>
<td>37.9</td>
<td>40.0</td>
</tr>
<tr>
<td>Self-income &gt;INR 60 000 / year</td>
<td>1.6</td>
<td>6.8</td>
<td>16.0</td>
<td>18.1</td>
</tr>
<tr>
<td>Family income &gt;INR 125 000 / year</td>
<td>22.9</td>
<td>24.9</td>
<td>20.0</td>
<td>27.3</td>
</tr>
</tbody>
</table>

*All values are percentages.*

The workers were assessed on how closely they followed the five steps to measure the BP. Asking the person to rest for 10 minutes before taking the measurement was the least followed step at three of the four sites (except Nandnagari, where it was placing the hand on a table). Other steps were more scrupulously followed in more than 90% of the measurements observed (Table 2).  

**Table 2. Compliance of community health workers with the steps involved in measurement of blood pressure**

<table>
<thead>
<tr>
<th>Steps in the measurement of blood pressure</th>
<th>Rural Ballabgarh (N=316)</th>
<th>Urban Ballabgarh (N=94)</th>
<th>Sangam Vihar (N=86)</th>
<th>Nandnagari (N=122)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant asked to sit quietly and rest for 10 min</td>
<td>54.7%</td>
<td>63.8%</td>
<td>50%</td>
<td>86.1%</td>
</tr>
<tr>
<td>Right arm of the participant placed on arm of chair/flat surface (to support it)</td>
<td>87.0%</td>
<td>96.8%</td>
<td>89.5%</td>
<td>64.7%</td>
</tr>
<tr>
<td>Clothing on arm removed/rolled up</td>
<td>98.4%</td>
<td>98.9%</td>
<td>93.0%</td>
<td>89.3%</td>
</tr>
<tr>
<td>Cuff positioned 2–3 fingers above elbow</td>
<td>98.7%</td>
<td>95.7%</td>
<td>98.8%</td>
<td>92.6%</td>
</tr>
<tr>
<td>Level of cuff same as that of heart</td>
<td>96.8%</td>
<td>93.6%</td>
<td>94.1%</td>
<td>94.2%</td>
</tr>
<tr>
<td>Overall number of correct steps followed out of five (mode)</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 3 depicts the mean systolic and diastolic values obtained by the CHWs and the supervisors observing them. The workers consistently recorded a slightly higher reading than that of the supervisors. However, on average, the difference was less than 4 mmHg. The correlation between readings was consistently high (Pearson correlation coefficient >0.8). In risk assessments, BP values are taken as high or low based on cut-offs. Using 140/90 mmHg and 160/100 mmHg as cut-offs (for hypertension grades I and II), the agreement ranged between 79% and 90%, and the kappa coefficient was rated as moderate or good.

**Discussion**

Our study shows that CHWs can be trained to measure BP at participants’ homes using digital devices. Their measurements were not too different from those recorded by trained research staff.

Our results are in agreement with those of previous studies. A study by Adams et al. among unpaid volunteers in a population-based survey showed that those who do not necessarily have a health professional background are able to take the BP and anthropometric measurements accurately and reliably in a population health survey, provided they receive adequate training and support. Reidpath et al. conducted a validation study on BP measurement by CHWs using digital BP measurement devices, as in our study. BP readings by non-health workers were more reliable than those taken by qualified health workers. There was no significant difference between the readings taken by qualified health workers and those taken by non-health workers for systolic BP. Measurements by non-health workers were, on average, 5–7 mmHg lower than those of qualified health workers.

<table>
<thead>
<tr>
<th>Classification of blood pressure status*</th>
<th>Overall agreement (kappa)</th>
<th>Rural Ballabgarh (N=316)</th>
<th>Urban Ballabgarh (N=94)</th>
<th>Sangam Vihar (N=86)</th>
<th>Nandnagari (N=122)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean systolic blood pressure (in mmHg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As measured by CHW</td>
<td>129.39±14.44</td>
<td>131.83±18.29</td>
<td>127.89±22.26</td>
<td>125.81±12.62</td>
<td></td>
</tr>
<tr>
<td>As measured by supervisor</td>
<td>126.04±13.90</td>
<td>130.51±20.18</td>
<td>124.52±23.33</td>
<td>124.83±11.41</td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td>−3.35±4.71</td>
<td>−1.32±11.38</td>
<td>−3.37±11.63</td>
<td>−0.97±3.26</td>
<td></td>
</tr>
<tr>
<td>Pearson correlation</td>
<td>0.945</td>
<td>0.831</td>
<td>0.871</td>
<td>0.969</td>
<td></td>
</tr>
<tr>
<td>Mean diastolic blood pressure (in mmHg)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As measured by CHW</td>
<td>81.09±8.04</td>
<td>81.14±12.03</td>
<td>78.54±12.93</td>
<td>74.93±9.58</td>
<td></td>
</tr>
<tr>
<td>As measured by supervisor</td>
<td>79.25±8.74</td>
<td>80.13±12.02</td>
<td>77.83±13.06</td>
<td>77.84±13.06</td>
<td></td>
</tr>
<tr>
<td>Mean difference</td>
<td>−1.84±3.94</td>
<td>−1.00±6.41</td>
<td>−0.70±6.46</td>
<td>−0.89±5.65</td>
<td></td>
</tr>
<tr>
<td>Pearson correlation</td>
<td>0.899</td>
<td>0.857</td>
<td>0.877</td>
<td>0.810</td>
<td></td>
</tr>
</tbody>
</table>

* Grade I hypertension (systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg) and grade II hypertension (systolic blood pressure ≥160 mmHg or diastolic blood pressure ≥100 mmHg).

In another study, which used a sphygmomanometer and stethoscope for measurement of BP, 172 health-care workers were divided into four groups (63 general practitioners, 25 clinical and 25 surgical specialists, and 59 nurses) and evaluated in a two-part test. In the first part (practical), the
examinee had to follow all the steps recommended by the American Heart Association to get a passing score. In the second part (theoretical, which came next to avoid influencing the practical), the examinee had to answer correctly 7 of 10 questions based on the American Heart Association’s guidelines to obtain a passing score. The highest accepted variation in systolic and diastolic pressures between examinee and observer was ±4 mmHg. None of the examinees followed the American Heart Association’s recommendations. Sixty-three per cent of systolic and 53% of diastolic readings were out of range. All of the groups were notably inaccurate in the practical test. Only 3% of the general practitioners and 2% of the nurses obtained reliable results. The clinical specialists obtained the best results in the theoretical test compared with the other groups with 60% correct answers, while the nurses had the lowest results, with only 10% correct answers.7

A study from Spain found that, of 25 lay persons trained as observers, 14 were comparable to professionals in terms of both the estimated validity of the BP measurement and estimated interobserver variability (100% of the observers complied with the criteria recommended for professional health-care workers), even though the training given to the former was in no way more comprehensive than or distinct from that recommended for professional health-care workers in community studies.8

The strengths of our study were the large number of volunteers, the diverse background of the CHWs and the large number of times they were observed by the supervisors. The weakness was the use of trained and experienced research workers as a gold standard. However, as seen by other studies, doctors are not necessarily the best gold standards. The fact that the supervisors measured the BP after the workers could have resulted in their obtaining lower BP values, as the second reading is often lower than the first. It must be noted that a single measurement of high BP by these workers is not sufficient for initiation of treatment, and serves only as a screening tool. Such patients are referred to a primary health-care clinic for further management by qualified doctors. These workers can be subsequently used to follow up these patients for monitoring their compliance with treatment as well as their BP levels.

Before this exercise is recommended as a standard practice, other non-technical issues need to be addressed. This would include the total workload of CHWs, incentives and other similar issues. The feedback from the CHWs was that they felt more appreciated by the community by providing this service, which was a felt need of the community. In addition, if this practice is introduced, it will result in a large number of new patients being identified for lifelong treatment. Therefore, CHWs can be recommended for undertaking this responsibility only after health systems are strengthened to be able to take on the load of these patients, both clinically and in terms of drug availability.

Given the large diagnostic gap that exists for hypertension in developing countries and the fatal consequences of untreated hypertension, it is imperative that countries strengthen their primary health-care systems to address this issue. While opportunistic screening should be initiated at the earliest among patients attending health facilities, outreach services would also be required to ensure high coverage. With the availability of digital devices, measuring the BP has become more feasible. Our results call for inclusion of BP measurement as one of the job responsibilities of CHWs for NCD prevention and control. In addition, other strategies to prevent hypertension such as population-level salt reduction must be urgently considered.

References


Empowering the community to fight against hypertension: the Indonesian experience

Bambang Hartono

Abstract

Untreated hypertension can cause fatal complications such as heart disease, kidney problems and stroke. However, many people do not realize that they have the disease because most of them have no symptoms. People can develop fatal heart disease and die suddenly, without knowing that they had high blood pressure. Therefore, hypertension is also known as the “silent killer”. While preventing and controlling hypertension requires a comprehensive set of actions, this paper presents experiences from Indonesia in a settings-based approach to health promotion (empowerment) in three important settings – households, schools and workplaces.

At the household level, village cadres encourage family members to join physical activity groups which are regularly organized by the Posyandu (Integrated Health Service Post). Housewives and maids are provided information on cooking low-fat and low-salt meals, and the importance of consuming adequate fruits and vegetables daily. Some Posyandu also regularly identify persons with high blood pressure by doing door-to-door blood pressure measurements. Those who are identified as having high blood pressure are referred to the health centre for follow-up. In schools, volunteer students called “little doctors” supervise the school canteens and sweet sellers, provide information to other students on the hazards to their health of consuming too much fat, sugar and salt. Teachers integrate messages on the prevention and control of hypertension into their teaching materials. In workplaces, the Safety and Health Management Team of the workplace encourages workers to do light exercise between work. Doctors or other health professionals of the workplace-owned clinic or nearest health centre are appointed to regularly measure the blood pressure of the workers. A counselling service for those who want to stop smoking or improve their diet is also being provided for in some workplaces, besides regular supervision of canteens and food sellers.

Introduction

Many people do not realize that hypertension can be fatal. In fact, many people do not even know that they have hypertension, because they do not have any symptoms – no pain, dizziness or vomiting. This situation may continue for a long time, even years, until it may be too late, and their vital organs (heart, kidney, brain, among others) start malfunctioning. These organs cannot function properly because, for years, the supply of oxygen and nutrients to them has been compromised. Studies show that the higher the blood pressure, the higher the risk of the patient having cardiovascular disease, kidney failure and stroke.¹

Increased blood pressure for a prolonged period of time hampers the functioning of the endothelium, which is the thin layer of cells that lines the inner surface of blood vessels, forming an interface between circulating blood in the lumen and the rest of the vessel wall. Endothelial

¹ Indonesian Society of Hypertension
Dysfunction is a hallmark of vascular diseases, and is often regarded as a key early event in the development of atherosclerosis, a condition in which the arterial wall thickens as a result of the accumulation of fatty materials such as cholesterol. Impaired endothelial function leads to the accumulation of plaques within the walls of the coronary arteries, the vessels that supply blood to the heart. The deposition of plaque in the lumen of an artery causes it to narrow. This, in turn, obstructs the supply of oxygen and nutrients to the muscle of the heart. The disease that results is the most common cause of sudden death. That is why hypertension is known as a “silent killer”.2

According to the report of basic health research in Indonesia, the prevalence of hypertension is 31.7%.3

Know about blood pressure

- Blood pressure is reported using two numbers. The systolic pressure is the higher number, and denotes the maximum pressure in the artery when the heart is beating and pumping blood through the body. The diastolic pressure denotes the lowest pressure in the artery when the heart is resting between beats.
- The pressures are indicated by the height of the mercury column in the blood pressure gauge (sphygmomanometer). Therefore, standard blood pressure readings are written as the height of the mercury column in millimeters, abbreviated as “mmHg”.
- According to WHO definition, a person is considered to have raised blood pressure (hypertension) when the systolic reading is either 140 mmHg or higher or the diastolic is 90 mmHg or higher.4

Why is it increasing?

Epidemiological evidence shows that several factors play an important role in the development, evolution and prognosis of hypertension. Some of these are non-modifiable, such as age, sex, ethnicity and heredity, while others are modifiable, such as body weight, fat and salt intake, tobacco use and insufficient physical activity. It is important to focus on the modifiable factors, as it is within our ability to control these. Besides, evidence shows that these factors are increasing.

- The worldwide prevalence of obesity or overweight has more than doubled between 1980 and 2008. In 1980, only 5% of men and 8% of women in the world were obese, while in 2008, 10% of men and 14% of women were obese. This means that in 2008, more than half a billion adults worldwide were obese.4
- In the absence of comparable data on individual dietary intake around the world, WHO indicates that there are large variations across WHO regions in the amount of total fats available for human consumption. The highest quantity available is in the European Region, while the lowest is in the South-East Asia Region. The availability of total fat correlates with income level, while the availability of saturated fats clusters at around 8% in low- and lower-middle-income countries, and around 10% in upper-middle- and high-income countries.
- The amount of salt intake is an important determinant of blood pressure level. For the prevention of cardiovascular disease, WHO recommends a salt intake of less than 5 g per person per day. However, current global levels of dietary salt intake are 9–12 g per person per day.4
According to WHO, nearly 80% of the world’s one billion smokers live in low- and middle-income countries. Consumption of tobacco products is increasing globally, though it is decreasing in some high-income and upper-middle-income countries. Globally, around 31% of adults aged 15 years and above were not sufficiently active in 2008 (men 28% and women 34%). Approximately 3.2 million deaths each year are attributable to insufficient physical activity.

As these risk factors are related to lifestyles determined by the sociocultural milieu at the community level, any attempt to modify them requires action at the community level.

Community empowerment

One of the five elements of primary health care is to increase the participation of stakeholders in health, especially the community. Evidence shows that this can be done effectively by empowering the community. Empowering the community means providing suitable and adequate information to the community to modify their attitudes, guide them to act, and facilitate behaviour change through health promotion. Empowerment enables the community to solve their health problems independently, using their own resources and capacity. Thus, investing in empowerment results in sustainable community participation in health development. The activities to be implemented by the community for the prevention and control of hypertension include: (1) identifying subjects with hypertension by measuring blood pressure; (2) controlling hypertension by managing the risk factors and treating the disease; and (3) preventing the development of hypertension by promoting healthy lifestyles.

In Indonesia, the prevention and control of hypertension is done through the implementation of the Clean and Healthy Life Behaviour Movement (Gerakan Perilaku Hidup Bersih dan Sehat), which follows a settings-based approach to health promotion. The movement was started by the Ministry of Health in 1996, and was re-emphasized in 2011 by the enactment of the Health Ministerial Regulation No. 2269/2011 on Guideline for the development of clean and healthy life behaviour (Pedoman Pembinaan Perilaku Hidup Bersih dan Sehat).

Taking a settings-based approach to health promotion means addressing the contexts within which people live, work and play, and making these the object of inquiry and intervention, as well as identifying the needs and capacities of people found in different settings. This approach increases the likelihood of success because it offers opportunities to position practice in the relevant context. People in the settings can optimize interventions for specific contextual contingencies, target crucial factors that influence behaviour in the organizational context, and render the settings themselves more health promoting.

According to the Guideline for the development of clean and healthy life behaviour, there are five settings in which clean and healthy life behaviour should be implemented: (1) households; (2) schools; (3) workplaces; (4) public places; and (5) health services. This paper focuses on community empowerment for the prevention and control of hypertension in three important settings that are often neglected, i.e. households, schools and workplaces, based on experiences gathered from some areas in Indonesia.
Households

In Indonesia, almost all villages have community-based primary health services, especially the one called Pos Pelayanan Terpadu or Posyandu (Integrated Health Service Post). The Posyandu, supported by the nearest health centre, provides basic health services such as maternal and child health, family planning, immunization, nutrition and health promotion. The services are provided by village cadres who are mostly local women, members of the Pembinaan Kesejahteraan Keluarga or PKK (Family Welfare Movement).6

With regard to hypertension, village cadres encourage family members to join physical activity groups, which are regularly organized by the Posyandu. The sessions are conducted every morning, one hour before the family members start their daily activities (go to work or school) in a village square or any open area. On working days, participation in the sessions may be minimal, but increases considerably during the weekends. Very often, the weekend sessions are followed by family bike rides along the village roads. While these activities increase physical activity among those who participate, they also serve as a reminder to those who do not join in.

The second effort that village cadres make to prevent and control hypertension is provide information to housewives and maids on how to prepare low-fat and low-salt meals, and how important it is to consume adequate amounts of fruits and vegetables every day. As men are not at home during the day, the village cadres can provide information only to housewives on the hazards of smoking and the effect of tobacco smoke on non-smokers (passive smoke). Stickers on the walls of their houses. These efforts create a “social pressure” on smokers to stop smoking. Due to the difficulty in finding counsellors, only a few Posyandu provide tobacco cessation counselling services. Some Posyandu also regularly identify persons with high blood pressure by doing door-to-door blood pressure measurements. Those who are identified as having high blood pressure are referred to the health centre for follow-up.

These empowerment activities are conducted by village cadres through counselling and discussions during Posyandu and home visits, and by inserting some messages in the speeches and/or discussions in village gatherings, youth meetings, Family Welfare Movement meetings, religious teachings, etc. Village cadres also actively advocate with village leaders (formal and informal) to support the prevention and control of hypertension by providing the Posyandu with necessary facilities such as blood pressure monitors, restricting people from smoking in public places and, most importantly, being role models by practising healthy behaviour.

Community empowerment at the village level is being strengthened with the introduction of the Posbindu PTM (Integrated NCD Post) by the Ministry of Health. To start a more specific empowerment programme to prevent and control hypertension, a memorandum of understanding has been signed between the Indonesian Society of Hypertension and the Ministry of Health. The Post will provide services for early detection and monitoring of the risk factors for major noncommunicable diseases (NCDs) such as diabetes, cancer, cardiovascular diseases, chronic obstructive pulmonary disease), health counselling and referral of patients to the nearest health centre.9

Schools

In Indonesia, the school health programme has been in place for a long time, and almost every school has a School Health Team consisting of some teachers and representatives of students.
Almost all schools have school health cadres called dokter kecil (little doctors), i.e. some students who do voluntary work for the school health programme. Under the guidance of the nearest health centre, the School Health Team and the little doctors conduct activities to maintain the health of all schoolchildren as well as a healthy school environment. They also conduct health promotion activities to create and maintain healthy behaviour among the children.*

The most important activity to prevent and control hypertension is to supervise the school canteen and/or sweets sellers so that they do not sell food and drinks that contain excessive fat, sugar and salt. Information to students on the hazards to their health of consuming too much fat, sugar and salt is provided by putting up posters, displaying banners and/or conducting extra-curricular discussions.

The school principals are encouraged to declare their schools as “tobacco-free schools”. The School Health Teams and the little doctors ensure that the regulations established by the school principals are complied with. Teachers integrate messages on the prevention and control of hypertension into their teaching materials. Sports teachers are strategically placed to prevent and control hypertension. They help students practise sports by bringing them to the school playground and guiding them to play badminton, table tennis, basketball, volleyball, soccer and other games.

The success of school-based programmes depends on the role played by the School Health Teams, including school managements, by providing supportive policies and facilities such as a canteen that provides healthy food, sports facilities, among others. Teachers are role models for their students by adapting healthy behaviours such as eating healthy food and avoiding smoking, and students emulate these behaviours.

**Workplaces**

Healthy workplaces in Indonesia are developed through the Sistem Manajemen Keselamatan dan Kesehatan Kerja or SMK3 (Safety and Health Management System).* Empowerment of workers in every workplace is the responsibility of the Safety and Health Management Team of the respective workplace. This team consists of representatives from both the management and the workers’ union.

In workplaces that do not require much physical activity such as offices, the most important thing is to encourage workers to do light exercises between work. For instance, after working for every two hours, workers do light exercises for about five to ten minutes before starting work again. With this routine, the workers not only refresh their minds but also have a chance to do physical activities for at least half an hour every day.

At some workplaces, doctors or other health professionals of the workplace-owned clinic or nearest health centre are appointed to regularly measure the blood pressure of the workers. Those who are identified as having hypertension are referred to the clinic or health centre for follow up. By doing this, the management can prevent losses in productivity due to workers’ sickness or death, while encouraging them to be aware of their blood pressure.

As in schools, the Safety and Health Management Team can advocate with the management or owner to provide sports facilities. After working hours, workers can play badminton, table tennis, basketball, volleyball, soccer, etc. Wherever possible, the Team also encourages and organizes a bike-to-work programme. Smoking is prohibited in almost all workplaces in Indonesia. However, many workers have problems with quitting smoking. Therefore, counselling services for those who want to stop smoking are provided in some workplaces, by hiring outside experts on a contractual basis. Due to the difficulty in finding counsellors, only a few workplaces can provide this service.
The Safety and Health Management Team ensures that the drinks and food provided or sold in the canteen or by food sellers are low in fat, sugar and salt. Workers are also adequately informed about the effects of consuming too much fat, sugar and salt on hypertension and its complications, so that they can understand the need for regulating the canteen and/or food sellers. This is done through distributing leaflets, displaying posters and banners, and/or conducting special talks and discussions, including some by invited experts. For successful prevention and control of hypertension in the workplace, the Safety and Health Management Teams should work hard to advocate with managements, owners and other decision-makers to support their efforts by providing policies and needed facilities.

Monitoring and Evaluation

To ensure the sustainability of these activities, a monitoring and evaluation system should be in place. In Indonesia, data recording at the village level is done by the Posbindu using an “NCD Health Card” (Kartu Menuju Sehat PTM) and “Posbindu Activities Record Book” (Buku Pencatatan Kegiatan Posbindu). The NCD Health Card is an individual patient card to record the condition of a patient’s risk factors for NCDs such as blood pressure, blood glucose, body mass index, etc. It is kept by the patient and must be brought when he/she visits the Posbindu. It is a good tool for patients to monitor their own risk status and for cadres to give advice on how to maintain their health. The Posbindu Activities Record Book is used by cadres to map the health of the community and trace specific cases for follow up, because this book contains the details of every patient such as name, age, address, education, etc. The book is also used to plan activities of the Posbindu. Similar monitoring tools and strategies need to be developed for schools and workplaces. This information should be compiled and reported on a regular basis to the higher levels for effective monitoring of activities. Evaluation helps to assess the outcome of the activities which, in this case, are changes in the behaviour of the community in all settings and a decrease in the prevalence of hypertension. In Indonesia, evaluation is integrated into the Basic Health Survey conducted every three years by the Ministry of Health, in collaboration with all provincial and district health offices.

Conclusion

Hypertension is a dangerous disease that is often neglected, as it has no symptoms. The risk factors include tobacco use, unhealthy diet and lack of physical activity. It is important to empower the community to fight against this “silent killer”. As people live in different settings, taking a setting-based approach to health promotion is recommended for successful empowerment of the community.

In Indonesia, initiatives to empower the community to fight against hypertension are integrated into the Clean and Healthy Life Behaviour Movement. The introduction of Posbindu PTM (Integrated NCD Post) by the Ministry of Health can become a good starting point. Similarly, a health promotional framework exists in workplaces and schools, which can be used to strengthen anti-hypertension activities. The success of such programmes depends largely on the support provided by the school or workplace management. Monitoring can be done through a system of creating and maintaining records and reporting formats, while evaluation can be done by conducting national surveys that are integrated into the existing national surveillance system.
References


Assessment of cardiovascular risk in Myanmar

Nwe Nwe

Abstract

In the past few decades, noncommunicable diseases (NCDs) have emerged as a major public health problem in Myanmar, due to demographic, epidemiological and socioeconomic transition. As part of the plan to develop a community-based intervention through basic health-care professionals, a study was conducted to assess the baseline 10-year risk for fatal and non-fatal cardiovascular disease events using the World Health Organization/International Society of Hypertension (WHO/ISH) risk prediction charts. The study was conducted in four different townships encompassing a total of 611 persons: 152 from Tharkayta township (Delta region, lower Myanmar), Yangon; 160 from Leeway township (Central Myanmar), Nay Pyi Taw; 145 from Mahar Aung Myay (Upper Myanmar), Mandalay; and 154 from Singu (hilly region), Pyin Oo Lwin. The survey found that 18.8% were current smokers, 45.8% were obese, 38.6% had high cholesterol levels, 24.9% had high triglyceride levels and 10.3% had diabetes. Over half of the respondents (57%) were hypertensive. While metabolic abnormalities (obesity, cholesterol and sugar levels) were higher among women, the prevalence of smoking and hypertension was higher among men. Overall, the prevalence of these risk factors was high. From the data collected, 10-year cardiovascular risk was calculated using the WHO/ISH risk prediction charts. About half of the population was at low risk. Moderate (10% to <20%) risk was found in 20.6%, high risk (20% to <30%) in 11.5% and very high risk (30% to <40%) in 9.5% of the study population. Despite differences in the individual risk factors, the risk profile of the men and women was similar. Pilot implementation of the WHO Package of Essential NCD interventions was started in two townships in 2012. Many initiatives have taken place in Myanmar in the recent past, but they need to be expanded and scaled up to have an impact at the national level.

Introduction

The prevalence of hypertension is rising in the South-East Asia Region, including Myanmar. It is a leading risk factor for mortality, and claims nearly 1.5 million lives each year in the Region.1 High blood pressure can affect anyone, regardless of age, sex, race, ethnicity and financial status.

In the past few decades, noncommunicable diseases (NCDs) have emerged as a major public health problem in Myanmar due to demographic, epidemiological and socioeconomic transition. One of the major challenges to the prevention and control of NCDs is the paucity of information on the risk factors for NCDs. In Myanmar, the rising trend in morbidity and mortality due to NCDs can be estimated from the Health Management Information System (HMIS). However, information on the prevalence of risk factors leading to these diseases including that of hypertension is very limited and cannot be extracted from the HMIS.

The National Health Plan (2011–2016) of Myanmar accords high priority to the prevention and control of NCDs. The Ministry of Health is promoting collaborative and multisectoral actions that involve integrated epidemiological surveillance and comprehensive environmental, policy and programme interventions for major risk factors. Equitable and cost-effective management of major

1 Programme Manager, Cardiovascular Disease Project, Myanmar
NCDs, coupled with optimal utilization of the existing capacity of health systems, need to be promoted. A Cardiovascular Disease Project was established in Myanmar in 1981, which runs hypertension clinics in 43 townships in Yangon division. The project is also expanding hypertension clinics to the districts to increase the accessibility to health-care services for hypertension. As a part of the plan to develop a community-based intervention through basic health-care professionals, a study was conducted to assess the baseline 10-year risk for fatal and non-fatal cardiovascular disease (CVD) events using the World Health Organization/International Society of Hypertension (WHO/ISH) risk prediction charts.

**Methods**

The Cardiovascular Disease Project in Myanmar conducted a community-based survey in four different townships in 2010 to assess the CVD risk factors including hypertension, and the 10-year risk of fatal or non-fatal CVD. The study population comprised 611 persons: 152 from Tharkayta township (Delta region, lower Myanmar), Yangon; 160 from Leiway township (Central Myanmar), Nay Pyi Taw; 145 from Mahar Aung Myay (Upper Myanmar), Mandalay; and 154 from Singu (hilly region), Pyin Oo Lwin.

Adult subjects above 25 years of age were enrolled by trained community health workers within their allotted area of work. Standard measurement procedures were followed for anthropometry and blood pressure. Blood was collected and tested for random sugar, total cholesterol and triglyceride levels using point-of-care diagnostic strips by Accutrend Plus (http://www.cobas-roche.co.uk/site/accutrendplus.aspx). This information was used to grade individuals on their cardiovascular risk using the WHO/ISH risk prediction charts. Using the chart, the health worker identified people at high risk and referred them for appropriate treatment to the next level of care.

The WHO/ISH charts have been developed from the best available mortality and risk factor data of low- and middle-income country populations. The charts have been developed using a modelling approach. In brief, a set of individual-level CVD risk factor profiles (age, sex, systolic blood pressure, total cholesterol, and the presence or absence of type-2 diabetes) have been generated using information on the population distribution of these risk factors from the WHO Comparative Risk Assessment study. These risk factor profiles have then been combined with information on the relative risk of each risk factor, along with the population-level estimate of absolute risk. The risks of non-fatal and fatal myocardial infarction and non-fatal and fatal stroke have been modelled and combined to predict the individual risk of coronary heart disease and cerebrovascular disease. All WHO regions have been divided into epidemiological subgroups based on the CVD epidemiology. Myanmar falls under the category SEAR-D.a

The results are presented as mean and prevalence using descriptive statistics.

**Results**

The mean age of the 611 study subjects was 52 years (range 27–88 years) with 58% of the subjects in the age group of 40–59 years. The majority (452; 74%) of the subjects were women who were on an average four years younger than the men.

a Countries with high child and high adult mortality in the South-East Asia Region
In the survey, 18.8% were current smokers. Other biological risk factors were also assessed and obesity was found in 45.8%, high total cholesterol level in 38.6%, high triglyceride level in 24.9% and diabetes in 10.3%. According to the data on measured blood pressure, over half of the respondents (57%) were hypertensive (Table 1). While metabolic abnormalities (obesity, cholesterol and sugar levels) were higher among women, the prevalence of smoking and hypertension was higher among men. Overall, the prevalence of these risk factors was high.

Table 1. Levels of risk factors for cardiovascular diseases (CVD) in four selected townships, Myanmar, 2010

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Men (N=159)</th>
<th>Women (N=452)</th>
<th>Both sexes (N=611)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current smoking</td>
<td>46.5</td>
<td>9.1</td>
<td>18.8</td>
</tr>
<tr>
<td>Body mass index (BMI) &gt;25</td>
<td>33.3</td>
<td>50.2</td>
<td>45.8</td>
</tr>
<tr>
<td>High total cholesterol level (190 mg/dl and above)</td>
<td>28.3</td>
<td>42.3</td>
<td>38.6</td>
</tr>
<tr>
<td>High triglyceride level (180 mg/dl and above)</td>
<td>22.6</td>
<td>25.7</td>
<td>24.9</td>
</tr>
<tr>
<td>Hypertension</td>
<td>64.2</td>
<td>54.9</td>
<td>57.3</td>
</tr>
<tr>
<td>Isolated diastolic hypertension (DBP ≥90 mmHg)</td>
<td>3.1</td>
<td>4.2</td>
<td>3.9</td>
</tr>
<tr>
<td>Isolated systolic hypertension (SBP ≥140 mmHg)</td>
<td>21.4</td>
<td>24.1</td>
<td>23.4</td>
</tr>
<tr>
<td>Both systolic and diastolic hypertension (SBP ≥140 mmHg, DBP ≥90 mmHg)</td>
<td>39.6</td>
<td>26.5</td>
<td>30.0</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>6.3</td>
<td>11.7</td>
<td>10.3</td>
</tr>
</tbody>
</table>

*All values are percentages.

From the data collected, the 10-year cardiovascular risk was calculated using the WHO/ISH risk prediction chart for SEAR-D. About half of the population was at low risk. Moderate (10% to <20%) risk was found in 20.6%, high risk (20% to <30%) in 11.5% and very high risk (30% to <40%) in 9.5% of the study population (Table 2). Despite differences in the individual risk factors, the risk profile of the men and women was similar.

Table 2. Distribution of 10 year risk for cardiovascular events by sex in four selected townships, Myanmar, 2010

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Men (N=159)</th>
<th>Women (N=452)</th>
<th>Both sexes (N=611)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (&lt;10%)</td>
<td>50.3</td>
<td>52.2</td>
<td>51.7</td>
</tr>
<tr>
<td>Moderate (10% to &lt;20%)</td>
<td>17.6</td>
<td>21.7</td>
<td>20.6</td>
</tr>
<tr>
<td>High (20% to &lt;30%)</td>
<td>14.4</td>
<td>10.4</td>
<td>11.5</td>
</tr>
<tr>
<td>Very high (30% to &lt;40%)</td>
<td>11.3</td>
<td>8.8</td>
<td>9.5</td>
</tr>
<tr>
<td>Extremely high (40% and above)</td>
<td>6.3</td>
<td>6.9</td>
<td>6.7</td>
</tr>
</tbody>
</table>

* All values are percentages.
Discussion

This study shows that basic health-care professionals can be trained to assess cardiovascular risk using the WHO/ISH charts and that the population studied had high levels of CVD risk. The study was aimed at testing a strategy and not in generating a representative sample for estimation of population risk, as is done under surveillance. The skewed sample structure, with three fourths of the study population being women, is due to the greater availability of women at home.

Other studies including the national NCD risk factor survey in 2009 have confirmed the high prevalence of risk factors in the population of Myanmar. A cross-sectional survey conducted in three urban townships of Yangon city (Sanchaung, Latha and Pabedan) and one rural township of Hmawbi showed that CVD was a health problem in both urban and rural communities. Coronary heart disease was found to be more prevalent in the urban townships than in the rural Hmawbi township, but hypertension and rheumatic heart disease were more prevalent in the rural township of Hmawbi. Obesity was not found to be a risk factor in the study population, but smoking was. According to the NCD risk factor survey in Myanmar in 2009, only 37% of the men and 45% of women diagnosed were taking antihypertensive drugs prescribed by health workers. These findings point to the urgent need to address NCDs as a major public health problem by strengthening national policies and health systems.

The threshold for implementing high-risk strategies, particularly drug treatment, will depend on the economic, political and social realities of each country. For example, very low-income countries may decide to implement high-risk strategies for a 10-year risk of CVD at a threshold of 40%. Other countries with additional resources may lower it to 30%. As the threshold is lowered, the health benefits will increase and costs will escalate. The level of risk at which drug treatment should be started when managing patients within the public health sector is a policy decision that has to be made by health authorities and experts at the national level. The WHO/ISH risk prediction charts facilitate the operationalization of such policy decisions.

WHO is providing technical support to ministries of health to develop and adapt clinical protocols for integration of NCDs in primary care in accordance with evidence-based guidelines. A minimum set of NCD interventions should be accessible for people at the primary care level before any NCD screening programme is initiated, because it does not make sense to detect cases if care cannot be assured. These are defined under the WHO Package of Essential Interventions for NCDs (PEN).

In Myanmar, the PEN intervention was implemented in Hlegu and Hmawbi townships with technical support from WHO. In each township, three areas were selected for implementation. Basic health staff and medical officers were trained in 2012. The project is currently being evaluated and it is planned to gradually expand the services to cover the whole country, based on the lessons learnt during the current implementation.

High blood pressure is a silent killer with no overt signs and symptoms. Many people in developing countries including Myanmar remain undiagnosed, although many of them could be treated with low-cost medications, which would significantly reduce the risk of death and disability from heart disease and stroke. Inadequate treatment and poor control of blood pressure lead to complications, due to which people spend more on long-term and lifelong health care, and are finally pushed into poverty. It is thus important to educate people about the need for regular check-ups for blood pressure so that hypertension can be diagnosed early. Paucity of awareness of the need for early detection of hypertension and irregular medication are the major causes of morbidity and complications of hypertension. Thus, counselling to ensure adherence to treatment should be
provided at each clinic visit. Health education on non-pharmacological measures including lifestyle modifications is as important as adherence to antihypertensive medications.

In conclusion, it is important to address the high levels of cardiovascular risk in Myanmar using an integrated approach of healthy public policies that target the major risk factors of NCDs (tobacco use, salt intake, etc.), strengthen health systems through the primary health-care approach and conduct awareness-generation activities. Many initiatives have taken place in Myanmar in the recent past; these need to be expanded and scaled up to make an impact at the national level.

References


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

Subarna M Dhital\textsuperscript{1}, Arjun Karki\textsuperscript{2}

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.\textsuperscript{1} 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.\textsuperscript{2} 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.\textsuperscript{2} 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

\textsuperscript{1}Assistant Professor in Medicine and Biochemistry, Patan Academy of Health Sciences, Lagankhel, Lalitpur, Nepal
\textsuperscript{2}Professor of Medicine and Medical Education, Patan Academy of Health Sciences, Lagankhel, Lalitpur, Nepal
hypertension, overweight/obesity, hyperglycaemia and hyperlipidaemia. Of these NCD risk factors, the percentage of deaths attributable to hypertension globally is the highest (13%).

**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. 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. 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.

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. Because of the lack of reliable national data, these are World Health Organization (WHO) estimates using data from other countries and country-specific characteristics. 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. Other studies, which were heterogeneous in design, showed variable results, with prevalence estimates ranging from 18.8% to 41.8% (Table 1).

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. 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. In increasing order of hierarchy from the community level are sub-health posts, health posts, primary health-care centres, and district, zonal and central hospitals under the umbrella of the Department of Health Services, Ministry of Health and Population. 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. The poorest quintile spent 2.4% of their household budget in 2008 on health care, which amounts to US$ 0.45 per person.
It is apparent that managing long-term illnesses would add a massive financial burden on the poor.

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

\(^a\) Hypertension defined by systolic blood pressure (SBP) ≥140 mmHg and/or diastolic blood pressure (DBP) ≥90 mmHg

\(^b\) Year of the study (year of publication mentioned instead if the year of the study has not been mentioned in the publication).

\(^c\) 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%.

\(^d\) 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.\(^12\) 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). 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 1 (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.

**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. 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. 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.

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.\textsuperscript{12}

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.\textsuperscript{16} 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

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

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.\textsuperscript{25} 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.\textsuperscript{4} Female
facilitators working with women’s groups in the community have proven to be effective and FCHVs are credited with some of these impressive achievements. 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. 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.

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.

References


Empowering communities to reduce the burden of diabetes and cardiovascular disease risk: lessons from the NIROGI Lanka project in Sri Lanka

Diyanath Samarasinghe, Sarath Amunugama, Carukshi Arambepola, Manoj Fernando and Chandrika Wijeyaratne

Abstract

In 2008, at the invitation of the Ministry of Health, the Sri Lanka Medical Association (SLMA), along with other partners developed a project called the National Initiative in Re-Organizing General diabetes care in Sri Lanka (NIROGI – means “wellness”). One of the three parallel components of the NIROGI project was a health promotion intervention in low-income urban settings. Representatives from 28 selected urban settings in Sri Lanka were engaged to generate processes to improve well-being and reduce risk factors associated with noncommunicable diseases, and to identify and address the determinants underlying these factors through collective action. After a slow start, activities spread to a total of 133 settings. Adoption of regular exercise, improved food habits and substantial reductions in BMI values were achieved in virtually all settings. Improved mental well-being and reduced alcohol and tobacco use were reported, but were less widespread. Rarer gains included better money management, less frequent quarrels and domestic conflicts, improved family well-being and community cohesiveness. The main underlying factors recognized and addressed were: time spent watching television, negative influences from within the community (discouraging initiatives to improve health), and “external” commercial influences, including advertising. The results provide support for community health activities implemented by members of the community itself, including the measurement of progress and impact. If the intervention is to be implemented through health sector staff, they will require initial training on how to encourage and improve the technical aspects of community initiatives while carefully avoiding the tendency to take control.

Introduction

The rising burden of disability and premature deaths due to noncommunicable diseases (NCDs) globally as well as in South-East Asia calls for prevention strategies directed not only at individuals but also at communities and populations. The common modifiable risk factors underlying NCDs include an unhealthy diet, physical inactivity, tobacco and alcohol consumption and mental stress. Interventions must address different stages of the life cycle and involve all relevant sectors, while the public at the “grass-roots level” must also play an active role for preventive activities to be effective.

1 Associate Professor, Dept of Psychological Medicine, Faculty of Medicine, University of Colombo, Sri Lanka
2 Deputy Director General (PHS), Ministry of Health, Sri Lanka
3 Senior Lecturer, Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka
4 Lecturer in Health Promotion, Faculty of Applied Sciences, University of Rajarata, Sri Lanka
5 Professor, Dept of Obstetrics and Gynaecology, Faculty of Medicine, University of Colombo, Sri Lanka
Sri Lanka has undergone a major demographic and epidemiological transition over the past two decades. The country has a rapidly ageing population due to reductions in communicable diseases and maternal mortality, resulting from improved living conditions, nationwide immunization, and strong maternal and child health services. In parallel, Sri Lanka has experienced a rise in cardiovascular disease (CVD), diabetes, chronic respiratory disease and cancer, which have reached levels similar to those in high-income countries. One of the reasons for this phenomenon is the rapid urbanization of a vulnerable population, which remains unaware of the root causes or determinants of these conditions.

Recognizing the need, the Sri Lanka Medical Association (SLMA) formed the Diabetes Prevention Task Force (DPTF) in 2004 and engaged in advocacy with the Ministry of Health to adopt a national policy and response. In 2008, at the invitation of the Ministry, the DPTF and other health sector stakeholders developed a project that addressed identified priority areas called the National Initiative in Re-Organizing General diabetes care in Sri Lanka (NIROGI – meaning “wellness” in the local language), which was approved for funding by the World Diabetes Foundation. One of the three parallel components of the NIROGI project was a health promotion intervention in low-income urban settings. This was consistent with the recognition accorded to health promotion as a major strategy in implementation of the national NCD policy.

This report is intended primarily to outline the broad strategy used and advocate for its wider application.

**Methods**

The main objective of the community component was to prevent type 2 diabetes and CVD risk through a “health promotion” approach, which was particularly appropriate for a “settings” focus. Relatively low-income urban settings were selected from two areas each looked after by a Medical Officer Health. These were Kotte and Kolonnawa, within the district of Colombo. A representative each from 10 schools (with 600–1000 students each), 10 workplaces (with 30–80 staff each) and 10 residential communities (of 100–500 households each) were invited to an inaugural workshop with members of the resource team (authors of this paper) and four trained health promotion facilitators selected for the intervention. The objectives, methodology and activities were discussed and jointly agreed upon. All 28 representatives who attended the workshop expressed interest in having the intervention implemented in their setting.

A trained health promotion facilitator visited each location to stimulate a process by means of questions, discussion and explanation of the potential for improved well-being through collective action. Anyone in the given setting who wished to participate in this health promotion initiative was welcome to attend these community-level meetings at each location. The facilitators visited the settings weekly during the first few weeks and gradually reduced the frequency of visits to around once a month or so, to provide regular inputs on technical matters. The frequency of visits was not rigidly laid down and was responsive to the demand from each setting. The resource team held five formal reviews at a separate venue, with the participation of the original representatives and keen new volunteers from the selected settings, along with the facilitators.

The intervention was designed primarily to empower members of the local communities to implement, monitor and evaluate their own efforts. Placing control in the hands of the people concerned was accorded higher priority than conforming to a rigid research methodology. It was felt
that such an approach, even if it was difficult at the start, was likely to create lasting and sustained improvements. The tasks of monitoring progress and assessing impact were also therefore shifted to members of the different settings. The trained facilitators provided feedback on the quality of the proposed actions, the determinants identified and the indicators chosen for assessing progress. Such feedback was provided as suggestions that people in the various settings or communities could accept or reject and not as “technical expertise” conveyed with authority.

Records maintained by the facilitators included assessments of progress by community members in each setting. How interested they were, how well they recognized the benefits of collective action and how perceptively they selected the determinants to be addressed were subjectively rated by the facilitators. Facilitators discussed, in reviews with some of the resource team members, how these assessments could be made increasingly reliable and valid. As “grass-roots” understanding of the required process grew, measurement of change was progressively shifted to community members in each setting. Measurement was complex, as “outcomes” or determinants of the desired final endpoint were also assessed. In efforts to reduce excess body weight, for instance, they learnt to record changes in individual body weight as well as shifts in the selected determinants. The determinants addressed may have included the availability and cost of different food items, the ability to overcome the desire to watch favourite programmes on television or handle negative or hostile reactions of others who constantly discouraged them or made fun of their endeavours.

Action in most communities began with regular shared exercise or games. As things progressed, the more successful communities broadened the focus to include other factors such as diet, tobacco and alcohol use, and mental well-being. With regard to these too, the ongoing data recorded by members of the settings and the facilitators were collected and classified under the headings of process, outcome and impact. “Impact” here referred to the desired changes in diet, body weight, and use of tobacco and alcohol. “Outcomes” referred to determinants they chose to address, such as vulnerability to commercial promotions, availability and price of different foods, or attitudes to women exercising or playing games in public grounds.

Formal research, which was outside the control of the populations involved, was not part of the original plan. However, an independent evaluation became feasible after the intervention ended. A post-intervention evaluation was therefore conducted with the consent of members of the participating communities by an academic in the medical faculty, although this had not been envisaged at the beginning.

**Results**

The results were collected and reported by individuals from each setting. These were supplemented and validated by the trained field facilitators, and analysed and classified by the resource team together with the facilitators. This information was constantly shared with members of the communities involved.

**A. Process aspects**

**(i) Ownership**

The results assessed the change process itself. A highly desirable characteristic noted was that people in the given settings took charge of the process within a few months. Success was seen
mostly within residential communities, while only four of the original 10 schools invited succeeded in sustaining the initiative.

(ii) Spread

People in highly enthusiastic settings engaged new, “secondary” settings. A few instances were reported where the activity spread from the secondary settings as well. The eventual number of settings grew from the initial 28 to 133. The spontaneous spread of successful initiatives occurred mostly in residential community settings. The formal evaluation found that 101 settings were “functional” in maintaining their health-related initiatives in a visible and organized way (Table 1). Most of these were communities (83) and workplaces (14).

<table>
<thead>
<tr>
<th>Setting</th>
<th>Type of setting</th>
<th>Functioning setting</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kotte area</td>
<td>Kolonnawa area</td>
</tr>
<tr>
<td>Workplaces</td>
<td>Highly functioning</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Moderately functioning</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Not functioning</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Sub total (functioning settings/total)</td>
<td>08 /13</td>
<td>06 /10</td>
</tr>
<tr>
<td>Schools</td>
<td>Highly functioning</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Moderately functioning</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Not functioning</td>
<td>2</td>
<td>4</td>
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<td></td>
<td>Sub total (functioning settings/total)</td>
<td>03 /05</td>
<td>01 /05</td>
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<tr>
<td>Communities</td>
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<td>3</td>
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<tr>
<td></td>
<td>Moderately functioning</td>
<td>37</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Not functioning</td>
<td>9</td>
<td>8</td>
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<td></td>
<td>Sub total (functioning settings/total)</td>
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<td>38/46</td>
</tr>
<tr>
<td></td>
<td>Total functional settings/total</td>
<td>56/72</td>
<td>45/61</td>
</tr>
</tbody>
</table>

This spontaneous spread is one of the most powerful indicators of the spirit generated when people take charge of activities. Many members interviewed in the formal evaluation said that they were continuing to further spread the activities, which they had begun to enjoy.

(iii) Addressing the determinants of selected factors

Increased physical activity, better dietary habits and, to a lesser extent, subjective feelings of well-being and reduced consumption of alcohol and tobacco were achieved through a sustained process among members of the concerned communities. The evolving process included increasingly insightful discussions that helped them recognize, analyse and decide upon the main underlying determinants, and to figure out feasible ways to address these.
Measuring changes in the determinants, and not merely in “end-points”, was a crucial technical feature that contributed to success. Members of the community proved capable of keeping relevant records of progress. Some of these indicators, such as body weights, time spent on physical activity and expenditure on tobacco and alcohol were quantitative. Changes in the selected determinants were also measured. The resultant feedback to the community by its own members was a powerful contributor to improving quality.

**B. Outcomes**

“Outcomes” referred to changes in the underlying contributors to the targeted factors – body mass, exercise, diet, tobacco and alcohol use, and mental well-being. Initial discussions guided attention to the underlying causes or determinants of these factors. An example of a determinant that changed was the liberation of community members from the hold of television – especially of some TV serials to which they were previously “addicted”. The reduction in time spent watching TV was not only documented numerically but was also presented in charts maintained in some settings.

Influences within the group and negative or hostile comments by some members of the wider community were other determinants addressed. Encouraging others to join in regular games and exercise, and working out collective ways to deal with negative comments were among the responses that emerged. In some settings, there were objections by older males to women exercising or playing games in public grounds. Some women, who initially discouraged their peers, joined in the exercise programmes later when they began to see visible improvements in body shape and high energy levels of those who exercised regularly.

Reported reductions in the number of quarrels and conflicts within the household, improved family well-being and increased savings were among the other improvements documented. Some of these may be considered associations rather than outcomes.

**C. Impacts**

A proper quantitative measurement of changes in risk factor status in different settings was not planned and therefore cannot be presented. The improvements documented within communities cannot meaningfully be presented as a percentage of the population involved, because the denominator is indefinite in an intervention targeting an ill-defined community through random individual volunteers. Noteworthy reductions in excess body weight among those reached were documented in all active settings, and are continuing. Major changes in dietary practices and exercise were also documented to be widespread. Reductions in tobacco and alcohol use were reported in fewer settings – around 15% – while improvements in subjective well-being were also noted.

Associated benefits, not directly related to the risk factors addressed, were sporadic reports of improved family harmony, financial management and community cohesiveness. The process continues autonomously because the relevant insights and activities are now incorporated into the day-to-day lives of the given families and communities.

The results of the independent post-intervention evaluation are not included in this report. That study, outside the control of the present authors, led to the conclusion, “…the programme could be
used as a low cost model for empowering communities in the prevention of non-communicable diseases." \(^{14}\)

**Discussion**

This report is intended primarily to draw attention to the lessons that can be learnt and the potential for implementing cost-beneficial interventions using a health promotion strategy. Assessing the benefits of health promotion and other community-based interventions is complex. The customary double-blind controlled trial design that applies to clinical research is often held up, mistakenly, as the “gold standard” for field research and assessment of policy intervention. The appropriate models and indicators for policy or community intervention need to be very different and designed according to the purpose and circumstances.\(^{13}\)

Measurement of results by people in the given settings is itself a positive product of this activity. Improved capacity of a community to assess progress, and be guided by what it finds, is a highly desirable product. This counts as a major lesson learnt. We find adequate support for several such tentative lessons that deserve wider application. There is of course room to improve and test these more stringently, now using methods closer to strict “experimental” design.

**A. Potential lessons**

The potential lessons are many, four of which are listed here.

1. People can successfully make their lives healthier through collective action. The initial time and effort spent to stimulate them to take charge is worthwhile. External inputs are not needed indefinitely to sustain progress when this happens.

2. It was found to be necessary but not sufficient for people to take ownership of their health. External facilitation was also required to provide suggestions on how the determinants of the selected goals may be worked out accurately and how they could be addressed effectively. The benefit of regular inputs by competent facilitators was well demonstrated in this intervention.

3. An incidental discovery was that some health sector staff found it difficult to hand over control of planning, implementation and measurement of progress to lay people. Most health sector staff may need some extra training to encourage members of communities to take the lead in health interventions. Once acquired, this ability enables health workers to function as powerful agents of change.

4. Better results are probably achieved when the people concerned take on the task of measuring progress as well. Enthusiastic individuals in the given settings quickly learnt how to develop their own indicators to examine whether the desired results were being achieved. Assessing changes in the determinants addressed helped them discover whether they were on track early enough to take remedial measures, when required.

**B. Practical implications**

Too many small-scale experimental interventions are forgotten or ignored because of failure to popularize the methodology used or its core strategy. Although publication of results in scientific journals is touted as the best route of dissemination, this may not always be the case. The content of
most “programmatic” activities is probably decided more on the basis of skilled advocacy than on evidence of the effectiveness or cost benefit.

Disseminating lessons from small-scale experiments is not easy. Encouraging results do not necessarily lead to calls for the successful action to be disseminated widely. And when any seemingly promising strategy is applied more widely, as rarely does happen, the successful intervention may not live up to the promise that its originators claimed. One reason for this failure is that the core features that underlie success are not emphasized and preserved during the wider application. Thus, the activity is applied incompletely or inaccurately, and the key ingredients of success are lost.

The ingredients contributing to the promising results of this intervention are common to many health promotional interventions. The growing evidence on the benefits of using these in efforts to improve cardiac health or prevent NCDs suggests that the health sector would do well to advocate strongly for incorporating such efforts.

Several “natural” or understandable obstacles need to be addressed if we wish to take promising “grass-roots” lessons to the programme level. A specific obstacle to dissemination that became evident through this intervention was the reluctance, especially initially, of professionals and authorities to trust the ordinary citizen or lay person to do things without an expert in charge.

We must take care to identify and preserve the core elements of any intervention that we want to implement on a wider scale. This small-scale experimental intervention reinforces the need to take into account the following considerations in implementing similar programmes aimed at creating sustained behaviour change in a community.

- People can bring about major improvements through changes in their own life settings.
- Working out and addressing the determinants of a desired behaviour enhances results.
- Continuous measurement of progress and redirecting activities improves efficiency.
- Changing behaviour is probably easier for a group than an individual.
- Disseminating the process requires mainly technology transfer and not expensive physical resources.
- Facilitators often need to learn new skills to spread the strategy.
- These skills are not difficult to acquire.

Results that awaken communities to what they are able to achieve are eventually “costless”. We must stimulate policy-makers and professionals to become aware of the huge potential of such initiatives.

References


Evolution of salt reduction initiatives in Thailand: lessons for other countries in the South-East Asia Region

Chaisri Supornsilaphachai

Abstract

Evidence from Thailand indicates that hypertension is an important risk factor for deaths due to cardiovascular diseases including stroke. Available evidence also shows that there has been a significant increase in salt consumption in Thailand, which is one of the important dietary determinants of hypertension. In 1997, the nutrition programme and noncommunicable diseases programme collaborated to revise the recommendations for daily intake of salt and other nutritional risk factors such as sugar, vegetables and fruits into dietary guidelines. A “Nutrition flag” was felt to be an important tool for advocacy with other related programmes and for communication. In 2006, the first specific National Salt Reduction Initiative was started by the Bureau of Non-communicable Diseases because of the striking increase in deaths due to hypertension and stroke, and availability of epidemiological evidence of the association of salt with cardiovascular risk factors and other diseases, especially hypertension and stroke. Successful country experiences, especially those of Japan from 1960 to 1980, were other push factors for undertaking this initiative. A “do no harm” component was added to the campaign to address perceived harmful effects of salt reduction initiatives and a multidisciplinary technical expert working group was set up. The salt reduction campaign targeted the general population, housewives and youth for communication activities, and food policy development for food and nutritional labelling. The interim results from data surveys and available vital statistics showed that the salt reduction programme was effective along with the other measures, and played an important role in decreasing the death rate from stroke and prevalence of hypertension. The Thai experience has shown that national salt reduction initiatives are effective in reducing cardiovascular diseases and should be initiated in other countries with a high death rate due to stroke.

Nutritional transition in Thailand

Thailand’s First National Economic and Social Development Plan (NESDP) was launched in 1961 and Thailand’s nutrition programme was one of its components. Since 1977, the National Food and Nutrition Plan (NFNP) became a separate entity from the NESDP. Between 1961 and 1987, Thailand achieved a dramatic reduction in the magnitude and severity of malnutrition in pre-school children and virtually eradicated the severe form of malnutrition.

The traditional Thai diet is rich in rice, seafood and vegetables cooked by grilling, stewing, baking and frying, using fresh spices and herbs.1,2 Over the years, the food consumption pattern has changed. Consumption of protein, fats and oils, fruits and vegetables increased, while that of rice and cereals decreased. However, due to uneven income distribution, inadequate consumer protection and unmitigated environmental degradation, malnutrition and other deficiency diseases are re-emerging in Thailand along with diseases of affluence.

1 Department of Disease Control, Ministry of Public Health, Thailand
Epidemiological transition and predominant cardiovascular diseases and risk factors in Thailand

Along with nutritional changes, the success of public health programmes and improved health-care delivery system resulted in Thailand undergoing a rapid demographic and epidemiological transition. In the 1990s, the epidemiological transition was in the phase of receding pandemics, in which cardiovascular diseases (CVDs) account for 10%–35% of the disease burden, comprising mainly hypertensive heart disease, haemorrhagic stroke, sequelae of rheumatic heart disease, and some infectious and nutritional cardiomyopathies. The possibility of an increase in noncommunicable diseases (NCDs) in Thailand was first reported by the World Health Organization (WHO) in 1983. The response to this was largely medical and resulted in the establishment of 15 specific disease-based programmes and some pilot projects. Ten years later, despite the burden of the HIV/AIDS epidemic, deaths due to CVD, cancer and injuries were increasing sharply. The rate of outpatient and inpatient consultations for CVD, including hypertension and diabetes, rose twofold in 1987. In 1997, it was also found that the number of deaths due to stroke was twice as high as that due to ischaemic heart disease. A verbal autopsy-based study during 1997–1999 confirmed that hypertension with stroke was the third and second leading cause of death among men and women, respectively, and was the leading contributor to disability-adjusted life-years.

In 1991, the Thai National Health Examination Survey found a hypertension prevalence of 5% among the population aged ≥15 years with an increase in blood pressure with age. During the 2000s, Thailand faced rapid industrialization and globalization. This brought about changes in lifestyles and the environment, and resulted in an increase in degenerative and human-induced diseases. The prevalence of hypertension increased twofold every 5–7 years, from 10% in 1996 to 22% in 2003. Moreover, a prospective study in Thailand (EGAT Study) confirmed that hypertension was a major risk factor for stroke and ischaemic heart disease. As the prevalence of smoking had decreased in Thailand since 1986, this meant that addressing salt intake was important for controlling hypertension.

Evidence on salt and its health effects

Since the 1960s, scientists have studied the extent to which increased salt consumption has adverse implications for population health and tried to quantify its contribution to deaths from stroke and CVD. International epidemiological studies such as the WHO MONICA Project confirmed that prevalence of smoking and elevated blood pressure explained a substantial proportion of the variation in stroke rates between populations. High salt, including sodium or sodium chloride intake, was identified as one of the important risk factors for hypertension, CVD, chronic kidney diseases and many other diseases.

The Scientific Advisory Committee on Nutrition (UK, 2003) reviewed the evidence of a link between high salt intake and high blood pressure and concluded that the relationship was stronger than had been thought and that the issue had last been considered in the early 1990s. It also concluded that a reduction in the average salt intake of the population would proportionally lower population-level blood pressure levels and confer significant public health benefits by reducing the risk of CVD. Reduction, even by small amounts, is likely to be of immense benefit in preventing both stroke and heart attack over a period of time, especially if it slowed down the rate of increase in blood pressure with age.
Evidence on salt consumption in Thailand

The first “Salt and Blood Pressure” study by The Kingdom of Thailand Nutritional Survey (October–December 1960)\(^2\) showed that the Thais’ mean blood pressure was near the minimum theoretical range (for the population 15+ years ~118/73 mmHg) and also found that the average sodium intake of Thai people was around 2.4 g/person/day.

All the national food and nutrition surveys conducted in Thailand since 1960\(^2,3,5,7,17,18\) provide evidence of increasing amounts of population consumption of condiments and fish sauces, which are the major sources of sodium since 1986. Other major risk factors for high blood pressure and stroke such as low consumption of vegetables and fruits, overweight/obesity and consumption of alcohol have been shown to be increasing over these years. Another important change has been a shift in the age distribution of cardiovascular risk factors from adults to Thai children and youth.

In 2007, the Division of Nutrition, Department of Health Promotion; and Faculty of Public Health, Mahidol University; along with the United Nations Children’s Fund (UNICEF) conducted the first household survey of sodium chloride consumption in the Thai population.\(^19\) This was a cross-sectional household survey using stratified, multistage, simple random sampling (region, province, district, sub-district/village/block) with a sample size of 2733 households (urban 842, rural 1891). The instruments used in the survey were diet weighing scale and three survey forms: dietary recall, household survey of sodium chloride consumption by three-day weighed inventory and the food shops survey. The main results were as below:

- Eighty per cent of sodium salt came from the use of flavour enhancers for food preparation – fish sauce (96.39%), salt (91.53%), soy bean sauce (64.59%), monosodium glutamate (61.60%).
- Twenty per cent of sodium salt came from the consumption of cooked food and food products containing salt – instant noodles (59.7%), canned fish (48.9%), steamed mackerel (47.2%), varieties of spicy cooked paste (44.9%).

Learning from the Japanese experience

In addition to existing country experience at that time, it was observed that the Thais’ natural course of CVD was like that of Japan in the 1960s, which had experienced rapid changes in diet and other lifestyles with economic growth between the 1960s and 1980s. Japan’s stroke death rate was higher than that of ischaemic heart disease, and high blood pressure was widely prevalent.\(^20,21\) In Japan, blood pressure levels declined due to improvements in drug treatment for hypertension and dietary improvements such as sodium reduction. This occurred despite an increase in the mean values of ethanol intake, body mass index and serum total cholesterol. The age-adjusted mortality rate of stroke declined by 70% between 1960 and 1990. The mortality rates for stroke in the middle-aged population from Shimane Prefecture during the 10 years after the introduction of dietary improvements showed a steeper decline for haemorrhagic, ischaemic and all strokes than the average for Japan.\(^22\) Evaluation of a community-based hypertension control programme for stroke prevention showed a larger decline in stroke incidence in the intervention community (69%) than in the reference community (49%, \(P<0.001\)). This stimulated the formulation of the 1982 National Act on Health and Medical Care, in which every municipal government was required to conduct health screening and education for residents aged 40 years and above to prevent CVD.
Salt reduction initiative in Thailand


In 1996, despite no clear-cut evidence, the Thai Ministry of Public Health started to address high salt in the diet as one of the important dietary determinants of chronic NCDs. There have been many related “high salt reduction” movements since 1996.

In 1990, in order to respond to nutrition-related NCDs, WHO recommended an “avoidable salty diet”. This was addressed in the first set of Dietary Guidelines for Thailand in 1992 in the Fourth NFNP under the Seventh NESDP (1992–1996), and again in 1996, through drafting of the food-based dietary guidelines (FBDGs), the Thai Dietary Guidelines for Better Health. In 1997, the nutrition programme and NCD programme collaborated to provide recommendations for the daily intake of salt and other nutritional risk factors such as sugar, vegetables and fruits. The salt risk dose recommended was no more than 6 g/day in the quantitative part of the Thai FBDGs. It was established as a “nutrition flag” after rigorous testing to understand its acceptability among consumers, and proved to be an important communication tool. Promotion and dissemination of the Thai FBDGs have been carried out at national and community levels through basic health, agricultural and educational services, and training activities, as well as periodic campaigning via multiple communication channels and the media.

During 2002–2003, “high sodium salt diet” was identified as a main focus of intervention by the NCD programme. This message was included under the “Hypertension Awareness Campaign” using the tag line “Taste before adding condiments”. The importance of salt reduction was also highlighted to all partners for integration of this message into their activities aimed at the general population as well as “at-risk” populations.

Phase II (2003–2008)

In 2003, the responsibility for the prevention and control of NCDs moved from the Department of Medical Services to the Department of Disease Control. Influenced by the World Health Report 2002, the Bureau of Non-communicable Diseases changed the approach from a disease-specific to a risk-based approach. This report emphasized the global burden of high blood pressure and that it alone was responsible for 50% of cases of CVD. Many innovative, risk-focused programmes for hypertension and diabetes prevention and control were implemented. The “National Salt Reduction Initiative” was one of the risk-focused programmes started at the end of 2005.

In 2004, the Thai Heart Foundation Under Royal Patronage, in collaboration with the Department of Nutrition, Faculty of Public Health, Mahidol University, developed the “Thai Food, Good Heart” project. They created the slogan “Food Treats Heart” for Thais to identify food items good for the heart, which would enable them to make healthier choices. This campaign also provided an opportunity for collaboration with the processed food industry to voluntarily reduce the salt content of processed foods. Under the “Thai Food, Good Heart” project, low content of salt was included as one of the criteria for labelling a processed food item as “good” for the heart.

Eventually, in 2005, stroke and hypertension were targeted as priority and urgent public health problems; therefore, salt was identified as the one of main dietary determinants. A specific risk determinant awareness and partnership programme, the “National Salt Reduction Initiative”, was started by the Bureau of Non-communicable Diseases based on the following:
(1) The striking increase in hypertension and stroke death rate since 1999;
(2) Epidemiological evidence of the correlation or association of salt with cardiovascular risk factors and many diseases, especially hypertension and stroke;
(3) Successful country experiences, especially of Japan in 1960–1980, in reducing the stroke death rate, and the United Kingdom in the movement to reduce salt intake;
(4) Specific awareness and activity targeted at addressing the perceived harmful effects of salt reduction – “do no harm”.35

Under this specific salt awareness and partnership programme, many new activities related to salt reduction were initiated by this network, as follows:

- A multidisciplinary technical expert working group was formed composed of clinicians, nutritionists, health education and behavioural science experts, social scientists, relevant government departments, the Thai Heart Foundation Under Royal Patronage, Restaurant Association of Thailand, etc. This group met regularly. Later, this group was called “Salt Net”. Its mandate was to review and share knowledge and coordinate the activities of different partners. This net provided comprehensive documentation on different aspects of the situation for the general public, such as “health effects of high salt intake”,36,37 the existing process of food and nutrition labelling, impact of different cooking styles on the salt content of food, especially the use of condiments, and finally on the influence of marketing and advertising on consumption behaviour. Studies also documented the source of sodium in the Thai diet. The sodium in food that had come from ingredients/condiments on the table accounted for 11%, fresh food 18%, and adding ingredients/condiments during cooking 71%.36 This confirmed the differences between the sources of sodium in food between industrialized countries and developing countries in Asia such as Thailand. In most of the industrialized countries, sources of sodium in food were processed foods and eating out.38 Subsequently, a variety of low-sodium condiments were developed by the Nutrition Institute, Mahidol University.

- The salt reduction campaigns targeted the general population, community housewives and youth for communication activities. The main points in the communication message were “causes and health consequences of salt consumption”. The second message was an integrated one of “reduce salt, increase vegetable consumption, keep hypertension far away”. The communication campaigns were intensified during occasions such as World Stroke Day, International Hypertension Day, etc. The Thai community received these messages from multiple sources: mass media, health professionals and health volunteers under the screening and risk communication programme, during special campaigns for risk and diseases reduction in villages and also from nutritional programmes such as healthy menus, and health-promoting hospitals.

- Even though food and nutritional labelling was one of the important activities under this initiative, the progress was slow. The food policy aimed to reduce the amount of salt, fat and sugar in snacks by 25%, and of salt in soy sauce, oyster sauce and other condiments by 20%. But, to date, nutritional labelling has been done for only a few food items and five snacks for children.

**Phase III (2008 onwards)**

Since 2008, there has been a decrease in the activities of the salt-specific risk determinant awareness and partnership programme because the key programme manager moved out, and due
to an increase in integrated nutritional and lifestyle messages such as “Too much Sweet, Too much Salt, Too much Fats”, “Thais without Big Belly Network” under the Thailand Healthy Lifestyles Strategic Plan, which has focused more specifically on obesity reduction, and a diabetes and hypertension screening programme.

However, in 2011, activities of the specific salt risk determinant awareness and partnership programme for public awareness made a comeback following collaboration with the new “Non-communicable Diseases Net” and “Chronic Kidney Diseases Prevention Group”. This Non-communicable Diseases Net was established in 2010, and was initiated and supported by WHO Thailand, the Thai Health Promotion Foundation and National Health Security Office, Thailand. The message used was “Thais reduce salt by half, keep diseases far away.” During this time, due to changes in the multidisciplinary technical expert and multisectoral working group for salt reduction, another activity was supported by the United States Centers for Disease Control and Prevention, which recommended further options for salt reduction such as providing “warnings” on high-salt foods or using “better choice” labels for low-salt foods, and developed guidelines for food service providers.

**Effectiveness of the measures**

Although monitoring and evaluation activities for salt reduction have not been established systemically, there have been some surveys and statistics that were used to assess the effectiveness of the measures. However, though these observations have not been able to definitely conclude that all or some of the following effective results came from only the salt reduction programme, they showed the important role played by the salt reduction programme in combination with other effective measures.

**Sodium consumption (Table 1):** The data from different surveys done over the years showed that sodium consumption had increased from 2.4 g/person/day in the 1960s to 4.4 g/person/day in the year 2007, and then showed a small decline. While the initial surveys were household surveys, since 2008, they are individual-based surveys.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated sodium consumption</td>
<td>2.4</td>
<td>2.4</td>
<td>–</td>
<td>–</td>
<td>4.0</td>
<td>4.4</td>
<td>3.3</td>
</tr>
</tbody>
</table>


b Aekplakorn W. The fourth Thai National Health Examination Survey 2008–2009 (population aged 19–59 years)

**Hypertension prevalence (Table 2):** During the same period (from the Third and Fourth National Health Examination Survey in Table 2), the prevalence of hypertension and diabetes remained more or less at the same level. The other related risk factors such as obesity, hypercholesterolaemia, inadequate consumption of vegetables and fruits remained high.
Table 2. Prevalence of cardiovascular risk factors in Thailand, 2003–2008 in the population aged ≥15 years

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>NHES III (2546–2547)</th>
<th>NNES IV (2551–2552)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension prevalence</td>
<td>22.0</td>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td>Inadequate vegetable and fruit consumption</td>
<td>78.0</td>
<td>82.3</td>
<td></td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>22.5</td>
<td>18.5</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>25.9</td>
<td>23.7</td>
<td></td>
</tr>
<tr>
<td>Moderate alcohol consumption</td>
<td>9.3 (54)</td>
<td>7.3 (45.3)</td>
<td></td>
</tr>
<tr>
<td>Overweight and obesity (BMI ≥25 kg/m²)</td>
<td>28.6</td>
<td>34.7</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>6.9</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Hypercholesterolaemia (≥240 mg/dl)</td>
<td>15.5</td>
<td>19.4</td>
<td></td>
</tr>
</tbody>
</table>

CVD death rates (Figure 1): An additional indicator for measuring the effectiveness of population-level salt reduction is the stroke-related death rate. Figure 1 compares the trend with timelines of the three main interventions (hypertension screening, community risk management and specific risk reduction, especially salt). Data show that the stroke death rate decreased significantly and rates of other diseases (ischaemic heart disease and diabetes) plateaued in the years 2005–2008. Because of resource constraints, the intensive salt reduction initiative was stopped and integrated into a proactive nutrition programme in 2008. This probably resulted in less intensive efforts, which could explain the increase in the stroke and ischaemic heart disease death rates in 2010–2011, despite continuing universal coverage of two other main programmes (screening and community programme).

Lessons learnt from the Thai experience

The experience of Thailand provides important lessons for other developing countries planning to introduce national salt reduction initiatives. The National Salt Reduction Initiative in Thailand suffered from limited financial support and lack of key human resources. Thailand successfully used available international evidence and generated local evidence for supporting evidence-based decision-making by developing a multidisciplinary and multisectoral partnership. The finding of an increasing stroke death rate with weakening of the programme indicates the need for a sustained programme, which is possible only with political commitment and resource allocation. The key lessons can be summarized as follows:

- An intensive and systematic approach is needed for a sustainable national salt reduction programme.
- A system for surveillance of salt intake has to be established, along with monitoring and periodic evaluation.
A multidisciplinary and multisectoral approach is required, which can be established by regular communication among stakeholders, understanding their needs and addressing these effectively.

There is a need for social mobilization and consumer education focusing on specific risk communication and promoting health literacy and incentives for reformulation of menus at all levels – home, street food, food shops, restaurants and the food industry.

National legislation for lowering the salt content of foods and compulsory nutritional labelling is needed to protect and promote a healthy environment, especially in urban areas.

Research is needed to support evidence-based policy formulation and implementation of food and nutritional labelling, as well as risk perception and risk communication strategies.

**Conclusion**

Salt or sodium is not a simple risk determinant. Despite several similarities, its nature is different in each country’s context, such as the proportion of the salt-sensitive population, the relative contribution of sodium and other risk determinants to different diseases, sources and patterns of consumption, difficulty in measuring the level of exposure at the population level, the role of important condiments/spices in the community, etc. From a programme manager’s point of view, answers need to be found to questions such as how much investment is required for this...
programme, the cost benefit of salt reduction programmes, among others. These reasons make salt an issue that is neglected by policy-makers and programme managers in countries of the South-East Asia Region. However, the Thai experience has shown that such programmes are effective in reducing CVD, which should be sufficient to initiate such programmes, especially in countries that have high death rates from stroke, as in Indonesia.

Acknowledgements
The National Salt Initiative in Thailand was initiated and led by informal and formal collaborative efforts from both leaders of the nutritional programme and noncommunicable diseases programme of the Ministry of Public Health since 1997 as well as other partners: Institute of Nutrition, Mahidol University; Faculty of Social Science, Mahidol University; Faculty of Medicine, Siriraj Hospital, Mahidol University; Department of Health Education and Behavioral Science and Department of Nutrition, Faculty of Public Health, Mahidol University; Faculty of Medicine, Chulalongkorn University; Nutrition Division, Department of Health, Ministry of Public Health; Thai Food and Drug Administration, Ministry of Public Health; Thai Heart Foundation Under Royal Patronage; Restaurant Association of Thailand; Bureau of Non-communicable Diseases, Department of Diseases Control, Ministry of Public Health, etc. Without their pioneering hard work, there would have been nothing for me to document.

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Promoting populationwide salt reduction in the South-East Asia Region: current status and future directions

Sailesh Mohan, D. Prabhakaran and Anand Krishnan

Abstract

High blood pressure or hypertension is a key modifiable risk factor for cardiovascular disease. In the South-East Asia Region, about a third of the adult population has hypertension, which causes 1.5 million deaths annually or 9.4% of all deaths in the Region. The Global Burden of Disease Study has found excess dietary salt intake to be the eleventh leading cause of mortality globally, accounting for 4 million deaths, while in the South-East Asia Region it is the seventh leading cause of mortality. Evidence indicates that reducing dietary salt/sodium consumption in the population will reduce the mean population blood pressure and associated risk of cardiovascular events in both hypertensive and normotensive individuals. We reviewed the available data on salt consumption by the population in the Region, which showed a paucity of contemporary, nationally representative data. However, available information indicates that salt intake is very high in many countries of the Region and exceeds the World Health Organization (WHO) recommended daily intake of 5 g/day or less. Recently, some initiatives towards population-level salt reduction have been undertaken in India, Indonesia, Thailand and Sri Lanka. This paper highlights key actions that countries can take to reduce salt intake as a population-based strategy to prevent and control hypertension and associated cardiovascular disease. The WHO Regional Office for South-East Asia convened an Expert Group Meeting on population-level salt/sodium reduction to review the global and regional evidence on salt/sodium and health, and to discuss regional strategies to reduce population-level salt/sodium intake and the methods to monitor population intake. The participants agreed that reducing population-level salt/sodium intake is a high-priority intervention, and that the paucity of data should not be a deterrent for initiating salt/sodium reduction programmes. The participants also affirmed that a salt reduction strategy can be combined with the salt iodization programme. The participants agreed to set a regional target of 10% relative reduction in population-level salt intake over the next five years and successive reductions thereafter, with the aim of achieving 30% relative reduction in population-level salt/sodium intake by 2025, in consonance with the set WHO–United Nations global targets. In order to achieve the target, the meeting formulated recommendations for Member States and WHO.

Introduction

Noncommunicable diseases (NCDs) such as cardiovascular diseases (CVD) are increasing in the South-East Asia Region (SEAR). In 2008, of the 7.9 million NCD-related deaths in SEAR, 3.6 million were due to CVD alone. This is anticipated to increase to 12.5 million by 2030.1,2 High blood

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1 Senior Research Scientist and Associate Professor, Public Health Foundation of India, New Delhi, India
2 Executive Director, Centre for Chronic Disease Control (CCDC) and Professor, Public Health Foundation of India, Director, Center of Excellence in Cardio-metabolic Risk Reduction in South Asia (CoE-CARRS), New Delhi, India
3 Additional Professor, Head, WHO Collaborating Centre for Capacity Development and Research in Community-based NCDPC, Centre for Community Medicine, All India Institute of Medical Sciences, New Delhi, India
pressure (HBP) or hypertension is the most important risk factor for CVD, accounting for about 9.4 million global deaths in 2010. In SEAR, about a third of the adult population has hypertension and, not surprisingly, it accounts for 1.5 million deaths annually or 9.4% of all deaths.

High dietary sodium/salt intake and health

Sodium is the main cation in the extracellular fluid of the human body and plays an important part in maintaining fluid balance (sodium causes the body to retain water), nerve transmission and cell function. Its homeostasis is largely regulated by the kidneys. Though hypertension has a complex etiology, the inability of the kidneys to excrete excess sodium fully is one of the major mechanisms by which the blood pressure rises.

Excess dietary sodium or salt intake is a well-established risk factor for hypertension through multiple investigations across animal, epidemiological, migration and population intervention studies done worldwide. Further, many convincing scientific reviews have critically examined this association and confirmed the harmful health impact of excessive salt intake, particularly on cardiovascular health, and have recommended salt reduction. Diets high in salt substantially increase the risk of blood pressure-related CVD events, even among those whose blood pressure is in the normal or high-normal range, and are associated with direct vascular and cardiac damage, obesity, stomach cancer, osteoporosis, kidney stones and increased severity of asthma symptoms. Foods with a high salt content increase thirst and lead to increased consumption of calorie-dense soft drinks, thus indirectly contributing to childhood obesity. On the basis of the harm caused to human health, the World Health Organization (WHO) recommends a daily salt intake of less than 5 g, which is equivalent to 2 g of sodium. Many other national and international health-related organizations as well as guidelines on CVD prevention and control also recommend dietary salt reduction as an effective population-based public health strategy to prevent CVD.

Recently, the Global Burden of Disease Study has found excess dietary salt intake to be the eleventh leading cause of mortality globally accounting for 4 million deaths, while in the SEA Region it is the seventh leading cause of mortality. These data underline the potential impact that effective population-level salt reduction can have on reducing the morbidity and mortality associated with HBP in this populous region of the world.

WHO, in the follow-up to the landmark United Nations (UN) High-Level Meeting on noncommunicable diseases held in New York in 2011, has mandated hypertension prevention and control by population-level salt reduction to be one of the most urgent, cost-effective and immediate high-priority interventions to reduce CVD worldwide. It has now set an ambitious goal of 25% reduction in avoidable mortality due to NCDs by 2025 through a range of multi-stakeholder driven actions, and establishment of a global monitoring framework to measure progress. This framework includes targets and indicators for hypertension as well as salt reduction, and proposes a 25% relative reduction in the population-level prevalence of hypertension and 30% relative reduction in mean salt intake. This provides an excellent opportunity and the necessary impetus to drive and monitor national salt reduction efforts within the SEA Region as a public health strategy to reduce the increasing burden of hypertension, CVD and NCDs. This paper summarizes the information available in the SEA Region on salt intake and highlights key actions that countries can undertake to promote salt reduction as a population-based strategy for the prevention and control of HBP and associated CVD.

Regional Health Forum – Volume 17, Number 1, 2013 73
Salt intake in countries of the SEA Region

Profound changes in lifestyles are occurring across the SEA Region. These have an adverse impact on food environments and consumption of unhealthy diets high in salt, fats and sugars, and deficient in fruits and vegetables. Almost 80% of the people do not consume the recommended quantities of fruits and vegetables, which are good sources of potassium and can reduce the impact of sodium on blood pressure. Our review indicates a paucity of contemporary data on population-level salt consumption and the sources of salt intake. In most studies, data were obtained from non-representative samples and based on dietary data instead of the gold standard 24-hour urinary sodium assessment, which points to the possible underestimation of actual salt intake. Further, data are limited on the public’s knowledge about the deleterious health impact of excessive salt intake and attitudes to salt reduction. However, available information indicates that salt intake is very high in many countries of the Region and exceeds the WHO-recommended daily dietary salt intake of 5 g or less (Table 1).

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimates of individual daily salt intake (95% CI or SD)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>17 g (95% CI: 16.4–17.5 g/day)</td>
<td>Subnational, urban and rural adults in Dhaka aged 20–60 years</td>
</tr>
<tr>
<td>India</td>
<td>13.8 g Ranged between 7 g and 26 g salt in different states</td>
<td>Household surveys in 13 states</td>
</tr>
<tr>
<td>India</td>
<td>12 g in Ladakh (SD ± 4.4 g/day)</td>
<td>Subnational, adults aged 20–59 years</td>
</tr>
<tr>
<td></td>
<td>9 g in Delhi (SD ± 3.4 g/day)</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>5 g salt</td>
<td>National household survey</td>
</tr>
<tr>
<td>Nepal</td>
<td>10–13 g</td>
<td>Subnational, suburban adults in Kotyang, Bhadrakali</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>8 g (SD ± 4.1 g/day): 9 g in men and 7.7 g in women</td>
<td>Subnational, urban and rural adults in western province aged 30–59 years</td>
</tr>
<tr>
<td>Thailand</td>
<td>10.8 g (SD ± 2.6 g/day)</td>
<td>National household survey</td>
</tr>
</tbody>
</table>

Table 1. Salt intake in countries of the SEA Region

Benefits of population-based salt reduction strategies for hypertension control

Current scientific evidence indicates that reducing dietary salt will reduce the mean population-level blood pressure and associated risk of cardiovascular events in both hypertensive and normotensive individuals. A modelling exercise was undertaken in selected countries of the Region to assess the effect on systolic blood pressure of a 15% reduction in salt intake by voluntary reduction of the salt
content in processed foods by the food industry, and consumer education to encourage a change in dietary habits, using the mass media. The results of this exercise are shown in Table 2.\textsuperscript{18}

### Table 2. Estimated effect of 15% reduction in salt intake in selected SEAR countries of the SEA Region

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Bangladesh</th>
<th>India</th>
<th>Indonesia</th>
<th>Myanmar</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>30–44</td>
<td>1.3</td>
<td>1.1</td>
<td>1.6</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
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A decrease of 2 mmHg diastolic blood pressure in the whole population, which is achievable by modest salt reduction, is estimated to reduce the prevalence of hypertension by 17%, coronary artery disease by 6% and the risk of stroke by 15%, with many of the benefits occurring among persons with normal blood pressure. This underlines the huge potential of salt reduction to improve population health.\textsuperscript{19} The estimated cost (in 2005) of implementing salt reduction strategies in select countries was between US$ 0.04 and US$ 0.06 per person per year.\textsuperscript{18}

Thus, populationwide salt reduction is potentially one of the most cost-effective strategies to prevent CVD. In addition, it is also cost saving, as it has the potential to improve hypertension control rates, reduce the need for antihypertensive medications and consequently curb associated health-care costs.\textsuperscript{4,7,8} Countries such as Finland, the United Kingdom and Japan have implemented effective salt reduction programmes and reported benefits in terms of lowering of blood pressure in the population and subsequent reduction in CVD.\textsuperscript{4,7,20} Other countries are implementing or planning to implement salt reduction programmes. Against the backdrop of a high and increasing burden of uncontrolled hypertension and resource-constrained health systems in the SEA Region, promoting and implementing salt reduction programmes offers an effective pathway for better prevention and control of hypertension and associated CVD.

### Strategies for salt reduction: insights from developed countries

Experience from developed countries that have successfully reduced salt consumption at the population level indicates that some of the key strategies are (i) partnerships with the food industry along with regulation, particularly in the absence of voluntary action; (ii) reformulating processed foods that are high in salt and account for a large percentage of intake; (iii) implementing effective consumer education programmes on the effects of excess salt consumption on health; (iv) implementing mandatory, easy-to-understand, consumer-friendly food labelling to identify low-salt products; and (v) creating an enabling environment for making healthy dietary choices easier by increasing the access to and availability of low-salt as well as healthy foods.\textsuperscript{4,7,11,20}
Salt reduction initiatives in the SEA Region

A recent global review of population-level salt reduction efforts reported no initiatives in the SEA Region. However, limited initiatives are in place or are being planned as hypertension rates increase and policies for NCD prevention and control prioritize population-based measures for greater health gains at lower costs. Available information on ongoing or planned initiatives is given below.

Thailand is implementing a national NCD prevention campaign that has salt reduction as a focus area. Besides, the Royal College of Physicians of Thailand and Thai Health are jointly planning to advance reformulation of food products and food labelling, conduct an evaluation of the NCD campaign vis-à-vis salt reduction, and develop a food composition database to monitor the salt content in foods.

In India, the National Institute of Nutrition has recently released new recommended dietary allowances for Indians, which recommend salt reduction. However, no concerted action has been taken nationally to implement this guideline. The Public Health Foundation of India recently conducted a national research consultation to identify salt reduction strategies for India and, as a follow-up, initiated studies to gather current evidence on population-level salt intake to facilitate policy development for national salt reduction.

In Indonesia, as part of an NCD control strategy, the government is considering regulating the food industry to mandate labelling of the salt, sugar and fat content in restaurant foods and on ready-to-eat foods. The regulation is expected to come into effect soon.

As part of efforts to advance NCD control in Sri Lanka, the Ministry of Health has prepared a major plan to implement a salt reduction programme that includes collaborating with the food industry to reduce population-level salt intake to 6 g/day by reducing salt in meat, bread and bakery products, as well as setting reduction targets for other products. Furthermore, a monitoring system to determine salt intake and likely reductions, development of a databank of processed foods, and implementation of public education campaigns are planned over the next few years.

Recent initiatives on salt reduction in the SEA Region

The WHO Regional Office for South-East Asia convened an Expert Group Meeting on population salt/sodium reduction in the Region from 11 to 13 December 2012, New Delhi, India with the aim of reviewing the global and regional evidence on salt/sodium and health, and to discuss regional strategies to reduce population-level salt/sodium intake and the methods to monitor population intake. The participants agreed that reducing population-level salt/sodium intake is a high-priority intervention for Member States of the Region to prevent and control hypertension and CVD, and that the paucity of data should not be a deterrent for initiating salt/sodium reduction programmes. Thus, it was decided that countries should start implementing salt reduction interventions along with efforts to collect data on population-level salt/sodium intake. The participants reaffirmed that a salt reduction strategy is compatible with the salt iodization programme and the two programmes stand to mutually benefit from each other. The participants agreed on setting a regional target of 10% relative reduction in population-level salt intake over the next five years and successive reductions thereafter, with the aim of achieving 30% relative reduction in population-level salt/sodium intake by 2025, in consonance with the global targets. In order to achieve the target, the meeting formulated the following recommendations for Member States and WHO.
Recommendations for Member States

(1) Advocate to policy-makers and other national stakeholders to raise the priority of salt/sodium reduction interventions for the prevention and control of CVD and other NCDs.

(2) Engage with a wide range of stakeholders (government, private sector, media, civil society, academia) and establish a national salt group with clear terms of reference to develop, implement and oversee national salt/sodium reduction programmes.

(3) Establish settings-based salt/sodium reduction programmes at government-owned institutions and workplaces (corporate sector), as well as in schools and the armed forces.

(4) Conduct targeted public awareness campaigns for salt/sodium reduction.

(5) Introduce voluntary regulation for the food industry to reformulate lower salt/sodium products; monitor compliance and, if needed, introduce mandatory regulation.

(6) Explore the possibility of substituting salt with locally available lower sodium substitutes by evaluating their composition, effectiveness and acceptability.

(7) Consider food labelling for salt/sodium using a colour-coding system.

(8) Implement the Codex Alimentarius.

(9) Increase collaboration between salt/sodium reduction programmes and salt iodization programmes for increased public health gains and higher efficiency.

(10) Collect data to establish baseline population-level salt/sodium intake by the end of 2015 using a range of available methods, including 24-hour urine analyses and spot urine analyses, in conjunction with dietary and behavioural surveys; perform repeat surveys every five years.

(11) Integrate salt/sodium surveys with existing NCD risk factor surveys such as STEPs and national health surveys.

(12) Conduct operations research on priority topics to identify locally appropriate salt/sodium monitoring methods and locally relevant strategies for salt/sodium reduction.

Recommendations for WHO

(1) Advocate to Member States to give high priority to salt/sodium reduction programmes for the prevention and control of CVD and other NCDs.

(2) Advocate to UN agencies, international nongovernmental organizations and other partners to raise the priority of salt/sodium reduction within existing health and developmental programmes.

(3) Provide technical assistance to Member States for setting up and implementing national salt/sodium reduction programmes.

(4) Strengthen national capacity for conducting monitoring and evaluation, as well as surveillance and operations research studies on population-level salt/sodium intake.

(5) Facilitate networking and sharing of expertise among Member States for implementing salt/sodium reduction programmes and monitoring population-level salt/sodium intake.
(6) Facilitate standardized data collection on salt/sodium consumption.

(7) Periodically publish regional data on salt/sodium as part of NCD reports and disseminate information and best practices through various channels including websites, policy briefs, aide memoires, newsletters, research publications.

(8) Organize periodic regional and national consultative meetings on population-level salt/sodium reduction to review progress in reaching the sodium/salt reduction goal and devise new strategies, as needed.

Conclusion

Available data, though limited, indicate high salt intake by the population in the SEA Region. However, the paucity of current data should not impede the initiation of context-specific salt/sodium reduction programmes. Countries should start implementing salt reduction interventions along with efforts to collect contemporary data on population-level salt/sodium intake. Against the background of a high and increasing burden of uncontrolled hypertension, CVD and NCDs, and resource-constrained health systems in the Region, promoting and implementing salt reduction programmes offers an effective pathway to better prevent and control hypertension and reduce associated CVD.

References


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Contributions on current events, issues, theories and activities in all aspects of health development are welcome. Contributions should be original and contain something of interest to those engaged in health policy and practice, some lesson to be learned, some idea, something that worked, something that didn't work, in fact anything that needs to be communicated and discussed on a broader scale. Articles, essays, notes, news and views across the spectrum of health development will be published.

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