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Research Article

Noncommunicable Disease Prevention and Control Situation in a Primary Health Care Setting of Bangladesh: Design and Baseline Findings of an Intervention

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Abstract

Background: Noncommunicable Diseases (NCDs) have been increasing in Bangladesh. It is necessary to examine the capacity of the Primary Health Care (PHC) system and its response to an intervention to strengthen NCD control measures. Current paper presents the initial finding of the assessment of capacity of PHC system in dealing with NCD prevention and control through a basic minimum intervention in an Upazila of Bangladesh.

Methods: The assessment of the capacity of PHC was done in Debhata upazila of Satkhira district using interviews, record reviews and observations using check lists and questionnaires. A basic minimum intervention was done to see its appropriateness in a view to detect, prevent and manage NCDs, and to generate evidence to substantiate control measures. The intervention included such components as (a) strengthening health system through training and supply of equipment and medicines; (b) promoting medical information system and evidence generation, and (c) creation of public awareness through observance of NCD related days and campaigns.

Results: Doctors, nurses, technologists and filed level workers were present as per approved post and providing services. Relevant medicines, as per WHO essential drug list, were either supplied inadequate quantities or not supplied at all. Newly established NCD corner was not able to function adequately. The attendance of patients with NCDs was also poor (only 427 patients in 2013). Detection and referral of cases from field by the health workers were absent. Training of people and supply of essential equipment/logistics have improved functions substantially. With a short training and provision of equipment, health assistants could conducts NCD risk factor survey with satisfactory quality.

Conclusion: Relevant backbone for NCD prevention and control is already existent at PHC level. Strengthening skills of personnel and provision of essential medicines and technologies can improve capacity of PHC system to deal with NCDs.

Keywords: Bangladesh; Non-communicable disease control; Risk factors; Primary health care system

Background

Proportional mortality rate due to Non-Communicable Diseases (NCDs) has been increasing in Bangladesh [1-5]. As a result NCDs have been identified as one of the important public health problems in Bangladesh. Major NCDs include heart diseases, stroke, diabetes, chronic respiratory diseases and cancers [5,6]. They are caused by the top of genetic predisposition and age, some behavioral risk factors like unhealthy diet, tobacco use, physical inactivity, and excessive use of alcohol over a prolonged period [7]. They gradually mature to metabolic risk factors such as hypertension, impaired glucose tolerance, dyslipidemia, and ultimately develop into full blown NCDs [8].

All the major behavioral risk factors are modifiable, metabolic factors are preventable and the NCDs are treatable to a large extent [9,10]. The best is to prevent NCDs before they develop. It needs health system approach among others. It is necessary to examine how the health system has been implementing programs for prevention and management of NCDs. It is well known that the tertiary and secondary level hospitals are providing curative care and contributing to secondary and tertiary preventions [11-13]. Primary Health Care (PHC) system plays an important role in prevention of diseases through public awareness, early detection, treatment and referral [13]. However, PHC's readiness and orientation towards prevention and management of NCDs are not systematically known [14].

The World Health Organization (WHO) has devised a Package for Essential NCD (PEN) intervention [15] in low resource settings, which is yet to be field-tested in Bangladesh. We presume that PHC is still far from dealing with the comprehensive PEN package. Therefore NCD interventions should be done in stepwise pattern, starting with a basic minimum, so that the system can absorb it efficiently. Towards this end, we have done an assessment of the capacity of an

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Debhata Upazila at glance [16]

Area: 173.21 sq.km.
Population: 125358
Density per sq.km.: 724
Sex ratio (M/F): 99
Average size of household: 4.2
Literacy: 54.8%
No. of Unions: 05
No. of Health and Family Welfare Centres: 05
No. of Community Clinics:15
No. of village: 125
Mauza: 59
Mahalla: 9

Figure 1: Map of Debhata upazila, Satkhira district. Source: Hello Bangladesh.

upazila health complex for prevention and control of NCDs. A basic minimum intervention was also given to examine its readiness to deal with NCDs. Its design and baseline findings are described in this report.

Setting

The capacity assessment was done in one of the south-western frontier upazila, Debhata, in Satkhira district in 2012. Debhata is situated on the east bank of the Ichhamoti river that separates West Bengal of India from Bangladesh. Debhata's total area is about 173 square kilometers. It consists of 5 unions, 59 mauza, and 125 villages. There are total 29,816 households having a population of 1,25,358. Of them 50,418 are adults aged 18 years or older. Its literacy rate (54.8%) is comparable to the national average (51.8%) [16,17] (Figure 1).

The PHC at upazila level is headed by Upazila Health and Family Planning Officer (UHFPO) and it operates through a large number of facilities at upazila down to the union and ward level [13]. The most peripheral level consists of community clinics. These are static centres for providing curative and preventive health at the grassroots level [18]. The next higher level of government-run fixed service delivery points consists of union health centres (or health and family welfare centres) [13]. The highest level is Upazila Health Complex (UZHC) [13]. UZHC have outpatient and inpatient services supported by laboratory and radiological services. It is the first level referral center also. In addition to the hospital or fixed-facility services mentioned above, there are domiciliary services provided by a pool of health assistants located at ward level.

There has been no dedicated service for NCDs both at fixed-facility and domiciliary levels. A few months prior to our assessment, an NCD corner was established in Debhata UZHC to provide outpatient services. One of the medical officers has been assigned for the NCD corner.

Design

The initiative has been undertaken by the Programme Manager (NCD Control) of the Directorate General of Health Services under a collaborative programme of WHO and the Government of Bangladesh. He has coordinated the project and made administrative decisions. UHFPO of Debhata was assigned as local coordinator of the project in addition to his job. One field coordinator was recruited for implementing the project under direct supervision of UHFPO. UHFPO provided necessary assistance in terms of logistics, information and communication to the field coordinator. Civil Surgeon of Satkhira district guided the project and facilitated strengthening of a referral mechanism between UZHC and the district hospital. WHO provided necessary technical support to the project in designing the intervention, monitoring and implementing the project. Some essential medical equipment (e.g., glucometer, sphygmomanometer, stethoscope, weigh scale, nebulizer, electrocardiograph, colorimeter) and disposables (e.g., blood glucose strips, urine protein-glucose strips) and computers (with printers) were provided to improve record keeping and email communications.

We conducted a capacity assessment of UZHC on service delivery including service availability, such as the availability of key human and infrastructure resources, and on the readiness of health facilities to provide basic health care interventions including NCDs. It was basically done using check list, questionnaire, and interviews of relevant people in Debhata UZHC. Questionnaire was adapted from Service Availability and Readiness Assessment (SARA) which was developed jointly by WHO and USAID [19,20]. The intervention package included a minimum standard for NCDs to strengthen capacity of the UZHC for prevention and care of NCDs. The intervention included methods for early detection, diagnoses using inexpensive technologies, non-pharmacological and pharmacological approaches for modification of risk factors and affordable medications for prevention and treatment of NCDs [5]. Efficient use of available resources, with minimum additional inputs to basic diagnostics and essential medicines were considered. All these were orchestrated with community awareness.

The intervention package has been developed under three strategic headings [15]. They are:

(a) Capacity building

Strengthening of PHC system was done by training and orientation of human resources (doctors, nurses, medical assistants, pharmacists, and other field staffs), promoting essential technologies and medicines, activating the referral system from community clinic and union facilities to upazila health complex.

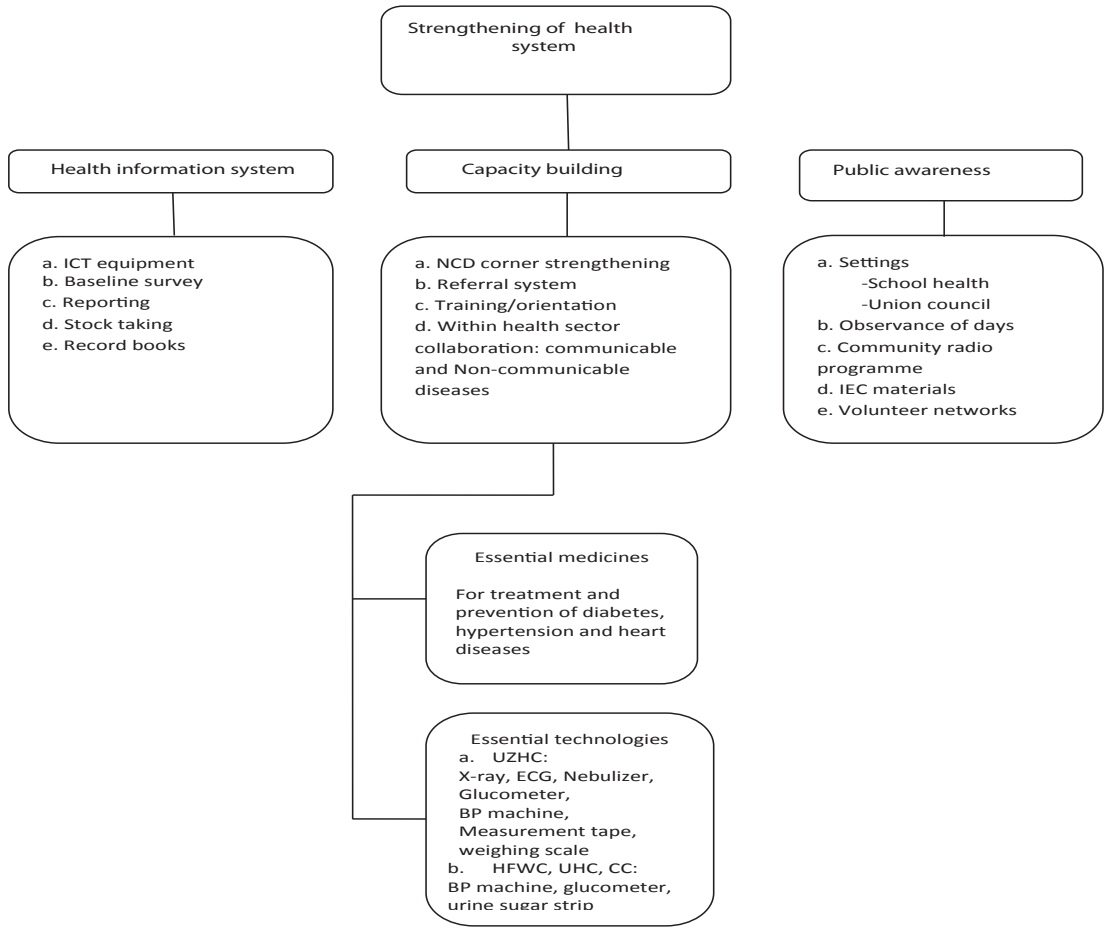

Figure 2: Layout of the interventions (UZHC indicates upazila health complex; ECG: electrocardiogram; HFWC: Health and family welfare centre; UHC: union health centre; CC: Community clinic).

(b) Health information system

ICT equipment were provided. Recording and reporting were facilitated. Stock taking was done to identify gaps. Baseline survey of NCD risk factors was done. Geographical Reconnaissance (GR) for household level information was also promoted.

(c) Public awareness

Awareness was created using school health programmes, opinion leader's orientation, observance of NCD related days, community radio programmes. A network of NGOs, local clubs and other organizations has been promoted for NCD prevention (Figure 2).

Findings

Findings of the assessment and intervention are described below under four broad headings of strengthening health system, public awareness and support from non-sectors:

Strengthening health system

Strong and efficient primary care is an integral component of a health system. Because there are many competing priorities in Bangladesh, the immediate reaction of people taking care of PHC was negative towards an attempt to integrate NCD care. Therefore as a starting point, only a core set of interventions were considered in this intervention. Ultimately it has been considered beneficial by all: doctors, nurses, paramedics, and health assistants and community health care providers in particular.

Orientation of health personnel: In addition to knowledge and skills for dealing with NCDs the whole range of manpower had an attitudinal issue. Repeated meetings were needed to overcome this. Doctors and nurses were trained using dedicated manuals on prevention, early detection and treatment of NCDs. Special focus was given to death certification, and tobacco cessation as per WHO MPOWER package [21]. All health facilities beginning from UZHC to union health certes and community clinics were declared and maintained smoke-free. Extensive training of field health work force on detection, counseling and referral of patients with hypertension and diabetes were done. Community health care workers were also trained. Table 1 shows the human resource positions sanctioned and manpower available in different tiers of Debhata PHC. As opposed to many other health complexes in Bangladesh, Debhata UZHC had most of the manpower against the sanctioned posts because of high level political commitments.

Essential technologies and medicines: Most of the equipment including their reagents was available. Medicines as per WHO PEN intervention [16] model a substantial number of medicines

Table 1: Human resources in Debhata upazila health complex from Health Complex to Community Clinics.

Designation	Approved post	Actual
Upazila health complex (n=1)		
Upazila Health and Family Planning Officer	1	1
Resident Medical Officer	1	1
Junior Consultant	4	2
Medical Officer	2	1
Assistant Dental Surgeon	1	1
Head Clerk cum Accountant	1	1
Statistician	1	1
Store keeper	1	1
Cashier	1	1
Office Assistant	3	3
Sub Assistant Community Medical Officer (SACMO)	2	4
Pharmacists	2	1
Medical Technologist (Pathology)	2	2
Medical Technologist (Dental)	1	1
Medical Technologist (Sanitary)	1	1
Medical Technologist (radiography)	1	0
Senior Staff Nurse	11	12
Member of Lower Subordinate Staff	6	6
Junior Mechanic	1	1
Ward Boy	3	3
Aya	2	2
Sweeper	5	4
Mali/ Gardener		
Cook	2	2
Herbal Assistant	1	1
Security Guard	2	2
Driver	1	1
Video support conference engineer	1	1
Union Sub Centre (5)		
Medical officer	2	1 (on call)
Assistant surgeon	3	1
SACMO/ Medical Assistant	5	5
Pharmacist	2	1
Field level staff (n=27)		
Medical technologist (Sanitary Inspector)	1	1
Medical Technologist (EPI)	1	1
Health Inspector	1	1
Assistant Health Inspector	4	4
Health Assistant	20	19
Community Clinic (n=15)		
Community Health Care Provider	15	15

were not available (Table 2) as per our stock taking. Accordingly interventions were done to make them available. The district supply chain accordingly has placed indents to the Central Medical Supply Department of DGHS. Blood pressure machine, stethoscope, nebulizer, glucometer with strip and urine glucose strips were provided. Medicine supply was also inadequate for many and some were not supplied at all (Table 3) because they are not in the list of medicines to be provided to PHC.

Recording and reporting system: Outpatient and inpatient departments and NCD corner data are being reported monthly to civil surgeon of the district for upward transmission. NCD corner was furnished with a computer to improve recording and reporting to higher level. Therefore it is contributing better to the monthly transmission disease profile to Medical Information System of Health Directorate. Gradual improvement of recording, reporting and case management is observable (Table 4).

Table 2: Essential technologies and tools for implementing essential NCD interventions in primary care/ Medical equipment are also provided to Upazila health complexes and community clinics from DGHS and community clinic project.

Name of the technologies and tools	Upazila Health Complex	Health and Family Welfare Centres	Community clinics		Health and Family Welfare Centres	Community clinics
	Outdoor	Emergency	NCD Corner	Laboratory		
Technologies						
Stethoscope	+	+	+	+	+	+
Sphygmomanometer	+	+	+	+	+	+
Tailor measuring tape	+	+	+		+	+
Measuring tape	+	+	+		+	+
Weighing scale	+	+	+		+	+
Glucometer		+	+	+	+	+
Blood glucose test strips	+	+	+			+
NCD Patient Registration Book			+			
Peak flow meter						
Spacers for inhalers						
Urine protein test strips						
Urine ketones test strips						
Nebulizer	+	+	+			
Pulse oximeter						
Blood cholesterol assay				+		
Lipid profile						
Serum Creatinine assay				+		
Troponin test strip						
Urine microalbuminuria test strips				+		
Tuning fork	+					
Electrocardiograph	+	+	+			
Defibrillator						
Tools						
WHO/ISH risk prediction charts						
Medical information register	+	+	+			
Evidence based clinical protocols						
Flow charts with referral criteria						
Audit tools						

NCD corner: A doctor has been assigned for NCD activities in UZHC and NCD corner in particular. He maintained a register of patients. Because of work load this register did not include all those came to the outpatient department for service. Therefore data at the outpatient department were entered in to the registers of all outpatient doctors. Completeness of the record is questionable as is the case for other diseases also. The registers could not provide information on the referral to and from the health complex. To improve such records the NCD corner was furnished with a computer. A field coordinator and statistical assistant of the UZHC were assigned to keep records, and prepare monthly reports.

Geographical Reconnaissance (GR): Every year the database of the households based on mauza and mahalla are being done by the health workers. However GR was not done after introduction of digital GR system [22,23]. There is a preference to paper-based GR because of health workers, long time association with the paper-based works. To test whether the health assistants can collect good quality data on NCD risk factors, the mauza maps in which the community clinics were located were updated. This was done to check patient flow through a usual chain of community clinic to UZHC.

NCDs and their risk factors survey: Collection of risk factor data is mandatory for prevention of NCDs at population level making shift of the population distribution of risk factors. All field level workers (health assistant, assistant health inspectors and health inspectors) were trained to collect data on fruit and vegetable intake, dietary added salt, tobacco use, blood pressure, height, weight and capillary glucose as per WHO STEPS [24]. Questions to capture documented cases of hypertension and diabetes were also included. The survey was done to check the feasibility of quality data collection by the health assistants under supervision of their inspectors. A comparison

Table 3: Core list of medicines required and available (+) for implementing essential NCD intervention in primary care facilities with physicians.

Name of medicines	Upazila Health Complex	Union Sub Centre/HFWC	Community Clinic
Aspirin			
Thiazide diuretics			
Calcium channel blocker (long acting) (amlodipine)	+	+	
Beta-blocker (Atenolol)	+		
Angiotensin converting enzyme inhibitor (long acting)(Losartan Potassium)	+	+	
Statin			
Metformin			
Insulin			
Glibenclamide			
Isosordide dinitrite			
Glyceryl trinitrite (locally purchased)	+		
Furosemide			
Spironolactone			
Salbutamol	+	+	+
Prednisilone			
Beclometasone			
Paracetamol	+	+	+
Ibuprofen/ Ketorolac	+	+	
Codeine			
Morphine			
Penicillin	+	+	+
Erythromycin	+		
Amoxycillin	+	+	+
Hydrocortisone	+		
Epinephrine			
Heparin			
Diazepam	+	+	
Magnesium Sulphate	+	+	+
Promethazine			
Senna	+		
Dextrose infusion	+		
Glucose injectable solution			
Sodium chloride infusion	+		
Oxygen	+		

of measurements with a standard (Dr Shubrato Ghosh) has shown a high degree of agreement. Field testing indicated that it will be feasible to incorporate risk factor data collection in to GR that is done by the UZHC periodically. It is noteworthy that the supply of medical equipment such as sphygmomanometer, stethoscope, glucometer (with strips), measuring tape and weighing scale have created a very high level of confidence, enthusiasm and self-resect among the health assistants.

Risk factor data were collected form 300 adults aged 25 years or older (100 from a Mahalla and 100 each from two Mauza) selected form consecutive households from sadar Union of Debhata upazila. It is necessary to inform here that Mauza and Mahalla are the primary sampling units used by the Bangladesh Bureau of Statistics [17]. Results are given in Table 5 to indicate that collection of data by health assistants as a part of GR is a realistic option. Results are almost similar to the national level data collected [25] except obesity data. Briefly saying more than three-quarters of people have low level of physical activity and vegetable/fruit intake. Half of them use tobacco in any form. Eight in ten people take salt on the table. Almost one-fifth have hypertension, one-third have overweight and large abdominal girth, and one-tenth have diabetes mellitus. A higher prevalence of obesity in this sample may indicate that people of Satkhira are more sedentary compared to Bangladesh at large.

Table 4: Distribution of patients with major noncommunicable disease who attended Debhata health complex in 2013.

Major NCDs	n	%
Heart disease	8	1.9
High blood pressure	131	30.7
Asthma	87	20.4
Chronic obstructive pulmonary disease	72	16.9
Diabetes mellitus	101	23.7
Cancer	0	0.0
Others	28	6.6
Total	**427**	**100.0**

Among the survey population, 14% and 8% reported that they were already having hypertension and diabetes, respectively. Among those having hypertension and diabetes 67% and 40%, respectively, were taking medicines. They took treatment mainly from UZHC and village doctors (including over the counter prescription). They did not use union health facilities or community clinics for treatment of diabetes and hypertension. The above facts indicate a relatively high level of awareness about hypertension and diabetes. However usefulness of health facilities at community and union levels has to be brought under discussion. These facilities probably are yet to have confidence of the patients.

Soliciting support from other sectors

Sensitization meetings were held under leadership of Upazila Chairman [26]. Upazila Taskforce committee for tobacco control [27] was considered as an entry point. Committee meetings decided to run mobile court drives more frequently (six times compared to two times in six previous months) to address tobacco control act violations and safe food act violation. Violators were penalized. Local media coverage was solicited to alert people to refrain from violations of these two acts.

Table 5: Distribution of NCD risk factors in a sample survey.

		Men (n=152)	Women (n=148)	Both sexes (n=148)
A. Socio-demographic:				
Mean (standard deviation) of age, years		49.2 (14.2)	44.7 (13.3)	47.0 (13.9)
Median schooling, years		5 (2, 8)	5 (1, 8)	5 (1, 8)
B. Prevalence of risk factors:				
Smoking only		29.6	0.0	15.0
Smokeless only		13.2	37.2	25.0
Dual tobacco use		4.6	0.0	2.3
Any form of tobacco use		47.4	37.2	42.2
Added salt consumption on the table		77.6	77.7	77.7
Fruit/vegetable <5 servings/day		100.0	100.0	100.0
Low physical activity, <150 mins/week		63.8	63.5	63.7
Overweight (BMI> 25 Kg/m^2)		29.6	35.8	32.7
Abdominal obesity (men=>94 cm, women =>80 cm)		13.8	57.4	35.3
Diabetes				
	Self-reported[a]	5.3	11.5	8.3
	Having medication[b]	25.0	47.0	40.0
	High blood glucose (on measurement)[c]	5.9	12.2	9.0
	Prevalence of diabetes mellitus[d]	6.6	12.8	9.7
	Control status of diabetes[e]	50.0	12.5	20.0
Hypertension				
	Self-reported[a]	11.2	16.9	14.0
	Having medication[b]	25.9	76.0	66.7
	High blood pressure (on measurement)[c]	17.8	18.2	18.0
	Prevalence of hypertension[d]	18.4	22.3	20.3
	Control status of hypertension[e]	55.6	26.3	35.7

a. As told by the doctor

b. Out of self-reported group

c. Blood glucose=>11.1 mmol/L; Blood pressure, =>140/90 mmHg

d. Blood glucose=>11.1 mmol/L or medication; Blood pressure, =>140/90 mmHg or medication

e. Blood glucose <11.1; and blood pressure <140/90 mmHg among those who are taking medication

Public awareness

School health programme: Engaging children and adolescents in healthy eating, regular physical activity can lower their risk of developing NCDs. Schools play a critical role by establishing a supportive environment for such healthy behaviors [28]. Demonstration classes on NCD risk factors were organized in 30 government and private schools. On average 200 students participated in each event. Field coordinator and health education officer (based at civil surgeon's office) demonstrated how to prevent NCD risk factors. These events were supported by the Education Department and School management committees.

Opinion leaders meeting: Opinion leaders are social change agents. They influence wider adoption of new ideas by communications through social chains and interpersonal networks. They can empower the community. Five orientation programmes held with participation of the members of local religious leaders, local public representatives, and school teachers in five unions of Debhata upazila. About 150 participants got oriented on how to prevent NCDs.

Observance of NCD related days: Observance of NCD-related days was a real time exercise of multisectoral collaboration and awareness rising among local people. Volunteer's network, members of local youth, social and cultural organization, opinion leaders, school, task force committee members (tobacco control) etc were involved. Health days [29] such as World Hypertension Day, World No Tobacco Day, World Heart Day and World Diabetes Day were observed to create public awareness. Rally and discussion meeting were organized on those days. Students, teachers, local people participated in the rally. Posters, flyer and leaflets developed by WHO and NCD unit of Health Directorate were used in school programmes and observance of various NCD-related days.

Community radio: Radio Nalta [30], a community radio has been running awareness programmes every Monday. PEN intervention in Debhata upazila has also been a part of the Radio Nalta programmes. Special focus was given to salt and tobacco control, availability of NCD services, and community support.

Limitation and Challenges

This project provided orientation on GR to field workforce, however data collection could not be done during this project period. Baseline survey of risk factors was done, in line with a GR, with small sample size. Transfer and posting of responsible doctors were frequent causing disruption of NCD functions. Getting supply of essential medicines in sufficient quantity was difficult. Record keeping at outpatient department has been difficult during rush hours.

Conclusion

We conclude after having this intervention of short duration that the basic package for NCD intervention is a feasible and realistic option at PHC level. Specific points are:

- Human resource and other infrastructure are available to deal with NCDs; On the job training of people can improve functions;
- Essential equipment and medicines are inadequate or not supplied at all to the PHC system; Approved list of equipment and medicines for PHC needs a revision;
- Improvement of hospital records and referral to and from UZHC needs special attention;
- NCD risk factor data collection can be done by health workers, if trained adequately, integrated in to GR;
- People do not use community clinics and union level health facilities for treatment of hypertension and diabetes although they are close to patients home; They need to build their image to the community.

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Conflict of Interest

The authors declare that they do not have any conflict of interest. They also declare that "The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated".

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