Original Article

A Study on Service Availability and Readiness Assessment of Non-Communicable Diseases Using the WHO Tool for Gazipur District in Bangladesh

Running Title: Service availability and Readiness assessment of NCDs

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Abstract: Non-communicable diseases (NCDs) disproportionately affect low and middle-income countries where nearly three quarters of NCD deaths occur. Bangladesh is also in NCD burden. This cross-sectional study was done on 50 health facilities centres at Gazipur district in Bangladesh from July 2015 to December 2015 to introduce SARA for better monitoring and evaluation of non-communicable diseases health service delivery. The General Service readiness index score was 61.52% refers to the fact that about 62% of all the facilities were ready to provide general services like basic amenities, basic equipment, standard precautions for infection prevention, and diagnostic capacity and essential medicines to the patients. But in case of non-communicable diseases, among all the health facilities 40% had chronic respiratory disease and cardiovascular diseases diagnosis/ management and only 32% had availability of diabetes diagnosis/management. Overall readiness score was 52% in chronic respiratory disease, 73% in cardiovascular disease and 70% in diabetes. Therefore, service availability and readiness of the health facilities to provide NCD related health services were not up to the mark for facing future targets. A full-scale census survey of all the facilities of the study area would give a better understanding of the availability and service readiness.

Key Words: Service availability, Service readiness, Non-communicable diseases, SARA tool, Bangladesh

Introduction: The four main types of non-communicable diseases are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. Non-communicable diseases (NCDs) kill 38 million people each year. NCDs already affect low- and middle-income countries disproportionately where nearly three quarters of NCD

deaths occur. Responsible risk factors include ageing, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. For example, globalization of unhealthy lifestyles like unhealthy diets may show up in individuals as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity. These are called 'intermediate risk factors' which can lead to cardiovascular disease, a NCD[1].

All people irrespective of age, sex and regions are affected by NCDs. But evidence shows that 16 million of all deaths attributed to non-communicable diseases (NCDs) occur before the age of 70. Of these "premature" deaths, 82% occurred in low- and middle-income countries. Children, adults and the elderly are all vulnerable to the risk factors that contribute to NCDs, whether from unhealthy diets, excess salt intake, physical inactivity, exposure to tobacco smoke or the effects of the harmful use of alcohol[2].

NCDs threaten progress towards the UN Millennium Development Goals and post-2015 development agenda (Sustainable Development Goals). Poverty is closely linked with NCDs. The rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries, particularly by increasing household costs associated with health care[3]. Vulnerable and socially disadvantaged people get sicker and die sooner than people of higher social positions, especially because they are at greater risk of being exposed to harmful products, such as tobacco or unhealthy food, and have limited access to health services[4] .

In low-resource settings, out pocket expenditure for cardiovascular diseases, cancers, diabetes or chronic lung diseases can quickly drain household resources, driving families into poverty. The exorbitant costs of NCDs, including often lengthy and expensive treatment and loss of breadwinners, are forcing millions of people into poverty annually, stifling development. In many countries, harmful drinking and unhealthy diet and lifestyles occur both in higher and lower income groups. However, high-income groups can access services and products that protect them from the greatest risks while lower-income groups can often not afford such products and services[5].

A comprehensive approach for all sectors including health is needed to lessen the impact of NCDs on individuals and society. An important way to reduce NCDs is to focus on lessening the risk factors associated with these diseases. Low-cost solutions exist to reduce the common modifiable risk factors (mainly tobacco use, unhealthy diet and physical inactivity, and the harmful use of alcohol) and map the epidemic of NCDs and their risk factors. Other ways to reduce NCDs are high impact essential NCD interventions that can be delivered through a primary health-care approach to strengthen early detection and timely treatment. Evidence shows that such interventions are excellent economic investments because, if applied to patients early, can reduce the need for more expensive treatment. These measures can be

implemented in various resource levels. The greatest impact can be achieved by creating healthy public policies that promote NCD prevention and control and reorienting health systems to address the needs of people with such diseases. Lower-income countries generally have lower capacity for the prevention and control of NCDs. High-income countries are nearly four times more likely to have NCD services covered by health insurance than low-income countries. Countries with inadequate health insurance coverage are unlikely to provide universal access to essential NCD interventions[1].

WHO proposed *Global action plan for the prevention and control of NCDs 2013-2020* to reduce the number of premature deaths from NCDs by 25% by 2025 through nine voluntary global targets such as tobacco use, harmful use of alcohol, unhealthy diet and physical inactivity that increase people's risk of developing these diseases[6].

Bangladesh faces double burden of diseases – both CDs & NCDs. But, in Bangladesh NCD burden is rapidly increasing due to social transition, unhealthy dietary habit & rapid urbanization. In terms of the number of lives lost due to ill-health and disability, NCDs account for 61% of the total disease burden. The under-privileged communities in the country are bearing the heaviest toll of this burden[7,8].

Core to the SARA framework is the strengthening of a common platform for monitoring, evaluation and review for National Health System. SARA is designed to function as a systematic tool to support annual verification of data and service delivery at the facility level. SARA provides evidence based data on health system progress to inform the annual health sector review, identify gaps and weaknesses responsible for sub- optimal service provision and intervention coverage that need to be addressed, provide a baseline for planning and monitoring scale-up intervention for service delivery improvement[9]. No assessment has been conducted so far in Bangladesh to monitor, review and evaluate NCD related health service delivery using SARA. Thus, the present study aimed to introduce SARA for better monitoring and evaluation of NCD related health service delivery in Gazipur, Bangladesh.

Research Question: What is the status of service availability and readiness assessment on non-communicable diseases for Gazipur District in Bangladesh?

General Objective: The objective of this assessment is to strengthen monitor-review-act system for non-communicable diseases health service delivery in Gazipur using SARA.

Specific objectives

- To find out service availability for providing NCD health services using SARA tool.
- To assess facility readiness for providing NCD health services using SARA tool

Ethical Implication: This study is very much important regarding to ethical aspects. Health is a basic need and according to goal 3 of sustainable development Goals (SDGs) "*Ensure healthy lives and promote well-being for all at all ages*"[10] must warrant. So, health service delivery should be made affordable and accessible to all.

Methodology: This cross-sectional study was done from July 2015 to December 2015 on 50 health facilities during Masters of Bioethics and Global Public Health (MBGPH) in AUSN. Two Upazila's (Kapasia and Sreepur) from Gazipur district were considered as assessment area. Different types of health facilities (Upazila Health Complex [UHC], Union Sub-centers [USC], Community Clinic [CC] and Private hospital [PH]) were included in the study[11-13]. This two Upazilas were selected by multistage sampling. Then a sampling frame was done from both upazilas including public and private facilities. From this stratified random sampling was done. Private clinics having both inpatient and outpatient departments were included in this study. Private clinics with only diagnostic facilities were excluded from this study.

Brief Description of Assessment Tool: Service Availability and Readiness Assessment (SARA) Indicators: The Service Availability and Readiness Assessment (SARA) survey is used to measure progress in health system strengthening over time comprising a set of core indicators on key inputs and outputs of the health system. Tracer indicators aim to provide objective information about whether or not a facility meets the required conditions to support provision of basic or specific services with a consistent level of quality and quantity. Summary or composite indicators, also called indices, can be used to summarize and communicate information about multiple indicators and domains of indicators. Indices can be used for general and service specific availability and readiness.

Service Availability refers to the physical presence of the delivery of services, encompassing health infrastructure, core health personnel, and service utilization. This does not include more complex dimensions such as geographic barriers, travel time, and user behavior, which require more complex input data. Service availability is described by an index using the three areas of tracer indicators. This is made possible by expressing the indicators as a percentage score compared with a target or benchmark, then taking the mean of the area scores.

General Service Readiness refers to the overall capacity of health facilities to provide general health services. Readiness is defined as the availability of components required to provide services such as basic amenities, basic equipment, standard precautions, laboratory tests, and medicines and commodities. General service readiness is described by an index using the five general service readiness domains. A score is generated per domain based on the number of domain elements present, then

an overall general readiness score is calculated based on the mean of the five domains.

Service Specific Readiness refers to the ability of health facilities to offer a specific service and the capacity to provide that service measured through selected tracer items that include trained staff, guidelines, equipment, diagnostic capacity, and medicines and commodities.

SARA is a health facility assessment tool designed to assess and monitor the service availability and readiness of the health sector and to generate evidence to support the planning and managing of a health system. SARA is designed as a systematic survey to generate a set of tracer indicators of service availability and readiness. The survey objective is to generate reliable and regular information on service delivery (such as the availability of key human and infrastructure resources), on the availability of basic equipment, basic amenities, essential medicines, and diagnostic capacities, and on the readiness of health facilities to provide basic health-care interventions relating to NCDs.

Data Collection: Data collection was done for two weeks from April 01 to April 15, 2015 using paper based questionnaire. Total 50 health facility was visited from which 25 were from Kapasia and the other 25 were from Sreepur. From these 50 facilities, there were 2 Upazila Health Complex, 4 Union Sub-centers, 30 Community clinics and 14 private clinics. Administrative head of every health facility was interviewed thoroughly. As an example, Upazila Health and Family Planning Officer (UH&FPO) was interviewed at UHC and Community Health Care Provider (CHCP) was interviewed at CC.

Moreover, people related with different health services were also asked detailed questions where needed. For example, in Upazila Health Complex, EPI technician was asked questions on vaccine carrier and temperature monitoring of refrigerator, whereas storekeeper was asked question on availability and stock out of medicines. At Community Clinic, CHCP were asked questions about Antenatal care and Family Welfare Assistant (FWA) gave information on Family Planning Services. Data that was collected from Community Clinics and Union Sub-centers were cross verified at Upazila Health Complex with Statistician who is responsible for entering data in District Health Information System-2 (DHIS-2) software. The interviews were done in such a way that almost all the unions of both Upazilas were covered.

Data Entry and Quality Assurance: Before formal data collection, the questionnaire was modified according to the feedback from the consultative meeting with the steering committee members. To ensure data quality, SARA team conducted a pretest in Gazipur Upazila Health Complex and its surrounding villages for facility assessment and community readiness. Data collectors were trained at two stages to

ensure quality data collection, firstly before pretesting to familiarize and how to use the tools and secondly, immediately prior to the main survey with the tools adapted based on field experience. Senior team members monitored and rechecked data on random basis at different check points-data collection, data entry and cleaning. Finally, data were entered on **Microsoft Excel** immediately after the data collection which helped to guard against wrong data entry. For facility assessment, calculation of different domain score and readiness score was done manually.

Ethical Consideration: Ethical aspects of the study were taken into account in a fairly linear way. At first, Ethical review committee of American University of Sovereign Nations reviewed this study proposal. On the other hand, verbal consent was taken from every key informant prior to data collection. All questionnaires were kept in a safe and secure place in order to ensure confidentiality. Coding was done. Only the researcher has access to those questionnaires in case of cross checking or validating any data if needed.

Limitations and Challenges: One of the limitations of the present study is that the study sites of this assessment were one of the high performing areas in terms of health indicators and it might introduce selection bias. As we have selected a sample of health facilities from the study area instead of a census of all the facilities, Service Availability data might not give us accurate measure. We had to face a few challenges while conducting the assessment. Some community clinics and the union sub centers are located in hard to reach area where transports were not available and communication system was very poor. Managing time was a hard job because the government facilities work up to 2.30 P.M. So, interviewing the doctors were challenging because of the interruption of the patients. So, each interview took more time than we expected. It was hard to interview the key informants (KI) as we had to go to their work place to take their schedule and then go to them again for taking interview.

Results: General Service Readiness Index includes Basic amenities, Basic equipment, Standard precautions for infection prevention, Diagnostic capacity and Essential medicines. Tracer indicators for basic amenities are Power source, Improved water source within 500 meters of facility, Consultation room with auditory and visual privacy for patient consultations, Access to adequate sanitation facilities for clients, Communication equipment (phone or SW radio), Computer with email/Internet access and Emergency transportation. Tracer indicators for basic equipment are Adult scale, Child scale, Thermometer, Stethoscope, Blood pressure apparatus and Light source. Tracer indicators for Standard precautions for infection prevention are Safe final disposal of sharps, Safe final disposal of infectious waste, Appropriate storage of sharps waste, Appropriate storage of infectious waste, Disinfectant, Single use - standard disposable or auto-disable syringes Soap and running water or alcohol based hand rub Latex gloves and Guidelines for standard precautions. Tracer indicators for

diagnostic capacity are Haemoglobin, Blood glucose, Malaria diagnostic capacity, Urine dipstick- protein, Urine dipstick- glucose, HIV diagnostic capacity, Syphilis rapid test and Urine test for pregnancy. Tracer indicators for essential medicines are Amitriptyline tablet, Amoxicillin suspension, Amoxicillin tablet, Ampicillin injection, Gentamicin injection, Ceftriaxone injection, Salbutamol inhaler, Beclomethasone inhaler, Enalapril tablet or alternative ACE inhibitor, Amlodipine tablet or alternative calcium channel blocker, Simvastatin 20 mg capsule/tablet, Glibenclamide tablet, Metformin tablet, Insulin regular, Omeprazole tablet or alternative, Oral rehydration solution, Paracetamol tablet, Zinc sulphate tablet, Ibuprofen tablet and Fluoxetine tablet.

The General Service readiness index for Kapasia and Sreepur Upazila was 62% where highest contributor was basic equipment domain (89%) and lowest contributor was diagnostic capacity (36%) of all the health facilities [Figure 1]. General service readiness index score by facility type was highest in Upazila health complex that was 90% and lowest in community clinic that was 46%. No diagnostic mean score was noted in union sub center [Figure 2].

Diabetes service availability means Types of service offered: Diabetes diagnosis and/ or management. Tracer indicators for diabetes service readiness are Trained staff and guidelines - Guidelines for diabetes diagnosis and treatment and Staff trained in diabetes diagnosis and treatment; Equipment- Blood pressure apparatus, Adult scale, Measuring tape (height board/ stadiometre); Diagnostics- Blood glucose, Urine dipstick- protein, Urine dipstick- ketones; Medicines and commodities- Metformin tab, Glibenclamide tab, Insulin injectable and Glucose injectable solution.

Cardiovascular disease service availability means Types of services offered cardiovascular disease diagnosis and/or management. Tracer indicators for Cardiovascular disease service readiness are Trained staff and guidelines- Guidelines for diagnosis and treatment of chronic cardiovascular conditions and Staff trained in diagnosis and management of chronic cardiovascular conditions; Equipment- Stethoscope, Blood pressure apparatus, Adult scale; Medicines and commodities- ACE inhibitors (e.g. enalapril), Thiazides, Beta blockers (e.g. atenolol), Calcium channel blockers (e.g. amlodipine), Aspirin cap/tabs, Metformin cap/tabs and Oxygen.

Chronic respiratory disease service availability means Types of services offered Chronic respiratory disease diagnosis and/or management. Tracer indicators for Chronic respiratory disease service readiness are Trained staff and guidelines- Guidelines for diagnosis and management of CRD and Staff trained in diagnosis and management of CRD; Equipment- Stethoscope, Peak flow meter, Spacers for inhalers; Medicines and commodities- Salbutamol inhaler, Beclomethasone inhaler, Prednisolone cap/tabs, Hydrocortisone cap/tabs, Epinephrine injectable and Oxygen.

The bar graph shows that about half of the health facilities in Gazipur district offered Cardiovascular and Chronic respiratory disease diagnosis/management (40%), One third offered Diabetes diagnosis/ management (32%) [Figure 3]. The bar graph shows that Overall readiness score was only 52% in chronic respiratory disease, 73% in cardiovascular disease and 70% in diabetes. But readiness score about staff and guideline was very poor only 5% for both chronic respiratory and cardiovascular diseases and 13% for diabetes [Figure 4].

General service readiness index and domain scores (n=50)

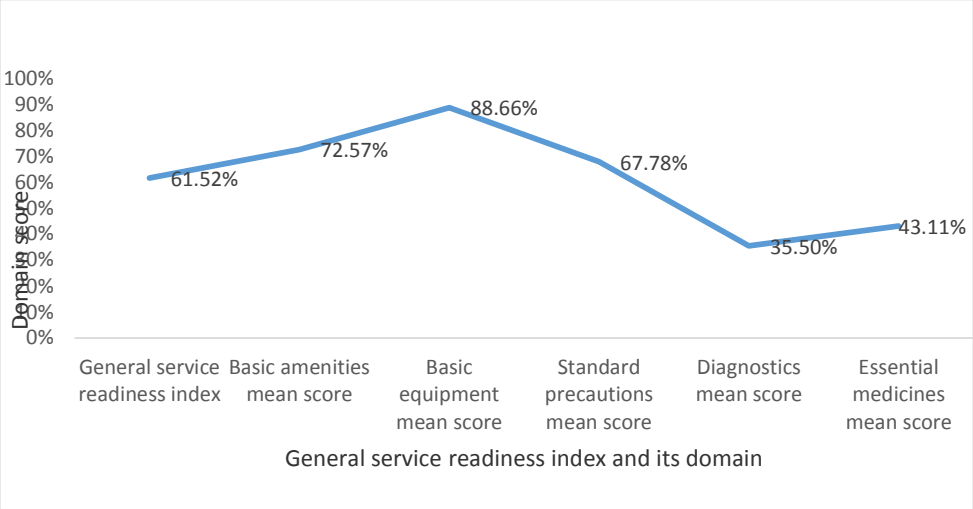

Figure 1: General Service readiness index and domain scores

General service readiness index and domain scores, by facility type (n=50)

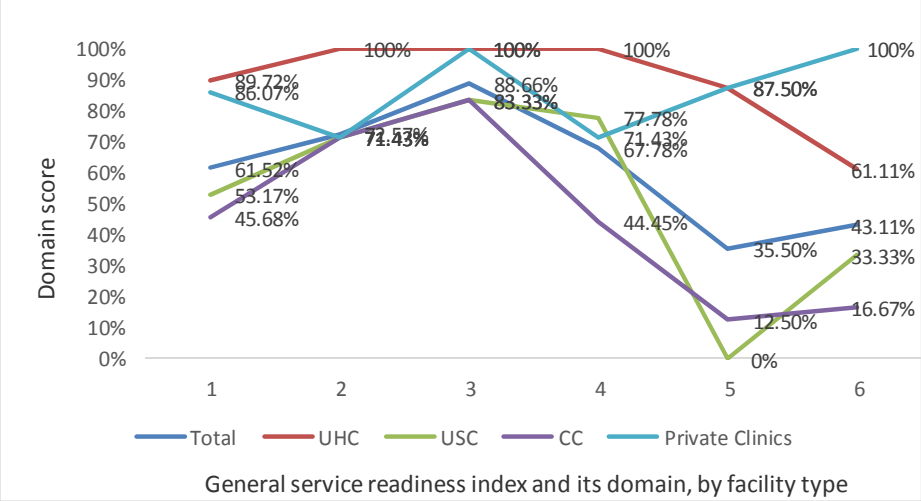

Figure 2: General service readiness index and domain scores, by facility type

Availability of non-communicable disease services

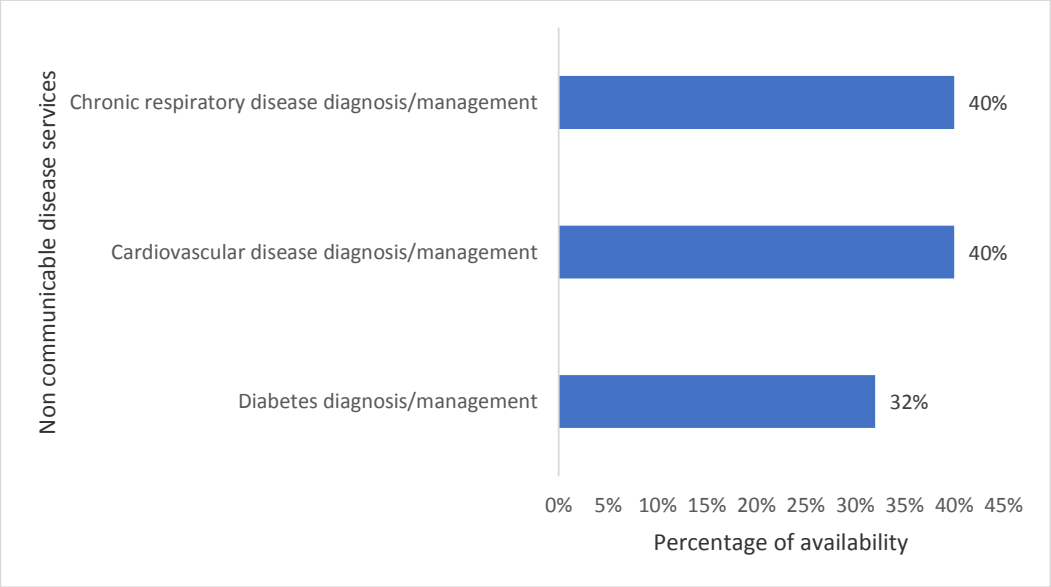

Figure 3: Availability of non-communicable disease services

Readiness to provide non-communicable disease services

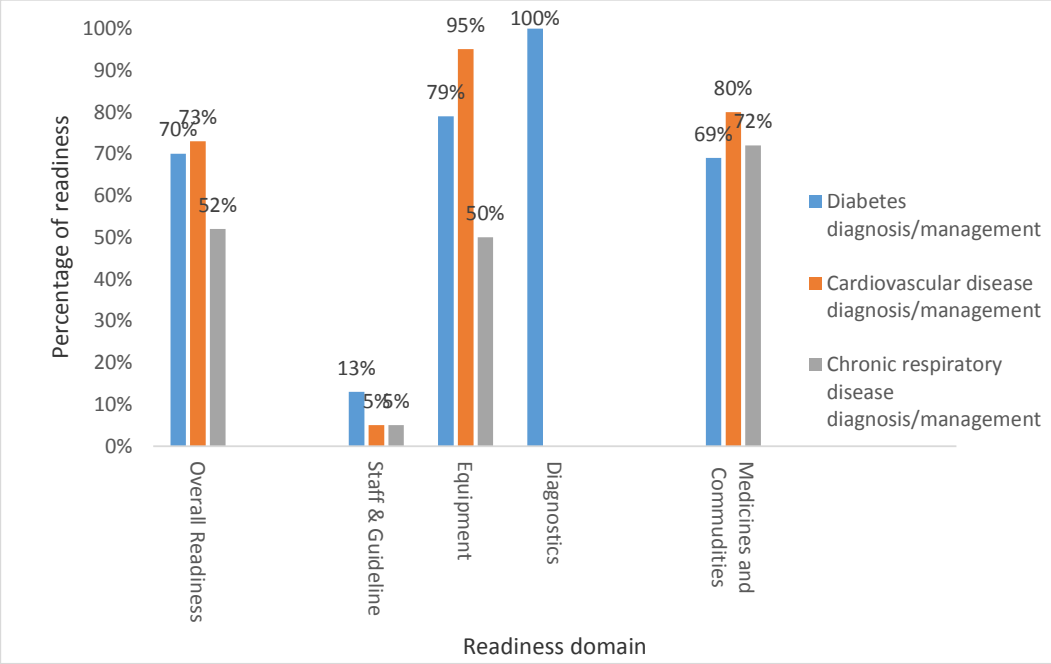

Figure 4: Readiness to provide non-communicable disease services

Discussion: For Facility Readiness Assessment, Basic amenities domain readiness score of 73% indicates that about two-third of the facilities in the study area had basic conveniences including adequate sanitation facilities, room with privacy, improved water source etc. Although 100% facilities had communication equipment and 64% had computer with internet, only 40% (2 UHC, 4 USC and 14 Private Hospitals) had adequate power source to use them properly. Overall readiness score for basic equipment domain 89% refers that most of the health facilities had necessary equipment needed to provide services to the people. However, uses of that equipment were not seen by the study team while observing the health care providers when patients came to seek any service.

Only 4% facilities of Kapasia and Sreepur had guideline which is need for Standard precautions for infection prevention. This is reflected in their daily practice as well. Although almost 92% facilities had appropriate storage of infectious and sharp waste, many of them told that they submitted their used needle to the Upazila Health Complex for final disposal. Overall domain score of 43% for essential medicine indicates that in the present area 43% facilities had essential medicines. But it is alarming that only 28% had all the essential medicines available at the time of this assessment. The reason for this shortage was inadequate supply of medicines for a quarter. In every community clinic in Kapasia Upazila there was no supply of any medicine over last three months. However, in some cases unnecessary use of medicine by the patients could also cause shortage of medicine.

For example, a 60-year-old woman in a community clinic came to take medicine. Then the CHCP asked her what was her problem? Women replied, "I have no problem right now, just wanted to take some medicine as I did not take medicine for last three weeks". Patient was happy for getting treatment and the community clinic was known to every person of the community. CHCP could not give answer appropriately how many drops make one milliliter (Field observation). General Service readiness index score 62% refers to the fact that 62% of all the facilities of the study area were ready to provide general services like basic amenities, basic equipment, standard precautions for infection prevention, and diagnostic capacity and essential medicines to the patients.

As only 2 UHC and few Private Hospital had diagnostic capacity and all basic amenities, the overall percentage became low. But in case of non-communicable diseases, among all the health facilities 40% had chronic respiratory disease and cardiovascular diseases diagnosis/ management and only 32% had availability of diabetes diagnosis/management. Overall readiness score was only 52% in chronic respiratory disease, 73% in cardiovascular disease and 70% in diabetes.

According to "iceberg of phenomenon" of disease, a great portion of people are undiagnosed or underdiagnosed[14]. We all know that most of the chronic diseases are

not curable, but in most cases these are preventable. So, primary prevention should be adopted initially[15]. Due to epidemiological transition of diseases non-communicable diseases are increasing day by day[16]. Community clinics should be strengthened. It may be a better center of preventive care. In this study, according to SARA guideline we did not consider community clinic. Because still now these community clinics are not functioning in many cases due to proper logistic support. In many cases these are functioning only in paper document. In case of SARA questionnaire, we consider here primary care physician. In case of cancers-there is no answer. Only VIA test for cervical cancer screening is done in Upazila health complex. In case of mental health issue, we didn't get proper data.

Conclusion: Despite all the bottlenecks identified in the study area, overall service availability and readiness of the health facilities to provide NCD related health services were below the acceptable range. At the same time community people were also aware of services that were available related to NCD related health services. A full-scale census survey of all the facilities of the study area would give a better understanding of the availability and service readiness. Thus, the findings could significantly contribute to the overall improvement of NCD related health not only in Bangladesh but also in global platform. Finally, all these efforts will act as a catalyst in achieving the better health for future Bangladesh.

Recommendations: Strengthening accountability of the supervisor/inspectors who visit community clinics and Union Sub-Centers. Because, often they do not comment about capacity of the health worker to deliver certain services and also do not care about the stock out of medicines. Persuade the policy makers to create a mandate for Private Health facilities in order to share their data with Government MIS departments and also for public view. Standardizing and modifying all different types of Registers according to the format they are supposed to fill up in DHIS-2. Introduce strict rules that make health workers preserve Guidelines of training at health facility rather than their own home. All CHCP should be trained up properly regarding their service. Some Community clinics have no medicine more than three months. It is necessary to ensure proper supply of medicine for maintaining treatment whole the year. Treatment should be given by at least primary care physician at all levels. More frequent training on DHIS- 2, especially for HA to enter data in DHIS-2 and did not get adequate training. Enhance coordination among CHCP, HA and FWA. Equipping all community clinics with electricity or any other alternative power source. For example, solar panel establishment.

Author's contribution:

1st author developed the conceptual idea, data collection, data analysis, compilation of results and manuscript writing. 2nd author develops the manuscript for publication and meticulous corrections of the article. 3rd author gives intellectual inputs in developing the concept of the manuscript.

Conflict of Interest: Declared none.

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