



# Implementation status of non-communicable disease control program at primary health care level in Bangladesh: Findings from a qualitative research

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## ABSTRACT

**Objective:** Bangladesh has 67% of estimated deaths caused by non-communicable diseases (NCDs). The country aimed to reduce NCD-related premature deaths by one-third by 2030. This study aimed to explore the overall implementation status of the NCD control program at the primary health care (PHC) level in Bangladesh, explore the challenges, and identify the way forward for better implementation.

**Study design:** Qualitative study.

**Methods:** Key informant interviews and observations of NCD service delivery at Upazila Health Complexes (UzHC) were conducted. Data were analyzed using framework analysis.

**Results:** NCD is prioritized in policy documents however, implementation remains weak. The operational plan indicators focus mostly on the process, which is hampering the quality of care. The primary health care (PHC) facilities are not yet fully ready to deliver all ranges of NCD care including mental health. The national NCD management protocol for PHC addressed health workforce scarcity through task shifting and team-based care which is yet to be scaled up nationwide. Record-keeping is poor as it is done manually. District health information software (DHIS2) is not yet capturing NCD monthly service provision data and not tracking indicators. Awareness for NCD screening at community clinics, and referral to the NCD corner of UzHC is operational in around 66 Upazilas of 31 districts, which needs to scale up nationwide.

**Conclusions:** NCD management protocol implementation, availability of drugs, diagnostics, electronic database development, updated DHIS2 to track indicators, and engagement of stakeholders to influence public policies on shared risk factors are important to achieve universal primary care for NCDs.

## 1. Introduction

Non-communicable diseases (NCDs) are the leading cause of mortality globally, causing about 70% of all deaths. Around 16 million people are dying prematurely before the age of 70 because of NCDs, and 82% of these deaths are from low and middle-income countries (LMICs) [1]. According to the World Health Organization (WHO), by investing 1 to 3 US\$ per person per year, illness and death from NCDs can be reduced dramatically, and every US\$1 invested in the proven interventions for NCDs will produce a return of at least US\$7 by 2030 [2].

Bangladesh has 572,600 (67%) estimated deaths caused by NCDs annually, with 22% probable premature deaths [3]. The National Health System of Bangladesh was reviewed in 2017 to look for medicines that are essential and categorized as generally available to treat major NCDs. It was found that only 5 out of 10 medicines were available at PHC facilities [4].

The four major NCDs (cardiovascular diseases, cancer, diabetes, and chronic respiratory diseases) are adding to multimorbidity (overweight, obesity, mental stress, renal failure, osteoporosis, depression, disability, Tuberculosis, HIV/AIDS, etc.) in patients and creating health system and

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**Table 1**  
Category, designation and expertise wise distribution of the key informants (N = 16).

Category	Designation	Relevant Expertise
1st group of KI were policy makers (n = 4) Designated as KI 1,2,3,4	High officials working with MOH&FW (Retired 1, and on job 3, one of them was mental health expert)	<ul style="list-style-type: none"> <li>- Contributing to policy decisions at the national level working with MOH&amp;FW.</li> <li>- Involved in developing the health sector programs.</li> <li>- Designing and implementing PHC program nationwide.</li> <li>- Designing and reviewing the NCDC OPs, and monitoring NCD program.</li> <li>- Contributing to mental health policy, strategy, action plan development, conducting nationwide surveys and supporting introduction of mental health care at PHC level.</li> </ul>
2nd group of KIs were the program managers (n = 4) Designated as KI 5,6,7,8	High officials at the directorate general of health services (DGHS).	<ul style="list-style-type: none"> <li>Implementing the NCDC program nationwide,</li> <li>- Ensuring capacity development of health workforce (HWF) for NCD care.</li> <li>- Dealing with supply chain management of NCD drugs and diagnostics.</li> <li>- Conducting monitoring and supportive supervision of NCD Program.</li> <li>- Reporting at the national level.</li> <li>- Taking innovative approaches in NCDC program to conduct implementation research.</li> </ul>
3rd group of KI were the Upazila health and family planning officers (UH&FPOs) (n = 8), Designated as KI 9,10, 11, 12, 13, 14, 15, 16	UHFPO is the manager of UzHC which is the highest level of PHC facility at the subdistrict. These UzHCs had been visited to observe the NCD corners.	<ul style="list-style-type: none"> <li>- Managing the UzHC to ensure ESP delivery from the facility.</li> <li>- Managing the NCD corner to ensure NCD care.</li> <li>- Implementing the preventive, and promotive PHC for NCD in the whole Upazila (subdistrict).</li> <li>- Sharing monthly reports to the DGHS.</li> <li>- Monitoring the below level facilities.</li> <li>- Four of the UzHC were implementing the NCDC program with government resources only and,</li> <li>- 4 UzHCs were receiving technical assistance from the development partners (DPs) to improve the quality of NCD service delivery. The DPs were supporting health system strengthening (HSS) of UzHC in different ways.</li> </ul>

socio-economic burden to the country [5–7]. The national health budget partly supports the specialized NCD care, and 67% of total health expenditure is met by households out of pocket (OOP) which is the highest in South-East Asia [8]. It is recommended that integrated PHC with the expansion of essential service packages (ESP) and healthcare financing are vital for achieving universal health coverage (UHC) [9].

Therefore, prevention and control of NCDs with ESP is important to minimize the OOP expenditure and the country counted on PHC in this

regard. Because by utilizing PHC Bangladesh achieved millennium development goal 4 for the under-five mortality rate [10]. Following the same strategy, the Ministry of Health and Family Welfare (MOH&FW) decided to strengthen PHC to address NCDs while implementing the 4th Health, Population and Nutrition Sector Program (HPNSP) from 2017 to 2022 [11]. For prevention of premature death and for achieving UHC, the NCD control (NCDC) operation plan (OP) of HPNSP is focusing on promoting a healthy lifestyle, preventing risk factors, screening for early diagnosis, and management of NCDs at PHC facilities [12].

The country is halfway to implementing the 4th HPNSP, drafting the next five-year plan, and NCDC is a priority in the sector program. More importantly, there is less than a decade away from achieving the sustainable development goal (SDG) 3 [13], while COVID-19 has made it more challenging. This study aimed to have a closer look at the implementation status of the NCDC program at the PHC level in the country, and explore the facilitators and barriers to implementation. The findings will help the program implementers to address the challenges while reviewing the OP and the policymakers to prepare the next 5-year plan. The other LMICs having similar contexts will also be benefited from the findings.

## 2. Method

To explore the implementation status of the NCDC program, an in-depth understanding of the situation using an exploratory design was essential. Therefore, we collected primary data using the qualitative research method from the key informants who shared their views regarding the challenges and the facilitators. This was supplemented by structured observation of the NCD corner of the Upazila Health Complexes (UzHCs).

Data were collected from January to March 2020. The method is described below:

### 3. Key informant interview

The objective of the key informant interview (KII) was to get an overview of the overall implementation status of the NCDC program at the PHC level, recognize the challenges and note down the facilitators that might improve the implementation status.

To formulate the guideline of the KII, we decided to use the set of 10 indicators of the WHO NCD progress monitor which was developed in 2014. The indicators reflected the wider perspective of control of NCD risk factors, the implementation status, and the burdens of the program [3]. While developing the guideline, to embrace the whole program and all NCDs we picked up other indicators as well which were not covered by the progress monitor. Two co-investigators, with two data collectors, conducted the KII. The 16 key informants (KIs) working at different tiers were selected purposively (see Table 1). Data were collected up to the data saturation level observed by the lead investigator. Each interview lasted for around 40 min and the interviewers were refrained from probing and asking leading questions. Interviews were recorded, transcribed, and translated.

### 4. Structured observation at Upazila Health Complexes

We visited the UzHCs, which are generally fifty-bed hospitals providing PHC in the Upazila. Some of the UzHCs are hundred-bed hospitals and depending on the availability of HWF provide some secondary care.

The UzHC was the main facility to implement NCDC OP and the NCD corner was designated to provide hypertension and diabetic care following the national protocol. The protocol was developed contextualizing the World Health Organization's package of essential non-communicable (WHO PEN) disease interventions for primary health care in low-resource settings (14). The remaining NCD-related services provided by the UzHCs were not following any protocol or were not

recorded properly. The objective of the field visit was to observe the implementation status of the national protocol for the management of hypertension and diabetes at the PHC level and the status of other NCD care provided. Therefore, we decided to focus on the NCD corner.

In consultation with the NCDC program, we purposively selected eight UzHCs where the national protocol rolled out to provide the services through the NCD corner. Out of these eight UzHC, four were run by the government system only and the remaining were supported by the DPs through HSS. We developed an observation checklist to conduct structured observation of the UzHCs maintaining the sequences mentioned in the checklist. We focused on the implementation status of the NCDC program and the situation of the NCD corner. The checklist addressed details of the scenarios which were, 1) Services delivered from the NCD corner, 2) Availability of NCD drugs and diagnostics, 3) provision of counseling services, 4) Record-keeping, and 5) Conduction of health education sessions in the patient waiting area. Teams comprising one co-investigator and a research assistant were engaged in the observation. The data collection team was intensely trained in data collection techniques. Non-participatory observations were conducted as the coinvestigator and the research assistant were sitting with the checklist and notes were compiled following the checklist. To ensure quality, the lead investigator was engaged in the monitoring and evaluation of the data collection process.

## 5. Data analysis

The data from KII were analyzed following the indicators of the WHO NCD progress monitor 2020, and other indicators beyond. A framework analysis was conducted after reading the transcribed and translated data several times. A deductive approach was considered with a set of a priori themes to align with the WHO NCD progress monitor. In addition, we looked for any other emerging themes.

The data of the structured observation were summarized narratively following the scenarios observed.

## 6. Results

### 6.1. Results from KII

The findings from KII following the indicators of the WHO NCD progress monitor are as follows;

**Indicator 1: The National NCD target and indicators** - In the 4th HPNSP the national NCD indicators were identified and targets were fixed as informed by the KIs. However, there were two result framework indicators, which were not fully aligned with SDG indicators, and there were five indicators for NCDC OP, three of which were process-related. At the implementation level, the activities which were reflected by the indicators were prioritized, budgeted, and implemented while the others remain neglected. Therefore, the KIs recommended the revision of indicators.

‘We give our best effort to achieve targets which are reflected by the indicators and inadvertently less prioritize the activities which are not reflected by the indicators’ (KI\_6; Program Manager)

**Indicator 2: Mortality Data** - the KIs informed that the routine vital registration system to capture the deaths and causes of death was absent in the country. They mentioned that most of the death certificates record the cause of death as ‘Cardio-Respiratory Failure’. It was also mentioned that initiatives had been taken by a different program to capture the mortality data through a pilot project the findings of which were not contributing to the decision-making process of the NCDC program. The KIs opined that the recording of number and causes of death was crucial for health program planning and budgeting therefore, the routine vital registration system should be scaled up nationwide.

‘The priority causes of morbidity and mortality should be identified properly. This will help evidence-based budget allocation for NCD management’ (KI-1; Policy Maker).

**Indicator 3: Risk factor surveys** - the findings informed that the last NCD risk factor survey was conducted in 2018, with the publication of the factsheet only in 2019, while the full result publication was pending during the study period of the first quarter of 2020. Also, there was a long gap between the previous publication in 2010 and the conduction in 2018 one. KIs opined that the non-availability of nationally representative data hampers health planning and budgeting.

‘The full report has not yet been published, and we don’t have up to date data to refer to’ (KI\_2; Policy Maker).

**Indicator 4: National integrated NCD policy/strategy/action plan** - the KIs shared that the country developed the Multisectoral Action Plan with ‘Health in All Policy’ and ‘Whole of society approach’, emphasizing engagement of stakeholders to influence public policies on shared risk factors such as tobacco use, unhealthy diet, physical inactivity, harmful use of alcohol, and exposure to poor quality air. The KIs also informed that a national multisectoral coordination committee was formed involving around 30 ministries, organizations, institutes, etc. with the NCDC program of DGHS as the secretariat. Also, committees were formed at different geographical levels with initiatives for risk factor control [13]. The KIs suggested that the NCD risk factors need to be addressed through initiatives like ‘healthy city’, ‘school health’ etc. However, they expressed their disappointment in experiencing challenges in involving the non-health sector and recommended providing more effort to deal with those sectors.

‘The notion of the community about a healthy city is that a model city will be built by the program or DPs. It is difficult to make them understand that everyone has a role to play to make a city healthy.’ (KI\_5; Program Manager)

**Indicator 5: Tobacco demand-reduction measures** - the findings informed that for tobacco demand-reduction, MOH&FW was implementing a program based on the WHO framework convention on tobacco control and Tobacco Control Law of Bangladesh. The program made good progress in community awareness creation, graphic health warnings introduction, training of law enforcement officers, journalists, HWF, sanitary inspectors, etc. The KIs felt the need of strengthening tobacco control laws, the capacity to enforce laws through training of law enforcement authority, better enforcement of tobacco advertisement, promotion, and sponsorship ban. They recommended regular monitoring, strengthening tobacco control coordination mechanism, resource allocation, and evidence generation through regular population-based surveys to contribute to tobacco control initiatives. KIs opined for imposing a higher tax for the reduction in affordability of tobacco products and for nicotine replacement therapy to be included in the essential drug list.

‘Among all NCD risk factors, we could make good progress in tobacco control as different stakeholders and groups of activists are working in many different areas.’ (KI\_4, Policymaker)

**Indicator 6: Harmful use of alcohol reduction measures** - The KIs informed that less work had been done in this area including community awareness creation and capacity building of HWF. They felt that to address substance use disorders and mental health disorders, DGHS needed to coordinate with the Directorate of narcotic control, and the Ministry of Women and Children Affairs. The NCDC program should emphasize ensuring the quality of pharmacological, and psychosocial treatment, aftercare, and rehabilitation services. The KIs suggested surveying the prevalence and risk factors of substance abuse.

‘Though harmful use of alcohol is not a priority problem yet, the target group may be associated with smoking and substance abuse.’

Therefore, we need to address the issue seriously.’ (KI\_7; Program Manager).

**Indicator 7: Unhealthy diet reduction measures** - the KIs informed that activities had been started to reduce salt, sugar-sweetened beverages, and *trans*-fat in food. They also informed that marketing to children restriction was addressed in the tobacco control policy, though the law enforcement was weak.

‘NCD risk factor reduction is an important area to work on, and we are yet to see strong enough civil society movement to curb risk factors like salt, sugar-sweetened beverage, *trans*-fat, etc.’ (KI\_9; UHFPO)

**Indicator 8: Public education and awareness campaign on physical activity** - the findings informed that this indicator couldn’t make much progress, though the NCDC program took different initiatives to encourage physical activities e.g., awareness campaign using different media and involving frontline HWF, supplied video clips endorsed by district commissioners and city mayors to encourage school-based physical activity, etc.

‘Creating awareness is not enough; we need to take a multisectoral approach to create opportunities for physical activity.’ (KI\_10; UHFPO).

**Indicator 9: Guidelines for the management of cancer, cardiovascular disease (CVD), diabetes, and chronic renal disease** - the KIs informed that there was a national strategy for cancer management and treatment focusing on the tertiary facilities. They suggested that the management protocol should be updated to include primary care as well. Regarding cervical cancer screening and management, it was revealed that this activity was going on at the PHC level, though, hospital and population-based cancer registries were yet to be introduced. The ‘National protocol for the management of hypertension and diabetes for PHC’ was developed contextualizing the WHO-PEN protocol, which was rolling out nationwide [14,15]. The national protocol for COPD and Asthma for PHC had been developed and waiting for implementation.

‘The private practitioners working as GPs and clinicians working at higher facilities need orientation regarding national PHC protocols so that they may be actively involved in encouraging patients to adhere to it.’ (KI\_11; UHFPO).

**Indicator 10: Drug therapy/counseling to prevent heart attacks and strokes** - the findings informed that the activities related to treatment and counseling to prevent heart attacks and strokes were going on in the field. The protocol for hypertension and diabetes management emphasized screening at the community clinic (CC) using physical and biochemical measurements and referral to the NCD corner of UzHC for CVD risk assessment with diagnosis confirmation, and management by the physician. The protocol had been implemented in 66 UzHCs including the CCs in the catchment area of 31 districts, and additional 203 UzHCs were running NCD corners. The KIs suggested that community awareness for lifestyle modification, drug compliance, care for the elderly and disabled, and improved care-seeking patterns need to be addressed more.

‘Demand has been created for NCD care. Now we have to improve the quality and maintain the sustainability of care which needs good governance and increase fund allocation.’ (KI\_12; UHFPO).

**Other NCD indicators beyond progress monitoring:** the KIs informed that the NCDs and health issues that were not reflected in OP indicators, were rarely being prioritized. Road traffic injury (RTI), disability, and other chronic diseases (e.g., Occupational health, drowning and burn injury, gender-based violence, intentional and animal injury, snakebite and poisoning, the health hazard for climate change, oral health, and environment, etc.) were not properly budgeted and not being addressed adequately by the NCDC OP. They also

mentioned that in the current practice, geriatric issues, palliative care, ear conditions, physiotherapy, thalassemia, renal disease, etc. were treated mostly at tertiary facilities which were increasing household OOP expenditure. They suggested that PHC and home-based rehabilitation for these NCDs should be available.

‘We need to address all NCDs at the PHC and community level, also home-based rehabilitation care should be introduced which may reduce OOP expenditure’ (KI\_13; UHFPO).

**Mental Health:** The KIs emphasized the need for MH training in undergraduate medical (MBBS), nursing, and midwifery curricula, including adequate stake at the examination. They shared that the majority of private and few public medical colleges lack inpatient service for patients suffering from mental disorders which were hampering service as well as education of medical and nursing students. The NCDC program and the National Institute of Mental Health were taking different initiatives, e.g., training on mental health (MH) and WHO mental health global action program (mhGAP) implementation, suicide prevention, community awareness, etc. They mentioned that competency-based training of HWF on the pharmacological and psychosocial model was required to provide MH care at the PHC level and the project approach to treating children with neurodevelopmental disorders and mental challenges should be integrated into the system.

‘To address the huge burden of mental disorder, the primary care and community-based care for MH should be ensured.’ (KI\_3; Policymaker)

‘Social stigma regarding mental disorder needs to be addressed vigorously.’ (KI-8; Program Manager).

**Electronic Database:** as data capturing is manual hampering record keeping, the respondents demanded urgent attention to develop an electronic database, updating the DHIS2 to capture all NCD and MH service data and reporting from all facilities public, NGO, and private.

**Urban Primary Care for NCD:** the KIs shared that the urban primary care for NCD was minimal, and designated PHC facilities in an urban area like urban dispensaries, should deliver NCD care. They endorsed the implementation of urban health strategy and any general practitioner model. The Public-Private or nongovernment organization (NGO) partnership for the strategic purchase of PHC for NCD and mental health should be considered. They recommended close coordination with the ministry of local government, rural development, and cooperatives, so that all public, private, city corporation, and NGO facilities ensure NCDs in ESP delivery in the urban area.

‘This is the high time to address PHC of NCDs and MH for the increasing urban population otherwise load at tertiary facilities can’t be managed.’ (KI\_14; UHFPO).

**NCDC Related Policy:** The KIs informed that Bangladesh maintained momentum at the global level while developing NCDC policies starting from the third Health, Population, and Nutrition Sector Development Program (HPNSDP) in 2011 [16]. The NCDC program was highlighted with budget and activities especially in the 4th HPNSP starting in 2017 [12].

‘We have all supporting policies however we are facing challenges while implementing the program. We need better coordination and good governance’ (KI\_15; UHFPO).

‘In 2018, Bangladesh conducted a side event in UNGA to include disability and MH in CC which is the first level of PHC facility. The CC is located at a distance of about half an hour’s walk and provides health care for around 6 to 10 thousand catchment population. This is one step forward as disability and especially MH care were included at PHC level’ (KI\_2; Policy Maker).



## 7. Results of structured observation of UzHCs

All the eight UzHCs observed were implementing the national protocol which was developed contextualizing the WHO PEN protocol for the management of hypertension and diabetes. The clinical service-providing teams comprising of the doctors, nurses, and paramedics, and the UH&FPOs who were the managers of the UzHCs, were trained to implement the protocol. The NCDC program was ensuring the supply of drugs and diagnostics following the protocol to all these UzHCs. The program was also ensuring the availability of a patient book (a Green book to record clinical sign symptoms, findings, the prescription, and date for the next follow-up visit), a referral card, and the register-to-register hypertensive and diabetic patients attending the NCD corner.

Out of eight UzHCs, four were implementing the protocol with the existing NCDC program resources available within the health system. The rest four UzHCs were supported by different DPs in varieties of ways to implement the protocol. The technical assistance was in the form of a) developing an electronic database, providing training and tab to capture patient and facility data, b) deploying human resources to maintain an electronic register, patient book, recording follow-up dates, and maintaining drug inventory c) engaging support staff to support and streamline patients attending NCD corner, d) deploying trained personnel to deliver health education session in the patient waiting for area or counseling, e) engaging community health volunteers (CHVs) for encouraging community for healthy lifestyle and screening, even in arranging screening session at community and referral to NCD corner. The findings from the observation were as follows;

### 1) Service delivery from the NCD corner

All the eight NCD corners were found providing services. The patients were receiving blood pressure and blood sugar check and protocol-based treatment for hypertension and diabetes. However, it was found that some doctors were reluctant to follow the protocol. Also, BMI calculation and risk prediction of having cardiovascular events in the next ten years were absent in all the eight NCD corners though this has been prescribed in the protocol. The NCD corners run by the program only portrayed the typical picture of the outpatient department of any UzHC with long queues of patients in the pick hours. In most instances, there was no human resource for gatekeeping to control patient entry and the rooms became overcrowded with patients and attendants. The nurses or paramedics were found struggling to keep the record manually and simultaneously checking blood pressure and blood sugar. The NCD corners supported by the DPs were having an electronic database, extra personnel to maintain the e-register, a gatekeeper, etc. Those were found to be delivering NCD care more efficiently.

### 2) Availability of NCD drugs and diagnostics

Three antihypertensive and two antidiabetic drugs and kits for blood sugar tests were available in all eight UzHC as those were supplied by the NCDC program. In most of the centers the patients were receiving drugs for 10–15 days, though the protocol referred for one month and this added the workload to the NCD corners with increased the risk of discontinuation of the drug by patients. Following the protocol, the DP-supported corners were providing the drugs from the same room which was ensuring patient compliance and maintenance of the drug stock register. This was absent in program only NCD corners.

### 3) Provision of counseling services

Only one DP-supported NCD corner was providing counseling services with trained personnel.

Lack of trained personnel was the reason for not providing the service as mentioned, though the protocol strongly recommended counseling.

### 4) Recordkeeping

The quality of manual record-keeping was poor in all the four NCD corners run by the program only, especially during pick hours when nurses or paramedics were found struggling to check blood pressure or sugar. Moreover, record-keeping was done only for the number of patients attending the NCD corner, not for the number of patients whose hypertension or diabetes was under control. That type of record-keeping was not reflecting the effectiveness of the program.

All the DP-supported NCD corners were having electronic databases though different DPs were using different software.

### 5) Conduction of health education session in the waiting area

The waiting areas of all the NCD corners were found disorganized except for one supported by DP. The sitting arrangements were insufficient, the electronic monitors were not properly placed which failed to draw the attention of the patients and attendants to the health education messages or video clips. Health education sessions were not organized regularly due to the non-availability of trained personnel.

## 8. Triangulation of findings

To supplement the finding of the KIIs, we conducted a structured observation. The findings of the structured observation were cohesive with the KII findings in corresponding domains. The NCD corners were found to provide services along with the provision of medicine and diagnostic services. This is aligned with the KII findings of Indicators 9 and 10 which demonstrated the implementation of the protocols for the management of hypertension, and diabetes in PHC facilities including NCD corners. During observation, other NCD service provisions along with the availability of drugs were not found in the NCD corner. The KII revealed similar findings that service for other NCDs was poor at the PHC level. Moreover, the observation findings showed poor counseling services in the NCD corners and health education activities in the patient waiting areas. The KII findings suggested improvement in the record-keeping activities including capturing electronic records for database management. Our observational findings also identified the poor performance in record-keeping and suggested that the record-keeping is not reflecting the effectiveness of the program. Overall, we could triangulate the findings demonstrating the cohesiveness of different data collected using different methods. It reflects the robustness of the research method and analysis.

## 9. Discussion

To better understand the NCD program implementation status, its barriers, and facilitators the study identified the gaps in implementing the NCDC policies across health system components. While looking into the NCDC-related policies, the study findings revealed that the national policy documents were developed keeping pace and aligning with global policies. The implementation status was bearing the gap. The first sector-wide approach (SWA) with the health and population sector program of Bangladesh was implemented without prioritizing NCD from 1998 to 2003, [17]. The second SWA with the health, nutrition, and population sector program was implemented from 2003 to 2011, which didn't have NCDC operational plan (OP), only an arsenic control program was there. That was the Millennium Development Goal era when NCD was not a priority [18]. The third SWA with the Health, Population, and Nutrition Sector Development Program (HPNSDP) developed and implemented NCDC OP from 2011 to 2016 [16]. In 2011 at the United Nations General Assembly (UNGA), the first NCD summit took the global agenda for NCDC [19], and WHO developed a global monitoring framework for tracking progress in preventing and controlling major NCDs and risk factors [20]. In 2014 the 2nd high-level meeting at UNGA reviewed the global NCD situation and identified and addressed the gaps

[21]. Simultaneously, Bangladesh reviewed and updated the NCD services in the ESP, and included NCD drugs in the essential drug list in 2016 [22]. Bangladesh, along with all UN member states committed to achieving SDGs including SDG 3 for the health and wellbeing of the people with the target to reduce premature deaths by one-third from NCDs [23]. The 4th HPNSP of Bangladesh allocated an estimated budget of USD 133.0 million in NCDC OP from 2017 to 2022 to strengthen the early detection and management of NCD at the PHC level [11]. Simultaneously in 2018, the 3rd high-level meeting at UNGA did a comprehensive review of progress made to address NCDs and MH [24]. Despite all policies emphasizing the NCDC program, the findings of the NCD country profiles of Bangladesh from 2002 to 2018 revealed that proportionate mortality from all chronic diseases increased gradually (44%, 52%, 59%, and 67% in 2002, 2011, 2014, in 2018 respectively). The proportionate contribution of injury to the total death was also substantial 10 to 7% during the period. The country profile also revealed an increasing trend in the proportionate mortality from four major NCDs, especially from CVD which increased from 23% in 2002 to 30% in 2018 [4,25–27]. Biswas et al. had similar findings, who revealed that despite policies, the absence of proper planning, implementation, and monitoring, the program failed to address the NCD burden [28].

The study findings revealed that, though doctors, nurses, and midwives had been recruited recently, there was an acute shortage of paramedics, medical technologists, and support staffs who had not been recruited for long. Upgradation of UzHC from 50 to 100-bed facility without required human resource allocation and deployment was another problem. The UH&FPOs expressed their concern with HWFs' competencies. The doctors deployed were not fully adapted to the local context, had a mismatch of professional competencies to patient priorities, and were uncomfortable with the team approach. The Lancet commission also reported a lack of competencies among professionals for effective teamwork, and leadership [29]. Lehmann et al. suggested addressing the acute shortage of paramedics, technologists, and nonclinical HWF by involving health and non-health sectors [30].

It was found that the NCDC OP expenditure which was from the development budget was not synchronized with that of the revenue budget, sometimes creating duplication in the purchase of drugs, diagnostics, logistics, or creating a lack of continuous supply. Moreover, the manual supply chain management system was hampering efficiency.

The short training courses which were the easiest way to budget burn and achieve targets were conducted utilizing OP funds, and impact assessment was hardly done. The study also revealed insufficient fund allocation for many important activities. These all were creating a gap in primary care, and contributing to OOP expenditure which increased to 71% in 2015 from 60% in 2008 [31]. A similar scenario is revealed in the neighboring countries in South Asia, and a study in Karnataka flagged findings of patients' dependency on the private sector due to gaps in continuous care for NCDs at PHCs [32].

The study informed that the NCD PHC protocol was focusing population  $\geq 40$  years of age for screening at CC and referral to the NCD corner of UzHC for management by physicians, which started working though back referral to CC and community was not established yet. Tracey K et al. had similar findings and identified the need of developing a referral system from the community to PHC for screening and management of cervical cancer and back referral for household follow-up [33]. The program kept the USCs underutilized, and lack of coordination with DGFP hampered NCD protocol implementation from the facilities of that directorate. It was found that MH care was almost non-available at the PHC level, mostly tertiary facilities were providing it though the National mental health survey revealed that 16.8% of adults and 13.6% of children and adolescents were suffering from any form of mental disorder. Among children and adolescents, neurodevelopmental disorders were 5.9%, anxiety disorder was 4.5% and autism is 1.5%. An increasing trend of addictive behavioral disorders, including internet addiction, was revealed while the treatment gap was found in 92.3% of the population [34]. The gap identified was at the

implementation level, though several policy documents like MH Policy, Strategic Plan 2020–2030, Strategic Plan for Neurodevelopmental Disorder 2016–2021, etc. were developed with the MH Act 2018 enacted. Minimum urban PHC for NCDs affecting the urban poor was identified in the study as a weak area as the NGOs, city corporation facilities and the private sectors were not ensuring NCD inclusive ESP. A recent study found that the prevalence of risk factors and NCDs are more among slum dwellers of Dhaka [35]. The study revealed that the national level surveys of NCD risk factors were not regular. The last STEPS survey was conducted in 2018, the report was published in mid-2020, and it took almost two years to publish the full result of the STEPS survey [36]. Regarding tobacco control services, the study found that nicotine replacement therapy was absent from the essential drug list, and there was no cessation clinic in the government facilities. However, awareness-creation, law amendments, and enforcement of tobacco control contributed to the decrease in tobacco use. According to the Global adult tobacco survey (GATS) prevalence of tobacco use among persons aged  $\geq 15$  years decreased from 43.3% in 2009 to 35.3% in 2017, among whom 46.0% were men and 25.2% are women [37].

It was found that there was no separate directorate, the NCDC program was implemented through OP. The weak governance was hampering multisectoral coordination across different ministries for the prevention of shared risk factors. The study showed that collaborations between the NCDC program and different DPs, NGOs, and nonprofit organizations such as the National Heart Foundation and Diabetic Association were effective and added quality to the program. The partners were taking approaches like assisting electronic database development, community awareness creation, screening, counseling, and data capturing at NCD corner, supporting the implementation of NCD management protocol, etc. The study findings prioritized HSS and better coordination of NCD OP with other OPs and directorates. Previous studies also suggested the same [38,39]. 'Absence of congenial environment is the challenges of NCD corner' as perceived by Rawal et al. also by the KIs [40]. The study emphasized NCD services at PHC for everyone. Previous studies also recommended ensuring equity at lower costs for both high and low resource settings [41] and addressing the challenges to ensure care for NCDs [42].

The study findings revealed that survey/surveillance systems for NCD indicator monitoring, both in the public and private sectors were lacking. The respondents felt the need for inbuilt monitoring and surveillance system to track the progress of program implementation. Similarly, Bangladesh health watch suggested surveillance of NCDC activities, involving rural, urban, public, private, and other non-state sectors [38]. Previous studies also recommended a nationally representative NCD surveillance system [43] and concurrent monitoring to enable continuous refinement of the interventions [44].

A lack of electronic database to capture individual and service data was found which was seriously hampering record keeping. Also, the district health information software 2 (DHIS2) platform to reflect service provision data from facilities was not updated to incorporate the NCD data. Current data from CC at DHIS2 reflects the number of patients receiving blood pressure measurement services not the hypertension control status. The DP-supported databases development was not synchronized with the mainstream and has not been evaluated for cost-effectiveness. The previous study highlighted the digital revolution, developing financing mechanisms for a resilient health system at PHC [45], and health system reforms for the integration of NCDs [12].

## 10. Strength and limitations

The study engaged multiple stakeholders in KIIs who shared their experiences regarding NCDC program implementation from different perspectives, though the observation was conducted in eight selected facilities only. This is the very first in-depth analysis of the NCDC program implementation in Bangladesh which identified the gaps and explored the way forward.

The study has got certain limitations like the KIIs and the sites for observations were selected purposively. The familiarity of the interviewer might have influenced the interviewees. However, the interviewers refrained from probing or any undue influence on the natural flow of the conversation.

## 11. Conclusion

The study findings conclude that NCD control program-related policy documents are there, though challenge exists at the implementation level. The study recommends that task shifting and electronic database use to maximize HWF utilization and electronic human resource management system to ensure effective management of HWF should be inbuilt into the NCDC program.

The study emphasized functional referral mechanisms to higher facilities and back to CC to ensure decreasing patient load at higher facilities and quality of care. Monthly refilling of NCD drugs by the nurse or paramedics of NCD corner and from CC should be introduced to increase access, and ensure continuity of treatment and utilization of PHC. An electronic logistic management information system for efficient supply chain management and availability of combination drugs to increase drug compliance might be considered.

Proper budgeting of all NCDC activities and decentralized financial power with efficient and timely use of funds were encouraged. To ensure tracking of NCD indicators surveillance system covering public and private sectors and updating DHIS2 needs to be initiated. A better coordination mechanism should be established among OPs and non-health sectors to maximize strategic utilization of resources to address NCDs and shared risk factors.

## Ethical approval

The study received ethical approval from the ethical review committee of the Center for Injury Prevention and Research (CIPRB)(CIPRB/ERC/2018/003/Amendment/2020). Individual consent was taken for KII. The NCDC program provided the approval for UzHC observation, with communication to the UH&FPOs, who were the managers of the facilities.

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## Competing interests

None declared.

## Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Contributors

KI conceived the study and EH, EK and KMSUR contributed to finalizing the proposal. The first draft was prepared by KI, KMSUR, EH, RH, EK contributed to finalizing the manuscript. KMSUR provided critical input and revised the manuscript. All authors approved this final version of the manuscript.

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## Abbreviations

CC	Community Clinic
DGHS	Directorate General of Health Services
DHIS2	District health information software 2
DP	Development Partner
ESP	Essential Service Package
HPNSP	Health, Population and Nutrition Sector Program
HWF	Health workforce
KI	Key Informant
KII	Key Informant Interview
LMICs	Low and middle -income countries
MH	Mental health
mhGAP	Mental health global action program
MOH&FW	Ministry of Health and Family Welfare
NCDs	Noncommunicable diseases
NCDC	NCDC control
NGOs	Non-government Organizations
OP	Operation plan
OOP	Out of pocket
PHC	Primary health care
SDG	Sustainable development goal
HSS	Health system strengthening
SWA	Sector wide approach
UHC	Universal health coverage
UH&FPO	Upazila Health and Family Planning Officer
UzHC	Upazila health complex
UNGA	United Nations General Assembly
WHO	World Health Organization
WHO PEN	World Health Organization's package of essential noncommunicable

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