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How prepared are urban primary care facilities to manage hypertension and type 2 diabetes in Dhaka, Bangladesh? A cross-sectional descriptive study of government urban dispensaries and NGO clinics

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Abstract

Background In urban Bangladesh, rapid urbanisation is increasing the prevalence of hypertension (HTN) and type 2 diabetes (T2D). The plurality of providers, often with minimal public provision, adds complexity. We aimed to evaluate how well two categories of primary health care (PHC) facilities for poor urban residents – NGO-run clinics under the Ministry of Local Government, Rural Development and Cooperation and Urban Dispensaries (UDs) under the Ministry of Health and Family Welfare – are prepared to manage these two conditions.

Methods We performed a cross-sectional survey of all 19 UD and 32 NGO clinics in Dhaka between 1st July, 2022 and 25th February, 2023. We developed a bespoke tool to assess how prepared facilities were to manage patients with HTN and T2D based on the essential requirements in Bangladesh's *National Protocol for Management of Diabetes and Hypertension* (2019, 2nd edition). Trained researchers observed practices in facilities and consulted facility staff to complete the checklist to assess whether the components in the checklist were adequately in place or not. The components were grouped into domains covering training, guidelines, equipment, diagnostic tests, and drugs. We also developed a separate tool to assess facility preparedness in relation to information systems. We then created an overall preparedness outcome based on the total number of components adequately in place across all domains (excluding the information system tool) and outcomes looking at whether each separate component (including those from the information systems tool) was adequately in place or not. We analysed data using generalised linear models and marginal effects approaches to estimate percentage preparedness levels within facility and disease

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groups and percentage point differences in preparedness levels between facility and disease groups, along with associated 95% confidence intervals.

Results Overall levels of preparedness were lacking for both HTN and T2D conditions in both facility types. For HTN management, overall preparedness was 46.8% (95% CI: 41.6%, 52%) for UDs and 32.5% (95% CI: 30.5%, 34.5%) for NGO clinics. For diabetes management, overall preparedness was 31.6% (95% CI: 27.5%, 35.6%) for UDs and 34.9% (95% CI: 33.2%, 36.6%) for NGO clinics. Training and guidelines were absent for NGO clinics for both conditions, with varying levels of preparedness related to diagnostics and drugs in both facility types for the two conditions, although basic equipment levels were high across facility types for both conditions. Only UDs recorded diagnosis and prescriptions that can be recognised and retrieved, and neither had digital records or a designated person for data management. Patient feedback mechanisms were absent for UDs but present at a high level in NGO clinics.

Conclusion Urban PHC facilities in Dhaka have considerable gaps in preparedness to treat HTN and T2D. National and city-level governments must prioritise ensuring diagnosis, care, and treatment across all providers.

Keywords Hypertension, Type 2 diabetes, Primary health care, Non-communicable diseases

Introduction

Non-communicable diseases (NCDs) are a major cause of premature death worldwide, especially in low and middle income countries (LMICs) where 41 million people die each year due to NCDs, accounting for 77% of global mortality [1]. Urbanisation has been identified as a wider determinant driving NCDs, particularly in LMICs where higher levels of blood cholesterol, diabetes mellitus (primarily type 2 diabetes [T2D]) and Body Mass Index (BMI) are found to be associated with urbanisation [2]. However, urban health services in LMICs are typically struggling to respond to expanding populations and the increasing prevalence of NCDs in urban populations, particularly diabetes, hypertension (HTN) and other cardio-metabolic diseases [3].

Bangladesh, the focus of this study, is a prime example of rapid urbanisation with a higher proportion of the population living in urban areas than other South Asia countries, with the urban share of its population predicted to exceed its rural share before 2037 [4]. Studies have shown that the prevalence of HTN and T2D is higher among the urban population compared to the rural population [5]. In urban areas, HTN has increased from 26.2% in 2011 to 36.9% in 2017-18, and T2D has increased from 12.1% to 16.3% over the same period, resulting in annual average percentage increases of 5% and 4.5% respectively [6]. This burden also affects poorer groups disproportionately, with out-of-pocket cost as a percent of income being much higher for poorer urban citizens in Dhaka (out-of-pocket cost as a percentage of income was 32.7% for the poorest groups but only 5.2% for the richest) [7].

Pertinent to this context, one important challenge to providing standardised health care in urban Bangladesh is that there exists a plurality of health care providers (that is, multiple actors performing diverse roles), which includes the government, private sector organisations, non-government organisations (NGOs), and donor

agencies [8]. In addition, the broader health system has been described as “entrepreneurial”, with health service acquisition considered an individual’s responsibility subject to their economic capacity [8]. In a 2015 study of providers serving slum areas in Dhaka city, 80% of facilities providing primary care were found to be private facilities, such as private pharmacies or road side medicine corner, and the rest were NGO or public facilities [9].

Two key non-private providers of Primary Health Care (PHC) in urban Bangladesh are the Urban Dispensaries (UDs), also sometimes called Government Outdoor Dispensaries, administered by the Ministry of Health and Family Welfare (MoH&FW) [10], and NGO clinics, administered by the Ministry of Local Government, Rural Development and Cooperation (MoLGRD&C) [11]. These types of PHC facilities can be found throughout the country. The MoH&FW manages approximately 37 UDs across the nation [10], and in partnership with the eight city corporations (local, elected, governing bodies that manage civic services in the large metropolitan cities of Bangladesh) the MoLGRD&C oversees 135 clinics operated by a variety of NGOs across the nation [11]. The UDs and NGO clinics both play a crucial role in delivering PHC services in urban areas for various medical conditions, including HTN and T2D, for the urban poor (given their free/low-cost services) [8, 9, 12]. The PHC provision in metropolitan municipalities are organised fundamentally by the MoLGRD&C in its partnership with NGOs and Development Partners (DPs) [13], with the MoLGRD&C providing primary care by contracting out the service provision work to NGO clinics under the Urban Primary Health Care Services Delivery Project (UPHCSDP) [14]. UDs extend their services to areas not covered by NGO clinics, thereby ensuring that primary care reaches the non-project areas of the NGO clinics [8, 9]. This complementary distribution of services helps to

bridge gaps in health care access across different areas [8, 9].

The 2019 Bangladesh *National Protocol for Management of Diabetes and Hypertension - Integrated Management of High Blood Pressure, Diabetes and High Cholesterol Using a Total Cardiovascular Risk Approach* (referred to as the National Protocol from hereon) [15], produced by the Non Communicable Diseases Control Program (NCDC) of the (MoHf&W), addresses how PHC providers, in an environment with limited resources, can manage HTN and T2D patients. However, assessments of the level of preparedness of UDs and NGO clinics to appropriately manage HTN and T2D, as outlined by the National Protocol, and in other studies from similar contexts [16–21], have not been conducted to the best of our knowledge for the urban Bangladeshi setting. Additionally, while these types of studies have often included NGO clinics, we are not aware of any that have specifically looked at UDs.

This study aims to understand how prepared these two crucial PHC providers are to appropriately manage HTN and T2D in Dhaka (metropolitan municipality), in relation to the service provision requirements outlined by the National Protocol. In addition, we aimed to understand current recording and reporting systems within these facility types, as well as any processes to respond to patient feedback (which the National Protocol does not explicitly outline). The findings from our study will contribute to strengthening current policies and enhancing PHC services for NCDs among poor urban residents. This research also aims to provide valuable insights that can improve health outcomes and address the needs of urban dwellers more effectively among LMICs more generally.

Methods

Study design

This study was conducted as part of the Community-led Responsive and Effective Urban Health System (CHORUS) research programme consortium (chorusurban-health.org), funded by the United Kingdom's Foreign, Commonwealth and Development Office, and is part of a larger study aiming to develop and evaluate a health system intervention to strengthen the management of common NCDs, particularly HTN and diabetes, by UDs and NGO clinics in Dhaka city. We used a single-period, cross-sectional design to survey the level of preparedness of UDs and NGO clinics.

Study setting and facilities

Dhaka is divided into two municipal corporations: Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC) that roughly divide the city into a northern and a southern area. UDs and NGO clinics are

present in both the DNCC and DSCC areas. In the most recent 2022 census, it was estimated that the total population living in DNCC and DSCC was 10,278,882 [22], with 2% of the population within Dhaka division as a whole living in slums [22].

UDs are PHC facilities that focus on providing health care for urban the poor, along with the wider population, including school going students and government employees. UDs are typically set up in available spaces within government buildings or existing infrastructure, such as government official zones, government staff quarters, and inside schools. UDs provide a wide range of PHC services, including (1) reproductive health care, (2) maternal health care, (3) child health care, (4) vaccination services, (5) treatment (i.e. medication) for common communicable illnesses, such as respiratory infections, (6) counseling (healthy lifestyle and behaviours), and (7) screening, diagnostics, and treatment for NCDs, particularly HTN and diabetes. They can also refer patients to higher-level facilities for further treatment if needed. UDs handle health-related issues for a large volume of patients with limited resources, and are staffed by one medical doctor, more than one paramedic, known as a Sub Assistant Community Medical Officer, one pharmacist and one Medical Lower Subordinate Staff [23].

NGO clinics, which are located in different project areas, as defined by the UPHCSDP, also focus on catering to the urban poor, but are primarily focused on maternal and child health care issues [12, 14]. However, they also provide screening and management for common NCDs, particularly HTN and T2D. These clinics play a vital role in delivering essential PHC services to urban communities, ensuring that both general health care and NCD screening services are accessible. Unlike UDs, NGO clinics are equipped with lab-based services. They are staffed by one medical doctor, more than one paramedic, one pharmacist, one lab technician, one field supervisor, one receptionist, and usually more than one health promoter [13].

There were no eligibility criteria and all UDs and NGO clinics in the study areas were considered eligible.

Sampling

We took a census sample of all 19 UDs present in DNCC and DSCC, and all 32 NGO clinics present in DNCC.

Outcomes

We developed two preparedness indices, one for the management of HTN and one for the management of T2D. The indices were designed to measure the extent to which primary care facilities can appropriately and effectively manage HTN and T2D, as per the requirements specified in the National Protocol [15]. In addition, the indices also included components to assess the

presence of WHO PEN package guidelines and training for the effective management of these conditions, given the effectiveness and wide use of the WHO PEN package among LMICs, as shown in other studies [24–26]. The National Protocol specifies how a patient should be screened for HTN and T2D, via the use of appropriate equipment and diagnostic tests, and how they should be treated, with appropriate medication, follow-up visits and referral if required. We also drew on the advice of a panel of clinicians and health system experts with experience of the management of NCDs in Bangladesh as well as the WHO PEN package [24], to ensure that all items

were appropriate to the primary care context of urban Bangladesh.

As shown in Table 1, the HTN preparedness index includes four domains and the T2D preparedness index includes five domains, with two or three components per domain. For each preparedness index, each component relates to a specific requirement, based on the National Protocol and/or the WHO PEN package and/or our experts' inputs, that should be in place in the facility (along with all the other components) to enable the facility to appropriately and effectively manage that condition. We grouped components into logical domains based on their similarity. Both indexes include components that look at whether staff have been suitably trained to manage each condition, in relation to training from the MoH&FW's Non-Communicable Diseases Control (NCDC) programme, and the WHO PEN package. They also both look at whether suitable guidelines are available covering the management of each condition, again in relation to guidelines provided by the NCDC Programme and those provided by the WHO on the PEN package. Both also look at whether key medications are available to treat each condition. And both also look at whether key pieces of equipment are available to diagnose HTN and risk factors for managing T2D. The T2D preparedness index also looks at whether key diagnostic lab-tests are available to diagnose DM.

For the training domain we asked if the health care staff at the facility had received any training from the NCDC Programme of the Directorate General of Health Services (DGHS), MoH&FW. The component was recorded as in place if at least one health care staff member had received such training. Otherwise, it was recorded as not in place. The component looking at training on the WHO PEN package was measured in the same way. For the component looking at the availability of NCDC Programme guidelines, we asked if the facility had such guidelines to help them manage patients. We also asked if they had WHO PEN package guidelines to help them manage patients. For assessing the availability of equipment, diagnostic tests and drugs we asked if they had each of the components mentioned in Table 1. In our assessments of availability, we did not assess if there were adequate amounts of drugs available. Instead, we simply inspected whether these drugs were available for provision to patients.

For analysis, we then created overall and domain-wide and component-specific HTN and T2D preparedness outcomes from the indices. The overall preparedness outcomes were binomial outcomes that, for each facility, were based on the sum of the number of components that were in place out of the total number of components assessed for that outcome. The domain-specific preparedness outcomes were also binomial outcomes,

Table 1 Domains and components forming each preparedness index

NCD condition	Domains	Components
Hypertension	Guidelines	Availability of guidelines (from the NCDC) based on the National Protocol Availability of guidelines based on WHO PEN package
	Training	Training from the NCDC Programme Training on the WHO PEN package
	Equipment	Functioning manual sphygmomanometer Functioning weight machine Functioning height tape
	Drugs	Availability of Amlodipine (for first-line therapy) Availability of Losartan (for second-line therapy) Availability of Thiazide diuretic (for third-line therapy)
Diabetes	Guidelines	Availability of guidelines (from the NCDC Programme) based on the National Protocol Training from the NCDC Programme
	Training	Training on the WHO PEN package Availability of guidelines based on the WHO PEN package
	Equipment	Functioning weight machine Functioning height tape A functioning glucometer along with test strips, a lancing device and needles
	Diagnostic tests	Availability of blood glucose lab test: random blood glucose test/ fasting blood glucose test Availability of HbA1c: Haemoglobin A1c test Availability of oral glucose tolerance tests
	Drugs	Availability of Metformin (for first-line therapy) Availability of Gliclazide (for second-line therapy)

NCDC = Non-Communicable Diseases Control Program, WHO PEN = World Health Organization's Package of Essential Non-communicable (PEN) Disease Interventions for Primary Health Care

but they measured, for each facility, the number of components that were in place out of the total number of components assessed within each domain, on a domain-by-domain basis, for that outcome. Finally, the component-specific outcomes were binary outcomes measuring, for each facility, whether each relevant component being assessed was in place (1) or not (0), on a component-by-component basis.

For the multi-component (overall and domain-wide) outcomes we chose this simple approach to equal scoring of components (if in place/not) as all components are considered critical and required for adequate and effective diabetes and HTN services under the National Protocol, and there was no objective way to weight components differentially. So, this approach was chosen because the national protocol presents these components as essential, without hierarchical prioritization. Furthermore, equal weighting is a transparent and commonly used method in composite index development for health facility assessments, as it avoids introducing subjective bias regarding the relative importance of one element over another.

We conducted a preliminary assessment of the health information systems in both types of facilities (UDs and NGO clinics), developing a tool based on consultations with our expert panel (see above). For the tool each component was measured as a separate binary indicator of whether that component was in place (1) or not (0) within that facility. Our outcomes for this aspect of the survey focused on the presence of a data recording system, whether it was digitised, data compilation practices, and the existence of a separate NCD register for collecting NCD diagnosis and prescription information. We also inquired about the presence of a designated data manager, staff training in HMIS, and mechanisms for collecting patient feedback, as outlined in Table 2.

We have analysed the HMIS domain separately from the facility preparedness index because it measures a facility's capacity for longitudinal data management, which is conceptually distinct from the direct clinical

care readiness captured by the main index. Additionally, the components used for the preparedness index were found in the national protocol, but there was no clear guideline available on how to assess the health information system in it. Thus, we think that it is best to keep the two separate. Although the data relating to the presence and nature of any health information systems were not included in the preparedness indices due to their non-essential status in limited-resource settings, having a robust health information system is beneficial for tracking patients, monitoring adherence to procedures, and facilitating research through data provision. We therefore assessed them but separately.

Data collection

To ensure data quality and consistency, all research assistants underwent intensive, standardized training on the data collection questionnaire and the issue being researched. The research assistants also conducted routine data validation checks, immediately after the data was brought to office after each survey. The paper-based data sheets were then entered into an SPSS dataset and cleaned by the research assistants.

Responses were taken in the presence of the health care staff in-charge (i.e. the most senior official in the facility) and the rest of the staff present, at the time of the survey for each facility. We surveyed the facilities during the clinic hours and all the information was collected on single visits to each facility. For physical components (e.g. guidelines, equipment and medications) their presence was validated by the data collectors through visual confirmation. Each visit involved around a 30-minute to 60-minute stay. The research assistants recorded all responses on paper. The full questionnaire is available in Supplementary file 1 Table 1. The nature of the data collection (direct observation and staff interview) resulted in a 100% completion rate for the checklist. So, it was not necessary to impute statistical values for missing data.

Sample size

There are approximately 37 UD [10] and 135 NGO [11] clinics across the nation. We did not make a statistical sample size calculation when determining our sample size, but instead aimed to sample all 19 UD in DNCC and DSCC, and all 32 NGO clinics present in DNCC. Due to time and resource constraints, we did not aim to sample any NGO clinics from DSCC.

Statistical analysis

We used Stata version 17 for all analyses [27]. As all preparedness outcomes were binomial or binary, we summarised levels of preparedness using percentages and looked at absolute differences in levels of preparedness on the additive scale as percentage point differences, and

Table 2 Assessment of the health information system

Topic	Questions asked
Health Information system	Is there a system for regular health service data collection?
	Is there a system for regular compilation of health services Information?
	Is there a digital/computerized recording system available?
	Is there a separate NCD register available?
	Is there a system for recording and retrieving NCD diagnoses and medication prescriptions?
	Is there a designated health care personnel for managing health services data?
	Is there at least one staff member trained in Health Management Information Systems (HMIS)?
	Is there a patient feedback mechanism available?

we made inferences about those percentages and percentage point differences via their associated 95% confidence intervals. We described the mean percentage preparedness levels for the overall, domain-specific, and component-specific facility preparedness outcomes for both appropriate management of HTN and diabetes and separately by facility type. We also described the differences in mean percentage preparedness levels between UDs and NGO clinics for all these outcomes.

We estimated these percentages and differences between percentages and their 95% confidence intervals using binomial logistic regression models with outcomes of the overall and domain-specific preparedness outcomes (treating the summed count of readiness components that were present/functioning for the relevant outcome as the number of binomial “successes” and the number of components contributing to the relevant outcome as the number of binomial “trials”) and binary logistic regression models for the component-specific outcomes. We used Stata’s *glm* function to estimate the models, and to obtain percentage-scale results from these models we used Stata’s *margins* functions to estimate mean predicted probabilities for the outcomes (by facility type etc.) and differences in mean predicted probabilities for the outcomes (between facility types etc.) and their associated 95% confidence intervals (based on the delta method), which we then scaled by 100 to the percentage scale [28].

We also compared the mean percentage levels of overall and domain-specific preparedness levels between HTN and diabetes management just within UDs and similarly just within NGO facilities (we only compared the equipment and drug domains as the test domain was only collected for diabetes management). To estimate these percentage point differences and their 95% confidence intervals (within each facility type) for each type of outcome (overall/domain-specific) we stacked the relevant HTN preparedness outcomes on top of the relevant diabetes preparedness outcomes and also created a dummy indicator for whether the outcome values related to HTN or diabetes management. We then used binomial logistic regression models with the new preparedness outcomes and the HTN/diabetes management dummy indicator as the sole independent variable, and adjusted the standard errors for clustering (due to the repeated within-facility outcome measures) via a facility identifier (using the *vce(cluster)* option within the *glm* function). Then lastly, we again used the *margins* function to obtain the percentage point differences and 95% confidence intervals.

There were no missing data. However, some of the domain-specific or component-specific outcomes were constants (i.e. the underlying components were all either

always absent or present) for either one or both facility types. When this occurred, there was no clearly justifiable approach to calculate the corresponding 95% confidence intervals, so for these results we provide only the point estimate of the relevant mean percentage and percentage point difference.

Ethics

We obtained ethical clearance from the Bangladesh Medical Research Council (BMRC) and The University of Leeds. With Dhaka as our research focus, we were authorised by the DNCC allowing us to conduct a comprehensive health facility assessment survey at all 32 NGO clinics. Additionally, we obtained an approval letter from the Dhaka Civil Surgeon to conduct the same survey across all 19 UDs in Dhaka city. To ensure compliance with ethical guidelines, we developed an information sheet and consent form tailored for both types of facilities. We diligently obtained written consent from each facility’s administrative head and all healthcare staff who participated in the survey. We obtained informed written consent from all participants in the study.

Results

We surveyed the facilities between 1st July, 2022 and 25th February, 2023. All 19 UDs in DNCC and DSCC agreed to participate and all 32 NGO clinics in DNCC agreed to participate.

Hypertension and type 2 diabetes management

Hypertension preparedness levels

Figure 1 depicts that none of the individual facilities were fully prepared to appropriately manage HTN or were anywhere close to being fully prepared. The inadequateness in overall preparedness for each type of facility is depicted in Table 3 which shows that the mean preparedness levels for UDs was 46.8% (95% CI: 41.6%, 52%) and that for NGO clinics was 32.5% (95% CI: 30.5%, 34.5%) with the former having a mean preparedness level 14.3% points (95% CI: 8.9, 19.8) higher than the latter. Both UDs and NGO clinics preparedness levels were very low for all other domains other than equipment availability.

Type 2 diabetes preparedness levels

As per Fig. 2, none of the facilities were fully prepared to appropriately manage diabetes or were anywhere close to being fully prepared. From Table 3 we can see that the mean preparedness levels for UDs was 31.6% (95% CI: 27.5%, 35.6%) and that for NGO clinics was 34.9% (95% CI: 33.2%, 36.6%), with the latter having a mean preparedness level – 3.3% points (-7.7, 1) lower than the former. Both UDs and NGO clinics preparedness levels were very low for all other domains other than equipment availability.

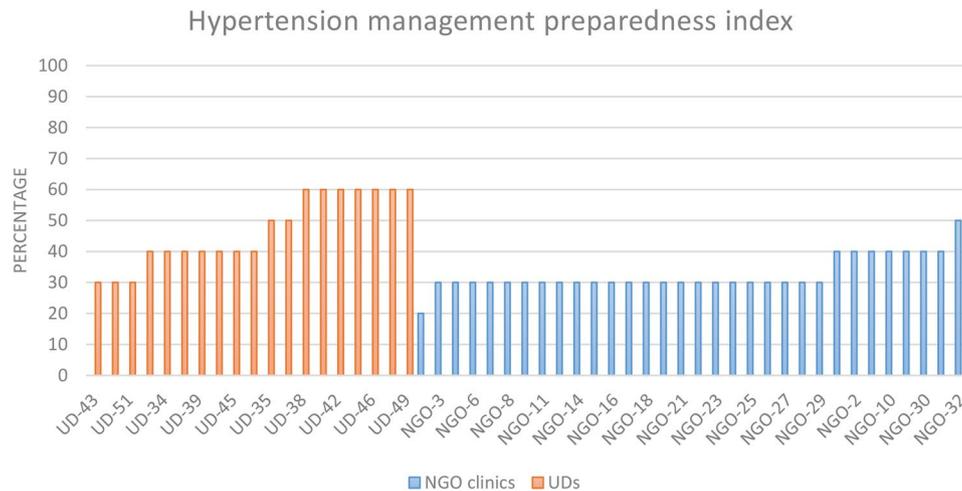


Fig. 1 Hypertension management preparedness levels for Urban Dispensaries and NGO clinics

Table 3 NCDC and WHO PEN training and guidelines

Criteria	Components	Urban dispensaries (n = 19)			NGO clinics (n = 32)			UD – NGO differences	
		% (95% CI)		PP (95% CI)	% (95% CI)		PP (95% CI)	PP (95% CI)	
		HTN	DM	HTN – DM difference	HTN	DM	HTN – DM difference	HTN related	DM related
Overall preparedness level		46.8% (41.6%, 52%)	31.6% (27.5%, 35.6%)	15.3PP (12, 18.5)	32.5% (30.5%, 34.5%)	34.9% (33.2%, 36.6%)	-2.4PP (-4.5, -0.2)	14.3PP (8.9, 19.8)	-3.3PP (-7.7, 1)
Guideline availability	Preparedness level for guideline availability	23.7% (12.2%, 35.2%)	23.7% (12.2%, 35.2%)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	23.7PP (CI: NA)	23.7PP (CI: NA)
	Guideline based on the National Protocol	47.4% (24.3%, 70.4%)	47.4% (24.3%, 70.4%)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	47.4PP (CI: NA)	47.4PP (CI: NA)
	Guideline based on WHO PEN	0% (CI: NA)	0% (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)
Training availability	Preparedness level for training availability	26.3% (14.8%, 37.8%)	26.3% (14.8%, 37.8%)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	26.3PP (CI: NA)	26.3PP (CI: NA)
	Training from the NCDC	52.6% (29.6%, 75.7%)	52.6% (29.6%, 75.7%)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	52.6PP (CI: NA)	52.6% (CI: NA)
	Training on WHO PEN	0% (CI: NA)	0% (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)	OPP (CI: NA)

NGO clinics did not receive any training or guidelines from the NCDC or on WHO PEN. In contrast, 52.6% of UDs received NCDC training and 47.4% received national guidelines, though none received training or guidelines related to WHO PEN. Where stand-alone percentages were 0%/100% or where comparisons involved one/both groups having an outcome of 0%/100% it was not possible to compute confidence intervals, which is indicated as CI: NA

NCDC = Non-Communicable Diseases Control Program, WHO PEN = World Health Organization's Package of Essential Non-communicable (PEN) Disease Interventions for Primary Health Care, UD = Urban dispensary, NGO = NGO clinic, PP = Percentage points, HTN = Hypertension, DM = Diabetes

Training and guideline availability for hypertension

As per Table 3, NGO clinics received no form of training on the NCDC Programme and neither did they receive any training on the WHO PEN package related to managing HTN. Similarly, the NGO clinics received no national guidelines or any guidelines related to the WHO PEN package in relation to managing HTN. However, the UDs were not completely neglected in relation to these preparedness components as 52.6% (95% CI: 29.6%, 75.7%) of them received training from the NCDC Programme, although none received any training related on the WHO PEN package, and 47.4% (95% CI: 24.3%, 70.4%) of the UDs also received national guidelines, although none

them received any guidelines related to the WHO PEN package.

Training and guideline availability for type 2 diabetes

As per Table 3, the NGO clinics received no form of training from the NCDC Programme and neither did they receive any training on the WHO PEN package related to managing T2D. Similarly, the NGO clinics received no national guidelines or any guidelines related to the WHO PEN package in relation to managing T2D. However, the UDs were not completely neglected in this regard as 52.6% (95% CI: 29.6%, 75.7%) of them received training from the NCDC Programme, although none

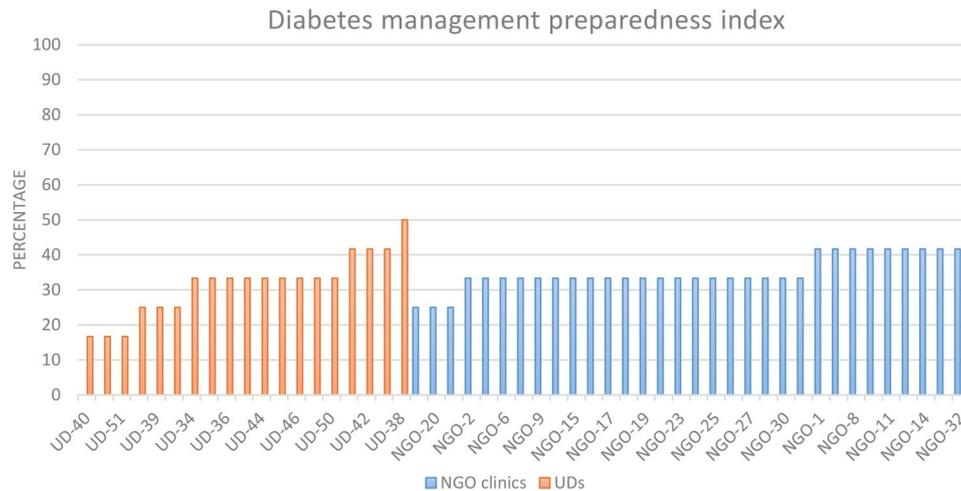


Fig. 2 Diabetes management preparedness levels for Urban Dispensaries and NGO clinics

received any training related to the WHO PEN package, and 47.4% (95% CI: 24.3%, 70.4%) of the UD received national guidelines, although none received any guidelines related to the WHO PEN package.

Medical equipment availability for managing hypertension

As per Table 4, all UD and NGO clinics had equipment to manually measure blood pressure, but both UD and NGO clinics had limited preparedness in terms of medicine availability for managing HTN. UD and NGO clinics had drug availability preparedness levels for managing HTN of 29.8% (95% CI: 25.1%, 34.6%) and 9.4% (95% CI: 3.3%, 15.4%) respectively, with the former having a mean drug availability preparedness level 20.4% points (95% CI: 12.9, 28) higher than the latter. For the UD, 89.5% (95% CI: 75.3%, 103.7%) had the first-line anti-HTN drug amlodipine available but none of them had the second-line (losartan) or third-line drugs (thiazide) available. For the NGO clinics, 25% (95% CI: 9.8%, 40.2%) had amlodipine and 3.1% (95% CI: 0%, 9.2%) had losartan but none of them had thiazide.

Medical equipment availability for managing type 2 diabetes

As per Table 4 and 63.2% (95% CI: 40.9%, 85.4%) of UD and 81.2% (95% CI: 67.5%, 95%) of NGO clinics had functioning glucometers along with glucose measurement strips, a lancing device and needles available, with the latter having a preparedness level 18.1% points (95% CI: -43.9, 7.7) higher than the former. In relation to diagnostic test availability for diagnosing diabetes these were absent from all UD, while the preparedness level for diagnostic tests diagnosing diabetes for NGO clinics was 45.8% (95% CI: 40.2%, 51.5%). All NGO clinics had random/fasting blood glucose tests available, but only 3.1% (95% CI: 0%, 9.2%) and 34.4% (95% CI: 17.7%, 51.1%) had

HbA1c tests and oral glucose tolerance tests available respectively.

In relation to the availability of medicines to manage diabetes, UD had an overall preparedness level of 18.4% (95% CI: 7.3%, 29.6%) while NGO clinics showed a 1.6% (-1.5%, 4.6%) level of preparedness, with the former having a preparedness level for overall drug availability 16.9% points (95% CI: 5.5, 28.2) higher than the latter. About 36.8% (95% CI: 14.6%, 59.1%) of UD had the first-line anti-diabetes drug metformin available but that preparedness level was only 3.1% (95% CI: 0%, 9.2%) for NGO clinics, with the availability of metformin for UD being 33.7% points (95% CI: 11, 56.5) higher than for NGO clinics. Neither UD nor NGO clinics had the second-line anti-diabetes drug (gliclazide) available.

Provision for health information collection

All facilities reported that they had a system to collect health services data but that it was not a digital/computerised one. 94.7% (95% CI: 84.4%, 100%) of UD and all NGO clinics reported that they compile reports containing health services information, but none of the facilities of either type reported having a separate NCD information collection register. However, 94.7% (95% CI: 84.4%, 100%) of the UD reported that they record their NCD diagnosis and medication prescriptions but none of the NGO clinics reported doing this. Furthermore, none of the facilities of either type reported having a separate designated person for managing health services data or having any staff who received any training from any institution on health management information systems. Finally, none of the UD reported having a system to collect patient feedback but 90.6% (95% CI: 80.4%, 100%) of NGO clinics reported having a mechanism for doing this (Table 5).

Table 4 Medical equipment availability

Criteria	Components	Urban dispensaries (n = 19)			NGO clinics (n = 32)			UD – NGO differences	
		% (95% CI)		PP (95% CI)	% (95% CI)		PP (95% CI)	PP (95% CI)	
		HTN	DM	HTN – DM difference	HTN	DM	HTN – DM difference	HTN related	DM related
Basic equipment availability	Preparedness level for overall basic equipment availability	93% (85%, 101%)	80.7% (68.1%, 93.3%)	12.3PP (4.9, 19.7)	99% (96.9%, 101%)	92.7% (87.9%, 97.6%)	6.2PP (1.7, 10.8)	-6PP (-14.1, 2.2)	-12PP (-25.3, 1.2)
	Functioning manual blood pressure apparatus	100% (CI: NA)	NA	NA	100% (CI: NA)	NA	NA	OPP (CI: NA)	NA
	Functioning Glucometer with strip and lancing device	NA	63.2% (40.9%, 85.4%)	NA	NA	81.2% (67.5%, 95%)	NA	NA	-18.1PP (-43.9, 7.7)
	Functioning weight machine	94.7% (84.4%, 105.1%)	NA	NA	100% (CI: NA)	NA	NA	-5.3PP (CI: NA)	NA
	Height tape	84.2% (67.4%, 101.1%)	NA	NA	96.9% (90.8%, 103%)	NA	NA	-12.7PP (-30.3, 5)	NA
	Diagnostic test	Preparedness level for overall diagnostic test availability	NA	0% (CI: NA)	NA	NA	45.8% (40.2%, 51.5%)	NA	NA
RBG/FBG		NA	0% (CI: NA)	NA	NA	100% (CI: NA)	NA	NA	-100PP (CI: NA)
HbA1c		NA	0% (CI: NA)	NA	NA	3.1% (0%, 9.2%)	NA	NA	-3.1PP (CI: NA)
OGTT		NA	0% (CI: NA)	NA	NA	34.4% (17.7%, 51.1%)	NA	NA	-34.4PP (CI: NA)
Drug availability		Preparedness level for overall drug availability	29.8% (25.1%, 34.6%)	18.4% (7.3%, 29.6%)	11.4PP (0.5, 22.3)	9.4% (3.3%, 15.4%)	1.6% (0%, 4.6%)	7.8PP (1.8, 13.9)	20.4PP (12.9, 28)
	Amlodipine	89.5% (75.3%, 103.7%)	NA	NA	25% (9.8%, 40.2%)	NA	NA	64.5PP (43.9, 85.1)	NA
	Losartan	0% (CI: NA)	NA	NA	3.1% (0%, 9.2%)	NA	NA	-3.1PP (CI: NA)	NA
	Thiazide	0% (CI: NA)	NA	NA	0% (CI: NA)	NA	NA	OPP (CI: NA)	NA
	Metformin	NA	36.8% (14.6%, 59.1%)	NA	NA	3.1% (0%, 9.2%)	NA	NA	33.7PP (11, 56.5)
	Gliclazide	NA	0% (CI: NA)	NA	NA	0% (CI: NA)	NA	NA	OPP (CI: NA)

All UD and NGO clinics had manual blood pressure apparatuses, but glucometer availability was higher in NGO clinics. In terms of diagnostic tests for diabetes, NGO clinics offered them with limited provision of OGTT and HbA1c. However, both centres showed low medicine availability, with UD having higher availability of first-line drugs (amlodipine and metformin)

UD = Urban dispensary, NGO = NGO clinic, PP = Percentage points, HTN = Hypertension, DM = Diabetes, RBG/FBG = Random blood glucose/fasting blood glucose, OGTT = Oral Glucose Tolerance Test. Where stand-alone percentages were 0%/100% or where comparisons involved one/both groups having an outcome of 0%/100% it was not possible to compute confidence intervals, which is indicated as CI: NA. Where a component (or comparison) was not applicable given the condition (e.g. metformin is only used to treat diabetes not hypertension) this was indicated by NA

Discussion

To the best of our knowledge, this is the first study to assess how prepared two crucial PHC providers (UDs and NGO clinics) are at appropriately and effectively managing patients with HTN and T2D, when considering the requirements set by Bangladesh's National Protocol, within Dhaka, and the first to report on preparedness levels among UD within Bangladesh for these conditions. Thus, findings from this study will provide crucial insights into the Bangladeshi PHC system, which mainly

serves the poor in Bangladesh's metropolitan municipalities, and may provide useful information for LMICs more generally. This study clearly highlights that UD and NGO clinics in this setting are inadequately prepared to appropriately and effectively manage HTN and T2D across most of the factors assessed, with significant variation in preparedness levels also observed across UD and NGO clinics.

The facilities surveyed are mostly frequented by people of lower socio-economic background because

Table 5 Health information system and recording scenario

Assessment areas	% (95% CI)		PP (95% CI)
	Urban dispensaries (n = 19)	NGO clinics (n = 32)	UD – NGO differences
A system to regularly collect health service data is available	100% (CI: NA)	100% (CI: NA)	0PP (CI: NA)
Regularly compiles reports containing health services information	94.7% (84.4%, 105.1%)	100% (CI: NA)	-5.3PP (CI: NA)
Has a digital/computerised recording system	0% (CI: NA)	0% (CI: NA)	NA
Has a separate NCD register	0% (CI: NA)	0% (CI: NA)	0PP (CI: NA)
Records NCD diagnosis and medication prescriptions such that they can be recognised and retrieved	94.7% (84.4%, 105.1%)	0% (CI: NA)	94.7PP (CI: NA)
Has a separate person to manage health services data	0% (CI: NA)	0% (CI: NA)	0PP (CI: NA)
Has at least one staff member who received HMIS training	0% (CI: NA)	0% (CI: NA)	0PP (CI: NA)
Is a patient feedback system available	0% (CI: NA)	90.6% (80.4%, 100.9%)	-90.6PP (CI: NA)

PP = Percentage points. Where stand-alone percentages were 0%/100% or where comparisons involved one/both groups having an outcome of 0%/100% it was not possible to compute confidence intervals, which is indicated as CI: NA. Note: All UD and NGO clinics collected health service data manually. While most UD and all NGO clinics compiled reports, none had a separate NCD register or trained HMIS staff. UD recorded NCD diagnoses and prescriptions, whereas NGO clinics had available the patient feedback system

they provide either free or low-cost care, and it is the urban poor who are most vulnerable to the cost burden of chronic illnesses like HTN and T2D. A recent study showed that the out-of-pocket cost as a percent of income is higher for the poorer urban citizens in Dhaka [7], and in a review paper it was also shown that HTN and diabetes ranked in the top 10 most common reasons for visiting primary care (the 2nd and 7th most common reasons respectively in LMICs) [29]. However, this lack of preparedness and low quality of care are key reasons for patients not going to such PHC facilities, and instead seeking care in private facilities or secondary- or tertiary-level facilities [30], which increases the patient load in these facilities.

Our finding of the inadequate level of training and guidelines in urban PHC facilities is consistent with the nationally representative Bangladesh Health Facility Survey (BHFS) in 2017 [31], which showed that just 34% and 41.2% of urban health facilities had staff member(s) who received some form of training for HTN and diabetes respectively. The 2017 BHFS also showed a low level of guideline availability for managing HTN and diabetes respectively (less than 16% for both) among urban facilities. Other research has shown that only 33% of PHC facilities at the sub-district level (known as upazilla

health complexes) and 16.2% of NGO/private facilities had at least one staff member trained in some aspect of diabetes management, while only 62% of PHC facilities and 60% of NGO/private facilities had guidelines for diabetes management [21]. In the rural areas of Bangladesh, guidelines which come with appropriate orientation training for both HTN and T2D are widely followed, though NGO clinics have been found to mostly not follow these due to lack of orientation and time constraints [32]. Similarly, staff in urban facilities usually receive little to no training [33]. Therefore, it is also important to make sure that the training and guidelines provided are feasible, practical and adequate to meet standards within a low-resource and high patient volume health setting.

Regarding basic medical screening equipment availability, we found that both facility types had higher levels of basic equipment. The BHFS 2017 showed that among urban facilities that provided HTN management 99% had blood pressure measuring equipment, 72% had either glucometer with strips, a lancing device and needles or blood chemistry analysers available, more than 94% had adult weighing scales, and 64.6% had height measuring equipment. Our study highlighted that both types of facilities were better prepared in relation to basic equipment availability compared to any of the other domains. This is probably due to the relatively lower cost of the basic equipment compared to meeting the requirements of the other domains. For example, drugs require frequent replenishment while a one-time bought basic piece of equipment can function for a long time. Similarly, training and guideline provision require more intellectual investment and higher-level staff time, and practically useful training and guidelines can be hard to develop. And diagnostic lab tests are also typically much more expensive than basic equipment.

Our study showed that all NGO clinics provided blood glucose measuring tests, but very few provided HbA1c or oral glucose tolerance tests (OGTT) for diabetes. However, none of the UD provided any such diagnostic tests. Recent studies showed that in 2018, 86% of sub-district level PHC facilities and 93% of NGO/private facilities had blood glucose measuring lab tests [21]. Another study conducted in 2021 showed that 63% of sub-district level PHC facilities had blood glucose measuring tests and only 2% provided HbA1c tests [16]. Furthermore, another study conducted in 2021 showed that 54% of a range of PHC facilities (at the sub-district level and below as well as private facilities) provided either HbA1c or OGTT tests [17]. Thus, blood glucose tests were more common among primary care facilities compared to HbA1c or OGTT tests. This is probably due to HbA1c and OGTT costing more, making them less suitable for low-resource settings and/or high patient volume settings.

We found predominantly inadequate amounts of medications for HTN and diabetes in both UD and NGO clinics, and drug availability was reduced progressively for second-line and third-line therapy drugs. The BHFS 2017 showed that from the urban health facilities that provided HTN management care 53% had calcium channel blocking medicines, such as amlodipine or nifedipine, 50% had losartan, and 17% had thiazide available. While among those that provided diabetes care, 53% of facilities had metformin available. A recent study showed that for HTN 100%, 98% and 53% of PHC facilities had amlodipine, losartan and thiazide available, respectively [16]. Another recent study showed that 48% of sub-district level PHC facilities and 57% of NGO/private facilities had metformin available [21]. However, studies often do not report on gliclazide availability. All these findings indicate that it is more common for facilities to have first-line therapy drugs available for either HTN or diabetes while second-line therapy drugs are less frequently available and third-line therapy drugs even less so. This is understandable as progressively fewer patients will require second and third-line therapy.

Our study also showed that both UD and NGO clinics had deficiencies in health information collection systems, lacking any digital records and any separate designated personnel for data management. While UD lacked any patient feedback mechanisms, almost all NGO clinics had some mechanism in place. A recent qualitative study showed that lack of a digitised health information system was an important barrier to NCD management at the primary care level, especially, because patients usually failed to bring medical information documents given to them for follow-up visits, and that the lack of the digital records meant that no surveillance data was generated to assess for prevalence [32]. Thus, it seems that while a health information system exists, it is not calibrated to adequately serve the needs of the patients, the facilities, or researchers in the facilities that we surveyed.

From our findings we see that the National Protocol, which was published in 2019 to standardise treatment procedure, had not been adequately implemented in public and NGO run PHC facilities in urban Bangladesh as of the end of 2022. This problem, of a lack of implementation of policies, has been highlighted by related studies, such as a study conducted in PHC facilities [34] and another study conducted on NCD policies [35], both of which address NCD management in Bangladesh. These studies showed that though policies were developed, implementation and monitoring efforts were not adequate. Consequently, to facilitate adoption in the PHC facilities we followed National Protocol instead of using the WHO SARA tool in this study.

Our findings on the suboptimal preparedness for HTN and diabetes care are not unique to Dhaka and reflect a

broader challenge across many low- and middle-income countries (LMICs), though the specific nature of the gaps varies. A common theme across South Asia and Sub-Saharan Africa is the critical shortfall in the availability of essential medicines. In Nepal, only about half of facilities had first-line drugs like amlodipine or metformin available [36], a situation mirrored—and in some cases surpassed in terms of lower performance—in our study. This issue is even more acute in some African settings; primary care facilities in Kenya and Nigeria reported near-total stock-outs of antihypertensive and diabetes medications [37, 38], while in Ethiopia, the availability of metformin and amlodipine was below 45% [39]. However, India fared better with 74% of PHC having metformin and amlodipine being the most widely available of drugs [40].

A second, widespread challenge is the lack of trained staff and clinical guidelines. In our study, training was largely absent in NGO clinics, a finding consistent with studies in India, Ethiopia and Kenya, where only a half or less of health workers had received training on either conditions [38, 39, 41]. The availability of guidelines was also low in India (23%) [41] and Ethiopia (19%) [39], though better in Kenya (60%) [38]. This contrasts with a notable outlier: primary care facilities in Myanmar's Shan state demonstrated high preparedness, with over 70% of facilities receiving training and nearly all having essential medicines and equipment [42]. This exceptional case proves that well-prepared primary care for NCDs is achievable in an LMIC context and provides a benchmark for what is possible.

Finally, the mixed availability of basic equipment and diagnostics reveals an important nuance. Similar to the high levels we observed in Dhaka, studies in Nepal, Tanzania, India, and Ethiopia confirmed that basic equipment like BP apparatus and weighing scales, and height measuring tapes are commonly available [36, 39, 40, 43]. However, the capacity for diagnosis and monitoring cracks at the next level; the availability of glucometers and test strips was, was found to be low in Nepal and Nigeria [36, 37], and advanced diagnostics like HbA1c testing were virtually absent in Kenya [38]. This pattern suggests that while the most fundamental tools for detection are in place, the systems for ongoing management and monitoring of NCDs are not.

The urban PHC preparedness gap for HTN and diabetes is a widespread systemic issue, but its manifestation varies and is context-specific. But, the consistent deficits in drug supply and staff training across diverse settings highlight these as fundamental, high-priority areas for global and national intervention. The case of Myanmar demonstrates that systemic improvement is possible and this provides a good source of inspiration for other LMICs.

Strengths and limitations of this paper

The strength of this study is that it uses the National Protocol as a basis to assess the preparedness levels of these types of PHC facilities to manage HTN and diabetes. This ensures the findings are relevant to policy making in Bangladesh and directly inform policy makers about the implementation of the policy so far. Secondly, this study conducted a survey of both types of PHC facilities available to the urban poor for accessing free or low-cost care for common NCDs within the major metropolitan municipality of Dhaka, reflecting the complexity of the urban context in this country, and (to the best of our knowledge) exploring these issues in this specific setting for the first time.

There are certain limitations of this study. Firstly, the representative strength of the sample beyond the study area may be weak, because we surveyed UDs and NGO clinics from only Dhaka and not the whole of Bangladesh. Dhaka is the capital of Bangladesh and its most densely populated city. The largest number of UDs and NGO clinics are located here compared to any other division in Bangladesh, but those located elsewhere may differ systematically in preparedness levels. Secondly, because we could not survey NGO clinics of the DSCC the sample may not be adequately representative of NGO clinics in the whole Dhaka city. However, since the DSCC and DNCC operate under the MoLGRD&C, NGO clinics of the latter can still be a good representation of the former. The healthcare system in Bangladesh is pluralistic and complex, especially in the urban areas. The primary, secondary, and tertiary level provision in the rural areas is mainly done by the MOH&FW, and there are a small number of NGOs and private providers [10]. In the Urban areas, especially in areas where the poor live, the vast majority of the provision is done by private providers (80%), and the rest by NGOs and the public sector [9]. Here, the MOH&FW also provides secondary and tertiary care, and also some primary care through a few UDs. But primary care is primarily the responsibility of MoLGRD&C in the urban areas and it provides this service in partnership with NGO clinics. Thus, the UDs and the NGO clinics that we studied make up a small but crucial part of government provision in the primary health-care scenario.

Finally, the study developed a questionnaire that aligns with the management procedure set forth National Protocol for HTN and diabetes management in PHC settings, 2019. Thus, preparedness levels may not be readily comparable to that of other studies that use standardised questionnaires such as the WHO SARA tool [44]. However, many of the components included in our study are the same and so can be compared to those in the other studies, such as the components in the medicines, diagnostic tests, and basic screening equipment domains.

Conclusion

Although both types of urban primary health care centres – UDs and NGO clinics – remain insufficiently prepared to manage T2D and HTN in line with the National Protocol. For HTN management, overall preparedness was 46.8% (95% CI: 41.6%, 52%) for UDs and 32.5% (95% CI: 30.5%, 34.5%) for NGO clinics. For diabetes management, overall preparedness was 31.6% (95% CI: 27.5%, 35.6%) for UDs and 34.9% (95% CI: 33.2%, 36.6%) for NGO clinics. And the health information system is not calibrated to adequately serve the needs of the patients, the facilities, or researchers (especially, due to the complete absence of a digitized system and training for health information management). The data presented here clearly highlight that much needs to be done to enhance existing health care providers' capacity and improve the availability of essential equipment and medicines to ensure better service delivery in urban primary care settings to appropriately and effectively manage common NCDs, such as HTN and T2D.

Recommendations for policy and practice.

The domains in our study refer to the three key aspects in the management of T2D and HTN: education (the training and guideline domains), screening (equipment and diagnostic tests domains), and treatment (medicines domain). We therefore recommend that these facilities urgently be strengthened with regard to education, screening and treatment capacity to enable appropriate and effective management of these conditions. Furthermore, clear standardised guidance regarding appropriate health information systems for managing NCDs should be formulated, and facilities adequately empowered to collect, manage and effectively use such data.

The identified gaps provide national and city-level policymakers with a clear roadmap for action. Although a formal cost-effectiveness analysis was beyond the scope of this study, the results highlight clear priorities for highly efficient investment. Because, ensuring reliable supplies of low-cost, essential medicines like antihypertensives and metformin is one of the most cost-effective interventions to prevent debilitating and expensive complications like stroke, heart disease, kidney disease and other major problems. Similarly, investing in targeted training for existing primary care staff on guideline-based management represents another high-impact, low-cost strategy. Furthermore, establishing simple, standardized patient record systems—paper-based or digital—is a foundational step towards enabling continuity of care and performance monitoring without requiring substantial financial resources.

One challenge is that both UDs and NGO clinics are overseen by two different ministries (the MoH&FW and the MoLGRD&C). Because their service delivery processes and areas of jurisdiction differ, both ministries

have traditionally placed less emphasis on establishing a long-term coordination mechanism. Thus, we also recommend that there needs to be a sustainable coordination mechanism between the MoH&FW and MoLGRD&C to ensure long-term effective health care services for the urban residents, especially the poor, seeking care in these clinics for such NCDs, given the complex and pluralistic urban health ecosystem that currently exists.

Abbreviations

BHFS	Bangladesh Health Facility Survey
DNCC	Dhaka North City Corporation
DSCC	Dhaka South City Corporation
DGHS	Directorate General of Health Services
HMIS	Health Management Information System
HTN	Hypertension
LMIC	Low-/Middle-income Country
MoHF&W	Ministry of Health and Family Welfare
MoLGRD&C	Ministry of Local Government, Rural, and Development Cooperatives
NGO	Non-governmental Organisation
NCD	Non-communicable Disease
NCDC	Non-communicable Disease Control
OGTT	Oral glucose tolerance test
WHO	World Health Organization
PEN	Package of Essential Non-communicable (PEN) Disease Interventions for Primary Health Care
SARA	Service Availability and Readiness Assessment
T2D	Type 2 Diabetes
UD	Urban Dispensary

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

M.S. and U.S.A. conceptualized the study and wrote first and all subsequent drafts of this paper, and both should be considered as co-first authors for this paper. D.B. made substantive contribution to the conception of the paper, and has supervised the study. J.H. contributed substantively to the methodology, statistical analysis, and interpretation of results. And J.H. also provided comments and made significant edits in drafting the manuscript. K.I., H.E., and R.H. made significant edits to the introduction, discussion and conclusion sections. K.I., H.E., and R.H. also contributed substantively in revising the paper. All authors reviewed the paper.

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Data availability

The dataset used and analysed for this study will be available from the corresponding author(s) on reasonable request.

Declarations

Ethics approval and consent to participate

The University of Leeds (No. MREC 21 – 008 CHORUS _____) and the Bangladesh Medical and Research Council (BMRC) (BMRC/NREC/2019–2022 / 485) both granted Ethical Clearances for the study.

With Dhaka as our research focus, we were authorized by the Dhaka North City Corporation (DNCC) allowing us to conduct a comprehensive health facility assessment survey at all 32 NGO clinics. Additionally, we obtained an approval letter from the Dhaka Civil Surgeon to conduct the same survey across all 19 Urban Dispensaries (UDs) in Dhaka city. To ensure compliance with ethical guidelines, we developed an information sheet and consent form tailored for both types of facilities. We diligently obtained written consent from each facility's administrative head and all healthcare staff who participated in the survey. We obtained informed written consent from all participants in the study.

Consent for publication

Not applicable as the manuscript does not contain data from any individual.

Competing interests

The authors declare no competing interests.

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References

- World Health Organization. Non-communicable diseases: Key facts 2023 [Internet]. [cited 2023 Sept 20]. Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.
- Goryakin Y, Rocco L, Suhrcke M. The contribution of urbanization to non-communicable diseases: evidence from 173 countries from 1980 to 2008. *Econ Hum Biology*. 2017;26:151–63.
- Eley H, Agyepong I, Huque R, Quayyem Z, Baral S, Ebenso B, et al. Rethinking health systems in the context of urbanisation: challenges from four rapidly urbanising low-income and middle-income countries. *BMJ Global Health*. 2019;4(3):e001501.
- United Nations, Department of Economic and Social Affairs, Population Division. World urbanization prospects: the 2018 revision (ST/ESA/SER.A/420). New York: United Nations: United Nations; 2019.
- Hoq MI, Hossain M, Jahan S, Mahmud H, Akter F, Mahmud F, et al. Trends in the prevalence of hypertension and type 2 diabetes in Bangladesh (2010–2020): A systematic review and Meta-Analysis. *Curr Diabetes Rev*. 2023;19(6):e290422204250.
- Sathi NJ, Islam MA, Ahmed MS, Islam SMS. Prevalence, trends and associated factors of hypertension and diabetes mellitus in Bangladesh: evidence from BHDS 2011 and 2017–18. *PLoS ONE*. 2022;17(5):e0267243.
- Sarker AR, Ali SMZ, Ahmed M, Chowdhury SMZI, Ali N. Out-of-pocket payment for healthcare among urban citizens in Dhaka, Bangladesh. *PLoS ONE*. 2022;17(1):e0262900.
- Ahmed SM, Alam BB, Anwar I, Begum T, Huque R, Khan JA, et al. In: Naheed A, Hort K, editors. Bangladesh health system review. World Health Organization; 2015.
- Adams AM, Islam R, Ahmed T. Who serves the urban poor? A Geospatial and descriptive analysis of health services in slum settlements in Dhaka, Bangladesh. *Health Policy Plan*. 2015;30(Suppl 1):i32–45.
- Ministry of Health & Family Welfare of Bangladesh. Health Bulletin 2021 Dhaka B. 2023. 351 p. Available from: <https://old.dghs.gov.bd/images/docs/vpr/Health%20Bulletin-2021.pdf>.

11. Government of Bangladesh. Ministry of Local Government Rural Development and Co-Operatives. Urban Primary Health Care Services Delivery- home. [cited 2023 Dec 11]. Available from: <https://uphcdp.gov.bd/>.
12. Reza HM, Sarkar MAM. Service providing scenario of urban primary health care services delivery project working in selected municipality. *Int J Community Med Public Health*. 2019;6(7):2764–7.
13. Primary health care systems (PRIMASYS): comprehensive case study from Bangladesh [Internet]. Geneva: World Health Organization. 2017 [cited 2024 Apr 26]. Available from: <https://ahpsr.who.int/publications/i/item/primasys-comprehensive-case-study-from-bangladesh>
14. Bangladesh Urban Primary Health Care Services Delivery Project. [The Center for Health Market Innovations. [cited 2023 Oct 25]. Available from: <https://healthmarketinnovations.org/program/bangladesh-urban-primary-health-care-services-delivery-project>.
15. National protocols for management of high blood pressure. And diabetes, using total cardiovascular risk approach, at primary health care setting (Second Edition). 2nd ed. Dhaka: Directorate General of Health Services, Government of Bangladesh; 2019.
16. Jubayer S, Hasan MM, Luna M, Al Mamun MA, Bhuiyan MR, Sayem NN, et al. Availability of hypertension and diabetes mellitus care services at subdistrict level in Bangladesh. *WHO South-East Asia J Public Health*. 2023;12(2):99.
17. Kabir A, Karim MN, Billah B. The capacity of primary healthcare facilities in Bangladesh to prevent and control non-communicable diseases. *BMC Prim Care*. 2023;24:60.
18. Alam W, Nujhat S, Parajuli A, Banyira L, Mohsen WAM, Sutradhar I, et al. Readiness of primary health-care facilities for the management of non-communicable diseases in rural Bangladesh: a mixed methods study. *Lancet Global Health*. 2020;8:S17.
19. Biswas T, Haider MM, Gupta RD, Uddin J. Assessing the readiness of health facilities for diabetes and cardiovascular services in Bangladesh: a cross-sectional survey. *BMJ Open*. 2018;8(10):e022817.
20. Islam MR, Laskar SP, Macer D. A Study on Service Availability and Readiness Assessment of Non-Communicable Diseases Using the WHO Tool for Gazipur District in Bangladesh. *Bangladesh J f Bioeth*. 2016;7(2):1–13.
21. Chowdhury HA, Paromita P, Mayaboti CA, Rakhshanda S, Rahman FN, Abedin M, et al. Assessing service availability and readiness of healthcare facilities to manage diabetes mellitus in Bangladesh: findings from a nationwide survey. *PLoS ONE*. 2022;17(2):e0263259.
22. Bangladesh Bureau of Statistics and Informatics Division, Ministry of Planning Population & Housing Census. 2022 Preliminary Report Government of the People's Republic of Bangladesh. Population & Housing Census 2022 Preliminary Report [Internet]. 2022. Available from: [https://sid.portal.gov.bd/sites/default/files/files/sid.portal.gov.bd/publications/01ad1ffe_cfef_4811_af97_594b6c64d7c3/PHC_Preliminary_Report_\(English\)_August_2022.pdf](https://sid.portal.gov.bd/sites/default/files/files/sid.portal.gov.bd/publications/01ad1ffe_cfef_4811_af97_594b6c64d7c3/PHC_Preliminary_Report_(English)_August_2022.pdf).
23. Anee US, Salaudinn M, Afrin S, Chowdhury F, Jahan NB, Barua D et al. Urban Dispensaries and Primary Healthcare in Dhaka. [cited 2024 Apr 25]. Available from: <https://chousurbanhealth.org/blog-urban-dispensaries-and-primary-healthcare-in-dhaka/>.
24. WHO package of essential noncommunicable (PEN) disease interventions for primary health care. Geneva: World Health Organization. 2020. 77 p. Available from: <https://www.who.int/publications/i/item/9789240009226>.
25. Kempers J, Rotaru C, Topa A, Zarbailov N, Curteanu A, Prytherch H. Does training on the WHO package of essential noncommunicable (PEN) disease interventions enhance consultation quality? A real-world assessment of adherence to PEN protocol in primary health centres in the Republic of Moldova. *Global Health Action*. 2023;16(1):2285619.
26. Hyon CS, Nam KY, Sun HC, Garg R, Shrestha SM, Ok KU, et al. Package of essential noncommunicable disease (PEN) interventions in primary health-care settings in the Democratic people's Republic of Korea: A feasibility study. *WHO South East Asia J Public Health*. 2017;6(2):69–73.
27. StataCorp. Stata statistical software: release 17. College station. TX: StataCorp LLC; 2021.
28. Kleinman LC, Norton EC. What's the risk? A simple approach for estimating adjusted risk measures from nonlinear models including logistic regression. *Health Serv Res*. 2009;44(1):288–302.
29. Finley CR, Chan DS, Garrison S, Korownyk C, Kolber MR, Campbell S, et al. What are the most common conditions in primary care? *Can Fam Physician*. 2018;64(11):832–40.
30. Kabir A, Karim N, Billah B. Preference and willingness to receive non-communicable disease services from primary healthcare facilities in Bangladesh: A qualitative study. *BMC Health Serv Res*. 2022;22(1):1473.
31. National Institute of Population Research and Training (NIPORT). and ICF. Bangladesh Health Facility Survey 2017. Dhaka, Bangladesh: NIPORT, ACPR, and ICF; 2019.
32. Kabir A, Karim MN, Billah B. Health system challenges and opportunities in organizing non-communicable diseases services delivery at primary healthcare level in Bangladesh: A qualitative study. *Front Public Health*. 2022;10:1015245.
33. Rahman MR, Islam M, Faiz M, Chowdhury H, Hoque M, Mashreky S, et al. Readiness of health Professionals, undergraduate medical curriculum and on-the-job training on noncommunicable diseases in Bangladesh to achieve program Objectives- an operational research study. *J Bangladesh Coll Physicians Surg*. 2022;9:95–105.
34. Islam K, Huque R, Saif-Ur-Rahman KM, Ehtesham Kabir ANM, Enayet Hussain AHM. Implementation status of non-communicable disease control program at primary health care level in Bangladesh: findings from a qualitative research. *Public Health Pract*. 2022;1:3.
35. Biswas T, Pervin S, Tanim MIA, Niessen L, Islam A. Bangladesh policy on prevention and control of non-communicable diseases: a policy analysis. *BMC Public Health*. 2017;17(1):582.
36. Nakarmi CS, Bhattarai S, Rhodes EC, Dhimal M, Baral PP, Poudel B et al. Primary healthcare system readiness for the prevention and management of non-communicable diseases in Nepal: a mixed-methods study. *Res Sq*. 2025;rs.3.rs-6755631.
37. Nwakile PC, Ekanem US, Uchendu OC, Odili AN. Service-specific readiness for hypertension and diabetes care and its related factors in primary health facilities in Akwa Ibom State, Nigeria: A comparative service availability and readiness assessment study. *Niger J Med*. 2023;32(6):653.
38. Ouma OJ, Omondi D, Museve E, Owenga J, Bogers J, Abrams S, et al. Assessing the capacity of primary healthcare facilities and healthcare workers in managing diabetes and hypertension in Kisumu county, Kenya. *BMC Health Serv Res*. 2025;30(1):1221.
39. Mulugeta TK, Kassa DH. Readiness of the primary health care units and associated factors for the management of hypertension and type II diabetes mellitus in Sidama, Ethiopia. *PeerJ*. 2022;10:e13797.
40. Krishnan A, Mathur P, Kulothungan V, Salve HR, Leburu S, Amarchand R, et al. Preparedness of primary and secondary health facilities in India to address major noncommunicable diseases: results of a National Noncommunicable Disease Monitoring Survey (NNMS). *BMC Health Serv Res*. 2021;21(1):757.
41. Srinivas V, Urs V, Kumar NS, Arora NK, Raghav P, Das S, et al. Preparedness of public & private health facilities for management of diabetes & hypertension in 19 districts in India. *Indian J Med Res*. 2025;161(4):327–35.
42. Aung WH, Kitreerawutiwong N, Keeratisiroj O, Jariya W. Health service Readiness, Availability, and utilization of primary health care facilities for Non-Communicable diseases in Shan State, Myanmar. *Iran J Public Health*. 2022;51(6):1303–12.
43. Adinan J, Manongi R, Temu GA, Kapologwe N, Marandu A, Wajanga B, et al. Preparedness of health facilities in managing hypertension & diabetes mellitus in Kilimanjaro, Tanzania: a cross sectional study. *BMC Health Serv Res*. 2019;31(1):537.
44. World Health Organization. Service availability and readiness assessment (SARA) [Internet]. [cited 2024 Jan 3]. Available from: <https://www.who.int/data/data-collection-tools/service-availability-and-readiness-assessment-sara>.

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