NIHR-Global Health Research Unit for diabetes and cardiovascular disease in South Asia

University of Kelaniya

Imperial College London

Executive Summary

Type-2 diabetes (T2D) and cardiovascular disease (CVD) account for over 25% of the mortality in South Asia. About 1/3 of these deaths occur in those under 60 years of age. Early detection and management of T2D and CVD has an important role in preventing premature morbidity and mortality in this region.

We have attempted to describe the health systems in three South Asian countries, Bangladesh, India and Sri Lanka in relation to the WHO health systems building blocks approach used for monitoring the performance of health systems. Health service delivery and health workforce have been aligned well with T2D and CVD care. Health information systems have been established and cover T2D and CVD. Access to essential medicines for T2D and CVD appears to be less than optimal. Health financing for T2D and CVD is still a small proportion of the total health expenditure of these countries. The health policy development for addressing T2D and CVD has been achieved indicating the essential leadership and governance for addressing these conditions.

The currently practiced guideline in Bangladesh has been developed in 2019 based on the HEARTS Technical Package of the World Health Organisation. It is comprehensive in content and provides adequate detail to the practitioners on management of diabetes and cardiovascular disease including lifestyle modification. At present, India does not have a separate management guideline on diabetes and cardiovascular disease. However, the management guidelines for cancer diabetes, cardiovascular disease and stroke have been included within the training manual of Medical Officers. The available Operational Guidelines have been developed in 2013 for the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke targeting the period 2013-2017. These operational guidelines focus mainly on the operational aspects of the programme and provide only an outline on the management of these four conditions. The national guidelines practiced in Sri Lanka have been developed in 2018 and cover diabetes, cardiovascular disease and obesity. The guidelines on diabetes and cardiovascular disease focus on the primary care level while the guidelines on obesity spans all levels of care including specialist facilities. Although diagnosis and pharmacological management are well covered in these guidelines the content on lifestyle modification is very limited and need improvement.

In future it will be important to focus on the implementation of these services in the health system and monitoring and evaluation aspects to ensure that services reach the target population addressing the disease burden of T2D and CVD through prevention and control.

Contents

List of abbreviations

AHI	Assistant Health Inspectors
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
T2D	Type-2 diabetes
CC	Community Clinic
CG	Community Group
CHCP	Community Health Care Provider
CHC	Community Health Centres
CSG	Community Support Group
CVD	Cardiovascular diseases
DGHS	Directorate General of Health Services
FPI	Family Planning Inspectors
FWA	Family Welfare Assistants
GNM	General Nurse Midwife
HA	Health Assistants
HI	Health Inspectors
HLC	Healthy Lifestyle Centres
ICT	Information Communication Technology
MIS	Management Information Systems
MOHFW	Ministry of Health and Family Welfare
MOLGRDC	Ministry of Local Government Rural Development and Cooperatives
MPV	Multi-Purpose Volunteers
NCD	Non Communicable Diseases
NGO	Non-Governmental Organisations
NHM	National Health Mission
NMNCC	National Multi-sectoral NCD Coordination Committee
NPCDCS	National Programme for Control of Diabetes, Cancer and Stroke
NRHM	National Rural Health Mission
NUHM	National Urban Health Mission
PEN	Package of Essential Non Communicable Disease
PHC	Primary Health Care
SACMO	Sub Assistant Community Medical Officers
UH&FPO	Upazilla Health and Family Planning Officers
UHC	Upazilla Health Complexes
WHO	World Health Organisation

List of contributors

Prof Anuradhani Kasturiratne, Professor in Public Health, Faculty of Medicine, University of Kelaniya, Sri Lanka

Prof Malay Kanti Mridha, Professor of Public Health, James P Grant School of Public Health, BRAC University, Dhaka, Bangladesh

Ms Anika Mandla, Research Associate, Max Healthcare, New Delhi, India

Dr Ian Goon, LKC School of Medicine, Nanyang Technological University, Singapore

Prof Brian Oldenburg, University of Melbourne, Melbourne, Australia

Prof JC Chambers, Professor of Cardiovascular Epidemiology, Imperial College London, United Kingdom and LKC School of Medicine, Nanyang Technological University, Singapore

Introduction

South Asia is home to one quarter of the world population (1). Type 2 diabetes (T2D) and cardiovascular disease (CVD) are leading public health problems in South Asia (2). Accounting for nearly 30% of the overall mortality of these countries, these two conditions contribute to a large economic and social burden across the region (3) . While early detection and comprehensive therapeutic management are important for addressing the burden of these condition, lifestyle interventions should be the basis for prevention and control of diabetes and cardiovascular disease in all strata of the general population (2).

The purpose of this report is to map the current health system context of the T2D and CVD and provide an insight on the gaps in the current practice in order to make recommendations to bridge those gaps.

Objectives

The objectives of this report are to:

- Map the current context of T2D and CVD management in the health systems of the three countries using the WHO Health System Building Blocks model
- Identify and summarise the content area that should be included in a comprehensive guideline on prevention and control of diabetes and CVD
- Describe the available guideline/s relevant to prevention and control of T2D and CVD in Bangladesh, India and Sri Lanka, and assess them for comprehensive content.
- Identify potential recommendations for improvement in the health system, guidelines and care pathways

Methods

Mapping the health system

Our research group consists of an international collaboration of specialists in Public Health and health systems, epidemiology, implementation science, clinical sciences and social sciences from Australia, Bangladesh, India, Sri Lanka, Singapore and the United Kingdom.

We mapped the current context of the health system in relation to T2D and CVD care in Bangladesh, India and Sri Lanka using the health system building blocks framework (4) . The WHO has recognised that health systems which can deliver services efficiently and equitably are critical for improving health. Health system strengthening has therefore been brought to the focus of many global health initiatives. The building blocks of the WHO health system model are: i. Health service delivery; ii. Health workforce; iii. Health information systems; iv. Access to essential medicines; v. Health financing; and vi. Leadership and governance. These are identified as core components which contribute to strengthening of the health system and help to monitor its progress (5).

Analysis of T2D and CVD management guidelines

The content area to be included in a comprehensive guideline for management of T2D and CVD was identified through literature review and expert opinion. We then systematically identified the guidelines developed in the three study countries in the last 10 years. These included guidelines developed by the state health authorities, and guidelines developed in collaboration with non-governmental stakeholders, international agencies and professional colleges and associations of the three countries. We also included the Package of Essential NCD (PEN) intervention protocols and manuals developed and piloted by the South East Asia Regional Office of the World Health Organisation (WHO SEARO) in our review. We discussed the findings of this review in an expert working group comprising multi-country partners to arrive at a consensus on the contents to be essentially included in a guideline on management of T2D and CVD. We also conducted a detailed review of the content of the selected guidelines to identify the depth to which they cover the desired content.

Results

Mapping the health system

The health system of each country was mapped in relation to the six building blocks. The results are given by country.

1. Bangladesh

i. Health service delivery

Rural sector: In Bangladesh about 27,000 community based health care providers provide health services to rural communities through house to house visits at the village/ ward level.

According to estimates there is one such provider for every 5000-6000 population. The majority (80%) of these providers are Health Assistants (HA). The rest are Assistant Health Inspectors (AHI) and Health Inspectors (HI). Similarly, community based family planning services are provided by Family Welfare Assistants (FWA) and Family Planning Inspectors (FPI). All of these health providers have the potential to conduct community based activities for NCD prevention and control in rural areas.

Urban sector: In urban areas health services are provided by the City Corporations and Municipalities under the Ministry of Local Government Rural Development and Cooperatives (MOLGRDC). The services for urban population are provided by both the government and NGOs.

Health facilities

Community clinics: Community Clinics (CC) are the lowest level public health facility for healthcare. Each covers a population of 7,000-10,000 and provides health, family planning and nutrition related services. There are approximately 14,000 operational CCs. They are managed by the state in partnership with the community through Community Groups (CGs). To support the CG in the management and community engagement, there are three Community Support Groups (CSGs) for each CC.

Service provision is done by Community Healthcare Provider (CHCP). Information Communication Technology (ICT) has been introduced to data management and service provision of CCs. Telemedicine services have been arranged between CCs and higher level institutions.

Health institutions at Union level: There are three types of health institutions at the Union level. They are

a.) Union Health and Family Welfare Centres
b.) Union Sub-centres
c.) Rural Health Centres

These institutions may have by Medical Officers/ Assistant Medical Officers. However most of the services are provided by Sub-assistant Community Medical Officers (SACMO), Health Inspectors (HI) and Assistant Health Inspectors (AHI).

Upzilla Health Complex: There are over 400 Upzilla Health Complexes (UHCs) at sub-district level. These have 10-50 beds for in-patients. UHCs have Medical Officers and nursing staff in addition to the SACMOs, Pharmacists and other allied health staff.

NCD related services at Primary Health care level: The Directorate General of Health Services (DGHS) of Bangladesh has identified the WHO Package of Essential Non-communicable Disease Interventions (WHO PEN) for primary health care (PHC) in low-resource settings as a suitable approach to address the problem of NCD.

The DGHS has initiated the steps to adapt the WHO PEN protocol for Bangladesh in 2019 through the inputs obtained from expert working groups. This customized protocol contains

guidelines for screening and management of (1) hypertension (2) diabetes and (3) cardiovascular disease using total risk approach and covers diagnosis, treatment and referral. Currently, this protocol is being implemented in 25 sub-districts with plans for scale up after one year.

This guideline designates the Upazilla Health and Family Planning Officers (UH&FPO) stationed at Upazilla Health Complexes (UHC) at sub-district level as the key health personnel for implementing NCD services at PHC level. UH&FPO are medically qualified and are able perform clinical functions and prescription together with the other medical officers providing clinical services at the UHC. The NCD services are expected to be delivered through multi-sectoral coordination adhering to the "Healthy Upazilla" initiative and the "Health in All Policies" approach.

ii. Health workforce

Bangladesh has identified a key set of health personnel for NCD related services. The main responsibilities of the different types of personnel in the UHC in organizing and managing NCD services are presented in Table 1.

Table 1. Main responsibilities of the personnel at UHC in relation to establishment and management of NCD services in Bangladesh

Task	**Responsible personnel**
Establishing NCD corner at UHC	UH&FPO
Training of personnel	UH&FPO
Assigning personnel to NCD corner	UH&FPO
Implementing NCD corner	Nurse/ Sub Assistant Community Medical Officer (SACMO)
Disease management and referral	UH&FPO/ Medical Officer
Maintaining drug stocks at NCD corner	Nurse/ SACMO
Monthly reporting on drug stocks	Nurse/ SACMO
Ensuring adequate and continuous drug availability	Pharmacist
Ensuring adequate and continuous supplies	UH&FPO
Ensuring adherence to protocols	UH&FPO
Networking with other institutions for maintaining the referral pathways	UH&FPO
Monitoring and supervision	UH&FPO
Overall reporting	UH&FPO

Although the UHC is expected to provide most of the services for NCD, lower level PHC facilities and community groups are expected to contribute to the first steps of the process. The lower level PHC facilities are manned by non-medical allied health professionals. The list of services and the professionals providing them at each level are given in Table 2.

Table 2. Services provided by medical and allied health professionals at different levels of the health system in Bangladesh

Level and/ Institution	Personnel	NCD care roles
Community	Community Group (CG) Community Support Group (CSG)	Improving awareness, motivation for screening
		Improving awareness, motivation for screening
Community Clinic	Multi-Purpose Volunteers (MPV) Health Assistant (HA) Family Welfare Assistant (FWA)	Raising awareness on NCDs
		Motivating the public for screening
	Community Health Care Provider (CHCP)	Screening for diabetes and hypertension
		Assessing CVD risk
		Counselling for lifestyle modification
		Counselling for medication adherence
Union Health and Family Welfare Centre (UH&FWC)*	Family Welfare Visitor (FWV)	Raising awareness on NCDs
		Motivating the public for screening
	Sub Assistant Community Medical Officer (SACMO)	Screening for diabetes and hypertension
		Assessing CVD risk
		Counselling for lifestyle modification
		Counselling for medication adherence
NCD corner, Upzilla Health Complex (UHC)	Sub Assistant Community Medical Officer (SACMO) Nurse	Screening for diabetes and hypertension
		Assessing CVD risk
		Counselling for lifestyle modification
		Counselling for medication adherence
		Registration for medical management
		Drug re-fill
Upzilla Health Complex (UHC)	Medical Officer Upzilla Health and Family Planning Officer (UH&FPO)	Confirmation of diagnosis
		Prescription of medications

iii. Health Information System

The Management Information System (MIS) Department of the DGHS is responsible for …. . The MIS has launched a programme to establish a Health Information System (HIS) and e-health system for Bangladesh. The government's 'Digital Bangladesh 2021' vision has been embraced by the public health sector, and all levels of healthcare are connected to the national databases. A number of projects aimed at improving the health information system of Bangladesh have been launched, several in partnership with international collaborations. However, the extent to which T2D and CVD are covered by these initiatives is not well documented.

iv. Access to essential medicines

In 1982 Bangladesh became one of the first countries to adopt a national drug policy based on the essential medicines concept of the WHO. The national essential drug policy of Bangladesh was revised in 2005 and 2016 (6). A strategic plan for surveillance and prevention of non-communicable diseases was included in the National Health Policy of Bangladesh in 2011. This strategic plan recognised the need for provision on essential medicines for NCD, however it did not specify the drugs to be included or regulatory steps for their pricing, quality control or rational use. It has been identified that the national drug policy has failed to address the need of essential medicines for non-communicable diseases specially diabetes. Out of 209 essential medicines included in the list of essential medicines in 2008, there were only 30 medicines targeting NCD (7). Between 2005-2014 the average share of out-of-pocket spending on medicine in Bangladesh has been 67%.
Bangladesh has a growing pharmaceutical sector and a great potential to improve accessibility and affordability to essential medicines for diabetes and cardiovascular disease. At present about 97% of the total requirement of the country is produced locally (6). However, reforms are recommended for appropriate regulation of pricing and improving access to the population (8).

Essential medicines for treating NCD in Bangladesh

Category	Number of medicines	Names
Cancer	7	Cisplatin, cyclophosphamide, methotrexate, procarbazine, tamoxifen, vinblastine, vincristine
Diabetes	4	Glibenclamide, gliclazide, insulin, metformin
Cardiovascular disease	13	Atenolol, digoxin, enalapril, furosemide, glyceryl trinitrate, isosorbide dinitrate, nifedipine, methyldopa, procainamide, propranolol, spironolactone, verapamil, warfarin
Mental health disorders	5	Amitryptiline, fluorouracil, fluphenazine, haloperidol, lithium carbonate
Respiratory diseases	1	Salbutamol

v. Health Financing

The activities of the DGHS are financed by the Government revenue and project aid. In the 2017-18 fiscal year, the total allocation was 386,137 lakhs Taka (USD 454,244.6 thousand). Of this, 16,530 lakhs Taka (USD 19,445.6 thousand) has been allocated for the operational plan on NCDs. However, total health expenditure of Bangladesh approximately 3% of the GDP which is considered quite low by global standards. The government health expenditure is only about 0.7% of the GDP (9). The total out-of-pocket expenditure on health is approximately 67%. The new reforms proposed by the Health Economics Unit of the MOHFW has set a target for bringing down the out-of-pocket expenditure on health to 32% by 2032 (10). A recent study has identified that non-communicable diseases is one of the leading underlying reason for impoverishment due to health costs in Bangladesh (11)

vi. Leadership and governance

The multi-sectoral action plan for prevention and control of non-communicable disease 2018-2025 was launched with an initial three-year operational plan (Directorate General of Health Services, 2018) developed by the Non-communicable Disease Control Programme, Directorate General of Health Services, Ministry of Health and Family Welfare, Bangladesh. This outlines the policy framework and targets for prevention and control of NCD in Bangladesh. The action plan is expected to employ a “health in all policies” approach engaging multi-sectoral partners in this effort. The NCD control and prevention targets are aligned to WHO South-East Asia regional targets for 2025.

The action plan identifies four broad strategic action areas:

1. Advocacy, leadership and partnerships
2. Health promotion and risk reduction
3. Health system strengthening for early detection and management of NCDs and their risk factors
4. Surveillance, monitoring and evaluation and research

The three-year multi-sectoral operational plan is designed for implementation of the action plan. The implementation is overseen by the National Multi-sectoral NCD Coordination Committee (NMNCC) appointed by the Prime Minister and chaired by the Minister of Health and Family Welfare.

The key focus of the action plan is addressing four NCDs: namely, cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. The Government has started dialogue with stakeholders, including WHO, on measures to improve diets, including awareness campaigns on dietary salt reduction. The NCDC program is piloting community based NCD management model (preferably hypertension and diabetes) in some selected sub districts following WHO PEN (Package of Essential Non-communicable Disease) intervention. protocol.

2. India

i. Health service delivery

National Health Mission (NHM) of India, launched in 2005 is a flagship programme for expanding access to quality health care to rural populations. In 2013 two sub-missions, National Urban Health Mission (NUHM) and National Rural Health Mission (NRHM) were introduced. The NPCDCS aims to integrate NCD interventions in the NHM framework. NPCDCS has a different package of services for each level of facilities (Table 3)

Table 3. Package of services at each level of health facilities

Health Facility	Health Personnel	Package of Services
Sub-centre	Auxiliary Nurse Midwife (ANM) Male Health Worker	Health Promotion for behavior change and counselling Opportunistic screening for diabetes and hypertension Raising awareness on early signs of common cancers Referral of probable cases to CHC/ nearby health facility
PHC	Medical Officer in charge (MO-IC) Auxiliary Nurse Midwife (ANM) Male Health Worker	Health Promotion for behaviour change and counselling Opportunistic screening for diabetes and hypertension Clinical diagnosis and treatment of common CVD, hypertension, diabetes Identification of early signs of common cancers Referral of probable cases to CHC
Community Health Centres (CHC)/ First Referral Units (FRU)	Medical Officer (NCD) Nurse Counsellor Data Entry Operator Laboratory technician	Health Promotion for behavior change and counselling Early diagnosis through clinical and laboratory investigations Management of common CVD, diabetes, stroke Opportunistic screening of common cancers Referral of complicated cases to District Hospital/ higher health facility
District Hospital	General Physician General Nurse Midwife (GNM) Technician Physiotherapist	Health Promotion for behavior change and counselling Opportunistic screening of common cancers

	Counsellor Data Entry Operator **CCU** Specialist-Cardiology/ General Physician General nurse Midwife (GNM)	Diagnosis and management of CVD, Diabetes, stroke and Cancer (Out-patient, Emergency, In-patient, intensive care) Follow-up chemotherapy in cancer Rehabilitation and physiotherapy Referral of complicated cases to higher health facility
Medical College		Mentoring of District Hospitals Early diagnosis of CVD, Diabetes, cancer and associated illnesses Training of health personnel Operational Research
Tertiary cancer Centre		Mentoring of District Hospitals and out-reach activities Comprehensive cancer care including prevention, early diagnosis, treatment, palliative care and rehabilitation Training of health personnel Operational Research

ii. Health workforce

Integration of NPCDCS with the National Health Mission (NHM) resulted into augmented infrastructure and human resources particularly in the form of frontline workers- the ANM and the ASHA. These frontline workers are expected to participate actively in the population-based periodic screening of hypertension, diabetes, and common cancers (oral, breast, cervical cancers), to facilitate the early detection of common NCDs.

iii. Health Information systems

The Ministry of Health and Family Welfare, Government of India has set up the National Health Portal (NHP) to serve as a single point of access for consolidated health information and to provide healthcare related information to the citizens of India. The Centre for Health Informatics of the National Institute of Health and Family Welfare (NIHFW) is the secretariat for managing the activities of the NHP. Healthy lifestyle and health promotion related to NCD are among the major health initiatives under the NHP.

iv. Access to essential medicines

In India access to essential medicines is considered to be unsatisfactory. Although the first list of essential medicines was developed in 1996 and subsequently revised in 2003 and 2011, the government health expenditure on essential medicines varies widely across the states (12). The access to essential medicines in primary health care level is reportedly low and the main reason for this is poor affordability. However, the government of India is working towards addressing these gaps. The National List of Essential Medicines revised in 2015 contains 30 medicines in the category of Cardiovascular medicines (13). In addition there are four diuretics and five medicines identified under the category of insulins and other anti-diabetic agents (14).

v. Health financing

For low-income people, the government recently launched the tax-financed National Health Protection Scheme (Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana, or PM-JAY), which allows them to also get cashless secondary and tertiary care at private facilities.

Government-funded health insurance schemes:

a. **National Health Insurance Program (Rashtriya Swasthya Bima Yojana, or RSBY),** launched in 2008. As of 2016, some 41 million families were enrolled in RSBY. However, evidence indicates that the scheme has not significantly reduced out-of-pocket spending.

b. **Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana (PM-JAY)** - In March 2018, the central government approved the implementation of PM-JAY. This flagship public health initiative has been internationally recognized as a significant step toward achieving universal coverage in India. The initiative offers hospital coverage for the 40 percent of the country's population that is poor or low-income.

vi. Leadership and governance

Section 4.6 of the National Health Policy of India (2017) recognizes the need to halt and reverse the growing incidence in Chronic Diseases. It recommends the establishment of the National Institute of Chronic Diseases to generate evidence for adopting cost-effective approaches and showcase best practices. The policy supports an integrated approach with screening for chronic diseases and secondary prevention incorporated into the comprehensive primary health care network with linkages to specialist consultations and follow-up at the Primary Health Care level.

The National programme for prevention and control of cancer diabetes, cardiovascular disease and stroke (NPCDCS) was established in 2010 by merging the National Cancer Control Programme and the National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases and Stroke (NPCDS). The programme is currently implemented in 100 districts.

Prior to this, the pilot phase of the NPCDS programme was launched in 10 states in 10 districts in 2008. Under this programme it was proposed to have District NPDCS programmes in 626 districts, 35 State/ Union Territory NCD Cells and one National NCD Cell established in the Directorate General of Health Services at the central level. The National

NCD Cell is responsible for planning, providing overall guidance to States/UTs for implementation, monitoring and evaluation of the activities and achieving physical and financial targets of the programme. State/ UT NCD Cells are established in the Directorate of Health services in the state governments. District NCD Cells are established in the District Hospitals.

NCD Focal Centres were planned in 54 Medical Colleges, 626 District Hospitals, 3035 CHCs, 16778 PHCs and all sub-centres will be linked to this network through community level activities.

The National Action Plan and Monitoring Framework for prevention and control of NCDs was developed in 2013 in line with the WHO Global Action Plan and Monitoring Framework on NCD. In this framework, 21 indicators and 10 targets are identified to monitor the progress of the NCD control activities till 2025.

3. Sri Lanka

i. Health service delivery

The Ministry of Health, Sri Lanka initiated the Healthy Lifestyle Centres (HLCs) in 2011 as part of the National NCD Policy and Strategic Framework for Chronic NCDs to provide a high impact NCD screening service at primary care units. The central objective of HLCs is to reduce the risk of NCDs amongst 40-65 year olds through early detection of risk factors and detection and management of NCDs.

The screening and initial management of non-communicable diseases is delivered through HLCs established in Primary Medical Care Units and Divisional Hospitals. The HLCs are headed by Medical Officers or Registered Medical Practitioners (RMP). The target group for this service is those above 35 years of age with no past history of diabetes, hypertension and cardiovascular disease living in the catchment area of the institution. They are screened for lifestyle and metabolic risk factors using a detailed history, anthropometry, blood pressure measurement and capillary blood glucose and cholesterol tests. Their total CVD risk is estimated using WHO-ISH CVD risk prediction charts and managed depending on the risk level. Those needing treatment are treated. Those needing referral are referred to the next level. Everyone is given lifestyle counseling and follow up at the HLC. Currently this programme has low coverage (<50% of the target population).

There are plans to improve NCD related primary care services through the proposed Primary Health Care Strengthening Project of the Ministry of Health, which is funded by the World Bank.

ii. Health workforce

The health workforce operating at the community level and primary care institutions have been identified to play a key role in T2D and CVD prevention and management. The structure of the PHC system and the workers providing specific services are given in Table 4.

In secondary and tertiary care level, both non-specialist and specialist medical officers provide services for advanced and complicated patients with T2D and CVD.

Table 4. Structure of the PHC system and the health personnel providing services in Sri Lanka

Level	Personnel	NCD care roles
Community	Public Health Midwife	Health promotion, counseling, motivation for screening
	Public Health Inspector	Health promotion, counseling, motivation for screening
	Medical Officer of Health/ Additional Medical Officer of Health	Supervision of field staff
		Management of field health services
		Health promotion, counseling, motivation for screening
Primary Medical Care Units (PMCU)	Medical Officer in charge	Administration, Screening, Risk stratification, Lifestyle modification, Prescription, Referral
	Medical Officer Registered Medical Practitioner/ Assistant Medical Practitioner	Screening, Risk stratification Lifestyle modification Prescription Referral
	Dispenser	Maintaining drug stocks, Dispensing drugs
	Health Assistants	Screening support, Maintenance
Divisional Hospitals (DH)	District Medical Officer	Administration, Screening, Risk stratification Lifestyle modification Prescription Referral
	Medical Officer Registered Medical Practitioner/ Assistant Medical Practitioner	Screening, Risk stratification Lifestyle modification Prescription Referral
	Public Health Nursing Officer	Screening Health Promotion, Lifestyle modification
	Nurse	
	Dispenser	Maintaining drug stocks, Dispensing drugs

	Health Assistants	Screening support, Maintenance

iii. Health Information systems

The national policy on health information and the national health information strategic plan have been published in 2017. The policy gives direction to five areas related to health information systems to achieve its objectives. These are: Health Information related resources, Indicators and data elements, Data and information management, Data security, client privacy, confidentiality and ethics and e-health and innovations. The Health Information Unit of the Ministry of Health has developed a Hospital Information Management System (HIMS) for data collection and management. This data collection platform can be used for generating reports, data analysis and data exchange.

iv. Access to essential medicines

To ensure availability and access to medicines and reducing the need of the patients who utilize the state sector to purchase the medicines, the Ministry of Health, Sri Lanka, identified 16 NCD medicines and issued a circular (02-174/2013) in 2013 indicating them as a list of priority drugs to manage NCD at primary-level healthcare institutions, mandating them to be available in the healthcare institutions at all times (15). Thereafter, as a direct step to reduce out-of-pocket expenditure on medicines, the government regulated the price of 48 commonly prescribed groups of medicines by setting a price ceiling through a notice by Extraordinary Gazette's on 21 October 2016, revised in December 2017.
These 48 included 18 NCD drugs and 16 of them were also identified in the 2013 list of priority drugs to manage NCD at primary-level healthcare institutions. The pricing regulation announced in 2017 was based on a mechanism that uses the median price of any drug that commands a 2% or more market share by volume.

v. Health financing

Health is financed by the tax revenue of the government of Sri Lanka and supported by foreign aid. The total government expenditure on health is 2018 was LKR 234,899 million. Of this, LKR 1675 million (0.7%) has been spent on health promotion and disease prevention. The total allocation for control of communicable and non-communicable diseases has been LKR 2513 million (1.1%). The total allocation for NCD control appears to be less than 1% of the government health expenditure.

vi. Leadership and governance

The National Health Policy of Sri Lanka (2016-2025) has five broad strategic aims. One of them is strengthening service delivery to achieve preventive health goals. One of the objectives included under this is, reduction of morbidity and mortality due to NCD.

The National Policy and Strategic framework for prevention and control of chronic NCD (2009) has identified nine (9) key strategies for prevention and control of NCD.

National Health Council (NHC), the highest body for promoting inter-ministerial/ inter-sectoral collaboration and multi-sectoral partnerships, oversees the implementation of the National NCD Policy. The National NCD Steering committee will be the monitoring body on National NCD Policy implementation and will have high level representation from all relevant government agencies and development partners including local and international NGOs. It will meet every two months and will report to the Minister of Health. The National Advisory Board for NCD chaired by the Director General of Health Services is the advisory body on National NCD Policy implementation.

The NCD Prevention and Control Unit is headed by the Director, NCD Prevention and Control under the leadership of Deputy Director General, NCD Prevention and Control. It has a separate budget to ensure effective implementation of the National NCD Policy.

There will be a Technical Working group (TWG) of 8-10 members under the Director, NCD to provide technical inputs to the programme. At provincial and district level, the planning and coordination unit of the Provincial Directorates of Health Services and the NCD Cells of the Regional Directorates of Health Services will develop integrated plans consistent with the National NCD Policy. The district level activities will be planned and implemented by the District NCD teams headed by the RDHSs. These activities will be coordinated by Consultant Community Physicians or Medical Officers- NCD Prevention and Control with the support of other technical experts.

A results based monitoring and evaluation system is established to evaluate the implementation of the National NCD Policy. Monitoring and evaluation of the national NCD programme will be done by the Director, NCD Prevention and Control and will be presented to the National Steering Committee.

T2D and CVD management guidelines

The working group first identified the content to be included in a management guideline on T2D and CVD (Table 5).

Table 5. Contents to be included in a guideline on management of T2D and CVD

Main Content area	Sub topics	Description
Target Group	-	Criteria for defining the target group/s who should be managed using this guidelines
Assessment of participants	History	Guidance on conducting a comprehensive assessment of the participants
	Examination	
	Investigations	
Diagnosis	Hypertension	Guidance on the diagnostic process and the criteria for diagnosis of each condition
	Diabetes	
	Dyslipidaemia	
	CVD risk level	

Management	Hypertension	Guidance on the management of each of the conditions
	Diabetes	
	Dyslipidaemia	
	CVD risk level	
	Acute presentations of hypertension and diabetes	
Lifestyle modification	Overweight/ Obesity	Guidance on providing lifestyle modification counseling targeting each of the risk factors
	Diet	
	Physical Activity	
	Tobacco	
	Alcohol	
	Stress	
Care pathway		Description of the care pathway for participants with different conditions and risk levels

We then identified the most up-to-date and currently practiced guideline for management of diabetes and CVD in the three study countries and mapped their content against the content identified above (Table 5). The description of the selected guidelines for each country is in Table 6. Results of the mapping is illustrated in Table 7.

Table 6. Description of the currently practiced guidelines by country

Country	Guideline	Ownership	Contributors	Year	Reference
Bangladesh	National Protocols for Management of high blood pressure and diabetes using a total cardiovascular risk approach in primary health care settings (2nd Edition)	NCD Control Programme Directorate General of Health Services, Ministry of Health and Family Welfare	Association of Physicians, Bangladesh	2019	HEARTS Technical Package: risk based management, Draft Version 0.2 (2017)
			Japan International Cooperation Agency		HEARTS Technical Package for cardiovascular disease management in primary health care: evidence-based treatment protocols. Geneva: WHO 2018
			World Health Organisation		

India	National Programme for Prevention and Control of Cancer, Diabetes, Cardio-vascular disease and Stroke: Operational Guidelines (Revised 2013-2017)**	Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India	-	2013	-
Sri Lanka	(1) Management of Diabetes Mellitus-Guideline for Primary Health Care Providers	Non Communicable Disease Unit, Ministry of Health, Nutrition and Indigenous Medicine	Sri Lanka College of Endocrinologists, Sri Lanka Society of Internal Medicine, Ceylon College of Physicians	2018 -	
	(2) Cardiovascular Risk Management Guidelines for Primary Health Care Providers (Total CV Risk Assessment Approach)		Ceylon College of Physicians, Heart Association of Sri Lanka, Sri Lanka College of Endocrinologists	2018	
	(3) Management of Overweight and Obesity – Guideline for		Sri Lanka College of Endocrinologists, Sri Lanka Society of Internal	2018	

	Health Care Providers		Medicine, Ceylon College of Physicians, Sri Lanka Medical Nutrition Association, Nutrition Division, Nutrition Coordination Division, Family Health Bureau, Health Promotion Bureau, Ministry of Sports, Sri Lanka Sports Medicine Association.		

** These guidelines are operational guideline of the programme rather than management guidelines of identified conditions. Guidelines for management are included in the respective training manuals for doctors and allied health workers. They were not included in this review as they are covered in SA2.

Table 7. Mapping of current practice guidelines in relations to identified components

Component	Details	Country		
		Bangladesh	India	Sri Lanka
Target Group identification		√	√	√
Assessment	History	√	√	√
	Examination	√	√	√
	Investigations	√	√	√
Diagnosis	Hypertension	√	√	√
	Diabetes	√	√	√
	Dyslipidaemia	√	X	√
	CVD risk	√	X	√
Management	Hypertension	√	√	√
	Diabetes	√	√	√
	Dyslipidaemia	√	X	X
	CVD risk	√	X	√
	Acute presentations	√	√	√
Lifestyle modification	Overweight/ Obesity	√	√	√
	Diet	√	√	√
	Physical Activity	√	√	√
	Tobacco	√	√	√
	Alcohol	√	X	√
	Stress	X	X	X
Care pathway		√	√	√

After the first round of mapping, we conducted a detailed review of the content of the selected guidelines to identify the depth to which they cover the desired content. The results of this review is presented in Table 8 by country and main components.

Table 8. Detailed review of content in T2D and CVD management guidelines

Content area	Bangladesh	India	Sri Lanka
Target population	People over 40 years of age, especially those having risk factors for CVD including: • Tobacco use • Hypertension • Diabetes • Dyslipidaemia • Family history of premature CVD • History of diabetes or kidney disease • High waist circumference	People aged 30 years and above	People ≥ 35 years and those between 20-35 years with the following: • Smoking • Overweight • Raised BP • Symptoms suggestive of T2D • Family history (in a first degree relative) of diabetes/ premature CVD • Dyslipidaemia • History of Gestational Diabetes Mellitus (GDM)/ baby delivered with birth weight ≥ 3.5 kg • Features of Polycystic ovarian syndrome (PCOS)/ insulin resistance • Previously detected pre-diabetes
Assessment of participants	Detailed guidance of history taking, examination and conducting the relevant investigations are given under the topics (1) Ask and (2) Assess.	The assessment will include history, examination and investigation as follows: 1. History on alcohol and tobacco intake, physical	Detailed guidelines on history, examination and investigations for diagnosis and identifying complications are described.

	This section is very comprehensively written.	activity level, dietary habits and family and past history of blood pressure and blood sugar. 2. Examination will include general physical examination, measurement of BMI and blood pressure. 3. Blood sugar will be measured using a glucometer (strip method).	
Diagnosis	All diagnostic guidelines are described in detail.	Diagnostic criteria are given only for diabetes mellitus and hypertension.	Diagnostic guidelines are described in detail.
Management	Detailed guidelines on the management of each condition/ risk factor are given.	Principles of management at each level are described briefly.	Detailed guidelines on the management of diabetes and cardiovascular disease are available.
Lifestyle Modification	Comprehensive guidance on lifestyle modification is included.	Broad principles are outlined. Details are not available.	Basic guidance on lifestyle modification is included.
Care Pathway	Primary care pathway for integrated management of hypertension, diabetes and cholesterol using a total risk approach is illustrated and explained.	Referral pathway is indicated. The services available at each level of care and who should be referred to each level from the level below is described.	Care pathway within primary care and referral criteria for the next level of care (specialist care) is described in detail.

Discussion

Bangladesh, India and Sri Lanka have made a strong commitment towards NCD prevention and control through appropriate policy formulation and implementation plans. They have identified mechanisms for good service delivery covering the majority of the population or the entire population of the country with emphasis on reducing health disparities in NCD prevention and control. Each country has developed guidelines for healthcare workers engaged in NCD care. These guidelines are primarily focused on the assessment, diagnosis and management of diabetes, hypertension and CVD. However, the following limitations were identified:

- Financing for NCD control that includes T2D and CVD care is proportionately low.
- Although service delivery mechanisms are clearly defined, gaps in implementation exist.
- The training needs of different categories of health staff are not determined focusing on T2D and CVD.
- Although guidelines on disease management have been developed and ratified, the emphasis on lifestyle modification is minimal.
- The essential drug lists are not updated in a timely manner to include medications for T2D and CVD.
- Access to essential drugs is not equitable due to economic reasons.

Recommendations

- WHO health systems building blocks approach can be used to assess the health system on T2D and CVD care at country level. Evidence from this exercise will be helpful to identify weaker building blocks that need to be strengthened.
- The current management guidelines of the three countries studied, can be improved:
    - Bangladesh: In the management guidelines, including content on prevention of unsafe alcohol consumption and managing stress is recommended.
    - India: It will be important to develop management guidelines on T2D and CVD as the current guidelines only cover operational aspects. The new guidelines should include CVD risk stratification and content on lifestyle modification with adequate guidance on delivery of the relevant messages to the target audience.
    - Sri Lanka: The guideline can be improved by including content on lifestyle modification with adequate details on delivery of the relevant messages to the target audience.
    - Strengthening the health service delivery and training of the health workforce in line with improved guidelines will be essential for better prevention and control of T2D and CVD.

1. Siegel KR, Patel SA, Ali MK. Non-communicable diseases in South Asia: Contemporary perspectives. Br Med Bull. 2014;111(1):31–44.
2. Moran A, Vedanthan R. Cardiovascular disease prevention in South Asia: Gathering the evidence. Glob Heart [Internet]. 2013;8(2):139–40. Available from: http://dx.doi.org/10.1016/j.gheart.2013.04.001
3. World Health Organization. Health Statitics and Information Systems [Internet]. Disease burden and mortality estimates; Cause-specific mortality, 2000-2016. [cited 2020 Dec 19]. Available from: https://www.who.int/healthinfo/global_burden_disease/estimates/en/
4. World Health Organization. Monitoring the Building Blocks of Health Systems: a Handbook of Indicators and Their Measurement Strategies. World Heal Organozation [Internet]. 2010;35(1):1–92. Available from: http://www.annualreviews.org/doi/10.1146/annurev.ecolsys.35.021103.105711
5. Manyazewal T. Using the World Health Organization health system building blocks through survey of healthcare professionals to determine the performance of public healthcare facilities. Arch Public Heal. 2017;75(1):1–8.
6. DGDA. National Drug Policy 2016 (English Version). 2016;1–27. Available from: http://www.dgda.gov.bd/index.php/laws-and-policies/261-national-drug-policy-2016-english-version
7. Islam SMS, Islam MT, Islam A, Rodgers A, Chow CK, Naheed A. National drug policy reform for noncommunicable diseases in lowresource countries: An example from Bangladesh. Bull World Health Organ. 2017;95(5):382–4.
8. Murshid ME, Haque M. Bangladesh National Drug Policy 1982-2016 and Recommendations in Policy Aspects. Eurasian J Emerg Med. 2019;18(2):104–9.
9. World Health Organisation. Health Accounts, an overview on the public and private expenditures in health sector [Internet]. 2017. Available from: https://www.who.int/bangladesh/news/detail/05-10-2017-bangladesh-national-health-accounts-an-overview-on-the-public-and-private-expenditures-in-health-sector
10. Islam MA, Akhter S, Islam M. Health financing in Bangladesh: Why changes in public financial management rules will be important. Heal Syst Reform. 2018;4(2):65–8.
11. Datta BK, Husain MJ, Husain MM, Kostova D. Noncommunicable disease-attributable medical expenditures, household financial stress and impoverishment in Bangladesh. SSM - Popul Heal [Internet]. 2018;6(October):252–8. Available from: https://doi.org/10.1016/j.ssmph.2018.10.001
12. Rituparna Maiti, Vikas Bhatia, Biswa Mohan Padhy DH. Essential Medicines: An Indian PerspectiveNo Title. Indian J Community Med. 2015;40(4):223–32.
13. Report of the Core-Committee for Revision of National List of Essential Medicines. 2015;(November).
14. คณะกรรมการพัฒนาระบบยาแห่งชาติ. บัญชียาหลักแห่งชาติ National List of Essential Medicines. 2558;
15. NLEM 2013-2014 Sri Lanka.pdf. available at:

https://nmra.gov.lk/images/PDF/publication/publication_003.pdf